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Catalog 4300 December 2011

aerospace
climate control
electromechanical
filtration
fluid & gas handling
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pneumatics
process control
sealing & shielding

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## **Together, we can** keep expectations high and equipment maintenance low.

**Trap-Seal™ O-ring,** with its revolutionary trapezoidal shape, dramatically improves seal retention.

**Robust Port Stud™** SAE adjustable connector allows for remarkably easier assembly.

**Superior Plating™** has unrivaled corrosion and rust protection reducing replacement costs.

Step up to even greater leak-free security and rely on peak fitting performance that lasts longer than ever before. Parker never stops targeting the challenges of connection component designs and performance. With our ever-growing exclusive innovations, we are making sure our components extend their like-new integrity even further. We are committed to setting new standards and raising the industry bar to a new level. To learn more, call 1-800-C-Parker or visit **www.fittingsthatraisethebar.com**.

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FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

**Offer of Sale**

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale."

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Tube Fittings Division
United States

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# Added Value

## The Parker advantage you can count on

When our name is on the product or service, you can be sure it includes Parker innovations and exclusives developed to maximize the leak-free performance and service life of your hydraulic connections. Here are some of our industry-leading examples.

Competitor A

Parker

Fittings exposed for 240 hours to neutral salt spray test ASTM B117 (independent testing)

**Superior Plating** provides unrivaled protection against corrosion, even in the harshest conditions. Parker fittings and adapters with this valuable enhancement exceed SAE red rust requirements and competitors' performance by far.

**www.ravagesofredrust.com**

**ACEsolutions™** including our unique Trap-Seal™ O-ring and Robust Port Stud™ virtually eliminate problems like O-ring pop-out and washer damage that cause potential leaks in standard SAE connections.

**www.fittingsthatraisethebar.com**

**ToolSpec™** is the quick, easy online way to determine the right tube fitting tool and tooling information for your particular need, saving valuable time on the job. Just select and enter your criteria, and this exclusive Parker system displays the appropriate product selection and details. Find it fast at **www.tfdtoolspec.com.**

**Custom Products** are an unsurpassed Parker advantage. Our dedicated facilities manufacture custom fittings, flanges and adapters precisely to your specifications or drawings – responsively and efficiently. For assistance, e-mail **customfittings@Parker.com**

# Parker SAE Aluminum Fittings

## save weight, resist corrosion and conserve energy resources

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When your application requires corrosion-resistant, lighter weight components that perform reliably in a range of environments, specify Parker's SAE aluminum fittings.

Ideal for mobile hydraulic systems, their lightweight advantage reduces overall vehicle weight and costs, and their "green" eco-friendly anodized coating improves corrosion resistance. They make system conversion simple too, with no need for redesign.

Compare the weight of a **steel/ stainless steel** fitting (top) to that of an **aluminum** fitting (bottom). Aluminum fittings are approximately **65% lighter.**

Parker aluminum fittings are ideal for use in agricultural, military, marine, mining and transportation applications where lighter weight and corrosion resistance are required.

**Get the substantial advantages:**

- **Up to 65% lighter than comparable steel and stainless steel fittings**
- **Superior corrosion resistance over comparable steel fittings**
- **Meets SAE J1453 and J514 fittings' dimension standards, eliminating system redesign and minimizing conversion costs**
- **Leak-free seal reliability with Parker's patented Trap-Seal™ O-ring and Robust Port Stud™**
- **Available in most any size, configuration or color**

# Parker Fittings with XTR Coating

## for extreme resistance to corrosion

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An outstanding advantage for equipment in highly caustic applications and environments, Parker fittings with XTR (Extreme-Resistance) Coating withstand corrosion more than seven times longer than the SAE standard of 96 hours. In fact, Parker's proprietary formulation has been **tested to resist corroding for more than 720 hours.**

In applications where connections come in contact with nitrogen-based fertilizers, salt spray and other aggressive chemicals, standard hose and tube fittings become severely corroded. In fact, corrosion can begin to occur in as few as 14 days, putting assemblies at increased risk of early failure, causing unnecessary and costly equipment downtime.

End users have been asking for an improvement to industry-standard hose and tube fittings to extend the life of their equipment. Parker's XTR Coating with unprecedented corrosion resistance is the answer.

Where systems are exposed to highly corrosive external conditions, Parker's XTR Coating is a valuable advantage. Ideal applications for Parker fittings and adapters with XTR Coating include construction, agriculture, utility, intermodal transportation, snow/ice removal equipment, above-ground mining, processing plants, car washes and other similar uses with high-corrosive conditions.

For manufacturers shipping vehicles, equipment and systems overseas, XTR Coated Parker components provide the level of protection critical to maintaining the factory-new look of those products on arrival.

In addition, Parker XTR Coating is compliant with environmental restrictions worldwide, including RoHS, ELV, and REACH.*

Parker products with XTR Coating assure all the leak-free performance and installation advantages that our customers expect. Even the assembly torque remains the same. For unmatched quality, service and support, now with extreme corrosion resistance, specify Parker hose and tube fitting products with XTR Coating.

Parker steel fittings can be ordered with the XTR Coating, offering corrosion protection above the standard zinc trivalent chromium. The most common configurations can be ordered, including Seal-Lok, Triple-Lok and Pipe Fittings.

*European Union restrictions for electronics products (Directive 2002/95/EG of European Union), Restrictions of Hazardous Substances Directive" – RoHS – 1st July 2006), automobile products (Directive 2000/53/EG of European Union – "End of Life Vehicle Directive" – ELV – 1st July 2007), and chemical products ("Registration, Evaluation, and Authorization of Chemicals Directive" – REACH – in preparation).

# Universal Push-to-Connect (UPTC) Assembly

## for unprecedented savings, from product design to maintenance

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**Push.**

**Click.**

**Done.**

"Push, click, done" literally describes how simple it is to achieve reliable leak-free assemblies with Parker's UPTC hose and tube assembly. That alone yields direct savings in time, equipment costs, rework and warranties. Unlike other push-to-connect assemblies, it's also universally compatible.

**Parker UPTC delivers:**

- **Substantial assembly efficiencies – no special tools**
- **Assured proper connections – with both tactile and visual indicators**
- **Leak-free performance – rigorously tested and field proven**
- **Wide-range availability and easy design implementation**
- **Excellent field serviceability – standard wrench disassembly**

**And it's truly "universal" for compatibility worldwide:**

- **Utilizes standard Seal-Lok™ ORFS or EO fittings**
- **Suited for inch or metric tube, rubber or thermoplastic hose assemblies**

UPTC assembly consists of a standard Seal-Lok™ (ORFS) or EO bite-type fitting, factory-assembled UPTC nut with internal sealing and retaining elements, and hydraulic hose or rigid tube.

# Complete Piping Solutions

## providing Parflange® F37 technology – and its implementation

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More than a superior component supplier, Parker is positioned globally as a system partner for non-welded piping systems. We have combined the innovative Parflange F37 non-welded piping system with a broad array of piping services in Parker's Complete Piping Solutions (CPS). For industries ranging from energy and mining to metals processing, testing systems and more, Parker CPS tailors piping solutions to maximize our customers' profitability.

**Moving the technology forward**
Parker is the worldwide leader in tube fitting and adapter technology. Numerous connector innovations and advancements are attributed to our engineering and customer-centric collaborations. Our Parflange® F37 system is the proven alternative to time-consuming and costly welding, and we continue to expand this product range to solve new customer challenges.

**The complete services advantage**
By coupling the best non-welded piping system with a complete engineered piping services package, CPS offers incomparable assurance, efficiency and value for our customers. Our Parflange F37 technology is supported with engineering consultation, design, state-of-the art piping fabrication facilities and on-site installation. Currently, Parker operates five CPS centers located worldwide with additional centers opening soon.

Parker's CPS team is on the jobsite providing the necessary expertise throughout the entire piping project.

**Consultation and Design**
The Parker CPS team of engineers offers expert consultation and design services.

During consultation, the customer's project requirements are reviewed with the CPS engineering team to determine the best-suited services. Technical and commercial requirements are reviewed. Line sizing, clamping requirements, routing, and environmental and safety concerns are considered during this early stage, as well as early commercial options.

Parker's CPS team provides a tailored proposal to match the customer's technical and commercial requirements whether the project is a line expansion, retrofit of existing piping

system or for OEM piping assemblies. This key collaborative planning provides a solid foundation for subsequent design work, as well as for fabrication of piping assemblies at a CPS center or on site.

As the project enters the design stage, Parker's engineer-to-engineer collaboration with the customer ensures that all technical requirements are met. Depending on the scope of work, piping assemblies are designed either on the jobsite or at the CPS center. Our piping designers are experts in on-site measurement/surveying, development or modification of detailed piping drawings, and steadfast review of customer technical specifications and applicable standards.

**Prefabricated Assemblies and Installations**

Parker's CPS team migrates the upfront piping engineering to factory prefabricated pipe assemblies with several installation options.

With state-of-the-art CNC large- and small-capacity bending equipment, as well as all complementary pipe end finishing equipment, the CPS team expertly manufactures prefabricated piping assemblies.

By using cold drawn seamless tubes, the non-welded Parflange F37 system is inherently cleaner than welded piping systems, providing the benefit of reduced system flushing time. The CPS center employs Parker filtration and condition monitoring technologies to bring piping cleanliness to documented customer requirements. On-site leak-proof testing services can also be specified.

Parker delivers fabricated pipe assemblies to the worksite. These pipe assemblies will be protected, labeled and ready for installation by the customer or Parker.

With the largest CNC cold bending capabilities in the industry, Parker's CPS team specializes in the factory fabrication of pre-bent piping assemblies. These assemblies reduce much of the on-site design and fabrication and allow for the most efficient installation on the jobsite. When the project does not allow for prefabrication of assemblies, Parker's CPS technicians dispatch these capabilities to the job.

Parker is fully engaged in the on-site installation of piping assemblies. A Parker CPS project manager leads the team of trained installers to maximize installation throughput and quality of installation work. Parker's lead role in overseeing the project from start to finish, and in ensuring that the installed piping system meets all requirements, instills a high degree of customer confidence.

The on-site piping installation service also enables quick reaction to unforeseen project obstacles or design changes. Costly project delays and downtime are dramatically minimized.

Parker provides best-in-class non-welded piping systems. Whether the scope of the project requires the complete redesign of a welded piping system or the fabrication and delivery of a pre-engineered non-welded piping assembly, Parker CPS will engineer a solution to maximize customer value.

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Flare Flange

Retaining Ring

Light Duty

Robust technology is the foundation of Parker Complete Piping Solutions (CPS). Parflange F37 non-welded piping systems utilize standard SAE Code 61/62, ISO 6162 and ISO 6164 flange interfaces. Parflange F37 is fully complemented with Parker's fabrication equipment and a broad range of interconnect components, valves, clamps and seamless tubes.

## Application Specific Piping Solutions

Some projects may require significant consultation and design services, while others may only need prefabricated pipe assemblies from a customer supplied print. Customers have the ability to choose from the breadth of services provided through the Parker CPS center – whether this is prefabricated piping assemblies delivered to the jobsite, on-site piping fabrication or a more turnkey approach including installation.

# Parker Dual Seal Flange Adapters

## for safer, more reliable flange connections in subsea applications

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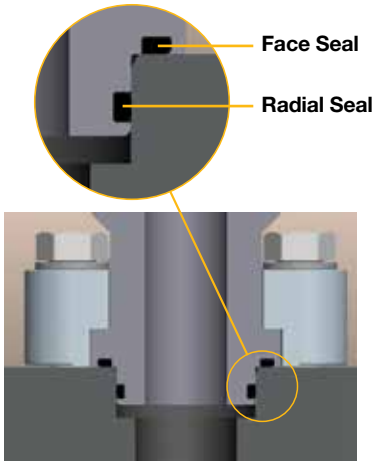
Dual Seal Flange Adapters use both a radial seal and face seal to achieve a leak-free port connection, eliminating traditional SAE flange connection problems.




Parker's Dual Seal Flange Adapters improve the reliability of high-vibration, high-shock hydraulic four-bolt connections in critical oil and gas applications.

Dual Seal Flange Adapters incorporate both radial and face seal technologies, reducing the potential for system leakage and air or water ingression caused by side loading of traditional flange face seal connections.

This Parker innovation is offered as an alternative to traditional SAE Code 62 Flange connections for improved port retention, increased sealing capability and elimination of costly field replacement due to failure.

**Key benefits include:**

- **Incorporates both radial and face sealing methods for improved sealing and port retention**
- **Available in standard Code 62 footprint sizes: ½", 1" and 1 ½"**
- **7500 psi / 515 bar working pressure rating with 4:1 design factor**
- **NACE MR0175 Compliant**
- **SAE 316/316L stainless steel construction**
- **Heat Code Traceable**
- **Tested to 1 million impulse cycles for proven reliability**
- **Face seal design includes captive O-ring for superior retention**
- **SAE Code 62 bolt pattern enables use of standard flange hardware**
- **Seal-Lok™, Triple-Lok® and socket weld configurations offered**

Illustrated above, the primary radial seal improves this adapter's pressure capabilities to 7500 psi while affording additional system integrity. The face seal provides resistance of external pressures introduced by the application environment.

# Phastite® Pipe Connectors

## deliver permanent, highly efficient non-welded piping solutions

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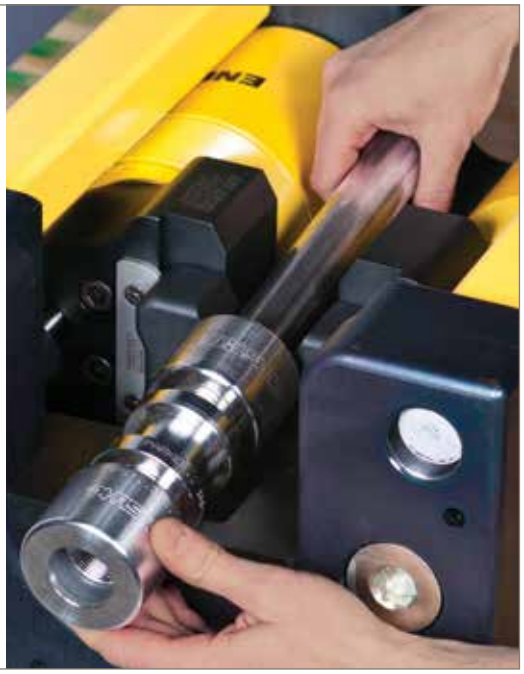
A breakthrough in pipe connection systems, Phastite connectors bring the proven technology of mechanically attached fittings to fluid and gas systems in a wide range of sizes.



Phastite non-welded piping connections provide permanent, leak-free connections quickly and efficiently. OEM or repair applications can be completed in less than three minutes as costly, time-consuming and hazardous welding can be eliminated. Parker has adapted the tube-sized Phastite technology to medium and heavy schedule nominal pipe size (NPS) range of 3/4" to 2".

**Key benefits include:**

- **Reduces install time for piping systems in NPS sizes 1" and 1-1/2" *(complete selection of 3/4" to 2" available soon)***
- **Reduces dye penetrant testing**
- **Reduces post welding RT/X-Ray expenditures**
- **Reduces requirements for special pipe sizing or beveling**
- **All 316/316L SS construction**
- **HCT – Heat Code Traceable**
- **6000 psi / 415 bar pressure rating at 4:1 design factor**
- **Inherently safe and clean process**
- **No post-weld clean up or cool down period required**
- **No post-weld chemical cleaning or passivation required**
- **No hot works permits required**
- **Simple hydraulic assembly tool**

# Mechanical Crimp Connection

## for piping or tube systems saves the time and costs of welding

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For today's piping or tube assemblies, Parker's Mechanical Crimp Connection (MCC) eliminates time-consuming, costly welding – and ensures reliable, leak-free performance.

MCC consists of a simple hydraulic assembly tool, specially designed bite ring and adapters. The bite ring attaches to the pipe or tube and secures the adapter. Internal seals in the MCC adapter ensure a leak-free connection and protect against ingression.

Assembly welding processes, from pre-cleaning to x-rays to post-cleaning, reduce valuable equipment uptime and require more labor. By comparison, MCC enables remarkably quick, easy mechanical crimping of adapters to tube or piping. A 1" heavy- scheduled stainless steel pipe, for example, can take more than 30 minutes to weld and clean if all the steps are followed. An MCC assembly can be crimped within five minutes!

In the shop or the field, MCC also eliminates a key failure mode of welding: weld cracks, which can form while the weld is hot or while it is cooling, or due to fatigue or corrosion.

### Key Features and Advantages

- **Eliminates time and costs of welding and post-weld processes**
- **Quicker, easier assembly promotes increased equipment uptime**
- **An inherently safe, clean process**
- **Simple hydraulic assembly tool**
- **Specially engineered bite ring for maximum retention**
- **Internal sealing components ensure leak-free performance**
- **Achieves "weld-less" NPS and tube connections from 1" to 2"**
- **Reduces requirements for special pipe sizing or beveling**
- **6000 psi/415 bar pressure rating at 4:1 design factor**
- **12L14 steel/ 316L stainless construction**
- **HTC – Heat Code Traceable**

### Sizes and Configurations

Parker MCC achieves NPS and tube assemblies in the most common welded sizes, ranging from 1" to 2". Whether your system is transferring fluid at lower pressures or operating at high dynamic hydraulic pressures, MCC offers a working pressure capability up to 6000 psi for many applications.

MCC adapters are offered in steel (Chrome 6 Free plated) and 316 stainless steel. Multiple end configurations including code 61/62, male and female O-ring face seal, male and female 37° flare, and male and female NPT are available to ensure system compliance with SAE and/or ISO standards. MCC also offers full-range interchangeability with Parker Tube Fittings Division's extensive product lines, covering SAE and ISO specifications such as SAE J514, SAE J1453, and ISO 6162.

Ideal for a wide range of applications in industrial processing, construction, large mobile, oil and gas operations, and more, MCC gets equipment up and running sooner – and potentially much longer, thanks to Parker's decades of global leadership in Dry Technology. For all of the advantages that can improve your bottom line, contact your Parker representative about MCC now.

## TH8-450 Production Crimper

### for fast and accurate crimping

With Parker's horizontal crimper, anyone can make factory quality assemblies quickly, easily and cost effectively. An MCC assembly can be crimped within five minutes!

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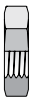
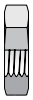
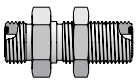
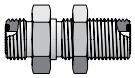
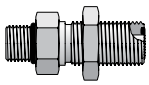
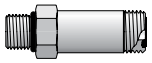
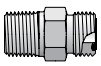
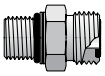
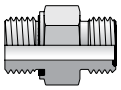
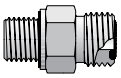
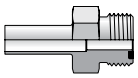
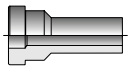
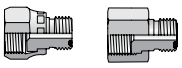
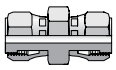
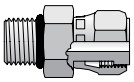
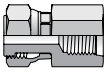
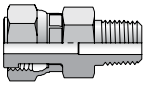
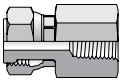
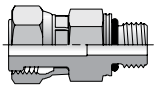
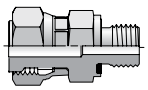
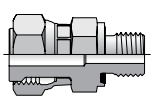
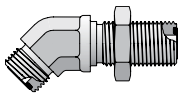
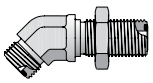
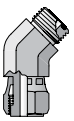
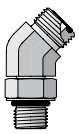
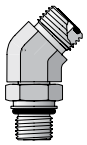
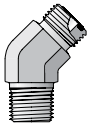
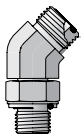
| **Nuts, Sleeves, Locknuts** | **BL**<br>Tube Nut<br> <br>A9 | **BML**<br>Tube Nut - mm Hex<br> <br>A9 | **TPLS (Metric)**<br>Parflange Sleeve<br> <br>A9 | **TPL (Inch)**<br>Parflange Sleeve<br> <br>A9 | **TL (Inch)**<br>Braze Reducer Sleeve<br> <br>A10 |
| **TLS (Metric)**<br>Braze Reducer Sleeve<br> <br>A10 | **SBR (Inch and Metric)**<br>Braze Ring<br> <br>A11 | **WLNL**<br>Bulkhead Locknut<br>  <br>A11 | **WLNML**<br>Blkhd Locknut - mm Hex<br>  <br>A11 | **Straights** | **HLO**<br>Union<br> <br>A12 |
| **HMLO**<br>Union - mm Hex<br> <br>A12 | **WLO**<br>Bulkhead Union<br>  <br>A12 | **WMLO**<br>Bulkhead Union - mm Hex<br>  <br>A13 | **WF5OLO**<br>ORFS Blkhd / SAE-ORB<br>  <br>A13 | **F5OLO**<br>ORFS / SAE-ORB<br> <br>A14 | **FF5OLO**<br>ORFS - Long / SAE-ORB<br>  <br>A14 |
| **FLO**<br>ORFS / NPTF<br>  <br>A14 | **GLO**<br>ORFS / NPTF<br> <br>A15 | **F87OMLO**<br>ORFS / ISO 6149<br>  <br>A15 | **F82EDMLO**<br>ORFS / Metric-ED<br>  <br>A15 | **F42EDMLO**<br>ORFS / BSPP-ED<br>  <br>A15 | **LOHB3**<br>ORFS / Braze Socket<br> <br>A16 |
| **MMLOHB3**<br>ORFS / Braze - mm Hex<br> <br>A16 | **LOHT3**<br>ORFS / Tube Weld<br>  <br>A16 | **TLW1**<br>Butt Weld / Sleeve<br>  <br>A17 | **Straight Swivels** | **TRLON**<br>Tube End Reducer<br>  <br>A17 | **LOHL6**<br>Extender and Expander<br> <br>A18 |
| **HL6**<br>ORFS Swivel Union<br>  <br>A18 | **F65OL**<br>ORFS Swivel / SAE-ORB<br>  <br>A18 | **G65L**<br>ORFS Swivel / SAE-ORB<br>  <br>A18 | **F6L**<br>ORFS Swivel / NPTF<br>  <br>A18 | **G6L**<br>ORFS Swivel / NPTF<br>  <br>A18 | **F687OML**<br>ORFS Swivel / ISO 6149<br>  <br>A19 |
| **F682EDML**<br>ORFS Swivel / Metric-ED<br>  <br>A19 | **F642EDML**<br>ORFS Swivel / BSPP-ED<br>  <br>A19 | **45° Elbows** | **WNLO**<br>Bulkhead Union<br>  <br>A19 | **WNMLO**<br>Bulkhead Union - mm Hex<br>  <br>A20 | **V6LO**<br>ORFS Swivel Elbow<br>  <br>A20 |
| **V5OLO**<br>ORFS / SAE-ORB<br>  <br>A20 | **V87OMLO**<br>ORFS / ISO 6149<br>  <br>A20 | **VLO**<br>ORFS / NPTF<br>  <br>A21 | **V4OMLO**<br>ORFS / BSPP-ORR<br>  <br>A21 | **90° Elbows** | **ELO**<br>Union Elbow<br> <br>A21 |



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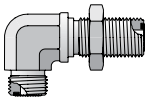
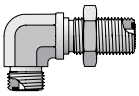
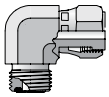
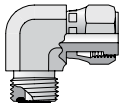
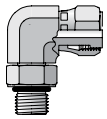
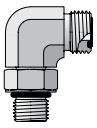
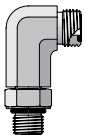
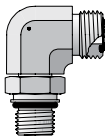
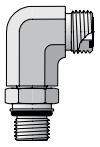
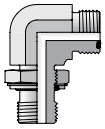
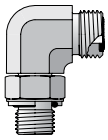
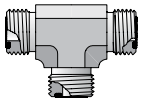
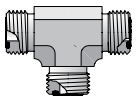
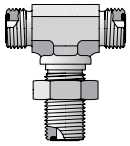
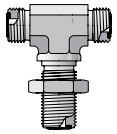
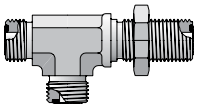
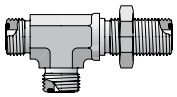
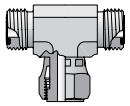
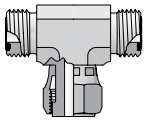
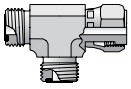
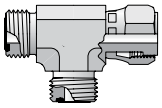
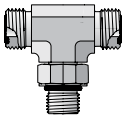
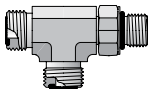
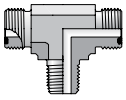
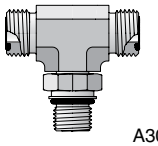
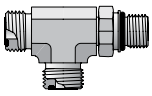
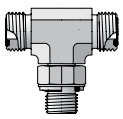
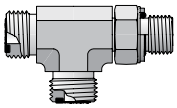
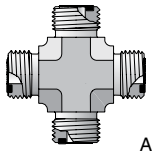
|---|---|---|---|---|---|
| **EMLO**<br>Union Elbow - mm Hex<br> <br>A21 | **WELO**<br>Bulkhead Union<br>  <br>A22 | **WEMLO**<br>Bulkhead Union - mm Hex<br>  <br>A22 | **C6LO**<br>ORFS Swivel Elbow<br>  <br>A23 | **C6MLO**<br>Swivel Elbow - mm Hex<br>  <br>A23 | **AOEL6**<br>ORFS Swivel / SAE-ORB<br>  <br>A23 |
| **C5OLO**<br>ORFS / SAE-ORB<br>  <br>A23 | **CC5OLO**<br>ORFS / SAE-ORB - Long<br>  <br>A24 | **CLO**<br>ORFS / NPTF<br> <br>A24 | **C87OMLO**<br>ORFS / ISO 6149<br>  <br>A24 | **CC87OMLO**<br>ORFS / ISO 6149 - Long<br>  <br>A25 | **C8OMLO**<br>ORFS / Metric-ORR<br>  <br>A25 |
| **C4OMLO**<br>ORFS / BSPP-ORR<br>  <br>A26 | **Tees** | **JLO**<br>Union Tee<br>  <br>A26 | **JMLO**<br>Union Tee - mm Hex<br>  <br>A26 | **WJLO**<br>Bulkhead Branch<br>  <br>A26 | **WJMLO**<br>Blkhd Branch - mm Hex<br>  <br>A27 |
| **WJJLO**<br>Bulkhead Run<br>  <br>A27 | **WJJMLO**<br>Bulkhead Run - mm Hex<br>  <br>A28 | **S6LO**<br>ORFS Swivel Branch<br>  <br>A28 | **S6MLO**<br>Swivel Branch - mm Hex<br>  <br>A28 | **R6LO**<br>ORFS Swivel Run<br>  <br>A29 | **R6MLO**<br>Swivel Run - mm Hex<br>  <br>A29 |
| **S5OLO**<br>SAE-ORB Branch Tee<br>  <br>A29 | **R5OLO**<br>SAE-ORB Run Tee<br>  <br>A30 | **SLO**<br>NPTF Branch Tee<br>  <br>A30 | **S87OMLO**<br>ISO 6149 Branch Tee<br>  <br>A30 | **R87OMLO**<br>ISO 6149 Run Tee<br>  <br>A31 | **S4OMLO**<br>BSPP-ORR Branch Tee<br>  <br>A31 |
| **R4OMLO**<br>BSPP-ORR Run Tee<br>  <br>A32 | **Crosses** | **KLO**<br>Union Cross<br>  <br>A32 | **Plugs, Caps and Bleed Adapters** | **PNLO**<br>ORFS Plug<br> <br>A33 | **PNMLO**<br>ORFS Plug - mm Hex<br> <br>A33 |
| **FNL**<br>ORFS Cap<br> <br>A33 | **FNML**<br>ORFS Cap - mm Hex<br> <br>A33 | **UPTC Nut Assembly** | **UPTC**<br>Nut Assembly<br> <br>A34 | | |



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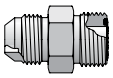
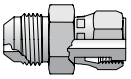
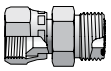
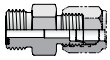
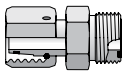
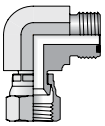
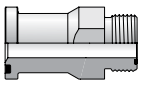
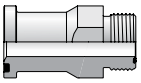
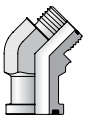
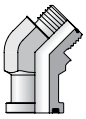
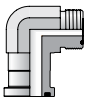
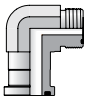
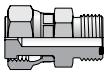
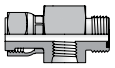
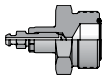
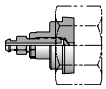
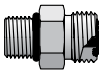
## Conversion Adapters (Shown in Section K)

| Conversion Adapters | | | | | |
|---|---|---|---|---|---|
| | **XHLO**<br>37° Flare / ORFS<br>  <br>K3 | **XHL6**<br>37° Flare / ORFS Swivel<br>  <br>K3 | **LOHX6**<br>ORFS / 37° Swivel<br>  <br>K3 | **BUHLO**<br>ORFS / Flareless (inch)<br>  <br>K4 | **LOHU86**<br>Metric Swivel (EO)/ORFS<br>  <br>K4 |
| **LOEX6**<br>ORFS / 37° Swivel<br>  <br>K3 | | | | | |

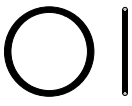
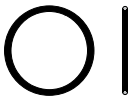
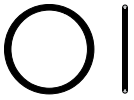
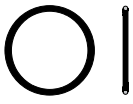
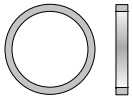
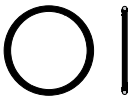
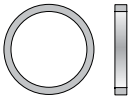
## Flange Adapters (Shown in Section L)

| SAE Flange Adapters | | | | | |
|---|---|---|---|---|---|
| | **LOHQ1**<br>Code 61 / ORFS<br>  <br>L12 | **LOHQ2**<br>Code 62 / ORFS<br>  <br>L12 | **LOVQ1**<br>Code 61 / ORFS<br>  <br>L30 | **LOVQ2**<br>Code 62 / ORFS<br>  <br>L30 | **LOEQ1**<br>Code 61 / ORFS<br>  <br>L31 |
| **LOEQ2**<br>Code 62 / ORFS<br>  <br>L31 | | | | | |

## Diagnostic, Bleed Adapters & Screen Fittings (Shown in Section M)

| Diagnostic, Bleed Adapters & Screen Fittings | | | | | |
|---|---|---|---|---|---|
| | **LOHL6 Orifice**<br>Orifice Swivel with Orifice / ORFS<br>  <br>M9 | **LOHL6G5TP**<br>Orifice Swivel / ORFS / SAE-ORB<br>  <br>M5 | **PNLOBA**<br>Bleed Screw / ORFS<br>  <br>M10 | **FNLBA**<br>Bleed Screw / SAE-ORB<br>  <br>M10 | **Screen Fittings**<br>  <br>M12 |

## O-Rings and Seals (Shown in Section N)

| O-Rings and Seals | | | | | |
|---|---|---|---|---|---|
| | **ORFS O-Ring**<br>  <br>N4 | **SAE O-Ring**<br>  <br>N4 | **ISO 6149 O-Ring**<br>  <br>N5 | **Metric O-Ring**<br>  <br>N5 | **Metric Retaining Ring**<br>  <br>N5 |
| **BSPP O-Ring**<br>  <br>N6 | **BSPP Retaining O-Ring**<br>  <br>N6 | **EOlastic Seal Ring**<br> <br>N6 | | | |

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Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# Seal-Lok Introduction

The Seal-Lok fitting meets or exceeds the strict requirements of SAE J1453 and ISO 8434-3. It is an O-ring face seal type fitting that consists of a nut, a body, an O-ring and a sleeve. As shown in Fig. A2, the tube is flanged to 90° (or the tube may be brazed instead to a braze-type sleeve). When the fitting is assembled, it compresses an O-ring in the precision machined groove of the fitting body to form a leak tight seal.

Seal-Lok fittings are suitable for a wide range of tube wall thicknesses and are readily adaptable to inch or metric tubing and hose. (Please refer to Tables U3 and U4 located in the Appendix section for min./max. tube wall thickness for inch and metric tubing, respectively). Seal-Lok's leak-free design and rugged construction make it suitable for a wide range of applications where higher pressures, vibration and impulse are prevalent.

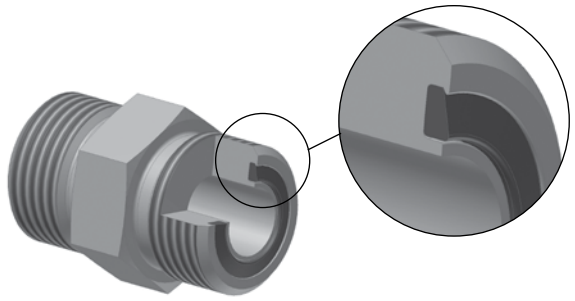

**Fig. A1 — Captive O-ring Groove (CORG) Cutaway with Parker's trap seal**

# How Seal-Lok Fittings Work

The Seal-Lok fitting body face contains a high durometer trap seal to maximize retention in a precision machined groove also known as a Captive O-Ring Groove (CORG) referenced in Fig. A1. As the nut is tightened onto the fitting body, the trap seal is compressed between the body and flat face of the tube flange or braze sleeve to form a tight, positive seal (see Fig. A2).

As the two faces come in contact, further tightening of the nut produces a sharp rise in assembly torque. A solid pull of the wrench at this point, to recommended assembly torque, completes the assembly. The sharp torque rise gives a "solid feel" at assembly, minimizing the possibility of over tightening.

Because the sealing surfaces are flat and perpendicular to the assembly pull, they remain virtually free of distortion during assembly, giving Seal-Lok fittings practically unlimited remakeability. The O-ring should be inspected at each disassembly and replaced when necessary. **See the O-Rings and Seals section for information on replacement ORFS O-rings.**

Because the tubing is a sealing surface, it must be smooth, free of any nicks, scratches, spiral tool marks, splits or weld beads. Seamless tube is recommended for Seal-Lok fittings for ease in flanging and bending. Certain types of harder tubes that are not fully annealed may not be suitable for flanging due to the potential for immediate or long-term cracking of the tube flange. For specific tube type and wall thickness recommendations, please see Table U3 in the Appendix Section.

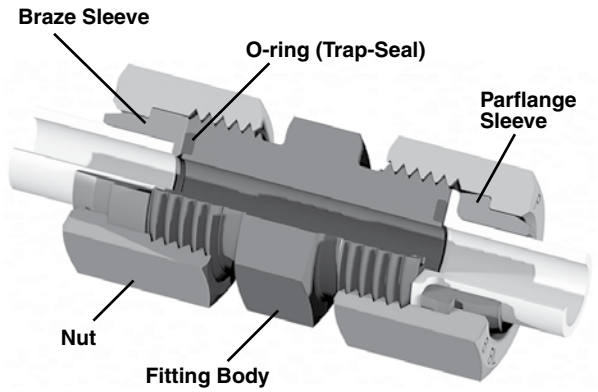


**Fig. A2 — Seal-Lok Union cutaway with flanged and brazed assemblies**

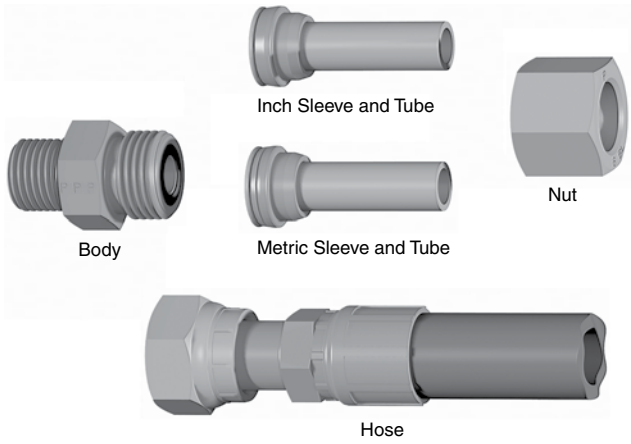


**Fig. A3 — Seal-Lok Works with Inch or Metric Tube and Hose**

# Reference locations

**Dynamic Pressure Ratings:** Please refer to the last column of the part number tables located on the following pages of this section for the appropriate dynamic pressure ratings.

**Recommended Tube Wall Thickness:** Please refer to Table U3 located in the Appendix section.

**Assembly and Installation:** Please refer to Seal-lok Assembly located within the Assembly/Installation section of this catalog.

**Standard material specifications:** Please refer to Table U1 located in the Appendix section.

**Seal Material Selection:** Please refer to Table T8 in the General Technical section of this catalog.

**Tube Wall Thickness:** Recommended min/max tube wall thicknesses for inch and metric Seal-Lok are provided in Tables U3 and U4 in the Appendix section, respectively. When using the braze method, all tube wall thicknesses can be used. For Parflange min/max tube wall thickness range, please refer to page R24 for tooling availability.

**Fig. A4 — UPTC Seal-Lok is adaptable to a UPTC hydraulic or thermoplastic hose assembly. To be used with ET, EN, or EU hose ends.**

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# International Acceptance

The tube/hose end connection for metric Seal-Lok is the same as standard (inch) Seal-Lok. It consists of a body, a flange or braze sleeve, an O-ring and a nut. The difference is at the port end of the fitting. Instead of the SAE straight thread connection for example, it features a similar connection with metric threads per ISO 6149-2 or ISO 9974-1. Additionally, the fitting body, tube nut and locknut are manufactured with metric hexes or wrench flats for shaped fittings. The metric Seal-Lok fittings meet or exceed all requirements of ISO 8434-3.

To identify the metric sleeves used for metric tubing, there is a groove machined into the TPLS & TLS sleeves.

**UPTC Pressure Ratings**

| Size | Pressure (psi) | Pressure (Bar) |
|---|---|---|
| -4 | 5800 | 400 |
| -6 | 5000 | 345 |
| -8 | 4250 | 293 |
| -10 | 4000 | 276 |
| -12 | 3125 | 216 |
| -16 | 3125 | 216 |

**Table A1 — UPTC Seal-Lok pressure ratings.**

# Universal Push-to-Connect (UPTC) Introduction

Traditionally, the fluid power industry has utilized threaded connectors to make a leak free connection. The speed of making connections is slow and the reliability of the connection is dependent on proper assembly procedures. Parker's UPTC connectors, on the other hand, rely on a mechanical retaining mechanism (other than threads) for holding power. No tools are required to assemble, and the reliability and speed of making connections with the UPTC design is greatly improved.

# Design and Construction

UPTC Seal-Lok consists of a base Seal-Lok ORFS fitting, a UPTC nut (including internal sealing and retaining elements) and a UPTC hose assembly, as shown in figure A4. The base ORFS fitting is a highly reliable and widely available off-the-shelf standard SAE J1453 adapter. The sealing O-Ring is supported by a pressure energized anti-extrusion ring that prevents O-Ring extrusion and ensures tight sealing even under high pressure. Once fully engaged, the retaining element is positively trapped between the male and UPTC nut. The dust seal keeps contamination out as well as giving a visual indication that the male stud has been inserted all the way. There is also a clear tactile indicator at the end of the push indicating a proper connection. Once a proper connection is made, the dust seal is covered by the UPTC nut. Proof of full engagement for easy inspection and quality control.

Once connected, the UPTC nut is permanently attached to the UPTC hose end similar to a traditional swivel nut. To disconnect, just use a wrench to unscrew the UPTC nut from the base adapter. Re-connect is possible by tightening the UPTC nut back to the base adapter, if the connection is not damaged. If the hose is damaged, it can be replaced by installing a readily available standard Seal-Lok ORFS hose assembly, or a new UPTC assembly.

**Features**

- Available in sizes 1/4", 3/8", 1/2", 5/8", 3/4", and 1"
- Utilizes all Seal-Lok adapters for a wide variety of configurations, as well as excellent field serviceability
- Meets or exceeds SAE 100R2 pressure ratings (see Table A1)
- Includes visual and tactile installation indicators
- Self-aligning nipple eliminates hose twist during assembly
- No special tooling required for disassembly
- Utilizes elastomeric seals, including Parker's patented Trap-Seal



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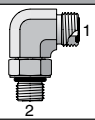
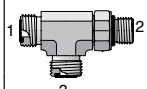
# How to order examples

| Base Seal-Lok Part | | UPTC Part # | Explanation |
|---|---|---|---|
|  | 8 C5OLO-S | **8UR10 C5OLO-S** | Uniform size, UPTC subassembly on 1st end only |
| | 8-10 C5OLO-S | **8-10UR10 C5OLO-S** | Jump size, UPTC subassembly on 1st end only |
|  | 8 R5OLO-S | **8UR101 R5OLO-S** | Uniform size, UPTC subassembly on 1st and 3rd end |
| | 8-10-8 R5OLO-S | **8-10-8UR001 R5OLO-S** | Jump size, UPTC subassembly on 3rd end only |
| | 8-10-8 R5OLO-S | **8-10-8UR100 R5OLO-S** | Jump size, UPTC subassembly on 1st end only |
| | 8M14F87OMLOS | **8M14UR10F87OMLOS** | Compressed nomenclature, UPTC subassembly on 1st end only |

# The Parker Advantage

**Trap Seal™:** The patented trapezoidal seal of the Seal-Lok tube end allows for maximum o-ring retention in the CORG groove. This advantage over the competition increases the productivity of assembly as well as offers the maximum assurance for a leak free connection. Ultimately, operational and maintenance costs can be avoided.

**Resistance to over-torque:** The minimum requirement for a Seal-Lok connection is to withstand 200% torque above the rated value. This reduces the frequency of metal distortion and the potential of leaks. Seal-Lok reduces production assembly and maintenance costs by its resistance to over-torque.

**Zero clearance:** The flat face of Seal-Lok allows for easy and fast drop-in installation. This reduces rework costs from a design and assembly perspective. Maintenance cost can be avoided due to the time savings of disassembly and assembly.

**High pressure rating:** Seal-Lok offers a high pressure rating which can be used in a wide range of applications. This provides the opportunity to standardize across multiple product lines, saving procurement and inventory costs.

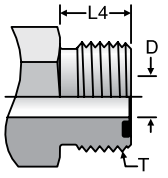
**Superior Plating:** Superior plating gives Parker steel tube fittings unmatched protection against red rust. In neutral salt spray test per ASTM B117, Parker Triple-Lok fittings substantially exceeded the SAE requirement of 96 hours to red rust.

**Robust Port Stud:** The adjustable port stud is manufactured with a longer locknut designed to cover the uppermost threads completely. Since the backup washer is never exposed to the upper threads, it cannot be damaged during assembly. During assembly, exposed upper threads, as common with fittings from other fitting manufacturers, can lead to a deformed backup washer that can pinch the o-ring and create an o-ring extrusion gap that has the potential to leak. The longer locknut also provides a greater grip area for the wrench.

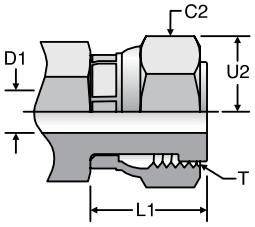
**Unlimited reusability:** When a Seal-Lok connection is completely assembled and disassembled, very little metal is distorting in the connection. So, Seal-Lok allows for unlimited reusability in the field, reducing the component replacement and maintenance costs of the connection.

**Universal Push to Connect (UPTC):** Parker's UPTC offers a quick and easy way to assemble Seal-Lok configurations. UPTC is ideal for hard to reach applications or to speed up the process of assembly. The tangible operational and maintenance costs associated with each connection made will be reduced when using UPTC.

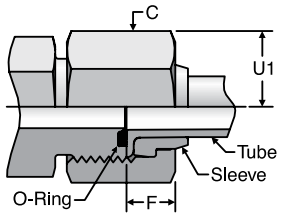
# Seal-Lok O-Ring Face Seal Tube Ends



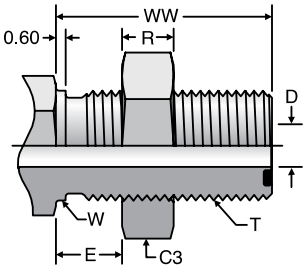

**Seal-Lok Male Tube End**




**Seal-Lok Female Swivel**




**Seal-Lok Tube End Assembly**




**Seal-Lok Bulkhead**

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| | | | | | | | | | | | | | | | Bulkhead | | | Across Corners | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Thread | Tube Nut Hex | | Swivel Nut Hex | | Bulhkead Locknut Hex | | Nominal Drill Tube End | Nominal Drill Swivel End | Max Bulkhead Thickness | Tube Nut Assembled Allowance | Swivel Turn Back | Male Turn Back | Locknut Thickness | Pilot Dia | Length | Tube Nut Hex | Swivel Nut Hex |
| **SAE Dash Size** | **Tube O.D.** (in.) | **Tube O.D.** (mm) | **T** UN/UNF | **C** (in.) | **C** (mm) | **C2** (in.) | **C2** (mm) | **C3** (in.) | **C3** (mm) | **D**[1)] (in) | **D1**[1)] (in) | **E** (in) | **F** (in) | **L1** (in) | **L4** (in) | **R** (in) | **W**[2)] (in) | **WW** (in) | **U1** (in) | **U2** (in) |
| **4** | 1/4 | 6 | 9/16-18 | 11/16 | 17 | 11/16 | 17 | 13/16 | 22 | 0.177 | 0.157 | 0.55 | 0.270 | 0.642 | 0.394 | 0.27 | 0.563 | 1.24 | 0.80 | 0.80 |
| **6** | 3/8 | 8<br>10 | 11/16-16 | 13/16 | 22 | 13/16 | 22 | 1 | 27 | 0.256 | 0.256 | 0.55 | 0.340 | 0.715 | 0.441 | 0.32 | 0.688 | 1.34 | 0.94 | 0.94 |
| **8** | 1/2 | 12 | 13/16-16 | 15/16 | 24 | 15/16 | 24 | 1 1/8 | 30 | 0.374 | 0.354 | 0.55 | 0.400 | 0.865 | 0.512 | 0.35 | 0.813 | 1.44 | 1.08 | 1.08 |
| **10** | 5/8 | 14<br>15<br>16 | 1-14 | 1 1/8 | 30 | 1 1/8 | 30 | 1 5/16 | 36 | 0.492 | 0.453 | 0.55 | 0.455 | 0.980 | 0.618 | 0.41 | 1.000 | 1.60 | 1.30 | 1.30 |
| **12** | 3/4 | 18<br>20 | 1 3/16-12 | 1 3/8 | 36 | 1 3/8 | 36 | 1 1/2 | 41 | 0.610 | 0.551 | 0.55 | 0.510 | 1.110 | 0.677 | 0.41 | 1.188 | 1.64 | 1.58 | 1.58 |
| **14** | 7/8 | — | 1 5/16-12 | 1 1/2 | | 1 1/2 | | 1 5/8 | | 0.709 | 0.709 | 0.55 | 0.512 | 1.145 | 0.697 | 0.41 | 1.313 | 1.66 | 1.74 | 1.74 |
| **16** | 1 | 22<br>25 | 1 7/16-12 | 1 5/8 | 41 | 1 5/8 | 41 | 1 3/4 | 46 | 0.807 | 0.787 | 0.55 | 0.596 | 1.190 | 0.697 | 0.41 | 1.438 | 1.66 | 1.88 | 1.88 |
| **20** | 1 1/4 | 28<br>30<br>32 | 1 11/16-12 | 1 7/8 | 50 | 1 7/8 | 50 | 2 | 50 | 1.024 | 1.024 | 0.55 | 0.566 | 1.251 | 0.697 | 0.41 | 1.688 | 1.66 | 2.16 | 2.16 |
| **24** | 1 1/2 | 35<br>38 | 2-12 | 2 1/4 | 60 | 2 1/4 | 60 | 2 3/8 | 60 | 1.260 | 1.260 | 0.55 | 0.545 | 1.330 | 0.697 | 0.41 | 2.000 | 1.66 | 2.60 | 2.60 |
| **32** | 2 | 42<br>50 | 2 1/2-12 | 2 7/8 | | 2 7/8 | | 2 3/4 | | 1.772 | 1.732 | 0.50 | 0.606 | 1.690 | 0.874 | 0.54 | 2.500 | 1.83 | 3.32 | 3.32 |

1) D and D1 nominal may vary from the values shown in the chart by 0.004 to 0.008. Also, D for -4 metric based Seal-Lok may be D.197 (5 mm) to satisfy ISO 8434-3 (1994 edition). Contact the Tube Fittings Division if there are any questions.

2) Recommended clearance hole = W + 0.015.

3) See page N4 for ORFS O-rings.

4) Note: For port and stud end dimensions reference section F: Pipe Fittings and Port Adapters.

Dimensions and pressures for reference only, subject to change.



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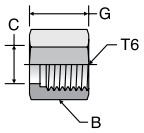
# BL

Tube Nut
ORFS

SAE 520110




| TUBE FITTING PART # | END SIZE (in.) | T6 UNF/UNF-2B | B HEX (in.) | C (in.) | G (in.) | Material -S | Material -SS |
|---|---|---|---|---|---|---|---|
| **4 BL** | 1/4 | 9/16 - 18 | 11/16 | 0.410 | 0.59 | • | • |
| **5 BL** | 5/16 | 5/8 - 18 | 3/4 | 0.470 | 0.63 | • | • |
| **6 BL** | 3/8 | 11/16 - 16 | 13/16 | 0.530 | 0.67 | • | • |
| **8 BL** | 1/2 | 13/16 - 16 | 15/16 | 0.650 | 0.79 | • | • |
| **10 BL** | 5/8 | 1 - 14 | 1 1/8 | 0.830 | 0.94 | • | • |
| **12 BL** | 3/4 | 1 3/16 - 12 | 1 3/8 | 0.950 | 1.04 | • | • |
| **12-14 BL** | 7/8 | 1 3/16 - 12 | 1 3/8 | 0.990 | 1.20 | • | • |
| **14 BL** | 7/8 | 1 5/16 - 12 | 1 1/2 | 1.075 | 1.04 | • | • |
| **16 BL** | 1 | 1 7/16 - 12 | 1 5/8 | 1.150 | 1.08 | • | • |
| **20 BL** | 1 1/4 | 1 11/16 - 12 | 1 7/8 | 1.420 | 1.08 | • | • |
| **24 BL** | 1 1/2 | 2 - 12 | 2 1/4 | 1.730 | 1.08 | • | • |
| **32 BL*** | 2 | 2 1/2 - 12 | 2 7/8 | 2.220 | 1.30 | • | • |

* Sizes 14 and 32 are not included in SAE J1453.

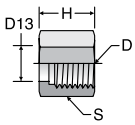
** These tube nuts should not be exposed to annealing temperatures, such as furnace brazing. Contact the Tube Fittings Division for information on special nuts.

• Stainless steel tube nuts are prelubricated for ease of assembly.

# BML

Tube Nut – mm Hex
ORFS

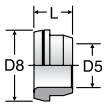
ISO 8434-3 NA
SAE 52M0110A




| TUBE FITTING PART # | END SIZE (mm) | END SIZE (in.) | D THREAD UN/UNF-2B | D13 DRILL (mm) | H (mm) | S HEX (mm) | Material S |
|---|---|---|---|---|---|---|---|
| **4BML** | 6 | 1/4 | 9/16 - 18 | 10.50 | 15.0 | 17 | • |
| **6BML** | 8,10 | 3/8 | 11/16 - 16 | 13.55 | 17.5 | 22 | • |
| **8BML** | 12 | 1/2 | 13/16 - 16 | 16.60 | 20.0 | 24 | • |
| **10BML** | 14,15,16 | 5/8 | 1 - 14 | 21.10 | 24.0 | 30 | • |
| **12BML** | 18,20 | 3/4 | 1 3/16 - 12 | 24.15 | 26.5 | 36 | • |
| **16BML** | 22,25 | 1 | 17/16 - 12 | 29.10 | 27.5 | 41 | • |
| **20BML** | 28,30,32 | 1 1/4 | 1 11/16 - 12 | 36.00 | 27.5 | 50 | • |
| **24BML** | 35,38 | 1 1/2 | 2 - 12 | 44.00 | 27.5 | 60 | • |

# TPLS (Metric)

Parflange Sleeve for
Metric Tubing
ORFS Mechanically
Attachable Sleeve



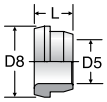

| TUBE FITTING PART # | USED WITH FITTING SIZE | D5 END SIZE (mm) | D8 DIA (mm) | L (mm) | Material S |
|---|---|---|---|---|---|
| **TPLS6** | -4 | 6 | 12.75 | 7.5 | • |
| **TPLS8** | -6 | 8 | 15.75 | 8.5 | • |
| **TPLS10** | -6 | 10 | 15.75 | 8.5 | • |
| **TPLS12** | -8 | 12 | 18.90 | 10.5 | • |
| **TPLS14** | -10 | 14 | 23.50 | 10.5 | • |
| **TPLS15** | -10 | 15 | 23.50 | 10.5 | • |
| **TPLS16** | -10 | 16 | 23.50 | 10.5 | • |
| **TPLS18** | -12 | 18 | 27.80 | 12.0 | • |
| **TPLS20** | -12 | 20 | 27.80 | 12.0 | • |
| **TPLS25** | -16 | 25 | 34.00 | 13.5 | • |
| **TPLS30** | -20 | 30 | 40.50 | 13.0 | • |
| **TPLS32** | -20 | 32 | 40.50 | 13.0 | • |
| **TPLS35** | -24 | 35 | 48.50 | 12.5 | • |
| **TPLS38** | -24 | 38 | 48.50 | 12.5 | • |

• Must be mechanically attached using Parflange system.

• Additional -S not required, TPLS6 is complete part number.

# TPL (Inch)

Parflange Sleeve
for Inch Tubing
ORFS Mechanically
Attachable Sleeve




| TUBE FITTING PART # | D5 END SIZE (in.) | D8 DIA (in.) | L (in.) | Material -S |
|---|---|---|---|---|
| **4 TPL** | 1/4 | 0.50 | 0.30 | • |
| **6 TPL** | 3/8 | 0.62 | 0.34 | • |
| **8 TPL** | 1/2 | 0.74 | 0.42 | • |
| **10 TPL** | 5/8 | 0.92 | 0.42 | • |
| **12 TPL** | 3/4 | 1.09 | 0.47 | • |
| **16 TPL** | 1 | 1.34 | 0.53 | • |
| **20 TPL** | 1 1/4 | 1.59 | 0.51 | • |
| **24 TPL** | 1 1/2 | 1.91 | 0.49 | • |
| **32 TPL** | 2 | 2.39 | 0.54 | • |

• Must be mechanically attached using Parflange system.

Dimensions and pressures for reference only, subject to change.



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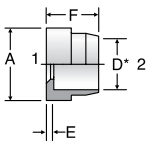
# TL (Inch)

Braze Sleeve for Inch Tubing
ORFS Silver Braze Sleeve Reducer



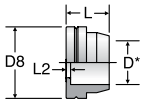

SAE 520115

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | A (in.) | D* (in.) | E (in.) | F (in.) | Material -S | Material -SS |
|---|---|---|---|---|---|---|---|---|
| **4 TL** | 1/4 | | 0.50 | 0.26 | 0.04 | 0.37 | • | • |
| **6 TL** | 3/8 | | 0.62 | 0.38 | 0.04 | 0.37 | • | • |
| **6-4 TL** | 3/8 | 1/4 | 0.62 | 0.26 | 0.08 | 0.41 | • | • |
| **8 TL** | 1/2 | | 0.75 | 0.51 | 0.04 | 0.37 | • | • |
| **8-4 TL** | 1/2 | 1/4 | 0.75 | 0.26 | 0.14 | 0.47 | • | • |
| **8-6 TL** | 1/2 | 3/8 | 0.75 | 0.38 | 0.14 | 0.47 | • | • |
| **10 TL** | 5/8 | | 0.92 | 0.63 | 0.06 | 0.41 | • | • |
| **10-4 TL** | 5/8 | 1/4 | 0.92 | 0.26 | 0.20 | 0.53 | • | • |
| **10-6 TL** | 5/8 | 3/8 | 0.92 | 0.38 | 0.20 | 0.53 | • | • |
| **10-8 TL** | 5/8 | 1/2 | 0.92 | 0.51 | 0.20 | 0.53 | • | • |
| **12 TL** | 3/4 | | 1.10 | 0.76 | 0.06 | 0.55 | • | • |
| **12-4 TL** | 3/4 | 1/4 | 1.10 | 0.26 | 0.24 | 0.57 | • | • |
| **12-6 TL** | 3/4 | 3/8 | 1.10 | 0.38 | 0.24 | 0.57 | • | • |
| **12-8 TL** | 3/4 | 1/2 | 1.10 | 0.51 | 0.24 | 0.57 | • | • |
| **12-10 TL** | 3/4 | 5/8 | 1.10 | 0.63 | 0.22 | 0.57 | • | • |
| **12-14 TL**** | 3/4 | 7/8 | 1.10 | 0.88 | 0.06 | 0.65 | • | • |
| **14 TL***** | 7/8 | | 1.22 | 0.88 | 0.06 | 0.55 | • | • |
| **16 TL** | 1 | | 1.35 | 1.01 | 0.06 | 0.61 | • | • |
| **16-8 TL** | 1 | 1/2 | 1.35 | 0.51 | 0.28 | 0.61 | • | • |
| **16-10 TL** | 1 | 5/8 | 1.35 | 0.63 | 0.26 | 0.61 | • | • |
| **16-12 TL** | 1 | 3/4 | 1.35 | 0.76 | 0.18 | 0.67 | • | • |
| **16-14 TL** | 1 | 7/8 | 1.35 | 0.88 | 0.18 | 0.67 | • | • |
| **20 TL** | 1 1/4 | | 1.60 | 1.26 | 0.06 | 0.61 | • | • |
| **20-12 TL** | 1 1/4 | 3/4 | 1.60 | 0.76 | 0.28 | 0.77 | • | • |
| **20-16 TL** | 1 1/4 | 1 | 1.60 | 1.01 | 0.28 | 0.83 | • | • |
| **24 TL** | 1 1/2 | | 1.91 | 1.51 | 0.06 | 0.61 | • | • |
| **24-16 TL** | 1 1/2 | 1 | 1.91 | 1.01 | 0.28 | 0.83 | • | • |
| **24-20 TL** | 1 1/2 | 1 1/4 | 1.91 | 1.26 | 0.28 | 0.83 | • | • |
| **32 TL***** | 2 | | 2.41 | 2.01 | 0.06 | 0.65 | • | • |

Unplated part, oil dipped for corrosion protection.
* D is for silver brazing.
** 12-14 TL must be assembled with 12-14 BL.
*** Sizes 14 and 32 are not included in SAE J1453.
• Uses SBR silver braze rings

# TLS (Metric)

Braze Sleeve for Metric Tubing
ORFS Silver Braze Sleeve




ISO 8434-3 BRSL
SAE 5201M15

| TUBE FITTING PART # | USED WITH FITTING SIZE | D* END SIZE (mm) | D8 DIA (mm) | L (mm) | L2 (mm) | Material S | Material SS |
|---|---|---|---|---|---|---|---|
| **TLS6** | -4 | 6 | 12.8 | 9.5 | 1.0 | • | • |
| **TLS8** | -6 | 8 | 15.8 | 9.5 | 1.0 | • | • |
| **TLS10** | -6 | 10 | 15.8 | 9.5 | 1.0 | • | • |
| **TLS12** | -8 | 12 | 18.9 | 9.5 | 1.0 | • | • |
| **TLS16** | -10 | 16 | 23.5 | 10.5 | 1.5 | • | • |
| **TLS20** | -12 | 20 | 27.9 | 14.0 | 1.5 | • | • |
| **TLS25** | -16 | 25 | 34.2 | 15.5 | 1.5 | • | • |
| **TLS30** | -20 | 30 | 40.6 | 15.5 | 1.5 | • | • |
| **TLS38** | -24 | 38 | 48.5 | 15.5 | 1.5 | • | • |

Unplated part, oil dipped for corrosion protection.
* D is for silver brazing.
• Uses SBR (metric) silver braze rings
• Stainless steel part number example: TLSS10

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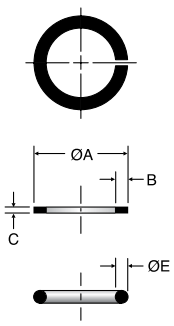
Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# SBR (Inch)

Silver Braze Ring for Inch Tubing




| TUBE FITTING PART # | END SIZE (in.) | A DIA (in.) | B (in.) | C (in.) | E (in.) |
|---|---|---|---|---|---|
| **4 SBR** | 1/4 | 0.260 | — | — | 0.05 |
| **6 SBR** | 3/8 | 0.390 | 0.07 | 0.03 | — |
| **8 SBR** | 1/2 | 0.515 | 0.07 | 0.03 | — |
| **10 SBR** | 5/8 | 0.640 | 0.07 | 0.03 | — |
| **12 SBR** | 3/4 | 0.765 | 0.08 | 0.04 | — |
| **14 SBR** | 7/8 | 0.890 | — | — | 0.06 |
| **16 SBR** | 1 | 1.015 | 0.08 | 0.04 | — |
| **20 SBR** | 1 1/4 | 1.265 | 0.08 | 0.04 | — |
| **24 SBR** | 1 1/2 | 1.515 | 0.08 | 0.04 | — |
| **32 SBR** | 2 | 2.015 | — | — | 0.09 |

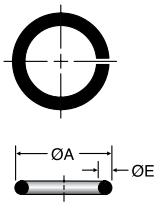
SBR recommended for steel or copper tubing. -S not required.

SBR-SS recommended for stainless tubing, but can be used on steel tubing.

Contact the Tube Fittings Division for braze rings used in marine or special applications.

# SBR (Metric)

Silver Braze Ring for MetricTubing




| TUBE FITTING PART # | END SIZE (mm) | A DIA (mm) | E (mm) |
|---|---|---|---|
| **SBR 6mm** | 6 | 6.4 | 1.2 |
| **SBR 8mm** | 8 | 8.4 | 1.2 |
| **SBR 10mm** | 10 | 10.4 | 1.2 |
| **SBR 12mm** | 12 | 12.4 | 1.2 |
| **SBR 16mm** | 16 | 16.4 | 1.2 |
| **SBR 20mm** | 20 | 20.4 | 1.6 |
| **SBR 25mm** | 25 | 25.4 | 1.6 |
| **SBR 30mm** | 30 | 30.4 | 1.6 |
| **SBR 38mm** | 38 | 38.4 | 1.6 |

SBR recommended for steel or copper tubing.

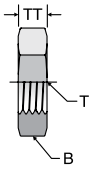
SBR-SS recommended for stainless tubing, but can be used on steel tubing.

Contact the Tube Fittings Division for braze rings used in marine or special applications.

# WLNL

Bulkhead Locknut

SAE 520118



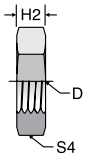

| TUBE FITTING PART # | END SIZE (in.) | T TUBE END UN/UNF-2A | B HEX (in.) | TT (in.) | Material -S |
|---|---|---|---|---|---|
| **4 WLNL** | 1/4 | 9/16 - 18 | 13/16 | 0.27 | • |
| **6 WLNL** | 3/8 | 11/16 - 16 | 1 | 0.31 | • |
| **8 WLNL** | 1/2 | 13/16 - 16 | 1 1/8 | 0.35 | • |
| **10 WLNL** | 5/8 | 1 - 14 | 1 5/16 | 0.41 | • |
| **12 WLNL** | 3/4 | 1 3/16 - 12 | 1 1/2 | 0.41 | • |
| **14 WLNL*** | 7/8 | 1 5/16 - 12 | 1 5/8 | 0.41 | • |
| **16 WLNL** | 1 | 1 7/16 - 12 | 1 3/4 | 0.41 | • |
| **20 WLNL** | 1 1/4 | 1 11/16 - 12 | 2 | 0.41 | • |
| **24 WLNL** | 1 1/2 | 2 - 12 | 2 3/8 | 0.41 | • |

* Size 14 is not included in SAE J1453.

# WLNML

Bulkhead Locknut – mm Hex

ISO 8434-3 BHLN
SAE 52M0118




| TUBE FITTING PART # | END SIZE (mm) | END SIZE (in.) | D TUBE END UN/UNF-2B | H2 (mm) | S4 HEX (mm) | Material S |
|---|---|---|---|---|---|---|
| **4WLNML** | 6 | 1/4 | 9/16 - 18 | 7.0 | 22 | • |
| **6WLNML** | 8,10 | 3/8 | 11/16 - 16 | 8.0 | 27 | • |
| **8WLNML** | 12 | 1/2 | 13/16 - 16 | 9.0 | 30 | • |
| **10WLNML** | 14,15,16 | 5/8 | 1 - 14 | 10.5 | 36 | • |
| **12WLNML** | 18,20 | 3/4 | 1 3/16 - 12 | 10.5 | 41 | • |
| **16WLNML** | 22,25 | 1 | 1 7/16 - 12 | 10.5 | 46 | • |
| **20WLNML** | 28,30,32 | 1 1/4 | 1 11/16 - 12 | 10.5 | 50 | • |
| **24WLNML** | 35,38 | 1 1/2 | 2 - 12 | 10.5 | 60 | • |

Dimensions and pressures for reference only, subject to change.



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Columbus, Ohio
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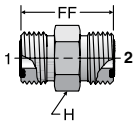
# HLO

Union
ORFS / ORFS



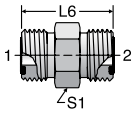

SAE 520101

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | FF (in.) | H HEX (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 HLO** | 1/4 | 1/4 | 1.08 | 5/8 | 9.2 | 9.2 |
| **6 HLO** | 3/8 | 3/8 | 1.22 | 3/4 | 9.2 | 9.2 |
| **6-4 HLO** | 3/8 | 1/4 | 1.18 | 3/4 | 9.2 | 9.2 |
| **8 HLO** | 1/2 | 1/2 | 1.40 | 7/8 | 9.2 | 9.2 |
| **8-6 HLO** | 1/2 | 3/8 | 1.32 | 7/8 | 9.2 | 9.2 |
| **10 HLO** | 5/8 | 5/8 | 1.67 | 1 1/16 | 6.0 | 6.0 |
| **10-8 HLO** | 5/8 | 1/2 | 1.57 | 1 1/16 | 6.0 | 6.0 |
| **12 HLO** | 3/4 | 3/4 | 1.85 | 1 1/4 | 6.0 | 6.0 |
| **12-8 HLO** | 3/4 | 1/2 | 1.69 | 1 1/4 | 6.0 | 6.0 |
| **12-10 HLO** | 3/4 | 5/8 | 1.79 | 1 1/4 | 6.0 | 6.0 |
| **16 HLO** | 1 | 1 | 1.95 | 1 1/2 | 6.0 | 6.0 |
| **16-12 HLO** | 1 | 3/4 | 1.93 | 1 1/2 | 6.0 | 6.0 |
| **20 HLO** | 1 1/4 | 1 1/4 | 2.03 | 1 3/4 | 6.0 | 6.0 |
| **20-16 HLO** | 1 1/4 | 1 | 2.03 | 1 3/4 | 6.0 | 6.0 |
| **24 HLO** | 1 1/2 | 1 1/2 | 2.09 | 2 1/8 | 5.0 | 5.0 |
| **32 HLO*** | 2 | 2 | 2.48 | 2 3/4 | 3.0 | 3.0 |

* Size 32 is not included in SAE J1453.

# HMLO

Union – mm Hex
ORFS / ORFS



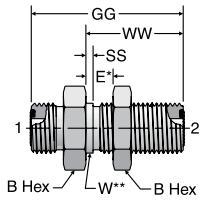

ISO 8434-3 S
SAE 52M0101

| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 1 & 2 (in.) | L6 (mm) | S1 HEX (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|
| **4HMLO** | 6 | 1/4 | 27.5 | 17 | 9.2 | 9.2 |
| **6HMLO** | 8,10 | 3/8 | 31.0 | 19 | 9.2 | 9.2 |
| **8HMLO** | 12 | 1/2 | 35.5 | 22 | 9.2 | 9.2 |
| **10HMLO** | 14,15,16 | 5/8 | 42.5 | 27 | 6.0 | 6.0 |
| **12HMLO** | 18,20 | 3/4 | 47.0 | 32 | 6.0 | 6.0 |
| **16HMLO** | 22,25 | 1 | 49.5 | 41 | 6.0 | 6.0 |
| **20HMLO** | 28,30,32 | 1 1/4 | 51.5 | 46 | 6.0 | 6.0 |
| **24HMLO** | 35,38 | 1 1/2 | 53.0 | 55 | 5.0 | 5.0 |

# WLO

Bulkhead Union
ORFS / ORFS

SAE 520601
WLO-WLNL Body with Locknut
(See page A11 for WLNL)




| TUBE FITTING PART # | END SIZE (in.) | B HEX (in.) | E MAX (in.) | GG (in.) | SS | W DIA (in.) | WW (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|
| **4 WLO** | 1/4 | 13/16 | 0.55 | 1.90 | 0.06 | 0.56 | 1.24 | 9.2 | 9.2 |
| **6 WLO** | 3/8 | 1 | 0.55 | 2.09 | 0.06 | 0.69 | 1.34 | 9.2 | 9.2 |
| **8 WLO** | 1/2 | 1 1/8 | 0.55 | 2.30 | 0.06 | 0.81 | 1.44 | 9.2 | 9.2 |
| **10 WLO** | 5/8 | 1 5/16 | 0.55 | 2.62 | 0.06 | 1.00 | 1.59 | 6.0 | 6.0 |
| **12 WLO** | 3/4 | 1 1/2 | 0.55 | 2.72 | 0.06 | 1.19 | 1.63 | 6.0 | 6.0 |
| **16 WLO** | 1 | 1 3/4 | 0.55 | 2.76 | 0.06 | 1.44 | 1.65 | 6.0 | 6.0 |
| **20 WLO** | 1 1/4 | 2 | 0.55 | 2.76 | 0.06 | 1.69 | 1.65 | 6.0 | 6.0 |
| **24 WLO** | 1 1/2 | 2 3/8 | 0.55 | 2.76 | 0.06 | 2.00 | 1.65 | 5.0 | 5.0 |

** W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

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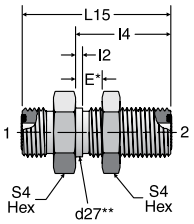
**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# WMLO

Bulkhead Union – mm Hex
ORFS / ORFS

ISO 8434-3 BHS
SAE 52M0601
WMLO-WLNML - Body with Locknut
(See page A11 for WLNML)



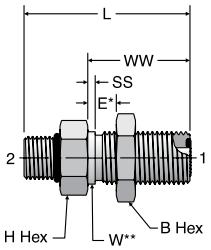

| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 1 & 2 (in.) | d27** (mm) | E (mm) | I4 (mm) | I2 (mm) | L15 (mm) | S4 HEX (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|---|---|
| **4WMLO** | 6 | 1/4 | 14.3 | 14 | 31.5 | 1.5 | 48.0 | 22 | 9.2 | 9.2 |
| **6WMLO** | 8,10 | 3/8 | 17.5 | 14 | 34.0 | 1.5 | 53.0 | 27 | 9.2 | 9.2 |
| **8WMLO** | 12 | 1/2 | 20.6 | 14 | 36.5 | 1.5 | 58.5 | 30 | 9.2 | 9.2 |
| **10WMLO** | 14,15,16 | 5/8 | 25.4 | 14 | 40.5 | 1.5 | 66.5 | 36 | 6.0 | 6.0 |
| **12WMLO** | 18,20 | 3/4 | 30.2 | 14 | 41.5 | 1.5 | 69.0 | 41 | 6.0 | 6.0 |
| **16WMLO** | 22,25 | 1 | 36.5 | 14 | 42.0 | 1.5 | 70.0 | 46 | 6.0 | 6.0 |
| **20WMLO** | 28,30,32 | 1 1/4 | 42.9 | 14 | 42.0 | 1.5 | 70.0 | 50 | 6.0 | 6.0 |
| **24WMLO** | 35,38 | 1 1/2 | 50.8 | 14 | 42.0 | 1.5 | 70.0 | 60 | 5.0 | 5.0 |

* E – Maximum bulkhead thickness.

**d27 – Bulkhead pilot diameter. Recommended clearance hole is d27 + 0.4 mm

# WF5OLO

Straight Thread Bulkhead
Connector
ORFS / SAE-ORB
WF5OLO-WLNL - Body with Locknut
(See page A11 for WLNL)




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | B HEX (in.) | E MAX (in.) | H HEX (in.) | L (in.) | SS (in.) | W DIA (in.) | WW (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **4 WF5OLO** | 1/4 | 7/16 - 20 | 13/16 | 0.55 | 13/16 | 2.14 | 0.06 | 0.56 | 1.24 | 9.2 | 9.2 |
| **6 WF5OLO** | 3/8 | 9/16 - 18 | 1 | 0.55 | 1 | 2.31 | 0.06 | 0.69 | 1.34 | 9.2 | 9.2 |
| **8 WF5OLO** | 1/2 | 3/4 - 16 | 1 1/8 | 0.55 | 1 1/8 | 2.60 | 0.06 | 0.81 | 1.44 | 9.2 | 9.2 |
| **10 WF5OLO** | 5/8 | 7/8 - 14 | 1 5/16 | 0.55 | 1 5/16 | 2.69 | 0.06 | 1.00 | 1.60 | 6.0 | 6.0 |
| **12 WF5OLO** | 3/4 | 1 1/16 - 12 | 1 1/2 | 0.55 | 1 1/2 | 2.89 | 0.06 | 1.19 | 1.64 | 6.0 | 6.0 |
| **16 WF5OLO** | 1 | 1 5/16 - 12 | 1 3/4 | 0.55 | 1 3/4 | 2.95 | 0.20 | 1.58 | 1.66 | 6.0 | 6.0 |

* E – Maximum bulkhead thickness.

** W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

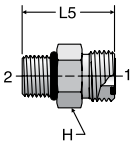
Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# F5OLO

Straight Thread Connector
ORFS / SAE-ORB

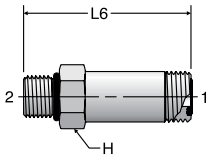



SAE 520120

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | H HEX (in.) | L5 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 F5OLO** | 1/4 | 7/16 - 20 | 5/8 | 1.13 | 9.2 | 9.2 |
| **4-5 F5OLO** | 1/4 | 1/2 - 20 | 5/8 | 1.16 | 9.2 | 9.2 |
| **4-6 F5OLO** | 1/4 | 9/16 - 18 | 3/4 | 1.20 | 9.2 | 9.2 |
| **4-8 F5OLO** | 1/4 | 3/4 - 16 | 7/8 | 1.32 | 9.2 | 9.2 |
| **6 F5OLO** | 3/8 | 9/16 - 18 | 3/4 | 1.26 | 9.2 | 9.2 |
| **6-4 F5OLO** | 3/8 | 7/16 - 20 | 3/4 | 1.34 | 9.2 | 9.2 |
| **6-5 F5OLO** | 3/8 | 1/2 - 20 | 3/4 | 1.22 | 9.2 | 9.2 |
| **6-8 F5OLO** | 3/8 | 3/4 - 16 | 7/8 | 1.38 | 9.2 | 9.2 |
| **6-10 F5OLO** | 3/8 | 7/8 - 14 | 1 | 1.52 | 9.2 | 9.2 |
| **6-12 F5OLO** | 3/8 | 1 1/16 - 12 | 1 1/4 | 1.67 | 9.2 | 9.2 |
| **8 F5OLO** | 1/2 | 3/4 - 16 | 7/8 | 1.44 | 9.2 | 9.2 |
| **8-4 F5OLO** | 1/2 | 7/16 - 20 | 7/8 | 1.44 | 9.2 | 9.2 |
| **8-6 F5OLO** | 1/2 | 9/16 - 18 | 7/8 | 1.48 | 6.0 | 6.0 |
| **8-10 F5OLO** | 1/2 | 7/8 - 14 | 1 | 1.59 | 6.0 | 6.0 |
| **8-12 F5OLO** | 1/2 | 1 1/16 - 12 | 1 1/4 | 1.75 | 6.0 | 6.0 |
| **8-16 F5OLO** | 1/2 | 1 5/16 - 12 | 1 1/2 | 1.79 | 6.0 | 6.0 |
| **10 F5OLO** | 5/8 | 7/8 - 14 | 1 1/16 | 1.69 | 6.0 | 6.0 |
| **10-6 F5OLO** | 5/8 | 9/16 - 18 | 1 1/16 | 1.63 | 6.0 | 6.0 |
| **10-8 F5OLO** | 5/8 | 3/4 - 16 | 1 1/16 | 1.77 | 6.0 | 6.0 |
| **10-12 F5OLO** | 5/8 | 1 1/16 - 12 | 1 1/4 | 1.85 | 6.0 | 6.0 |
| **10-16 F5OLO** | 5/8 | 1 5/16 - 12 | 1 1/2 | 1.89 | 6.0 | 6.0 |
| **12 F5OLO** | 3/4 | 1 1/16 - 12 | 1 1/4 | 1.91 | 6.0 | 6.0 |
| **12-6 F5OLO** | 3/4 | 9/16 - 16 | 1 1/4 | 1.77 | 6.0 | 6.0 |
| **12-8 F5OLO** | 3/4 | 3/4 - 16 | 1 1/4 | 1.91 | 6.0 | 6.0 |
| **12-10 F5OLO** | 3/4 | 7/8 - 14 | 1 1/4 | 1.99 | 6.0 | 6.0 |
| **12-16 F5OLO** | 3/4 | 1 5/16 - 12 | 1 1/2 | 1.95 | 6.0 | 6.0 |
| **14 F5OLO** | 7/8 | 1 3/16 - 12 | 1 3/8 | 1.91 | 6.0 | 6.0 |
| **16 F5OLO** | 1 | 1 5/16 - 12 | 1 1/2 | 1.97 | 6.0 | 6.0 |
| **16-8 F5OLO** | 1 | 3/4 - 16 | 1 1/2 | 1.96 | 6.0 | 6.0 |
| **16-10 F5OLO** | 1 | 7/8 - 14 | 1 1/2 | 2.05 | 6.0 | 6.0 |
| **16-12 F5OLO** | 1 | 1 1/16 - 12 | 1 1/2 | 2.15 | 6.0 | 6.0 |
| **16-20 F5OLO** | 1 | 1 5/8 - 12 | 1 7/8 | 2.07 | 6.0 | 6.0 |
| **16-24 F5OLO** | 1 | 1 7/8 - 12 | 2 1/8 | 2.13 | 6.0 | 6.0 |
| **20 F5OLO** | 1 1/4 | 1 5/8 - 12 | 1 7/8 | 2.07 | 6.0 | 6.0 |
| **20-16 F5OLO** | 1 1/4 | 1 5/16 - 12 | 1 7/8 | 2.28 | 6.0 | 6.0 |
| **20-24 F5OLO** | 1 1/4 | 1 7/8 - 12 | 2 1/8 | 2.13 | 5.0 | 5.0 |
| **24 F5OLO** | 1 1/2 | 1 7/8 - 12 | 2 1/8 | 2.13 | 5.0 | 5.0 |
| **24-20 F5OLO** | 1 1/2 | 1 5/8 - 12 | 2 1/8 | 2.34 | 5.0 | 5.0 |
| **32 F5OLO*** | 2 | 2 1/2 - 12 | 2 3/4 | 2.32 | 3.0 | 3.0 |

# FF5OLO

Long Straight Thread Connector
ORFS-Long / SAE-ORB

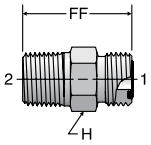



SAE 521720 (previously 520122)

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | H HEX (in.) | L6 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 FF5OLO** | 1/4 | 7/16 - 20 | 5/8 | 2.07 | 9.2 | 9.2 |
| **6 FF5OLO** | 3/8 | 9/16 - 18 | 3/4 | 2.27 | 9.2 | 9.2 |
| **6-4 FF5OLO** | 3/8 | 7/16 - 20 | 3/4 | 2.39 | 9.2 | 9.2 |
| **8 FF5OLO** | 1/2 | 3/4 - 16 | 7/8 | 2.67 | 9.2 | 9.2 |
| **10 FF5OLO** | 5/8 | 7/8 - 14 | 1 1/16 | 3.14 | 6.0 | 6.0 |
| **12 FF5OLO** | 3/4 | 1 1/16 12 | 1 1/4 | 3.76 | 6.0 | 6.0 |
| **16 FF5OLO** | 1 | 1 5/16 - 12 | 1 1/2 | 4.14 | 6.0 | 6.0 |
| **20 FF5OLO** | 1 1/4 | 1 5/8 - 12 | 1 7/8 | 4.76 | 6.0 | 6.0 |
| **24 FF5OLO** | 1 1/2 | 1 7/8 - 12 | 2 1/8 | 5.26 | 5.0 | 5.0 |

# FLO

Male Pipe Connector
ORFS / NPTF




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | FF (in.) | H HEX (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 FLO** | 1/4 | 1/8 - 27 | 1.07 | 5/8 | 6.0 | 6.0 |
| **4-4 FLO** | 1/4 | 1/4 - 18 | 1.26 | 5/8 | 6.0 | 6.0 |
| **4-6 FLO** | 1/4 | 3/8 - 18 | 1.32 | 3/4 | 6.0 | 6.0 |
| **4-8 FLO** | 1/4 | 1/2 - 14 | 1.52 | 7/8 | 6.0 | 6.0 |
| **6 FLO** | 3/8 | 1/4 - 18 | 1.25 | 3/4 | 6.0 | 6.0 |
| **6-2 FLO** | 3/8 | 1/8 - 27 | 1.16 | 3/4 | 6.0 | 6.0 |
| **6-6 FLO** | 3/8 | 3/8 - 18 | 1.34 | 3/4 | 6.0 | 6.0 |
| **6-8 FLO** | 3/8 | 1/2 - 14 | 1.55 | 7/8 | 6.0 | 6.0 |
| **8 FLO** | 1/2 | 3/8 - 18 | 1.48 | 7/8 | 6.0 | 6.0 |
| **8-4 FLO** | 1/2 | 1/4 - 18 | 1.48 | 7/8 | 6.0 | 6.0 |
| **8-8 FLO** | 1/2 | 1/2 - 14 | 1.64 | 7/8 | 6.0 | 6.0 |
| **8-12 FLO** | 1/2 | 3/4 - 14 | 1.69 | 1 1/8 | 6.0 | 6.0 |
| **10 FLO** | 5/8 | 1/2 - 14 | 1.82 | 1 1/16 | 6.0 | 6.0 |
| **10-12 FLO** | 5/8 | 3/4 - 14 | 1.82 | 1 1/8 | 5.5 | 5.5 |
| **12 FLO** | 3/4 | 3/4 - 14 | 1.93 | 1 1/4 | 5.5 | 5.5 |
| **12-8 FLO** | 3/4 | 1/2 - 14 | 1.93 | 1 1/4 | 6.0 | 6.0 |
| **12-16 FLO** | 3/4 | 1 - 11 1/2 | 2.13 | 1 3/8 | 4.5 | 4.5 |
| **16 FLO** | 1 | 1 - 11 1/2 | 2.19 | 1 1/2 | 4.5 | 4.5 |
| **16-12 FLO** | 1 | 3/4 - 14 | 2.00 | 1 1/2 | 5.5 | 5.5 |
| **16-20 FLO** | 1 | 1 1/4 - 11 1/2 | 2.30 | 1 3/4 | 3.0 | 3.0 |
| **20 FLO** | 1 1/4 | 1 1/4 - 11 1/2 | 2.30 | 1 7/8 | 3.0 | 3.0 |
| **20-12 FLO** | 1 1/4 | 3/4 - 14 | 2.02 | 1 7/8 | 4.5 | 4.5 |
| **20-16 FLO** | 1 1/4 | 1 - 11 1/2 | 2.27 | 1 7/8 | 4.5 | 4.5 |
| **24 FLO** | 1 1/2 | 1 1/2 - 11 1/2 | 2.40 | 2 1/8 | 3.0 | 3.0 |

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VISUAL INDEX

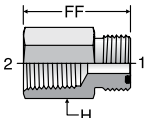
Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# GLO

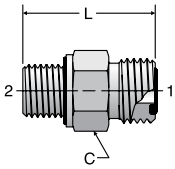
Female NPT
ORFS / Female Pipe




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | FF (in.) | H HEX (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|
| 4 GLO | 1/4 | 1/8 - 27 | 1.03 | 5/8 | 6.0 | 6.0 |
| 4-4 GLO | 1/4 | 1/4 - 18 | 1.25 | 3/4 | 6.0 | 6.0 |
| 6 GLO | 3/8 | 1/4 - 18 | 1.30 | 3/4 | 6.0 | 6.0 |
| 6-6 GLO | 3/8 | 3/8 - 18 | 1.34 | 7/8 | 6.0 | 6.0 |
| 8 GLO | 1/2 | 3/8 - 18 | 1.34 | 7/8 | 6.0 | 6.0 |

# F42EDMLO

Male Connector – BSPP
(for ISO 1179-1 Port)
ORFS / BSPP-ED

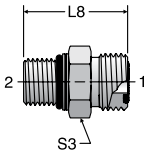



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 BSPP | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|
| 4F42EDMLO | 6 | 1/4 | 1/8 - 28 | 17 | 25.7 | 9.2 | 9.2 |
| 4-4F42EDMLO | 6 | 1/4 | 1/4 - 19 | 19 | 30.5 | 9.2 | 9.2 |
| 4-6F42EDMLO | 6 | 1/4 | 3/8 - 19 | 22 | 31.6 | 9.2 | 9.2 |
| 4-8F42EDMLO | 6 | 1/4 | 1/2 - 14 | 27 | 35.4 | 6.0 | 6.0 |
| 6F42EDMLO | 8,10 | 3/8 | 1/4 - 19 | 19 | 31.9 | 9.2 | 9.2 |
| 6-2F42EDMLO | 8,10 | 3/8 | 1/8 - 28 | 19 | 31.1 | 9.2 | 9.2 |
| 6-6F42EDMLO | 8,10 | 3/8 | 3/8 - 19 | 22 | 33.0 | 9.2 | 9.2 |
| 6-8F42EDMLO | 8,10 | 3/8 | 1/2 - 14 | 27 | 36.5 | 6.0 | 6.0 |
| 6-12F42EDMLO | 8,10 | 3/8 | 3/4 - 14 | 32 | 40.3 | 6.0 | 6.0 |
| 8F42EDMLO | 12 | 1/2 | 3/8 - 19 | 22 | 34.6 | 9.2 | 9.2 |
| 8-4F42EDMLO | 12 | 1/2 | 1/4 - 19 | 22 | 37.5 | 9.2 | 9.2 |
| 8-8F42EDMLO | 12 | 1/2 | 1/2 - 14 | 27 | 38.4 | 6.0 | 6.0 |
| 8-12F42EDMLO | 12 | 1/2 | 3/4 - 14 | 32 | 41.9 | 6.0 | 6.0 |
| 10F42EDMLO | 14,15,16 | 5/8 | 1/2 - 14 | 27 | 41.1 | 6.0 | 6.0 |
| 10-6F42EDMLO | 14,15,16 | 5/8 | 3/8 - 19 | 27 | 42.4 | 9.2 | 9.2 |
| 10-12F42EDMLO | 14,15,16 | 5/8 | 3/4 - 14 | 32 | 44.3 | 6.0 | 6.0 |
| 12F42EDMLO | 18,20 | 3/4 | 3/4 - 14 | 32 | 46.1 | 6.0 | 6.0 |
| 12-8F42EDMLO | 18,20 | 3/4 | 1/2 - 14 | 32 | 48.5 | 6.0 | 6.0 |
| 12-16F42EDMLO | 18,20 | 3/4 | 1 - 11 | 41 | 47.5 | 6.0 | 6.0 |
| 12-20F42EDMLO | 18,20 | 3/4 | 1 1/4 - 11 | 50 | 53.0 | 6.0 | 6.0 |
| 16F42EDMLO | 22,25 | 1 | 1 - 11 | 41 | 49.8 | 6.0 | 6.0 |
| 16-12F42EDMLO | 22,25 | 1 | 3/4 - 14 | 38 | 50.3 | 6.0 | 6.0 |
| 16-20F42EDMLO | 22,25 | 1 | 1 1/4 - 11 | 50 | 53.8 | 6.0 | 6.0 |
| 16-24F42EDMLO | 22,25 | 1 | 1 1/2 - 11 | 55 | 57.5 | 5.0 | 5.0 |
| 20F42EDMLO | 28,30,32 | 1 1/4 | 1 1/4 - 11 | 50 | 53.8 | 6.0 | 6.0 |
| 20-16F42EDMLO | 28,30,32 | 1 1/4 | 1 - 11 | 48 | 55.9 | 6.0 | 6.0 |
| 20-24F42EDMLO | 28,30,32 | 1 1/4 | 1 1/2 - 11 | 55 | 57.6 | 5.0 | 5.0 |
| 24F42EDMLO | 38 | 1 1/2 | 1 1/2 - 11 | 55 | 57.6 | 5.0 | 5.0 |

# F87OMLO

Metric Straight Thread Connector
ORFS / ISO 6149

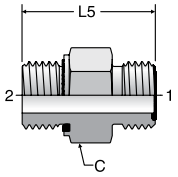
ISO 8434-3 SDS
SAE 52M0187




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 ISO 261 | L8 (mm) | S3 HEX (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|
| 4M12F87OMLO | 6 | 1/4 | M12X1.5 | 28.5 | 17 | 9.2 | 9.2 |
| 4M14F87OMLO | 6 | 1/4 | M14X1.5 | 29.5 | 19 | 9.2 | 9.2 |
| 6M12F87OMLO | 8,10 | 3/8 | M12X1.5 | 32.0 | 22 | 9.2 | 9.2 |
| 6M14F87OMLO | 8,10 | 3/8 | M14X1.5 | 32.0 | 22 | 9.2 | 9.2 |
| 6M16F87OMLO | 8,10 | 3/8 | M16X1.5 | 33.5 | 22 | 9.2 | 9.2 |
| 6M18F87OMLO | 8,10 | 3/8 | M18X1.5 | 36.1 | 24 | 9.2 | 9.2 |
| 8M14F87OMLO | 12 | 1/2 | M14X1.5 | 35.1 | 24 | 9.2 | 9.2 |
| 8M16F87OMLO | 12 | 1/2 | M16X1.5 | 36.6 | 24 | 9.2 | 9.2 |
| 8M18F87OMLO | 12 | 1/2 | M18X1.5 | 38.1 | 24 | 9.2 | 9.2 |
| 8M22F87OMLO | 12 | 1/2 | M22X1.5 | 39.6 | 27 | 6.0 | 6.0 |
| 8M27F87OMLO | 12 | 1/2 | M27X2.0 | 44.2 | 32 | 6.0 | 6.0 |
| 10M18F87OMLO | 14,15,16 | 5/8 | M18X1.5 | 41.0 | 27 | 6.0 | 6.0 |
| 10M22F87OMLO | 14,15,16 | 5/8 | M22X1.5 | 42.0 | 27 | 6.0 | 6.0 |
| 10M27F87OMLO | 14,15,16 | 5/8 | M27x2.0 | 47.0 | 32 | 6.0 | 6.0 |
| 12M22F87OMLO | 18,20 | 3/4 | M22X1.5 | 45.0 | 32 | 6.0 | 6.0 |
| 12M27F87OMLO | 18,20 | 3/4 | M27X2.0 | 48.5 | 32 | 6.0 | 6.0 |
| 12M33F87OMLO | 18,20 | 3/4 | M33X2.0 | 51.5 | 41 | 6.0 | 6.0 |
| 16M27F87OMLO | 22,26 | 1 | M27X2.0 | 33.6 | 41 | 6.0 | 6.0 |
| 16M33F87OMLO | 22,25 | 1 | M33X2.0 | 52.0 | 41 | 6.0 | 6.0 |
| 20M33F87OMLO | 28,30,32 | 1 1/4 | M33x2.0 | 35.1 | 46 | 5.0 | 5.0 |
| 20M42F87OMLO | 28,30,32 | 1 1/4 | M42X2.0 | 54.5 | 50 | 5.0 | 5.0 |
| 24M48F87OMLO | 35,38 | 1 1/2 | M48X2.0 | 57.0 | 55 | 5.0 | 5.0 |

# F82EDMLO

Male Connector – Metric
(for ISO 9974-1 Port)
ORFS / Metric-ED




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 Metric | C HEX (mm) | L5 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|
| 4M12F82EDMLO | 6 | 1/4 | M12X1.5 | 17 | 29.7 | 9.2 | 9.2 |
| 4M14F82EDMLO | 6 | 1/4 | M14X1.5 | 19 | 30.5 | 9.2 | 9.2 |
| 6M14F82EDMLO | 8,10 | 3/8 | M14X1.5 | 19 | 31.9 | 9.2 | 9.2 |
| 6M16F82EDMLO | 8,10 | 3/8 | M16X1.5 | 22 | 31.9 | 9.2 | 9.2 |
| 8M16F82EDMLO | 12 | 1/2 | M16X1.5 | 22 | 32.0 | 9.2 | 9.2 |
| 8M18F82EDMLO | 12 | 1/2 | M18X1.5 | 24 | 34.6 | 9.2 | 9.2 |
| 10M22F82EDMLO | 14,15,16 | 5/8 | M22X1.5 | 27 | 41.1 | 6.0 | 6.0 |
| 12M22F82EDMLO | 18,20 | 3/4 | M22X1.5 | 32 | 42.7 | 6.0 | 6.0 |
| 12M27F82EDMLO | 18,20 | 3/4 | M27X2 | 32 | 46.1 | 6.0 | 6.0 |
| 16M33F82EDMLO | 22,25 | 1 | M33X2 | 41 | 49.8 | 6.0 | 6.0 |
| 20M42F82EDMLO | 28,30,32 | 1 1/4 | M42X2 | 50 | 54.0 | 5.0 | 5.0 |

Dimensions and pressures for reference only, subject to change.

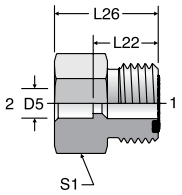


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# MMLOHB3

Braze Connector
ORFS / Braze Socket

ISO 8434-3 BRS
SAE 52M0104



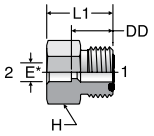

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 (mm) | D5* DIA TUBE SOCKET | L22 (mm) | L26 (mm) | S1 HEX | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|---|
| **4-6MMLOHB3** | 6 | 1/4 | 6 | 6.15 | 13.5 | 22.0 | 17 | 9.2 | 9.2 |
| **4-8MMLOHB3** | 6 | 1/4 | 8 | 8.15 | 13.5 | 22.0 | 17 | 9.2 | 9.2 |
| **6-10MMLOHB3** | 8, 10 | 3/8 | 10 | 10.15 | 14.5 | 23.0 | 19 | 9.2 | 9.2 |
| **8-12MMLOHB3** | 12 | 1/2 | 12 | 12.15 | 16.0 | 24.5 | 22 | 9.2 | 9.2 |
| **10-16MMLOHB3** | 14, 15, 16 | 5/8 | 16 | 16.15 | 19.0 | 27.5 | 27 | 6.0 | 6.0 |
| **12-20MMLOHB3** | 18, 20 | 3/4 | 20 | 20.18 | 21.0 | 33.5 | 32 | 6.0 | 6.0 |
| **16-25MMLOHB3** | 22, 25 | 1 | 25 | 25.18 | 24.5 | 38.5 | 41 | 6.0 | 6.0 |
| **20-30MMLOHB3** | 28, 30, 32 | 1 1/4 | 30 | 30.20 | 24.5 | 38.5 | 46 | 6.0 | 6.0 |
| **24-38MMLOHB3** | 35, 38 | 1 1/2 | 38 | 38.20 | 24.5 | 38.5 | 55 | 5.0 | 5.0 |

* D5 is for silver brazing. Standard steel parts are not recommended for welding.

# LOHB3

Braze Connector
ORFS / Braze Socket

SAE 520104



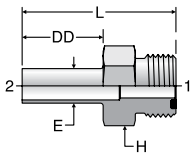

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | DD (in.) | E* DIA (in.) | H HEX (in.) | L1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|
| **4 LOHB3** | 1/4 | 1/4 | 0.53 | 0.26 | 5/8 | 0.86 | 9.2 | 9.2 |
| **4-6 LOHB3** | 1/4 | 3/8 | 0.53 | 0.38 | 5/8 | 0.86 | 9.2 | 9.2 |
| **6 LOHB3** | 3/8 | 3/8 | 0.57 | 0.38 | 3/4 | 0.90 | 9.2 | 9.2 |
| **6-4 LOHB3** | 3/8 | 1/4 | 0.57 | 0.26 | 3/4 | 0.90 | 9.2 | 9.2 |
| **6-8 LOHB3** | 3/8 | 1/2 | 0.57 | 0.51 | 3/4 | 0.90 | 9.2 | 9.2 |
| **8 LOHB3** | 1/2 | 1/2 | 0.63 | 0.51 | 7/8 | 0.97 | 9.2 | 9.2 |
| **8-4 LOHB3**** | 1/2 | 1/4 | 0.64 | 0.26 | 7/8 | 0.97 | 9.2 | 9.2 |
| **8-6 LOHB3** | 1/2 | 3/8 | 0.63 | 0.38 | 7/8 | 0.97 | 9.2 | 9.2 |
| **8-10 LOHB3** | 1/2 | 5/8 | 0.63 | 0.63 | 7/8 | 0.97 | 6.0 | 6.0 |
| **8-12 LOHB3**** | 1/2 | 3/4 | 0.67 | 0.76 | 1 1/16 | 1.16 | 6.0 | 6.0 |
| **10 LOHB3** | 5/8 | 5/8 | 0.74 | 0.63 | 1 1/16 | 1.07 | 6.0 | 6.0 |
| **10-6 LOHB3** | 5/8 | 3/8 | 0.74 | 0.38 | 1 1/16 | 1.07 | 6.0 | 6.0 |
| **10-8 LOHB3** | 5/8 | 1/2 | 0.74 | 0.51 | 1 1/16 | 1.07 | 6.0 | 6.0 |
| **10-12 LOHB3** | 5/8 | 3/4 | 0.74 | 0.76 | 1 1/16 | 1.23 | 6.0 | 6.0 |
| **12 LOHB3** | 3/4 | 3/4 | 0.83 | 0.76 | 1 1/4 | 1.32 | 6.0 | 6.0 |
| **12-8 LOHB3** | 3/4 | 1/2 | 0.83 | 0.51 | 1 1/4 | 1.16 | 6.0 | 6.0 |
| **12-10 LOHB3** | 3/4 | 5/8 | 0.83 | 0.63 | 1 1/4 | 1.16 | 6.0 | 6.0 |
| **12-16 LOHB3** | 3/4 | 1 | 0.83 | 1.01 | 1 1/2 | 1.38 | 6.0 | 6.0 |
| **16 LOHB3** | 1 | 1 | 0.97 | 1.01 | 1 1/2 | 1.52 | 6.0 | 6.0 |
| **16-8 LOHB3**** | 1 | 1/2 | 0.97 | 0.51 | 1 1/2 | 1.30 | 6.0 | 6.0 |
| **16-12 LOHB3** | 1 | 3/4 | 0.97 | 0.76 | 1 1/2 | 1.46 | 6.0 | 6.0 |
| **16-20 LOHB3** | 1 | 1 1/4 | 0.96 | 1.26 | 1 3/4 | 1.52 | 6.0 | 6.0 |
| **20 LOHB3** | 1 1/4 | 1 1/4 | 0.97 | 1.26 | 1 3/4 | 1.52 | 6.0 | 6.0 |
| **20-16 LOHB3** | 1 1/4 | 1 | 0.97 | 1.01 | 1 3/4 | 1.52 | 6.0 | 6.0 |
| **20-24 LOHB3** | 1 1/4 | 1 1/2 | 0.97 | 1.51 | 2 1/8 | 1.52 | 5.0 | 5.0 |
| **24 LOHB3** | 1 1/2 | 1 1/2 | 0.97 | 1.51 | 2 1/8 | 1.52 | 5.0 | 5.0 |
| **24-20 LOHB3** | 1 1/2 | 1 1/4 | 0.97 | 1.26 | 2 1/8 | 1.52 | 5.0 | 5.0 |

* E is for silver brazing. Standard steel parts are not recommended for welding.

** Size 14 is not included in SAE J1453.

# LOHT3

Tube Stub Connector
ORFS / Tube Weld




| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | DD (in.) | E DIA (in.) | H HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4-4X035 LOHT3** | 1/4 | 0.88 | 0.25 | 5/8 | 1.58 | 5.9 |
| **6-6X035 LOHT3** | 3/8 | 0.88 | 0.38 | 3/4 | 1.67 | 3.8 |
| **8-8X065 LOHT3** | 1/2 | 1.00 | 0.50 | 7/8 | 1.89 | 5.5 |
| **12-12X065 LOHT3** | 3/4 | 1.16 | 0.75 | 1 1/4 | 2.35 | 3/5 |
| **12-16X065 LOHT3** | 1 | 1.13 | 1.00 | 1 1/4 | 2.32 | 2.6 |
| **16-16X065 LOHT3** | 1 | 1.13 | 1.00 | 1 1/2 | 2.40 | 2.6 |

* Contact Tube Fittings Division for pressure ratings.

Dimensions and pressures for reference only, subject to change.



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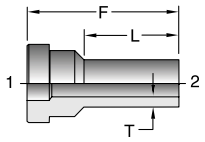
# TLW1

Butt Weld
Sleeve

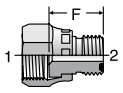



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | F (in.) | L (in.) | T (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4-4X035 TLW1** | 1/4 | 1/4 | 1.20 | 0.75 | 0.035 | 5950 |
| **6-4X035 TLW1** | 3/8 | 1/4 | 1.26 | 0.75 | 0.035 | 5950 |
| **6-4X049 TLW1** | 3/8 | 1/4 | 1.26 | 0.75 | 0.049 | 8650 |
| **6-6X035 TLW1** | 3/8 | 3/8 | 1.20 | 0.75 | 0.035 | 3850 |
| **6-6X049 TLW1** | 3/8 | 3/8 | 1.20 | 0.75 | 0.049 | 5550 |
| **6-6X065 TLW1** | 3/8 | 3/8 | 1.20 | 0.75 | 0.065 | 7550 |
| **8-8X049 TLW1** | 1/2 | 1/2 | 1.20 | 0.75 | 0.049 | 4050 |
| **8-8X065 TLW1** | 1/2 | 1/2 | 1.20 | 0.75 | 0.065 | 5500 |
| **12-12X065 TLW1** | 3/4 | 3/4 | 1.39 | 0.75 | 0.065 | 3500 |
| **12-12X083 TLW1** | 3/4 | 3/4 | 1.39 | 0.75 | 0.083 | 4600 |
| **12-12X095 TLW1** | 3/4 | 3/4 | 1.39 | 0.75 | 0.095 | 5350 |
| **12-8X049 TLW1** | 3/4 | 1/2 | 1.52 | 0.75 | 0.049 | 4050 |
| **16-16X083 TLW1** | 1 | 1 | 1.43 | 0.75 | 0.083 | 3400 |
| **16-16X095 TLW1** | 1 | 1 | 1.43 | 0.75 | 0.095 | 3900 |

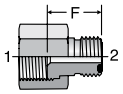
# TRLON

Tube End Reducer
ORFS Swivel / ORFS Tube End

SAE 520123 (body only)
SAE 520123A (body with large nut)




* Assembled with Crimp Nut




** Assembled with Large BL Nut

| TUBE FITTING PART # | | | END SIZE | | F | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|
| TRLON | TRLON | TRLO | | | | | |
| *One Piece Design (With Crimp Nut) | **Two Piece Design (With Large Nut) | ***Body Only (For Two-Piece Design Only) | 1 (in.) | 2 (in.) | (in.) | -S | -SS |
| 6-4 TRLON | — | — | 3/8 | 1/4 | 0.77 | 9.2 | 9.2 |
| — | 8-4 TRLON | 8-4 TRLO | 1/2 | 1/4 | 0.87 | 9.2 | 9.2 |
| 8-6 TRLON | — | — | 1/2 | 3/8 | 0.89 | 9.2 | 9.2 |
| — | 10-4 TRLON | 10-4 TRLO | 5/8 | 1/4 | 0.91 | 6.0 | 6.0 |
| — | 10-6 TRLON | 10-6 TRLO | 5/8 | 3/8 | 0.94 | 6.0 | 6.0 |
| — | 10-8 TRLON | 10-8 TRLO | 5/8 | 1/2 | 1.00 | 6.0 | 6.0 |
| — | 12-4 TRLON | 12-4 TRLO | 3/4 | 1/4 | 0.98 | 6.0 | 6.0 |
| — | 12-6 TRLON | 12-6 TRLO | 3/4 | 3/8 | 1.02 | 6.0 | 6.0 |
| — | 12-8 TRLON | 12-8 TRLO | 3/4 | 1/2 | 1.08 | 6.0 | 6.0 |
| 12-10 TRLON | — | — | 3/4 | 5/8 | 1.16 | 6.0 | 6.0 |
| — | 16-8 TRLON | 16-8 TRLO | 1 | 1/2 | 1.14 | 6.0 | 6.0 |
| — | 16-10 TRLON | 16-10 TRLO | 1 | 5/8 | 1.26 | 6.0 | 6.0 |
| 16-12 TRLON | — | — | 1 | 3/4 | 1.30 | 6.0 | 6.0 |
| — | 20-12 TRLON | 20-12 TRLO | 1 1/4 | 3/4 | 1.32 | 5.0 | 5.0 |
| 20-16 TRLON | — | — | 1 1/4 | 1 | 1.34 | 5.0 | 5.0 |
| — | 24-12 TRLON-S | — | 1 1/2 | 3/4 | 1.32 | 4.0 | 4.0 |
| — | 24-16 TRLON | 24-16 TRLO | 1 1/2 | 1 | 1.34 | 4.0 | 4.0 |
| — | 24-20 TRLON | 24-20 TRLO | 1 1/2 | 1 1/4 | 1.34 | 4.0 | 4.0 |
| — | 32-20 TRLON** | 32-20 TRLO** | 2 | 1 1/4 | 1.42 | 3.0 | 3.0 |
| — | 32-24 TRLON** | 32-24 TRLO** | 2 | 1 1/2 | 1.42 | 3.0 | 3.0 |

* Assembled with crimp nut.
** Assembled with large BL nut.
***To order reducer without large nut (body only) remove the "N" from the part number (i.e., TRLO).

Dimensions and pressures for reference only, subject to change.



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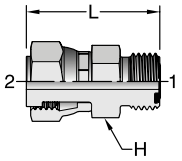
VISUAL INDEX

# LOHL6

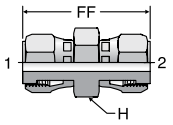
Tube End Extender / Expander
ORFS / ORFS Swivel




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | L (in.) | H HEX (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 LOHL6** | 1/4 | 1/4 | 1.33 | 5/8 | 9.2 | 9.2 |
| **6 LOHL6** | 3/8 | 3/8 | 1.44 | 3/4 | 9.2 | 9.2 |
| **6-4 LOHL6** | 3/8 | 1/4 | 1.37 | 3/4 | 9.2 | 9.2 |
| **8 LOHL6** | 1/2 | 1/2 | 1.67 | 7/8 | 9.2 | 9.2 |
| **8-6 LOHL6** | 1/2 | 3/8 | 1.62 | 7/8 | 9.2 | 9.2 |
| **10-8 LOHL6** | 5/8 | 1/2 | 1.81 | 1 1/16 | 6.0 | 6.0 |
| **12-10 LOHL6** | 3/4 | 5/8 | 1.99 | 1 1/4 | 6.0 | 6.0 |
| **16-12 LOHL6** | 1 | 3/4 | 2.16 | 1 1/2 | 6.0 | 6.0 |
| **20-16 LOHL6** | 1 1/4 | 1 | 2.28 | 1 3/4 | 5.0 | 5.0 |
| **24-20 LOHL6** | 1 1/2 | 1 1/4 | 2.35 | 2 1/8 | 4.0 | 4.0 |

# HL6

Swivel Nut Union
ORFS Swivel / ORFS Swivel

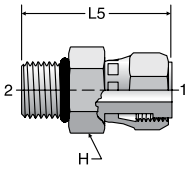



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | FF (in.) | H HEX (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 HL6** | 1/4 | 1/4 | 1.59 | 5/8 | 9.2 | 9.2 |
| **6 HL6** | 3/8 | 3/8 | 1.77 | 3/4 | 9.2 | 9.2 |
| **8 HL6** | 1/2 | 1/2 | 2.12 | 7/8 | 9.2 | 9.2 |
| **10 HL6** | 5/8 | 5/8 | 2.42 | 1 1/16 | 6.0 | 6.0 |
| **12 HL6** | 3/4 | 3/4 | 2.74 | 1 1/4 | 6.0 | 6.0 |
| **16 HL6** | 1 | 1 | 2.95 | 1 7/16 | 6.0 | 6.0 |

# F65OL

Straight Thread Swivel Connector
ORFS Swivel / SAE-ORB

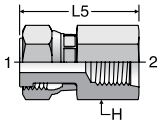
SAE 520181




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | H HEX (in.) | L5 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 F65OL** | 1/4 | 7/16 - 20 | 5/8 | 1.46 | 9.2 | 9.2 |
| **6 F65OL** | 3/8 | 9/16 - 18 | 3/4 | 1.57 | 9.2 | 9.2 |
| **8 F65OL** | 1/2 | 3/4 - 16 | 7/8 | 1.95 | 9.2 | 9.2 |
| **10 F65OL** | 5/8 | 7/8 - 14 | 1 1/16 | 2.13 | 6.0 | 6.0 |
| **12 F65OL** | 3/4 | 1 1/16 - 12 | 1 1/4 | 2.34 | 6.0 | 6.0 |
| **16 F65OL** | 1 | 1 5/16 - 12 | 1 1/2 | 2.66 | 6.0 | 6.0 |
| **20 F65OL** | 1 1/4 | 1 5/8 - 12 | 1 7/8 | 2.66 | 5.0 | 5.0 |

# G65L

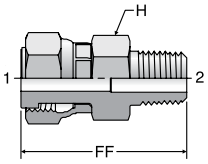
Straight Thread Swivel Female Connector
ORFS Swivel / SAE-ORB




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2B | H HEX (in.) | L5 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 G65L** | 1/4 | 7/16 - 20 | 3/4 | 1.38 | 6.0 | 6.0 |
| **4-6 G65L** | 1/4 | 9/16 - 18 | 13/16 | 1.45 | 6.0 | 6.0 |
| **6-4 G65L** | 3/8 | 7/16 - 20 | 3/4 | 1.51 | 6.0 | 6.0 |
| **8-4 G65L** | 1/2 | 7/16 - 20 | 7/8 | 1.57 | 6.0 | 6.0 |

# F6L

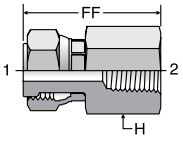
Pipe Thread Swivel Connector
ORFS Swivel / NPTF




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | FF (in.) | H HEX (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 F6L** | 1/4 | 1/8 - 27 | 1.33 | 5/8 | 6.0 | 6.0 |
| **4-4 F6L** | 1/4 | 1/4 - 18 | 1.52 | 5/8 | 6.0 | 6.0 |
| **6 F6L** | 3/8 | 1/4 - 18 | 1.69 | 3/4 | 6.0 | 6.0 |
| **6-6 F6L** | 3/8 | 3/8 - 18 | 1.67 | 3/4 | 6.0 | 6.0 |
| **8 F6L** | 1/2 | 3/8 - 18 | 1.95 | 3/4 | 6.0 | 6.0 |
| **8-8 F6L** | 1/2 | 1/2 - 14 | 2.14 | 7/8 | 6.0 | 6.0 |
| **10 F6L** | 5/8 | 1/2 - 14 | 2.29 | 1 1/16 | 6.0 | 6.0 |
| **12 F6L** | 3/4 | 3/4 - 14 | 2.37 | 1 1/4 | 5.5 | 5.5 |
| **16 F6L** | 1 | 1 - 11 1/2 | 2.87 | 1 1/2 | 4.5 | 4.5 |

# G6L

Female Pipe Thread Swivel Connector
ORFS Swivel / NPTF




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | FF (in.) | H (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4-4 G6L** | 1/4 | 1/4 - 18 | 1.48 | 3/4 | 6.0 | 6.0 |
| **6 G6L** | 3/8 | 1/4 - 18 | 1.60 | 7/8 | 6.0 | 6.0 |
| **8-4 G6L** | 1/2 | 1/4 - 18 | 1.75 | 7/8 | 6.0 | 6.0 |

Dimensions and pressures for reference only, subject to change.



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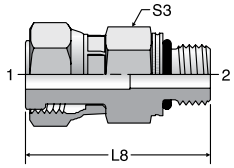
# F687OML

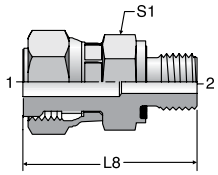
Swivel ISO 6149 Connector
ORFS Swivel / ISO 6149




| TUBE FITTING PART # | END SIZE 1 (mm) | 1 (in.) | 2 ISO 261 | L8 (mm) | S3 HEX (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|
| **4M12F687OML** | 6 | 1/4 | M12x1.5 | 37.0 | 17 | 9.2 | 9.2 |
| **6M12F687OML** | 8, 10 | 3/8 | M12x1.5 | 39.0 | 17 | 9.2 | 9.2 |
| **6M14F687OML** | 8, 10 | 3/8 | M14x1.5 | 38.0 | 19 | 9.2 | 9.2 |
| **6M16F687OML** | 8, 10 | 3/8 | M16x1.5 | 43.5 | 22 | 9.2 | 9.2 |
| **8M16F687OML** | 12 | 1/2 | M16x1.5 | 48.0 | 22 | 9.2 | 9.2 |
| **10M22F687OML** | 14, 15, 16 | 5/8 | M22x1.5 | 53.0 | 27 | 6.0 | 6.0 |
| **10M27F687OML** | 14, 15, 16 | 5/8 | M27x2 | 57.0 | 32 | 6.0 | 6.0 |
| **12M27F687OML** | 18, 20 | 3/4 | M27x2 | 59.5 | 32 | 6.0 | 6.0 |
| **16M33F687OML** | 22, 25 | 1 | M33x2 | 67.5 | 41 | 6.0 | 6.0 |

# F682EDML

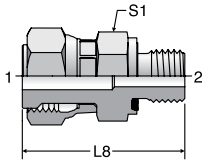
Swivel Metric Connector
ORFS Swivel / Metric-ED




| TUBE FITTING PART # | END SIZE 1 (mm) | 1 (in.) | 2 Metric | L8 (mm) | S1 HEX (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|
| **4M12F682EDML** | 6 | 1/4 | M12x1.5 | 38.2 | 17 | 9.2 | 9.2 |
| **6M14F682EDML** | 8, 10 | 3/8 | M14x1.5 | 40.2 | 19 | 9.2 | 9.2 |
| **8M16F682EDML** | 12 | 1/2 | M16x1.5 | 47.3 | 22 | 9.2 | 9.2 |
| **10M22F682EDML** | 14, 15, 16 | 5/8 | M22X1.5 | 51.8 | 27 | 6.0 | 6.0 |
| **12M27F682EDML** | 18, 20 | 3/4 | M27X2 | 57.2 | 32 | 6.0 | 6.0 |
| **16M33F682EDML** | 22, 25 | 1 | M33X2 | 67.0 | 41 | 6.0 | 6.0 |

# F642EDML

Swivel BSPP Connector
ORFS Swivel / BSPP-ED

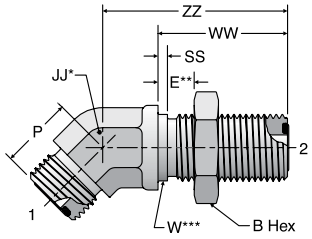



| TUBE FITTING PART # | END SIZE 1 (mm) | 1 (in.) | 2 BSPP | L8 (mm) | S1 HEX (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|
| **4F642EDML** | 6 | 1/4 | 1/8 | 34.0 | 14 | 7.2 | 7.2 |
| **6F642EDML** | 8, 10 | 3/8 | 1/4 | 40.2 | 19 | 9.2 | 9.2 |
| **8F642EDML** | 12 | 1/2 | 3/8 | 47.3 | 22 | 9.2 | 9.2 |
| **10F642EDML** | 14, 15, 16 | 5/8 | 1/2 | 51.8 | 27 | 6.0 | 6.0 |
| **12F642EDML** | 18, 20 | 3/4 | 3/4 | 57.2 | 32 | 6.0 | 6.0 |
| **16F642EDML** | 22, 25 | 1 | 1 | 67.0 | 46 | 6.0 | 6.0 |

# WNLO

45° Bulkhead Union Elbow
ORFS / ORFS

SAE 520801
WNLO-WLNL - Body with Locknut
(See page A11 for WLNL)




| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | B HEX (in.) | E MAX (in.) | JJ (in.) | P (in.) | SS (in.) | W DIA (in.) | WW (in.) | ZZ (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4 WNLO** | 1/4 | 1/4 | 13/16 | 0.55 | 9/16 | 0.63 | 0.06 | 0.56 | 1.24 | 1.73 | 9.2 | 9.2 |
| **6 WNLO** | 3/8 | 3/8 | 1 | 0.55 | 3/4 | 0.75 | 0.06 | 0.69 | 1.34 | 1.91 | 9.2 | 9.2 |
| **8 WNLO** | 1/2 | 1/2 | 1 1/8 | 0.55 | 3/4 | 0.81 | 0.06 | 0.81 | 1.44 | 2.01 | 9.2 | 9.2 |
| **10 WNLO** | 5/8 | 5/8 | 1 5/16 | 0.55 | 1 1/16 | 0.93 | 0.06 | 1.00 | 1.59 | 2.22 | 6.0 | 6.0 |
| **12 WNLO** | 3/4 | 3/4 | 1 1/2 | 0.55 | 1 3/16 | 1.02 | 0.06 | 1.19 | 1.63 | 2.38 | 6.0 | 6.0 |
| **16 WNLO** | 1 | 1 | 1 3/4 | 0.55 | 1 7/16 | 1.18 | 0.06 | 1.44 | 1.65 | 2.56 | 6.0 | 6.0 |
| **20 WNLO** | 1 1/4 | 1 1/4 | 2 | 0.55 | 1 5/8 | 1.26 | 0.06 | 1.69 | 1.65 | 2.64 | 5.0 | 5.0 |
| **24 WNLO** | 1 1/2 | 1 1/2 | 2 3/8 | 0.55 | 1 7/8 | 1.46 | 0.06 | 2.00 | 1.65 | 2.64 | 4.0 | 4.0 |

* JJ – Across wrench flats.

** E – Maximum bulkhead thickness.

*** W – Bulkhead pilot diameter. Recommended clearnace hole is W + 0.015".

Dimensions and pressures for reference only, subject to change.



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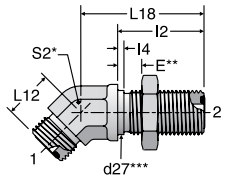
# WNMLO

45° Bulkhead Union Elbow – mm Hex
ORFS / ORFS

ISO 8434-3 BHE45
SAE 52M0801
WNMLO-WLNML - Body with Locknut
(See page A11 for WLNML)




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | (in.) | d27*** (mm) | E (mm) | I2 (mm) | I4 (mm) | L12 (mm) | L18 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **4WNMLO** | 6 | 1/4 | 14.3 | 14 | 31.5 | 1.5 | 16.0 | 44.0 | 14 | 9.2 | 9.2 |
| **6WNMLO** | 8,10 | 3/8 | 17.5 | 14 | 34.0 | 1.5 | 19.0 | 48.5 | 19 | 9.2 | 9.2 |
| **8WNMLO** | 12 | 1/2 | 20.6 | 14 | 36.5 | 1.5 | 20.5 | 51.0 | 19 | 9.2 | 9.2 |
| **10WNMLO** | 14,15,16 | 5/8 | 25.4 | 14 | 40.5 | 1.5 | 23.5 | 56.5 | 27 | 6.0 | 6.0 |
| **12WNMLO** | 18,20 | 3/4 | 30.2 | 14 | 41.5 | 1.5 | 26.0 | 60.5 | 30 | 6.0 | 6.0 |
| **16WNMLO** | 22,25 | 1 | 36.5 | 14 | 42.0 | 1.5 | 30.0 | 65.0 | 36 | 6.0 | 6.0 |
| **20WNMLO** | 28,30,32 | 1 1/4 | 42.9 | 14 | 42.0 | 1.5 | 32.0 | 67.0 | 41 | 5.0 | 5.0 |
| **24WNMLO** | 35,38 | 1 1/2 | 50.8 | 14 | 42.0 | 1.5 | 37.0 | 67.0 | 50 | 4.0 | 4.0 |

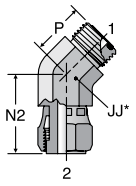
* S2 – Across Wrench Flats.

** E – Maximum bulkhead thickness.

***d27 – Bulkhead pilot diameter. Recommended clerance hole is d27 + 0.4 mm.

# V6LO

45° Swivel Nut Elbow
ORFS / ORFS Swivel



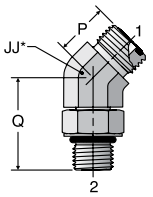

* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | JJ (in.) | N2 (in.) | P (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|
| **4 V6LO** | 1/4 | 9/16 | 0.99 | 0.63 | 9.2 | 9.2 |
| **6 V6LO** | 3/8 | 3/4 | 1.12 | 0.74 | 9.2 | 9.2 |
| **8 V6LO** | 1/2 | 3/4 | 1.49 | 0.80 | 9.2 | 9.2 |
| **10 V6LO** | 5/8 | 1 1/16 | 1.53 | 0.92 | 6.0 | 6.0 |
| **12 V6LO** | 3/4 | 1 3/16 | 1.73 | 1.02 | 6.0 | 6.0 |
| **16 V6LO** | 1 | 1 7/16 | 1.87 | 1.18 | 6.0 | 6.0 |
| **20 V6LO** | 1 1/4 | 1 5/8 | 1.98 | 1.26 | 5.0 | 5.0 |
| **24 V6LO** | 1 1/2 | 1 7/8 | 2.06 | 1.45 | 4.0 | 4.0 |

# V5OLO

45° Straight Thread Elbow
ORFS / SAE-ORB

SAE 520320



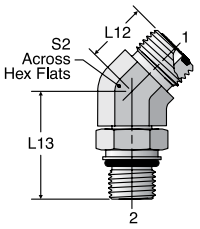

* JJ – Across Hex Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 UN/UNF-2A | JJ (in.) | P (in.) | Q (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|
| **4 V5OLO** | 1/4 | 7/16 - 20 | 9/16 | 0.63 | 1.18 | 6.0 | 6.0 |
| **4-6 V5OLO** | 1/4 | 9/16 - 18 | 3/4 | 0.69 | 1.30 | 6.0 | 6.0 |
| **6 V5OLO** | 3/8 | 9/16 - 18 | 3/4 | 0.75 | 1.30 | 6.0 | 6.0 |
| **6-4 V5OLO** | 3/8 | 7/16 - 20 | 3/4 | 0.75 | 1.22 | 6.0 | 6.0 |
| **6-8 V5OLO** | 3/8 | 3/4 - 16 | 3/4 | 0.75 | 1.44 | 6.0 | 6.0 |
| **8 V5OLO** | 1/2 | 3/4 - 16 | 3/4 | 0.81 | 1.44 | 6.0 | 6.0 |
| **8-6 V5OLO** | 1/2 | 9/16 - 18 | 3/4 | 0.81 | 1.28 | 6.0 | 6.0 |
| **8-10 V5OLO** | 1/2 | 7/8 - 14 | 3/4 | 0.85 | 1.75 | 6.0 | 6.0 |
| **10 V5OLO** | 5/8 | 7/8 - 14 | 1 1/16 | 0.93 | 1.75 | 6.0 | 6.0 |
| **10-8 V5OLO** | 5/8 | 3/4 - 16 | 1 1/16 | 0.93 | 1.57 | 6.0 | 6.0 |
| **10-12 V5OLO** | 5/8 | 1 1/16 - 12 | 1 3/16 | 0.96 | 1.97 | 6.0 | 6.0 |
| **12 V5OLO** | 3/4 | 1 1/16 - 12 | 1 3/16 | 1.02 | 1.97 | 6.0 | 6.0 |
| **12-10 V5OLO** | 3/4 | 7/8 - 14 | 1 3/16 | 1.02 | 1.81 | 6.0 | 6.0 |
| **12-16 V5OLO** | 3/4 | 1 5/16 - 12 | 1 7/16 | 1.16 | 2.07 | 5.5 | 5.5 |
| **16 V5OLO** | 1 | 1 5/16 - 12 | 1 7/16 | 1.18 | 2.07 | 5.5 | 5.5 |
| **16-10 V5OLO** | 1 | 7/8 - 14 | 1 7/16 | 1.18 | 2.03 | 6.0 | 6.0 |
| **16-12 V5OLO** | 1 | 1 1/16 - 12 | 1 7/16 | 1.18 | 2.03 | 6.0 | 6.0 |
| **16-20 V5OLO** | 1 | 1 5/8 - 12 | 1 5/8 | 1.26 | 2.11 | 4.0 | 4.0 |
| **20 V5OLO** | 1 1/4 | 1 5/8 - 12 | 1 5/8 | 1.26 | 2.11 | 4.0 | 4.0 |
| **24 V5OLO** | 1 1/2 | 1 7/8 - 12 | 1 7/8 | 1.46 | 2.11 | 4.0 | 4.0 |

# V87OMLO

45° Metric Straight Thread Elbow
ORFS / ISO 6149

ISO 8434-3 SDE45
SAE 52M0387




* S2 – Across Hex Flats

| TUBE FITTING PART # | END SIZE 1 (mm) | (in.) | 2 ISO 261 | L12 (mm) | L13 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|---|
| **4M12V87OMLO** | 6 | 1/4 | M12X1.5 | 16.0 | 30.0 | 14 | 6.0 | 6.0 |
| **4M14V87OMLO** | 6 | 1/4 | M14X1.5 | 17.5 | 31.5 | 17 | 6.0 | 6.0 |
| **6M16V87OMLO** | 8,10 | 3/8 | M16X1.5 | 19.0 | 33.5 | 19 | 6.0 | 6.0 |
| **8M18V87OMLO** | 12 | 1/2 | M18X1.5 | 20.5 | 37.0 | 19 | 6.0 | 6.0 |
| **10M22V87OMLO** | 14,15,16 | 5/8 | M22X1.5 | 23.5 | 44.0 | 27 | 6.0 | 6.0 |
| **12M27V87OMLO** | 18,20 | 3/4 | M27X2 | 26.0 | 50.5 | 27 | 6.0 | 6.0 |
| **16M33V87OMLO** | 22,25 | 1 | M33X2 | 30.0 | 52.5 | 36 | 5.0 | 5.0 |
| **20M42V87OMLO** | 28,30,32 | 1 1/4 | M42X2 | 32.0 | 54.0 | 41 | 4.0 | 4.0 |
| **24M48V87OMLO** | 35,38 | 1 1/2 | M48X2 | 37.0 | 56.5 | 50 | 4.0 | 4.0 |

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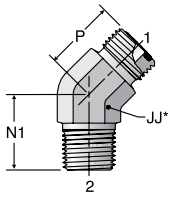
Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# VLO

45° Male Elbow
ORFS / NPTF

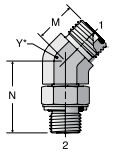



* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | JJ (in.) | N1 (in.) | P (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 VLO** | 1/4 | 1/8 - 27 | 9/16 | 0.64 | 0.63 | 6.0 | 6.0 |
| **4-4 VLO** | 1/4 | 1/4 - 18 | 9/16 | 0.86 | 0.68 | 6.0 | 6.0 |
| **6 VLO** | 3/8 | 1/4 - 18 | 3/4 | 0.87 | 0.74 | 6.0 | 6.0 |
| **6-6 VLO** | 3/8 | 3/8 - 18 | 3/4 | 0.87 | 0.74 | 6.0 | 6.0 |
| **8 VLO** | 1/2 | 3/8 - 18 | 3/4 | 0.95 | 0.80 | 6.0 | 6.0 |
| **8-8 VLO** | 1/2 | 1/2 - 14 | 7/8 | 1.17 | 0.86 | 6.0 | 6.0 |
| **10 VLO** | 5/8 | 1/2 - 14 | 1 1/16 | 1.17 | 0.92 | 6.0 | 6.0 |
| **12 VLO** | 3/4 | 3/4 - 14 | 1 5/16 | 1.30 | 1.02 | 4.0 | 4.0 |
| **16 VLO** | 1 | 1 - 11 1/2 | 1 7/16 | 1.48 | 1.18 | 3.0 | 3.0 |
| **20 VLO** | 1 1/4 | 1 1/4 - 11 1/2 | 1 5/8 | 1.67 | 1.26 | 2.5 | 2.5 |

# V4OMLO

Male 45° Elbow – BSPP
(for ISO 1179-1 Port)
ORFS / BSPP-ORR



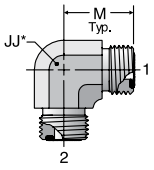

* Y – Across Hex Flats

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 BSPP | M (mm) | N (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|
| **4V4OMLO** | 6 | 1/4 | 1/8 - 28 | 16.0 | 27.5 | 14 | 4.0 | 4.0 |
| **4-4V4OMLO** | 6 | 1/4 | 1/4 - 19 | 17.5 | 32.0 | 19 | 4.0 | 4.0 |
| **6V4OMLO** | 8,10 | 3/8 | 1/4 - 19 | 19.0 | 32.0 | 19 | 4.0 | 4.0 |
| **6-6V4OMLO** | 8,10 | 3/8 | 3/8 - 19 | 19.0 | 33.5 | 19 | 4.0 | 4.0 |
| **6-8V4OMLO** | 8,10 | 3/8 | 1/2 - 14 | 19.5 | 43.5 | 27 | 4.0 | 4.0 |
| **8V4OMLO** | 12 | 1/2 | 3/8 - 19 | 20.5 | 33.5 | 19 | 4.0 | 4.0 |
| **8-8V4OMLO** | 12 | 1/2 | 1/2 - 14 | 21.0 | 43.5 | 27 | 4.0 | 4.0 |
| **10V4OMLO** | 14,15,16 | 5/8 | 1/2 - 14 | 23.5 | 43.5 | 27 | 4.0 | 4.0 |
| **10-12V4OMLO** | 14,15,16 | 5/8 | 3/4 - 14 | 24.5 | 46.5 | 30 | 4.0 | 4.0 |
| **12V4OMLO** | 18,20 | 3/4 | 3/4 - 14 | 26.0 | 46.5 | 30 | 4.0 | 4.0 |
| **12-16V4OMLO** | 18,20 | 3/4 | 1 - 11 | 26.0 | 51.0 | 37 | 4.0 | 4.0 |
| **16V4OMLO** | 22,25 | 1 | 1 - 11 | 30.0 | 51.0 | 37 | 4.0 | 4.0 |

# ELO

Union Elbow
ORFS / ORFS

SAE 520201




* JJ – Across Wrench Flats

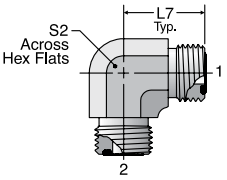
| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | JJ (in.) | M (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 ELO** | 1/4 | 1/4 | 9/16 | 0.85 | 9.2 | 9.2 |
| **6 ELO** | 3/8 | 3/8 | 3/4 | 0.98 | 9.2 | 9.2 |
| **8 ELO** | 1/2 | 1/2 | 3/4 | 1.10 | 9.2 | 9.2 |
| **10 ELO** | 5/8 | 5/8 | 1 1/16 | 1.32 | 6.0 | 6.0 |
| **12 ELO** | 3/4 | 3/4 | 1 3/16 | 1.48 | 6.0 | 6.0 |
| **16 ELO** | 1 | 1 | 1 7/16 | 1.63 | 6.0 | 6.0 |
| **20 ELO** | 1 1/4 | 1 1/4 | 1 5/8 | 1.75 | 5.0 | 5.0 |
| **24 ELO** | 1 1/2 | 1 1/2 | 1 7/8 | 1.93 | 4.0 | 4.0 |
| **32 ELO*** | 2 | 2 | 2 1/2 | 2.76 | 3.0 | 3.0 |

** Size 32 is not included in SAE J1453.

# EMLO

Union Elbow – mm Hex
ORFS / ORFS

ISO 8434-3 E
SAE 52M0201




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 1 & 2 (in.) | L7 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|
| **4EMLO** | 6 | 1/4 | 21.5 | 14 | 9.2 | 9.2 |
| **6EMLO** | 8,10 | 3/8 | 25.0 | 19 | 9.2 | 9.2 |
| **8EMLO** | 12 | 1/2 | 28.0 | 19 | 9.2 | 9.2 |
| **10EMLO** | 14,15,16 | 5/8 | 33.5 | 27 | 6.0 | 6.0 |
| **12EMLO** | 18,20 | 3/4 | 37.5 | 30 | 6.0 | 6.0 |
| **16EMLO** | 22,25 | 1 | 41.5 | 36 | 6.0 | 6.0 |
| **20EMLO** | 28,30,32 | 1 1/4 | 44.5 | 41 | 5.0 | 5.0 |
| **24EMLO** | 35,38 | 1 1/2 | 49.0 | 50 | 4.0 | 4.0 |

Dimensions and pressures for reference only, subject to change.

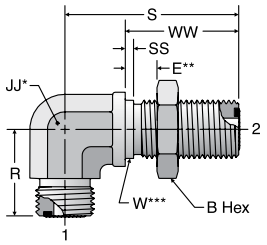


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# WELO

Bulkhead Union Elbow
ORFS / ORFS

SAE 520701
WELO-WLNL - Body with Locknut
(See page A11 for WLNL)




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | B HEX (in.) | E MAX (in.) | JJ (in.) | R (in.) | S (in.) | SS (in.) | W (in.) | WW (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4 WELO** | 1/4 | 1/4 | 13/16 | 0.55 | 9/16 | 0.89 | 1.85 | 0.06 | 0.56 | 1.24 | 9.2 | 9.2 |
| **6 WELO** | 3/8 | 3/8 | 1 | 0.55 | 3/4 | 1.02 | 2.05 | 0.06 | 0.69 | 1.34 | 9.2 | 9.2 |
| **8 WELO** | 1/2 | 1/2 | 1 1/8 | 0.55 | 3/4 | 1.14 | 2.19 | 0.06 | 0.81 | 1.44 | 9.2 | 9.2 |
| **10 WELO** | 5/8 | 5/8 | 1 5/16 | 0.55 | 1 1/16 | 1.36 | 2.48 | 0.06 | 1.00 | 1.59 | 6.0 | 6.0 |
| **12 WELO** | 3/4 | 3/4 | 1 1/2 | 0.55 | 1 3/16 | 1.52 | 2.64 | 0.06 | 1.19 | 1.63 | 6.0 | 6.0 |
| **16 WELO** | 1 | 1 | 1 3/4 | 0.55 | 1 7/16 | 1.67 | 2.80 | 0.06 | 1.44 | 1.65 | 6.0 | 6.0 |
| **20 WELO** | 1 1/4 | 1 1/4 | 2 | 0.55 | 1 5/8 | 1.79 | 2.97 | 0.06 | 1.69 | 1.65 | 5.0 | 5.0 |
| **24 WELO** | 1 1/2 | 1 1/2 | 2 3/8 | 0.55 | 1 7/8 | 1.95 | 3.13 | 0.06 | 2.00 | 1.65 | 4.0 | 4.0 |

* JJ – Across wrench flats.

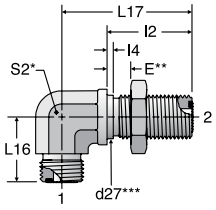
** E – Maximum bulkhead thickness.

*** W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

# WEMLO

Bulkhead Union Elbow – mm Hex
ORFS / ORFS

ISO 8434-3 BHE
SAE 52M0701
WEMLOWLNML - Body with Locknut
(See page A11 for WLNML)




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 1 & 2 (in.) | d27*** (mm) | E (mm) | l2 (mm) | l4 (mm) | L16 (mm) | L17 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **4WEMLO** | 6 | 1/4 | 14.3 | 14 | 31.5 | 1.5 | 22.5 | 47.0 | 14 | 9.2 | 9.2 |
| **6WEMLO** | 8,10 | 3/8 | 17.5 | 14 | 34.0 | 1.5 | 26.0 | 52.0 | 19 | 9.2 | 9.2 |
| **8WEMLO** | 12 | 1/2 | 20.6 | 14 | 36.5 | 2.5 | 29.0 | 55.5 | 19 | 9.2 | 9.2 |
| **10WEMLO** | 14,15,16 | 5/8 | 25.4 | 14 | 40.5 | 2.5 | 34.5 | 63.0 | 27 | 6.0 | 6.0 |
| **12WEMLO** | 18,20 | 3/4 | 30.2 | 14 | 41.5 | 3.0 | 38.5 | 67.0 | 30 | 6.0 | 6.0 |
| **16WEMLO** | 22,25 | 1 | 36.5 | 14 | 42.0 | 3.0 | 42.5 | 71.0 | 36 | 6.0 | 6.0 |
| **20WEMLO** | 28,30,32 | 1 1/4 | 42.9 | 14 | 42.0 | 3.0 | 45.5 | 75.5 | 41 | 5.0 | 5.0 |
| **24WEMLO** | 35,38 | 1 1/2 | 50.8 | 14 | 42.0 | 3.0 | 49.5 | 79.5 | 50 | 4.0 | 4.0 |

* S2 – Across wrench flats.

** E – Maximum bulkhead thickness.

***d27 - Bulkhead pilot diameter. Recommended clearance is d27 + 0.4 mm.

Dimensions and pressures for reference only, subject to change.

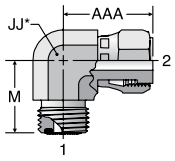


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# C6LO

Swivel Nut Elbow
ORFS / ORFS Swivel

SAE 520221



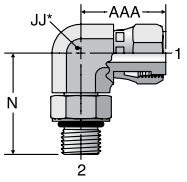

* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | AAA (in.) | JJ (in.) | M (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 C6LO** | 1/4 | 1/4 | 1.07 | 9/16 | 0.85 | 9.2 | 9.2 |
| **6 C6LO** | 3/8 | 3/8 | 1.17 | 3/4 | 0.98 | 9.2 | 9.2 |
| **8 C6LO** | 1/2 | 1/2 | 1.50 | 3/4 | 1.10 | 9.2 | 9.2 |
| **10 C6LO** | 5/8 | 5/8 | 1.61 | 1 1/16 | 1.32 | 6.0 | 6.0 |
| **12 C6LO** | 3/4 | 3/4 | 1.83 | 1 3/16 | 1.48 | 6.0 | 6.0 |
| **16 C6LO** | 1 | 1 | 2.11 | 1 7/16 | 1.64 | 6.0 | 6.0 |
| **20 C6LO** | 1 1/4 | 1 1/4 | 2.28 | 1 5/8 | 1.75 | 5.0 | 5.0 |
| **24 C6LO** | 1 1/2 | 1 1/2 | 2.41 | 1 7/8 | 1.92 | 4.0 | 4.0 |

# AOEL6

Straight Thread Swivel Elbow
ORFS Swivel / SAE-ORB

SAE 520281



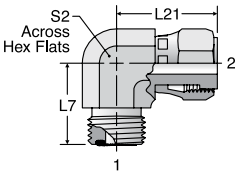

* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | AAA (in.) | JJ (in.) | N (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 AOEL6** | 1/4 | 7/16 - 20 | 1.04 | 9/16 | 1.30 | 6.0 | 6.0 |
| **6 AOEL6** | 3/8 | 9/16 - 18 | 1.17 | 3/4 | 1.46 | 6.0 | 6.0 |
| **8 AOEL6** | 1/2 | 3/4 - 16 | 1.50 | 3/4 | 1.59 | 6.0 | 6.0 |
| **10 AOEL6** | 5/8 | 7/8 - 14 | 1.65 | 1 1/16 | 1.97 | 6.0 | 6.0 |
| **12 AOEL6** | 3/4 | 1 1/16 - 12 | 1.79 | 1 1/16 | 2.17 | 6.0 | 6.0 |
| **16 AOEL6** | 1 | 1 5/16 - 12 | 2.07 | 1 5/16 | 2.34 | 5.5 | 5.5 |
| **20 AOEL6** | 1 1/4 | 1 5/8 - 12 | 2.28 | 1 5/8 | 2.44 | 4.0 | 4.0 |
| **24 AOEL6** | 1 1/2 | 1 7/8 - 12 | 2.40 | 1 7/8 | 2.60 | 4.0 | 4.0 |

# C6MLO

Swivel Nut Elbow – mm Hex
ORFS / ORFS Swivel

ISO 8434-3 SWE
SAE 52M0221



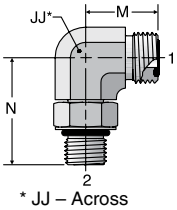

* S2 – Across Hex Flats

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 (in.) | L7 (mm) | L21 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|
| **4C6MLO** | 6 | 1/4 | 21.5 | 27.2 | 14 | 9.2 | 9.2 |
| **6C6MLO** | 8,10 | 3/8 | 25.0 | 29.7 | 19 | 9.2 | 9.2 |
| **8C6MLO** | 12 | 1/2 | 28.0 | 38.0 | 19 | 9.2 | 9.2 |
| **10C6MLO** | 14,15,16 | 5/8 | 33.5 | 41.0 | 27 | 6.0 | 6.0 |
| **12C6MLO** | 18,20 | 3/4 | 37.5 | 46.5 | 30 | 6.0 | 6.0 |
| **16C6MLO** | 22,25 | 1 | 41.6 | 53.5 | 36 | 6.0 | 6.0 |
| **20C6MLO** | 28,30,32 | 1 1/4 | 44.5 | 58.0 | 41 | 4.0 | 4.0 |
| **24C6MLO** | 35,38 | 1 1/2 | 48.8 | 61.0 | 50 | 4.0 | 4.0 |

# C5OLO

Straight Thread Elbow
ORFS / SAE-ORB

SAE 520220




* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | JJ (in.) | M (in.) | N (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 C5OLO** | 1/4 | 7/16 - 20 | 9/16 | 0.85 | 1.30 | 6.0 | 6.0 |
| **4-6 C5OLO*** ** | 1/4 | 9/16 - 18 | 9/16 | 0.93 | 1.46 | 6.0 | 6.0 |
| **4-8 C5OLO** | 1/4 | 3/4 - 16 | 3/4 | 0.98 | 1.59 | 6.0 | 6.0 |
| **6 C5OLO** | 3/8 | 9/16 - 18 | 3/4 | 0.98 | 1.46 | 6.0 | 6.0 |
| **6-4 C5OLO** | 3/8 | 7/16 - 20 | 3/4 | 0.98 | 1.38 | 6.0 | 6.0 |
| **6-5 C5OLO** | 3/8 | 1/2 - 20 | 3/4 | 0.98 | 1.38 | 6.0 | 6.0 |
| **6-8 C5OLO** | 3/8 | 3/4 - 16 | 3/4 | 1.04 | 1.59 | 6.0 | 6.0 |
| **6-10 C5OLO*** ** | 3/8 | 7/8 - 14 | 7/8 | 1.15 | 1.97 | 6.0 | 6.0 |
| **6-12 C5OLO** | 3/8 | 1 1/16 - 12 | 1 1/16 | 1.28 | 2.17 | 6.0 | 6.0 |
| **8 C5OLO** | 1/2 | 3/4 - 16 | 3/4 | 1.10 | 1.59 | 6.0 | 6.0 |
| **8-6 C5OLO** | 1/2 | 9/16 - 18 | 3/4 | 1.10 | 1.44 | 6.0 | 6.0 |
| **8-10 C5OLO*** ** | 1/2 | 7/8 - 14 | 7/8 | 1.21 | 1.97 | 6.0 | 6.0 |
| **8-12 C5OLO** | 1/2 | 1 1/16 - 12 | 1 3/16 | 1.32 | 2.17 | 6.0 | 6.0 |
| **10 C5OLO** | 5/8 | 7/8 - 14 | 1 1/16 | 1.32 | 1.97 | 6.0 | 6.0 |
| **10-8 C5OLO** | 5/8 | 3/4 - 16 | 1 1/16 | 1.32 | 1.81 | 6.0 | 6.0 |
| **10-12 C5OLO** | 5/8 | 1 1/16 - 12 | 1 3/16 | 1.42 | 2.17 | 6.0 | 6.0 |
| **12 C5OLO** | 3/4 | 1 1/16 - 12 | 1 3/16 | 1.48 | 2.17 | 6.0 | 6.0 |
| **12-8 C5OLO** | 3/4 | 3/4 - 16 | 1 3/16 | 1.48 | 1.83 | 6.0 | 6.0 |
| **12-10 C5OLO** | 3/4 | 7/8 - 14 | 1 3/16 | 1.48 | 2.01 | 6.0 | 6.0 |
| **12-16 C5OLO** | 3/4 | 1 5/16 - 12 | 1 7/16 | 1.61 | 2.34 | 5.5 | 5.5 |
| **16 C5OLO** | 1 | 1 5/16 - 12 | 1 7/16 | 1.63 | 2.34 | 5.5 | 5.5 |
| **16-12 C5OLO** | 1 | 1 1/16 - 12 | 1 7/16 | 1.63 | 2.30 | 6.0 | 6.0 |
| **16-20 C5OLO** | 1 | 1 5/8 - 12 | 1 5/8 | 1.75 | 2.44 | 4.0 | 4.0 |
| **20 C5OLO** | 1 1/4 | 1 5/8 - 12 | 1 5/8 | 1.75 | 2.44 | 4.0 | 4.0 |
| **20-16 C5OLO** | 1 1/4 | 1 5/16 - 12 | 1 5/8 | 1.75 | 2.44 | 4.0 | 4.0 |
| **20-24 C5OLO** | 1 1/4 | 1 7/8 - 12 | 1 7/8 | 1.93 | 2.60 | 4.0 | 4.0 |
| **24 C5OLO** | 1 1/2 | 1 7/8 - 12 | 1 7/8 | 1.93 | 2.60 | 4.0 | 4.0 |
| **24-20 C5OLO** | 1 1/2 | 1 5/8 - 12 | 1 7/8 | 1.93 | 2.60 | 4.0 | 4.0 |
| **32 C5OLO**** | 2 | 2 1/2 - 12 | 2 1/2 | 2.76 | 3.07 | 2.5 | 2.5 |

** Size 32 is not included in SAE J1453.
*** JJ for these parts does not conform to SAE.

Dimensions and pressures for reference only, subject to change.

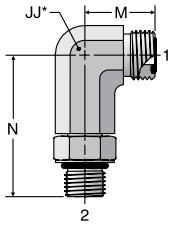


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# CC5OLO

Long Straight Thread Elbow
ORFS-Long / SAE-ORB

SAE 521520

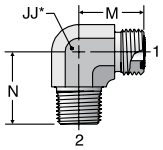



* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN-UNF-2A | JJ (in.) | M (in.) | N (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|
| **4 CC5OLO** | 1/4 | 7/16 - 20 | 9/16 | 0.85 | 2.22 | 6.0 | 6.0 |
| **6 CC5OLO** | 3/8 | 9/16 - 18 | 3/4 | 0.98 | 2.62 | 6.0 | 6.0 |
| **8 CC5OLO** | 1/2 | 3/4 - 16 | 3/4 | 1.10 | 2.95 | 6.0 | 6.0 |
| **10 CC5OLO** | 5/8 | 7/8 - 14 | 1 1/16 | 1.32 | 3.50 | 6.0 | 6.0 |
| **12 CC5OLO** | 3/4 | 1 1/16 - 12 | 1 5/16 | 1.48 | 3.98 | 6.0 | 6.0 |
| **16 CC5OLO** | 1 | 1 5/16 - 12 | 1 5/8 | 1.63 | 4.49 | 5.5 | 5.5 |

# CLO

Male Pipe Elbow
ORFS / NPTF



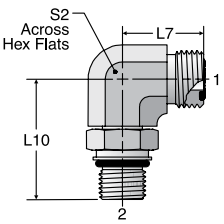

* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | JJ (in.) | M (in.) | N (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|
| **4 CLO** | 1/4 | 1/8 - 27 | 9/16 | 0.85 | 0.80 | 6.0 | 6.0 |
| **4-4 CLO** | 1/4 | 1/4 - 18 | 9/16 | 0.85 | 1.12 | 6.0 | 6.0 |
| **4-6 CLO** | 1/4 | 3/8 - 18 | 3/4 | 0.97 | 1.22 | 6.0 | 6.0 |
| **4-8 CLO** | 1/4 | 1/2 - 14 | 7/8 | 1.07 | 1.47 | 6.0 | 6.0 |
| **6 CLO** | 3/8 | 1/4 - 18 | 3/4 | 0.98 | 1.09 | 6.0 | 6.0 |
| **6-6 CLO** | 3/8 | 3/8 - 18 | 3/4 | 0.98 | 1.22 | 6.0 | 6.0 |
| **6-8 CLO** | 3/8 | 1/2 - 14 | 7/8 | 1.15 | 1.47 | 6.0 | 6.0 |
| **8 CLO** | 1/2 | 3/8 - 18 | 3/4 | 1.10 | 1.22 | 6.0 | 6.0 |
| **8-4 CLO** | 1/2 | 1/4 - 18 | 3/4 | 1.10 | 1.22 | 6.0 | 6.0 |
| **8-8 CLO** | 1/2 | 1/2 - 14 | 7/8 | 1.10 | 1.47 | 6.0 | 6.0 |
| **8-12 CLO** | 1/2 | 3/4 - 14 | 1 1/16 | 1.32 | 1.59 | 4.0 | 4.0 |
| **10 CLO** | 5/8 | 1/2 - 14 | 1 1/16 | 1.31 | 1.47 | 6.0 | 6.0 |
| **10-6 CLO** | 5/8 | 3/8 - 18 | 1 1/16 | 1.31 | 1.28 | 6.0 | 6.0 |
| **10-12 CLO** | 5/8 | 3/4 - 14 | 1 3/16 | 1.41 | 1.59 | 4.0 | 4.0 |
| **12 CLO** | 3/4 | 3/4 - 14 | 1 3/16 | 1.47 | 1.59 | 4.0 | 4.0 |
| **12-8 CLO** | 3/4 | 1/2 - 14 | 1 3/16 | 1.47 | 1.59 | 6.0 | 6.0 |
| **12-16 CLO** | 3/4 | 1 - 11 1/2 | 1 5/16 | 1.62 | 1.97 | 3.0 | 3.0 |
| **16 CLO** | 1 | 1 - 11 1/2 | 1 7/16 | 1.64 | 1.97 | 3.0 | 3.0 |
| **16-12 CLO** | 1 | 3/4 - 14 | 1 7/16 | 1.64 | 1.78 | 4.0 | 4.0 |
| **20 CLO** | 1 1/4 | 1 1/4 - 11 1/2 | 1 5/8 | 1.76 | 2.38 | 2.5 | 2.5 |
| **24 CLO** | 1 1/2 | 1 1/2 - 11 1/2 | 1 7/8 | 1.92 | 2.64 | 2.5 | 2.5 |
| **24-20 CLO** | 1 1/2 | 1 1/4 - 11 1/2 | 1 7/8 | 1.92 | 2.61 | 2.5 | 2.5 |

# C87OMLO

90° Metric Straight Thread Elbow
ORFS / ISO 6149

ISO 8434-3 SDE
SAE 52M0287




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 ISO 261 | L7 (mm) | L10 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|---|
| **4M12C87OMLO** | 6 | 1/4 | M12X1.5 | 21.5 | 33.0 | 14 | 6.0 | 6.0 |
| **4M14C87OMLO** | 6 | 1/4 | M14X1.5 | 23.5 | 35.5 | 17 | 6.0 | 6.0 |
| **6M12C87OMLO** | 8,10 | 3/8 | M12X1.5 | 25.0 | 35.5 | 19 | 6.0 | 6.0 |
| **6M14C87OMLO** | 8,10 | 3/8 | M14X1.5 | 25.0 | 35.5 | 19 | 6.0 | 6.0 |
| **6M16C87OMLO** | 8,10 | 3/8 | M16X1.5 | 25.0 | 37.5 | 19 | 6.0 | 6.0 |
| **8M14C87OMLO** | 12 | 1/2 | M14X1.5 | 28.0 | 36.0 | 19 | 6.0 | 6.0 |
| **8M18C87OMLO** | 12 | 1/2 | M18X1.5 | 28.0 | 41.0 | 19 | 6.0 | 6.0 |
| **8M22C87OMLO** | 12 | 1/2 | M22X1.5 | 31.0 | 49.0 | 27 | 6.0 | 6.0 |
| **10M18C87OMLO** | 14,15,16 | 5/8 | M18X1.5 | 33.5 | 47.5 | 27 | 6.0 | 6.0 |
| **10M22C87OMLO** | 14,15,16 | 5/8 | M22X1.5 | 33.5 | 49.0 | 27 | 6.0 | 6.0 |
| **12M22C87OMLO** | 18,20 | 3/4 | M22X1.5 | 37.5 | 49.0 | 27 | 6.0 | 6.0 |
| **12M27C87OMLO** | 18,20 | 3/4 | M27X2 | 37.5 | 55.5 | 27 | 6.0 | 6.0 |
| **16M33C87OMLO** | 22,25 | 1 | M33X2 | 41.5 | 59.5 | 36 | 5.0 | 5.0 |
| **20M38C87OMLO*** | 28,30,32 | 1 1/4 | M38X2 | 44.5 | 62.0 | 41 | 4.0 | 4.0 |
| **20M42C87OMLO** | 28,30,32 | 1 1/4 | M42X2 | 44.5 | 63.0 | 41 | 4.0 | 4.0 |
| **24M48C87OMLO** | 35,38 | 1 1/2 | M48X2 | 49.0 | 71.5 | 50 | 4.0 | 4.0 |

* For special M38x2 (ISO 6149-1 style) port. The current ISO 6149 does not include the M38 size.

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VISUAL INDEX

Dimensions and pressures for reference only, subject to change.

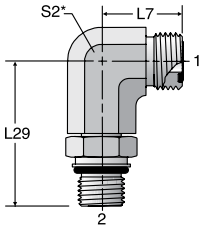


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# CC87OMLO

Long 90° Metric Straight Thread Elbow
ORFS-Long / ISO 6149

ISO 8434-3 SDEL
SAE 52M1587

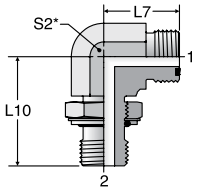



* S2 – Across Hex Flats

| TUBE FITTING PART # | END SIZE 1 (mm) | 1 (in.) | 2 ISO 261 | L7 (mm) | L29 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|---|
| **4M12CC87OMLO** | 6 | 1/4 | M12X1.5 | 21.5 | 56.5 | 14 | 6.0 | 6.0 |
| **6M14CC87OMLO** | 8,10 | 3/8 | M14X1.5 | 25.0 | 56.5 | 17 | 6.0 | 6.0 |
| **6M16CC87OMLO** | 8,10 | 3/8 | M16X1.5 | 25.0 | 66.5 | 17 | 6.0 | 6.0 |
| **8M18CC87OMLO** | 12 | 1/2 | M18X1.5 | 28.0 | 75.0 | 19 | 6.0 | 6.0 |
| **8M22CC87OMLO** | 12 | 1/2 | M22X1.5 | 31.5 | 88.0 | 27 | 6.0 | 6.0 |
| **10M22CC87OMLO** | 14,15,16 | 5/8 | M22X1.5 | 33.5 | 88.0 | 27 | 6.0 | 6.0 |
| **12M27CC87OMLO** | 18,20 | 3/4 | M27X2 | 37.5 | 100.5 | 27 | 6.0 | 6.0 |
| **16M33CC87OMLO** | 22,25 | 1 | M33X2 | 41.5 | 114.5 | 36 | 5.0 | 5.0 |
| **20M42CC87OMLO** | 28,30,32 | 1 1/4 | M42X2 | 44.5 | 126.5 | 41 | 4.0 | 4.0 |

# C8OMLO

Metric Straight Thread Elbow
ORFS / Metric-ORR




* S2 – Across Hex Flats

| TUBE FITTING PART # | END SIZE 1 (mm) | 1 (in.) | 2 ISO 261 | L7 (mm) | L10 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|---|
| **4M12C8OMLO** | 6 | 1/4 | M12X1.5 | 21.5 | 33.0 | 14 | 3.6 | 3.6 |
| **6M12C8OMLO** | 8, 10 | 3/8 | M12X1.5 | 25.0 | 35.5 | 17 | 3.6 | 3.6 |
| **6M14C8OMLO** | 8, 10 | 3/8 | M14X1.5 | 25.0 | 35.5 | 17 | 3.6 | 3.6 |
| **6M16C8OMLO** | 8, 10 | 3/8 | M16X1.5 | 25.0 | 37.5 | 17 | 3.6 | 3.6 |
| **8M14C8OMLO** | 12 | 1/2 | M14X1.5 | 28.0 | 36.0 | 19 | 3.6 | 3.6 |
| **8M18C8OMLO** | 12 | 1/2 | M18X1.5 | 28.0 | 41.0 | 19 | 3.6 | 3.6 |
| **8M22C8OMLO** | 12 | 1/2 | M22X1.5 | 31.5 | 49.0 | 27 | 3.6 | 3.6 |
| **10M22C8OMLO** | 14, 15, 16 | 5/8 | M22X1.5 | 33.5 | 49.0 | 27 | 3.6 | 3.6 |
| **12M27C8OMLO** | 18, 20 | 3/4 | M27X2 | 37.5 | 55.5 | 30 | 3.6 | 3.6 |
| **16M33C8OMLO** | 22, 25 | 1 | M33X2 | 41.5 | 59.5 | 36 | 2.5 | 2.5 |
| **20M38C8OMLO** | 28, 30, 32 | 1 1/4 | M38X2 | 44.5 | 62.0 | 41 | 2.5 | 2.5 |
| **20M42C8OMLO** | 28, 30, 32 | 1 1/4 | M42X2 | 44.5 | 63.0 | 41 | 2.5 | 2.5 |

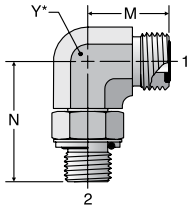
Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# C4OMLO

Male Elbow – BSPP
(for ISO 1179-1 Port)
ORFS / BSPP-ORR



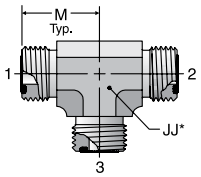

* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 BSPP | M (mm) | N (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|
| **4C4OMLO** | 6 | 1/4 | 1/8 - 28 | 21.5 | 30.0 | 14 | 4.0 | 4.0 |
| **4-4C4OMLO** | 6 | 1/4 | 1/4 - 19 | 23.5 | 36.0 | 19 | 4.0 | 4.0 |
| **4-6C4OMLO** | 6 | 1/4 | 3/8 - 19 | 24.5 | 38.0 | 19 | 4.0 | 4.0 |
| **6C4OMLO** | 8,10 | 3/8 | 1/4 - 19 | 25.0 | 36.0 | 19 | 4.0 | 4.0 |
| **6-6C4OMLO** | 8,10 | 3/8 | 3/8 - 19 | 26.5 | 38.0 | 19 | 4.0 | 4.0 |
| **8-4C4OMLO** | 12 | 1/2 | 1/4 - 19 | 28.0 | 35.5 | 19 | 4.0 | 4.0 |
| **8C4OMLO** | 12 | 1/2 | 3/8 - 19 | 28.0 | 38.0 | 19 | 4.0 | 4.0 |
| **8-8C4OMLO** | 12 | 1/2 | 1/2 - 14 | 31.0 | 48.5 | 27 | 4.0 | 4.0 |
| **8-12C4OMLO** | 12 | 1/2 | 3/4 - 14 | 33.5 | 51.5 | 30 | 4.0 | 4.0 |
| **10-6C4OMLO** | 14,15,16 | 5/8 | 3/8 - 19 | 33.5 | 40.5 | 27 | 4.0 | 4.0 |
| **10C4OMLO** | 14,15,16 | 5/8 | 1/2 - 14 | 33.5 | 48.5 | 27 | 4.0 | 4.0 |
| **10-12C4OMLO** | 14,15,16 | 5/8 | 3/4 - 14 | 36.0 | 51.5 | 30 | 4.0 | 4.0 |
| **10-16C4OMLO** | 14,15,16 | 5/8 | 1 - 11 | 39.5 | 58.5 | 36 | 4.0 | 4.0 |
| **12-8C4OMLO** | 18,20 | 3/4 | 1/2 - 14 | 37.5 | 49.5 | 30 | 4.0 | 4.0 |
| **12C4OMLO** | 18,20 | 3/4 | 3/4 - 14 | 37.5 | 51.5 | 30 | 4.0 | 4.0 |
| **12-16C4OMLO** | 18,20 | 3/4 | 1 - 11 | 41.0 | 58.5 | 36 | 4.0 | 4.0 |
| **16-12C4OMLO** | 22,25 | 1 | 3/4 - 14 | 41.5 | 56.0 | 36 | 4.0 | 4.0 |
| **16C4OMLO** | 22,25 | 1 | 1 - 11 | 41.5 | 58.5 | 36 | 4.0 | 4.0 |
| **16-20C4OMLO** | 22,25 | 1 | 1 1/4 - 11 | 44.5 | 61.0 | 41 | 3.0 | 3.0 |
| **20-16C4OMLO** | 28,30,32 | 1 1/4 | 1 - 11 | 44.5 | 61.0 | 41 | 4.0 | 4.0 |
| **20C4OMLO** | 28,30,32 | 1 1/4 | 1 1/4 - 11 | 44.5 | 61.0 | 41 | 2.0 | 2.0 |
| **20-24C4OMLO** | 28,30,32 | 1 1/4 | 1 1/2 - 11 | 49.0 | 64.5 | 50 | 2.0 | 2.0 |
| **24C4OMLO** | 35,38 | 1 1/2 | 1 1/2 - 11 | 49.0 | 64.5 | 50 | 2.0 | 2.0 |

# JLO

Union Tee
ORFS (all three ends)

SAE 520401




* JJ – Across Wrench Flats

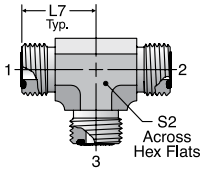
| TUBE FITTING PART # | END SIZE 1-3 (in.) | JJ (in.) | M (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|
| **4 JLO** | 1/4 | 9/16 | 0.85 | 9.2 | 9.2 |
| **6 JLO** | 3/8 | 3/4 | 0.98 | 9.2 | 9.2 |
| **8 JLO** | 1/2 | 3/4 | 1.10 | 9.2 | 9.2 |
| **10 JLO** | 5/8 | 1 1/16 | 1.32 | 6.0 | 6.0 |
| **12 JLO** | 3/4 | 1 3/16 | 1.48 | 6.0 | 6.0 |
| **16 JLO** | 1 | 1 7/16 | 1.63 | 6.0 | 6.0 |
| **20 JLO** | 1 1/4 | 1 5/8 | 1.75 | 5.0 | 5.0 |
| **24 JLO** | 1 1/2 | 1 7/8 | 1.93 | 4.0 | 4.0 |
| **32 JLO*** | 2 | 2 1/2 | 2.76 | 3.0 | 3.0 |

* Size 32 is not included in SAE J1453.

# JMLO

Union Tee – mm Hex
ORFS (all three ends)

ISO 8434-3 T
SAE 52M0401



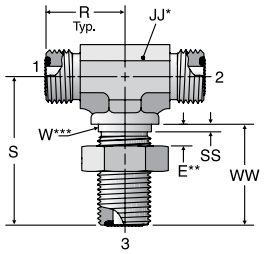

* S2 – Across Hex Flats

| TUBE FITTING PART # | END SIZE 1-3 (mm) | END SIZE 1-3 (in.) | L7 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|
| **4JMLO** | 6 | 1/4 | 21.5 | 14 | 9.2 | 9.2 |
| **6JMLO** | 8,10 | 3/8 | 25.0 | 19 | 9.2 | 9.2 |
| **8JMLO** | 12 | 1/2 | 28.0 | 19 | 9.2 | 9.2 |
| **10JMLO** | 14,15,16 | 5/8 | 33.5 | 27 | 6.0 | 6.0 |
| **12JMLO** | 18,20 | 3/4 | 37.5 | 30 | 6.0 | 6.0 |
| **16JMLO** | 22,25 | 1 | 41.5 | 36 | 6.0 | 6.0 |
| **20JMLO** | 28,30,32 | 1 1/4 | 44.5 | 41 | 5.0 | 5.0 |
| **24JMLO** | 35,38 | 1 1/2 | 49.0 | 50 | 4.0 | 4.0 |

# WJLO

Bulkhead Branch Tee
ORFS (all three ends)

SAE 520959
WJLO-WLNL - Body with Locknut
(See page A11 for WLNL)




| TUBE FITTING PART # | END SIZE 1-3 (in.) | E MAX (in.) | JJ (in.) | R (in.) | S (in.) | SS (in.) | W DIA (in.) | WW (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|---|
| **4 WJLO** | 1/4 | 0.55 | 9/16 | 0.89 | 1.85 | 0.06 | 0.56 | 1.24 | 9.2 | 9.2 |
| **6 WJLO** | 3/8 | 0.55 | 3/4 | 1.02 | 2.05 | 0.06 | 0.69 | 1.34 | 9.2 | 9.2 |
| **8 WJLO** | 1/2 | 0.55 | 3/4 | 1.14 | 2.19 | 0.06 | 0.81 | 1.44 | 9.2 | 9.2 |
| **10 WJLO** | 5/8 | 0.55 | 1 1/16 | 1.36 | 2.48 | 0.06 | 1.00 | 1.59 | 6.0 | 6.0 |
| **12 WJLO** | 3/4 | 0.55 | 1 3/16 | 1.52 | 2.64 | 0.06 | 1.19 | 1.63 | 6.0 | 6.0 |
| **16 WJLO** | 1 | 0.55 | 1 7/16 | 1.67 | 2.80 | 0.06 | 1.44 | 1.65 | 6.0 | 6.0 |

* JJ – Across wrench flats.

** E – Maximum bulkhead thickness.

*** W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

Dimensions and pressures for reference only, subject to change.

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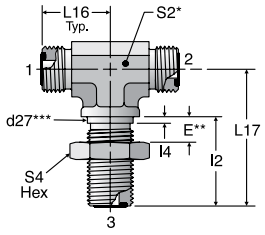
**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# WJMLO

Bulkhead Union Tee – mm Hex
ORFS (all three ends)

ISO 8434-3 BHBT
SAE 52M0959
WJMLOWLNML - Body with Locknut
(See page A11 for WLNML)




| TUBE FITTING PART # | END SIZE 1-3 (mm) | END SIZE 1-3 (in.) | d27*** (mm) | E (mm) | I2 (mm) | I4 (mm) | L16 (mm) | L17 (mm) | S2 (mm) | S4 HEX (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4WJMLO** | 6 | 1/4 | 14.3 | 14 | 31.5 | 1.5 | 22.5 | 47.0 | 14 | 22 | 9.2 | 9.2 |
| **6WJMLO** | 8,10 | 3/8 | 17.5 | 14 | 34.0 | 1.5 | 26.0 | 52.0 | 19 | 27 | 9.2 | 9.2 |
| **8WJMLO** | 12 | 1/2 | 20.6 | 14 | 36.5 | 2.5 | 29.0 | 55.5 | 19 | 30 | 9.2 | 9.2 |
| **10WJMLO** | 14,15,16 | 5/8 | 25.4 | 14 | 40.5 | 2.5 | 34.5 | 63.0 | 27 | 36 | 6.0 | 6.0 |
| **12WJMLO** | 18,20 | 3/4 | 30.2 | 14 | 41.5 | 3.0 | 38.5 | 67.0 | 30 | 41 | 6.0 | 6.0 |
| **16WJMLO** | 22,25 | 1 | 36.5 | 14 | 42.0 | 3.0 | 42.5 | 71.0 | 36 | 46 | 6.0 | 6.0 |
| **20WJMLO** | 28,30,32 | 1 1/4 | 42.9 | 14 | 42.0 | 3.0 | 45.5 | 75.5 | 41 | 50 | 5.0 | 5.0 |
| **24WJMLO** | 35,38 | 1 1/2 | 50.8 | 14 | 42.0 | 3.0 | 49.5 | 79.5 | 50 | 60 | 4.0 | 4.0 |

* S2 – Across wrench flats.

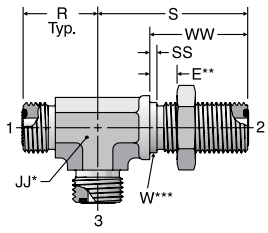
** E – Maximum bulkhead thickness.

***d27 - Bulkhead pilot diameter. Recommended clearance hole is d27 + 0.4 mm.

# WJJLO

Bulkhead Run Tee
ORFS (all three ends)

SAE 520958
WJJLOWLNML - Body with Locknut
(See page A11 for WLNL)




| TUBE FITTING PART # | END SIZE 1-3 (in.) | E MAX (in.) | JJ (in.) | R (in.) | S (in.) | SS (in.) | W DIA (in.) | WW (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|---|
| **4 WJJLO** | 1/4 | 0.55 | 9/16 | 0.89 | 1.85 | 0.06 | 0.56 | 1.24 | 9.2 | 9.2 |
| **6 WJJLO** | 3/8 | 0.55 | 3/4 | 1.02 | 2.05 | 0.06 | 0.69 | 1.34 | 9.2 | 9.2 |
| **8 WJJLO** | 1/2 | 0.55 | 3/4 | 1.14 | 2.19 | 0.06 | 0.81 | 1.44 | 9.2 | 9.2 |
| **10 WJJLO** | 5/8 | 0.55 | 1 1/16 | 1.36 | 2.48 | 0.06 | 1.00 | 1.59 | 6.0 | 6.0 |
| **12 WJJLO** | 3/4 | 0.55 | 1 3/16 | 1.52 | 2.64 | 0.06 | 1.19 | 1.63 | 6.0 | 6.0 |
| **16 WJJLO** | 1 | 0.55 | 1 7/16 | 1.67 | 2.80 | 0.06 | 1.44 | 1.65 | 6.0 | 6.0 |
| **20 WJJLO** | 1 1/4 | 0.55 | 1 5/8 | 1.79 | 2.79 | 0.06 | 1.69 | 1.65 | 5.0 | 5.0 |
| **24 WJJLO** | 1 1/2 | 0.55 | 1 7/8 | 1.95 | 3.13 | 0.06 | 2.00 | 1.65 | 4.0 | 4.0 |

* JJ – Across wrench flats.

** E – Maximum bulkhead thickness.

*** W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

Dimensions and pressures for reference only, subject to change.

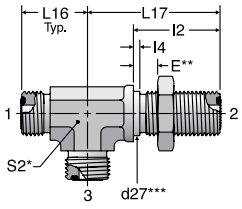


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# WJJMLO

Bulkhead Run Tee – mm Hex
ORFS (all three ends)

ISO 8434-3 BHRT
SAE 52M0958
WJJMLOWLNML - Body with Locknut
(See page A11 for WLNML)




| TUBE FITTING PART # | END SIZE 1-3 (mm) | END SIZE 1-3 (in.) | d27*** (mm) | E (mm) | l2 (mm) | l4 (mm) | L16 (mm) | L17 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **4WJJMLO** | 6 | 1/4 | 14.3 | 14 | 31.5 | 1.5 | 22.5 | 47.0 | 14 | 9.2 | 9.2 |
| **6WJJMLO** | 8,10 | 3/8 | 17.5 | 14 | 34.0 | 1.5 | 26.0 | 52.0 | 19 | 9.2 | 9.2 |
| **8WJJMLO** | 12 | 1/2 | 20.6 | 14 | 36.5 | 2.5 | 29.0 | 55.5 | 19 | 9.2 | 9.2 |
| **10WJJMLO** | 14,15,16 | 5/8 | 25.4 | 14 | 40.5 | 2.5 | 34.5 | 63.0 | 27 | 6.0 | 6.0 |
| **12WJJMLO** | 18,20 | 3/4 | 30.2 | 14 | 41.5 | 3.0 | 38.5 | 67.0 | 30 | 6.0 | 6.0 |
| **16WJJMLO** | 22,25 | 1 | 36.5 | 14 | 42.0 | 3.0 | 42.5 | 71.0 | 36 | 6.0 | 6.0 |
| **20WJJMLO** | 28,30,32 | 1 1/4 | 42.9 | 14 | 42.0 | 3.0 | 45.5 | 71.0 | 41 | 5.0 | 5.0 |
| **24WJJMLO** | 35,38 | 1 1/2 | 50.8 | 14 | 42.0 | 3.0 | 49.5 | 79.5 | 50 | 4.0 | 4.0 |

* S2 – Across wrench flats.

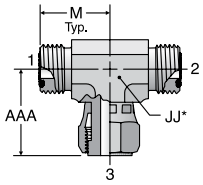
** E – Maximum bulkhead thickness.

***d27 - Bulkhead pilot diameter. Recommended clearance hole is d27 + 0.4 mm.

# S6LO

Swivel Nut Branch Tee
ORFS / ORFS / ORFS Swivel

SAE 520433



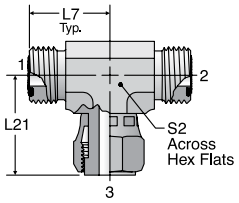

* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1-3 (in.) | AAA (in.) | JJ (in.) | M (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 S6LO** | 1/4 | 1.07 | 9/16 | 0.85 | 9.2 | 9.2 |
| **6 S6LO** | 3/8 | 1.17 | 3/4 | 0.98 | 9.2 | 9.2 |
| **8 S6LO** | 1/2 | 1.50 | 3/4 | 1.10 | 9.2 | 9.2 |
| **10 S6LO** | 5/8 | 1.61 | 1 1/16 | 1.32 | 6.0 | 6.0 |
| **12 S6LO** | 3/4 | 1.83 | 1 3/16 | 1.48 | 6.0 | 6.0 |
| **16 S6LO** | 1 | 2.11 | 1 7/16 | 1.63 | 6.0 | 6.0 |
| **20 S6LO** | 1 1/4 | 2.28 | 1 5/8 | 1.75 | 5.0 | 5.0 |
| **24 S6LO** | 1 1/2 | 2.40 | 1 7/8 | 1.93 | 4.0 | 4.0 |

# S6MLO

Swivel Nut Branch Tee – mm Hex
ORFS / ORFS / ORFS Swivel

ISO 8434-3 SWBT
SAE 52M0433




* S2 – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1-3 (mm) | END SIZE 1-3 (in.) | L7 (mm) | L21 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|
| **4S6MLO** | 6 | 1/4 | 21.5 | 27.2 | 14 | | |
| **6S6MLO** | 8,10 | 3/8 | 25.0 | 29.7 | 19 | 9.2 | 9.2 |
| **8S6MLO** | 12 | 1/2 | 28.0 | 38.0 | 19 | 9.2 | 9.2 |
| **10S6MLO** | 14,15,16 | 5/8 | 33.5 | 41.0 | 27 | 6.0 | 6.0 |
| **12S6MLO** | 18,20 | 3/4 | 37.5 | 46.5 | 30 | 6.0 | 6.0 |
| **16S6MLO** | 22,25 | 1 | 41.5 | 53.5 | 36 | 6.0 | 6.0 |
| **20S6MLO** | 28,30,32 | 1 1/4 | 44.5 | 58.0 | 41 | 4.0 | 4.0 |
| **24S6MLO** | 35,38 | 1 1/2 | 49.0 | 61.0 | 50 | 4.0 | 4.0 |

Dimensions and pressures for reference only, subject to change.



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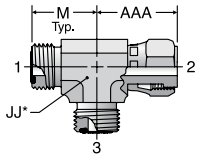
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# R6LO

Swivel Nut Run Tee
ORFS / ORFS Swivel / ORFS

SAE 520432



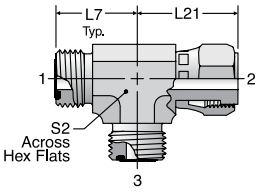

* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1-3 (in.) | AAA (in.) | JJ (in.) | M (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|
| **4 R6LO** | 1/4 | 1.07 | 9/16 | 0.85 | 9.2 | 9.2 |
| **6 R6LO** | 3/8 | 1.17 | 3/4 | 0.98 | 9.2 | 9.2 |
| **8 R6LO** | 1/2 | 1.50 | 3/4 | 1.10 | 9.2 | 9.2 |
| **10 R6LO** | 5/8 | 1.61 | 1 1/16 | 1.32 | 6.0 | 6.0 |
| **12 R6LO** | 3/4 | 1.83 | 1 3/16 | 1.48 | 6.0 | 6.0 |
| **16 R6LO** | 1 | 2.11 | 1 7/16 | 1.63 | 6.0 | 6.0 |
| **20 R6LO** | 1 1/4 | 2.28 | 1 5/8 | 1.75 | 5.0 | 5.0 |
| **24 R6LO** | 1 1/2 | 2.40 | 1 7/8 | 1.93 | 4.0 | 4.0 |

# R6MLO

Swivel Nut Run Tee – mm Hex
ORFS / ORFS Swivel / ORFS

ISO 8434-3 SWRT
SAE 52M0432

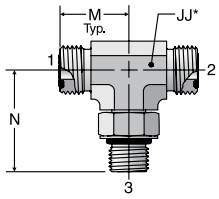



| TUBE FITTING PART # | END SIZE 1-3 (mm) | (in.) | L7 (mm) | L21 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|
| **4R6MLO** | 6 | 1/4 | 21.5 | 27.2 | 14 | 9.2 | 9.2 |
| **6R6MLO** | 8,10 | 3/8 | 25.0 | 29.7 | 19 | 9.2 | 9.2 |
| **8R6MLO** | 12 | 1/2 | 28.0 | 38.0 | 19 | 9.2 | 9.2 |
| **10R6MLO** | 14,15,16 | 5/8 | 33.5 | 41.0 | 27 | 6.0 | 6.0 |
| **12R6MLO** | 18,20 | 3/4 | 37.5 | 46.5 | 30 | 6.0 | 6.0 |
| **16R6MLO** | 22,25 | 1 | 41.5 | 53.5 | 36 | 6.0 | 6.0 |
| **20R6MLO** | 28,30,32 | 1 1/4 | 44.5 | 58.0 | 41 | 4.0 | 4.0 |
| **24R6MLO** | 35,38 | 1 1/2 | 49.0 | 61.0 | 50 | 4.0 | 4.0 |

# S5OLO

Straight Thread Branch Tee
ORFS / ORFS / SAE-ORB

SAE 520429




* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 UN/UNF-2A | JJ (in.) | M (in.) | N (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|
| **4 S5OLO** | 1/4 | 1/4 | 7/16 - 20 | 9/16 | 0.85 | 1.30 | 6.0 | 6.0 |
| **4-4-6 S5OLO** | 1/4 | 1/4 | 9/16 - 18 | 9/16 | 0.93 | 1.46 | 6.0 | 6.0 |
| **6 S5OLO** | 3/8 | 3/8 | 9/16 - 18 | 3/4 | 0.98 | 1.46 | 6.0 | 6.0 |
| **6-6-4 S5OLO** | 3/8 | 3/8 | 7/16 - 20 | 3/4 | 0.98 | 1.38 | 6.0 | 6.0 |
| **6-6-8 S5OLO** | 3/8 | 3/8 | 3/4 - 16 | 3/4 | 1.04 | 1.59 | 6.0 | 6.0 |
| **8 S5OLO** | 1/2 | 1/2 | 3/4 - 16 | 3/4 | 1.10 | 1.59 | 6.0 | 6.0 |
| **8-8-10 S5OLO** | 1/2 | 1/2 | 7/8 - 14 | 1 1/16 | 1.24 | 1.97 | 6.0 | 6.0 |
| **8-8-12 S5OLO** | 1/2 | 1/2 | 1 1/16 - 12 | 1 3/16 | 1.34 | 2.17 | 6.0 | 6.0 |
| **10 S5OLO** | 5/8 | 5/8 | 7/8 - 14 | 1 1/16 | 1.32 | 1.97 | 6.0 | 6.0 |
| **10-10-12 S5OLO** | 5/8 | 5/8 | 1 1/16 - 12 | 1 3/16 | 1.42 | 2.17 | 6.0 | 6.0 |
| **12 S5OLO** | 3/4 | 3/4 | 1 1/16 - 12 | 1 3/16 | 1.48 | 2.17 | 6.0 | 6.0 |
| **12-12-16 S5OLO** | 3/4 | 3/4 | 1 5/16 - 12 | 1 7/16 | 1.61 | 2.34 | 5.5 | 5.5 |
| **16 S5OLO** | 1 | 1 | 1 5/16 - 12 | 1 7/16 | 1.63 | 2.34 | 5.5 | 5.5 |
| **16-16-20 S5OLO** | 1 | 1 | 1 5/8 - 12 | 1 5/8 | 1.75 | 2.44 | 4.0 | 4.0 |
| **20 S5OLO** | 1 1/4 | 1 1/4 | 1 5/8 - 12 | 1 5/8 | 1.75 | 2.44 | 4.0 | 4.0 |
| **24 S5OLO** | 1 1/2 | 1 1/2 | 1 7/8 - 12 | 1 7/8 | 1.93 | 2.60 | 4.0 | 4.0 |

Dimensions and pressures for reference only, subject to change.

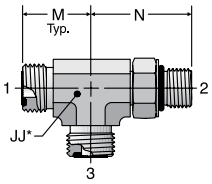


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# R5OLO

Straight Thread Run Tee
ORFS / SAE-ORB / ORFS

SAE 520428



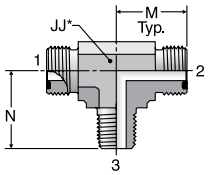

* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | END SIZE 3 (in.) | JJ (in.) | M (in.) | N (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|
| **4 R5OLO** | 1/4 | 7/16 - 20 | 1/4 | 9/16 | 0.85 | 1.30 | 6.0 | 6.0 |
| **4-6-4 R5OLO** | 1/4 | 9/16 - 18 | 1/4 | 3/4 | 0.92 | 1.46 | 6.0 | 6.0 |
| **6 R5OLO** | 3/8 | 9/16 - 18 | 3/8 | 3/4 | 0.98 | 1.46 | 6.0 | 6.0 |
| **6-8-6 R5OLO** | 3/8 | 3/4 - 16 | 3/8 | 3/4 | 1.04 | 1.59 | 6.0 | 6.0 |
| **8 R5OLO** | 1/2 | 3/4 - 16 | 1/2 | 3/4 | 1.10 | 1.59 | 6.0 | 6.0 |
| **8-10-8 R5OLO** | 1/2 | 7/8 - 14 | 1/2 | 1 1/16 | 1.24 | 1.97 | 6.0 | 6.0 |
| **10 R5OLO** | 5/8 | 7/8 - 14 | 5/8 | 1 1/16 | 1.32 | 1.97 | 6.0 | 6.0 |
| **10-12-10 R5OLO** | 5/8 | 1 1/16 - 12 | 5/8 | 1 3/16 | 1.42 | 2.17 | 6.0 | 6.0 |
| **12 R5OLO** | 3/4 | 1 1/16 - 12 | 3/4 | 1 3/16 | 1.48 | 2.17 | 6.0 | 6.0 |
| **12-16-12 R5OLO** | 3/4 | 1 5/16 - 12 | 3/4 | 1 7/16 | 1.61 | 2.34 | 5.5 | 5.5 |
| **16 R5OLO** | 1 | 1 5/16 - 12 | 1 | 1 7/16 | 1.63 | 2.34 | 5.5 | 5.5 |
| **16-20-16 R5OLO** | 1 | 1 5/8 - 12 | 1 | 1 5/8 | 1.75 | 2.44 | 4.0 | 4.0 |
| **20 R5OLO** | 1 1/4 | 1 5/8 - 12 | 1 1/4 | 1 5/8 | 1.75 | 2.44 | 4.0 | 4.0 |
| **24 R5OLO** | 1 1/2 | 1 7/8 - 12 | 1 1/2 | 1 7/8 | 1.93 | 2.60 | 4.0 | 4.0 |

# SLO

Male Pipe Tee
ORFS / ORFS / NPTF

SAE 520425



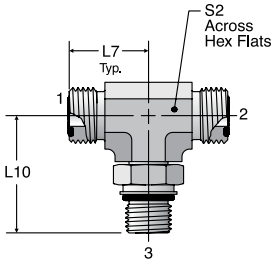

* JJ – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | END SIZE 3 NPTF | JJ (in.) | M (in.) | N (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4-4-4 SLO** | 1/4 | 1/4 - 18 | 9/16 | 0.85 | 1.12 | 6.0 | 6.0 |
| **6 SLO** | 3/8 | 1/4 - 18 | 3/4 | 0.98 | 1.09 | 6.0 | 6.0 |
| **6-6-6 SLO** | 3/8 | 3/8 - 18 | 3/4 | 0.98 | 1.22 | 6.0 | 6.0 |
| **8 SLO** | 1/2 | 3/8 - 18 | 3/4 | 1.10 | 1.22 | 6.0 | 6.0 |
| **8-8-8 SLO** | 1/2 | 1/2 - 14 | 7/8 | 1.10 | 1.47 | 6.0 | 6.0 |
| **10 SLO** | 5/8 | 1/2 - 14 | 1 1/16 | 1.31 | 1.47 | 6.0 | 6.0 |
| **12 SLO** | 3/4 | 3/4 - 14 | 1 3/16 | 1.47 | 1.59 | 4.0 | 4.0 |
| **16 SLO** | 1 | 1 - 11 1/2 | 1 7/16 | 1.64 | 1.97 | 3.0 | 3.0 |
| **20 SLO** | 1 1/4 | 1 1/4 - 11 1/2 | 1 5/8 | 1.76 | 2.38 | 2.5 | 2.5 |

# S87OMLO

Metric Straight Thread Branch Tee
ORFS / ORFS / ISO 6149

ISO 8434-3 SDBT
SAE 52M0489




* S2 – Across Hex Flats

| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 1 & 2 (in.) | END SIZE 3 ISO 261 | L7 (mm) | L10 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|
| **4M12S87OMLO** | 6 | 1/4 | M12X1.5 | 21.5 | 33.0 | 14 | 6.0 | 6.0 |
| **4M14S87OMLO** | 6 | 1/4 | M14X1.5 | 23.5 | 35.5 | 19 | 6.0 | 6.0 |
| **6M14S87OMLO** | 8,10 | 3/8 | M14X1.5 | 25.0 | 35.5 | 19 | 6.0 | 6.0 |
| **6M16S87OMLO** | 8,10 | 3/8 | M16X1.5 | 25.0 | 37.5 | 19 | 6.0 | 6.0 |
| **8M14S87OMLO** | 12 | 1/2 | M14X1.5 | 28.0 | 36.0 | 19 | 6.0 | 6.0 |
| **8M18S87OMLO** | 12 | 1/2 | M18X1.5 | 28.0 | 41.0 | 19 | 6.0 | 6.0 |
| **8M22S87OMLO** | 12 | 1/2 | M22X1.5 | 31.0 | 49.0 | 27 | 6.0 | 6.0 |
| **10M22S87OMLO** | 14,15,16 | 5/8 | M22X1.5 | 33.5 | 49.0 | 27 | 6.0 | 6.0 |
| **12M27S87OMLO** | 18,20 | 3/4 | M27X2 | 37.5 | 55.5 | 30 | 6.0 | 6.0 |
| **16M33S87OMLO** | 22,25 | 1 | M33X2 | 41.5 | 59.5 | 36 | 5.1 | 5.1 |
| **20M42S87OMLO** | 28,30,32 | 1 1/4 | M42X2 | 44.5 | 63.0 | 41 | 4.0 | 4.0 |
| **24M48S87OMLO** | 35,38 | 1 1/2 | M48X2 | 49.0 | 71.5 | 50 | 4.0 | 4.0 |

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Columbus, Ohio
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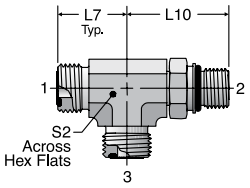
# R87OMLO

Metric Straight Thread Run Tee
ORFS / ISO 6149 / ORFS

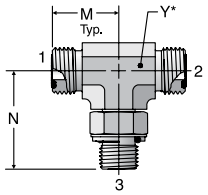
ISO 8434-3 SDRT
SAE 52M0488




| TUBE FITTING PART # | END SIZE 1 & 3 (mm) | END SIZE 1 & 3 (in.) | END SIZE 2 ISO 261 | L7 (mm) | L10 (mm) | S2 (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|
| **4M12R87OMLO** | 6 | 1/4 | M12X1.5 | 21.5 | 33.0 | 14 | 6.0 | 6.0 |
| **4M14R87OMLO** | 6 | 1/4 | M14X1.5 | 23.5 | 35.5 | 19 | 6.0 | 6.0 |
| **6M14R87OMLO** | 8,10 | 3/8 | M14X1.5 | 25.0 | 35.5 | 19 | 6.0 | 6.0 |
| **6M16R87OMLO** | 8,10 | 3/8 | M16X1.5 | 25.0 | 37.5 | 19 | 6.0 | 6.0 |
| **8M14R87OMLO** | 12 | 1/2 | M14X1.5 | 28.0 | 36.0 | 19 | 6.0 | 6.0 |
| **8M18R87OMLO** | 12 | 1/2 | M18X1.5 | 28.0 | 41.0 | 19 | 6.0 | 6.0 |
| **8M22R87OMLO** | 12 | 1/2 | M22X1.5 | 31.0 | 49.0 | 27 | 6.0 | 6.0 |
| **10M22R87OMLO** | 14,15,16 | 5/8 | M22X1.5 | 33.5 | 49.0 | 27 | 6.0 | 6.0 |
| **12M27R87OMLO** | 18,20 | 3/4 | M27X2 | 37.5 | 55.5 | 30 | 6.0 | 6.0 |
| **16M33R87OMLO** | 22,25 | 1 | M33X2 | 41.5 | 59.5 | 36 | 4.0 | 4.0 |
| **20M42R87OMLO** | 28,30,32 | 1 1/4 | M42X2 | 44.5 | 63.0 | 41 | 4.0 | 4.0 |
| **24M48R87OMLO** | 35,38 | 1 1/2 | M48X2 | 49.0 | 71.5 | 50 | 4.0 | 4.0 |

# S4OMLO

Branch Tee – BSPP
(for ISO 1179-1 Port)
ORFS / ORFS / BSPP-ORR




* Y – Across
Wrench Flats

| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 1 & 2 (in.) | END SIZE 3 BSPP | M (mm) | N (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|
| **4S4OMLO** | 6 | 1/4 | 1/8 - 28 | 21.5 | 30.0 | 14 | 4.0 | 4.0 |
| **4-4-4S4OMLO** | 6 | 1/4 | 1/4 - 19 | 23.5 | 36.0 | 19 | 4.0 | 4.0 |
| **6S4OMLO** | 8,10 | 3/8 | 1/4 - 19 | 25.0 | 36.0 | 19 | 4.0 | 4.0 |
| **6-6-6S4OMLO** | 8,10 | 3/8 | 3/8 - 19 | 26.5 | 38.0 | 19 | 4.0 | 4.0 |
| **8S4OMLO** | 12 | 1/2 | 3/8 - 19 | 28.0 | 38.0 | 19 | 4.0 | 4.0 |
| **8-8-8S4OMLO** | 12 | 1/2 | 1/2 - 14 | 31.0 | 48.5 | 27 | 4.0 | 4.0 |
| **10S4OMLO** | 14,15,16 | 5/8 | 1/2 - 14 | 33.5 | 48.5 | 27 | 4.0 | 4.0 |
| **12S4OMLO** | 18,20 | 3/4 | 3/4 - 14 | 37.5 | 51.5 | 30 | 4.0 | 4.0 |
| **16S4OMLO** | 22,25 | 1 | 1 - 11 | 41.5 | 58.5 | 36 | 4.0 | 4.0 |

Dimensions and pressures for reference only, subject to change.



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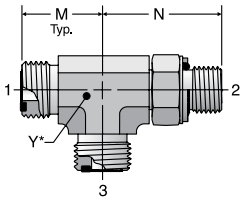
# R4OMLO

Run Tee – BSPP
(for ISO 1179-1 Port)
ORFS / BSPP-ORR / ORFS



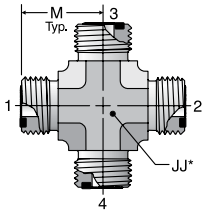

* Y – Across
Wrench Flats

| TUBE FITTING PART # | END SIZE 1 & 3 (mm) | END SIZE 1 & 3 (in.) | END SIZE 2 BSPP | M (mm) | N (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | Dynamic Pressure (x 1,000 PSI) SS |
|---|---|---|---|---|---|---|---|---|
| **4R4OMLO** | 6 | 1/4 | 1/8 - 28 | 21.5 | 30.0 | 14 | 4.0 | 4.0 |
| **4-4-4R4OMLO** | 6 | 1/4 | 1/4 - 19 | 23.5 | 36.0 | 19 | 4.0 | 4.0 |
| **6R4OMLO** | 8,10 | 3/8 | 1/4 - 19 | 25.0 | 36.0 | 19 | 4.0 | 4.0 |
| **6-6-6R4OMLO** | 8,10 | 3/8 | 3/8 - 19 | 26.5 | 38.0 | 19 | 4.0 | 4.0 |
| **8R4OMLO** | 12 | 1/2 | 3/8 - 19 | 28.0 | 38.0 | 19 | 4.0 | 4.0 |
| **8-8-8R4OMLO** | 12 | 1/2 | 1/2 - 14 | 31.0 | 48.5 | 27 | 4.0 | 4.0 |
| **10R4OMLO** | 14,15,16 | 5/8 | 1/2 - 14 | 33.5 | 45.2 | 27 | 4.0 | 4.0 |
| **12R4OMLO** | 18,20 | 3/4 | 3/4 - 14 | 37.5 | 51.5 | 30 | 4.0 | 4.0 |
| **16R4OMLO** | 22,25 | 1 | 1 - 11 | 41.5 | 58.5 | 37 | 4.0 | 4.0 |

# KLO

Union Cross
ORFS (all four ends)

SAE 520501




* JJ – Across
Wrench Flats

| TUBE FITTING PART # | END SIZE 1-4 (in.) | JJ (in.) | M (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|
| **4 KLO** | 1/4 | 9/16 | 0.85 | 9.2 | 9.2 |
| **6 KLO** | 3/8 | 3/4 | 0.98 | 9.2 | 9.2 |
| **8 KLO** | 1/2 | 3/4 | 1.10 | 9.2 | 9.2 |
| **10 KLO** | 5/8 | 1 1/16 | 1.32 | 6.0 | 6.0 |
| **12 KLO** | 3/4 | 1 3/16 | 1.48 | 6.0 | 6.0 |
| **16 KLO** | 1 | 1 5/8 | 1.63 | 6.0 | 6.0 |
| **20 KLO** | 1 1/4 | 1 5/8 | 1.75 | 5.0 | 5.0 |
| **24 KLO** | | | | | |

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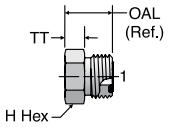
# PNLO

Plug
ORFS

SAE 520109



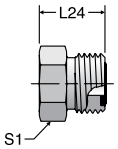

| TUBE FITTING PART # | END SIZE 1 (in.) | H HEX (in.) | OAL (REF) (in.) | TT (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|
| **4 PNLO** | 1/4 | 5/8 | 0.65 | 0.20 | 9.2 | 9.2 |
| **6 PNLO** | 3/8 | 3/4 | 0.75 | 0.32 | 9.2 | 9.2 |
| **8 PNLO** | 1/2 | 7/8 | 0.87 | 0.35 | 9.2 | 9.2 |
| **10 PNLO** | 5/8 | 1 1/16 | 1.02 | 0.41 | 6.0 | 6.0 |
| **12 PNLO** | 3/4 | 1 1/4 | 1.08 | 0.41 | 6.0 | 6.0 |
| **14 PNLO*** | 7/8 | 1 3/8 | 1.10 | 0.49 | 6.0 | 6.0 |
| **16 PNLO** | 1 | 1 1/2 | 1.10 | 0.41 | 6.0 | 6.0 |
| **20 PNLO** | 1 1/4 | 1 3/4 | 1.10 | 0.41 | 6.0 | 6.0 |
| **24 PNLO** | 1 1/2 | 2 1/8 | 1.10 | 0.41 | 5.0 | 5.0 |
| **32 PNLO*** | 2 | 2 3/4 | 1.40 | 0.50 | 3.0 | 3.0 |

* Sizes 14 and 32 are not included in SAE J1453.

# PNMLO

Plug – mm Hex
ORFS

ISO 8434-3 PL
SAE 52M0109

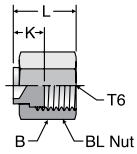



| TUBE FITTING PART # | ORFS TUBE O.D. (mm) | (in.) | L24 (mm) | S1 HEX (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|
| **4PNMLO** | 6 | 1/4 | 16.5 | 17 | 9.2 | 9.2 |
| **6PNMLO** | 8,10 | 3/8 | 19.0 | 19 | 9.2 | 9.2 |
| **8PNMLO** | 12 | 1/2 | 22.0 | 22 | 9.2 | 9.2 |
| **10PNMLO** | 14,15,16 | 5/8 | 26.0 | 27 | 6.0 | 6.0 |
| **12PNMLO** | 18,20 | 3/4 | 27.5 | 32 | 6.0 | 6.0 |
| **16PNMLO** | 22,25 | 1 | 28.0 | 41 | 6.0 | 6.0 |
| **20PNMLO** | 28,30,32 | 1 1/4 | 28.0 | 46 | 6.0 | 6.0 |
| **24PNMLO** | 38 | 1 1/2 | 28.0 | 55 | 5.0 | 5.0 |

# FNL

Cap
ORFS

SAE 520112

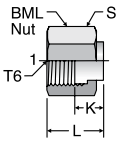



| TUBE FITTING PART # | TUBE O.D. (in.) | T6 SWIVEL UN/UNF-2B | B HEX (in.) | K (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|
| **4 FNL** | 1/4 | 9/16 - 18 | 11/16 | 0.35 | 0.66 | 9.2 | 9.2 |
| **6 FNL** | 3/8 | 11/16 - 16 | 13/16 | 0.41 | 0.74 | 9.2 | 9.2 |
| **8 FNL** | 1/2 | 13/16 - 16 | 15/16 | 0.47 | 0.87 | 9.2 | 9.2 |
| **10 FNL** | 5/8 | 1 - 14 | 1 1/8 | 0.53 | 1.02 | 6.0 | 6.0 |
| **12 FNL** | 3/4 | 1 3/16 - 12 | 1 3/8 | 0.59 | 1.12 | 6.0 | 6.0 |
| **14 FNL*** | 7/8 | 1 5/16 - 12 | 1 1/2 | 0.59 | 1.12 | 6.0 | 6.0 |
| **16 FNL** | 1 | 1 7/16 - 12 | 1 5/8 | 0.63 | 1.16 | 6.0 | 6.0 |
| **20 FNL** | 1 1/4 | 1 11/16 - 12 | 1 7/8 | 0.63 | 1.16 | 6.0 | 6.0 |
| **24 FNL** | 1 1/2 | 2 - 12 | 2 1/4 | 0.63 | 1.16 | 5.0 | 5.0 |
| **32 FNL*** | 2 | 2 1/2 - 12 | 2 7/8 | 0.79 | 1.46 | 3.0 | 3.0 |

* Sizes 14 and 32 are not included in SAE J1453.

# FNML

Cap
ORFS




| TUBE FITTING PART # | TUBE O.D. (mm) | (in.) | T6 SWIVEL UN/UNF-2B | K (mm) | L (mm) | S HEX (mm) | Dynamic Pressure (x 1,000 PSI) S | SS |
|---|---|---|---|---|---|---|---|---|
| **4FNML** | 6 | 1/4 | 9/16 - 18 | 9.0 | 16.8 | 17 | 9.2 | 9.2 |
| **6FNML** | 8, 10 | 3/8 | 11/16 - 16 | 10.5 | 18.8 | 22 | 9.2 | 9.2 |
| **8FNML** | 12 | 1/2 | 13/16 - 16 | 12.0 | 22.0 | 24 | 9.2 | 9.2 |
| **10FNML** | 14, 15, 16 | 5/8 | 1 - 14 | 13.5 | 26.0 | 30 | 6.0 | 6.0 |
| **12FNML** | 18, 20 | 3/4 | 1 3/16 - 12 | 15.0 | 28.6 | 36 | 6.0 | 6.0 |
| **16FNML** | 22, 25 | 1 | 1 7/16 - 12 | 16.0 | 29.5 | 41 | 6.0 | 6.0 |
| **20FNML** | 28, 30, 32 | 1 1/4 | 1 11/16 - 12 | 16.0 | 29.5 | 50 | 6.0 | 6.0 |
| **24FNML** | 35, 38 | 1 1/2 | 2 - 12 | 16.0 | 29.5 | 60 | 5.0 | 5.0 |

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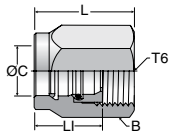
# UPTC Nut Assembly




| TUBE FITTING PART # | END SIZE (in.) | T6 UN/UNF-2B | B HEX (in.) | L (in.) | L1 (in.) | C Nominal Nipple Size (in.) | C Nominal Nipple Size (mm) |
|---|---|---|---|---|---|---|---|
| **4 UPTCL** | 1/4 | 9/16-18 | 11/16 | 0.97 | 0.68 | 0.31 | 8 |
| **6 UPTCL** | 3/8 | 11/16-16 | 13/16 | 1.06 | 0.74 | 0.47 | 12 |
| **8 UPTCL** | 1/2 | 13/16-16 | 15/16 | 1.19 | 0.81 | 0.59 | 15 |
| **10 UPTCL** | 5/8 | 1-14 | 1 1/8 | 1.34 | 0.87 | 0.71 | 18 |
| **12 UPTCL** | 3/4 | 1 3/16-12 | 1 3/8 | 1.38 | 0.86 | 0.87 | 22 |
| **16 UPTCL** | 1 | 1 7/16-12 | 1 5/8 | 1.48 | 0.94 | 0.98 | 25 |

To order as pre-torqued assembly on standard Seal-Lok adapters, see page A7.

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# Triple-Lok™ & Triple-Lok™ 2 37° Flare Tube Fittings

B

Parker

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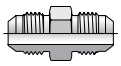
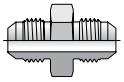
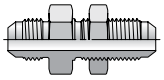
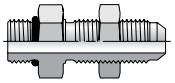
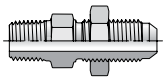
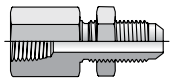
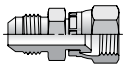
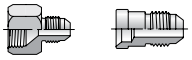
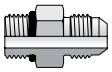
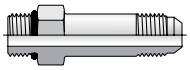
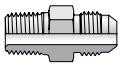
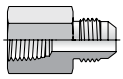
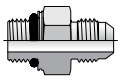
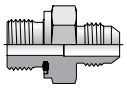
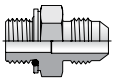
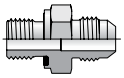
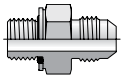
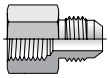
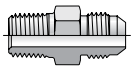
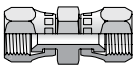
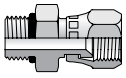
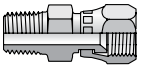
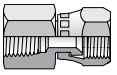
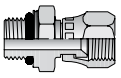
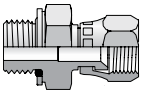
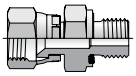
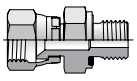
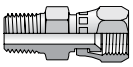
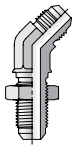
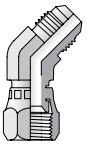
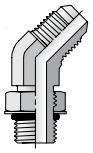
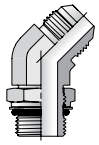
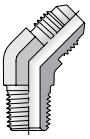
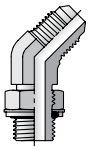
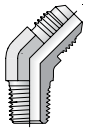
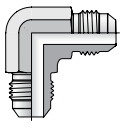
| **Straights** | **HTX**<br>Union<br>  <br>B10 | **LHTX**<br>Large Hex Union<br>  <br>B10 | **WTX**<br>Bulkhead Union<br>  <br>B11 | **WF5OX**<br>SAE-ORB / 37° Bulkhead<br>  <br>B11 | **WFTX**<br>NPTF / 37° Bulkhead<br>  <br>B11 |
| **WGTX**<br>NPTF / 37° Bulkhead<br>  <br>B12 | **XHX6**<br>Extender and Expander<br>  <br>B12 | **TRTX / TRTXN**<br>Reducer<br>  <br>B13 | **F5OX**<br>SAE-ORB / 37° Flare<br>  <br>B14 | **FF5OX**<br>SAE-ORB / 37° – Long<br>  <br>B14 | **XHB3**<br>Braze Socket / 37° Flare<br> <br>B14 |
| **FTX**<br>NPTF / 37° Flare<br>  <br>B15 | **FFTX**<br>NPTF / 37° Flare – Long<br> <br>B15 | **GTX**<br>NPTF / 37° Flare<br>  <br>B15 | **F87OMX**<br>ISO 6149 / 37° Flare<br>  <br>B16 | **F82EDMX**<br>Metric-ED / 37° Flare<br>  <br>B16 | **F8OMX**<br>Metric-ORR / 37° Flare<br>  <br>B16 |
| **F42EDMX**<br>BSPP-ED / 37° Flare<br>  <br>B16 | **F4OMX**<br>BSPP-ORR / 37° Flare<br>  <br>B17 | **G4MX**<br>BSPP / 37° Flare<br>  <br>B17 | **F3MX**<br>BSPT / 37° Flare<br>  <br>B17 | **Straight Swivels** | **HX6**<br>37° Swivel Union<br>  <br>B17 |
| **F65OX**<br>SAE-ORB / 37° Swivel<br>  <br>B18 | **F6X**<br>NPTF / 37° Swivel<br>  <br>B18 | **G6X**<br>NPTF / 37° Swivel<br>  <br>B18 | **F687OMX**<br>ISO-6149 / 37° Swivel<br>  <br>B18 | **F68OMX**<br>Metric-ORR / 37° Swivel<br>  <br>B19 | **F682EDMX**<br>Metric-ED / 37° Swivel<br>  <br>B19 |
| **F642EDMX**<br>BSPP-ED / 37° Swivel<br>  <br>B19 | **F63MX**<br>BSPT / 37°Swivel<br>  <br>B19 | **45° Elbows** | **WNTX**<br>Bulkhead Union<br>  <br>B20 | **V6X**<br>37° Swivel Elbow<br>  <br>B20 | **V5OX**<br>SAE-ORB / 37° Flare<br>  <br>B20 |
| **V87OMX**<br>ISO-6149 / 37° Flare<br>  <br>B20 | **VTX**<br>NPTF / 37° Flare<br>  <br>B21 | **V4OMX**<br>BSPP-ORR / 37° Flare<br>  <br>B21 | **V3MX**<br>BSPT / 37° Flare<br>  <br>B21 | **90° Elbows** | **ETX**<br>Union Elbow<br>  <br>B21 |



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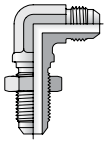
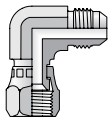
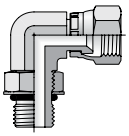
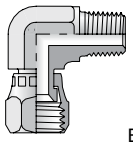
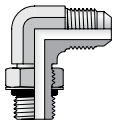
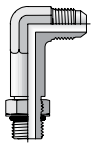
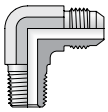
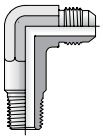
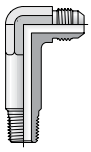
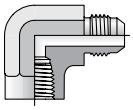
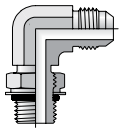
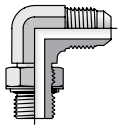
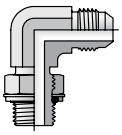
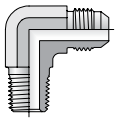
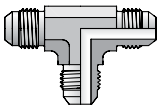
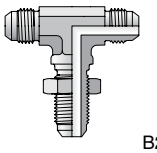
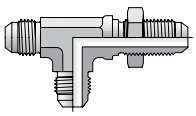
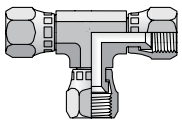
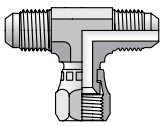
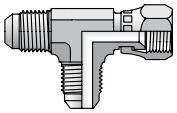
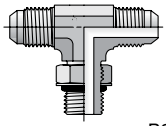
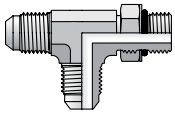
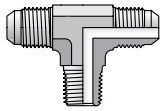
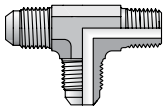
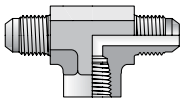
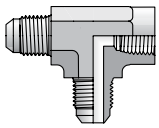
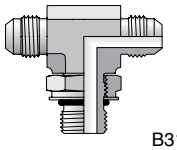
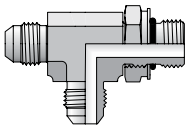
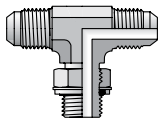
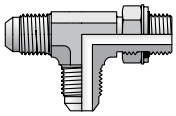
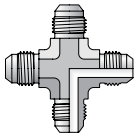
| **WETX**<br>Bulkhead Union<br>  <br>B22 | **C6X**<br>37° Swivel Elbow<br>  <br>B22 | **AOEX6**<br>SAE-ORB / 37° Swivel<br>  <br>B22 | **X6EF**<br>NPTF / 37° Swivel<br>  <br>B23 | **C5OX**<br>SAE-ORB / 37° Flare<br>  <br>B23 | **CC5OX**<br>SAE-ORB / 37° – Long<br>  <br>B23 |
| **CTX**<br>NPTF / 37° Flare<br>  <br>B24 | **CCTX**<br>NPTF / 37° Flare – Long<br>  <br>B24 | **CCCTX**<br>NPTF / 37° – Extra Long<br>  <br>B24 | **DTX**<br>NPTF / 37° Flare<br>  <br>B25 | **C87OMX**<br>ISO-6149 / 37° Flare<br>  <br>B25 | **C8OMX**<br>Metric-ORR / 37° Flare<br>  <br>B25 |
| **C4OMX**<br>BSPP-ORR / 37° Flare<br>  <br>B26 | **C3MX**<br>BSPT / 37° Flare<br>  <br>B26 | **Tees** | **JTX**<br>Union Tee<br>  <br>B26 | **WJTX**<br>Bulkhead Branch Tee<br>  <br>B27 | **WJJTX**<br>Bulkhead Run Tee<br>  <br>B27 |
| **JX6**<br>37° Swivel Union Tee<br>  <br>B28 | **S6X**<br>37° Swivel Branch Tee<br>  <br>B28 | **R6X**<br>37° Swivel Run Tee<br>  <br>B28 | **S5OX**<br>SAE-ORB Branch Tee<br>  <br>B29 | **R5OX**<br>SAE-ORB Run Tee<br>  <br>B29 | **STX**<br>NPTF Branch Tee<br>  <br>B30 |
| **RTX**<br>NPTF Run Tee<br>  <br>B30 | **OTX**<br>NPTF Branch Tee<br>  <br>B30 | **MTX**<br>NPTF Run Tee<br>  <br>B30 | **S87OMX**<br>ISO 6149 Branch Tee<br>  <br>B31 | **R87OMX**<br>ISO 6149 Run Tee<br>  <br>B31 | **S4OMX**<br>BSPP-ORR Branch Tee<br>  <br>B31 |
| **R4OMX**<br>BSPP-ORR Run Tee<br>  <br>B31 | **Cross** | **KTX**<br>Union Cross<br>  <br>B32 | **Plug and Cap** | **PNTX**<br>37° Plug<br> <br>B32 | **FNTX**<br>37° Cap<br> <br>B32 |
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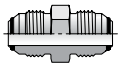
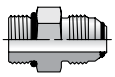
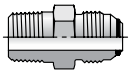
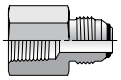
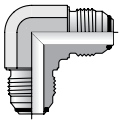
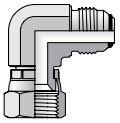
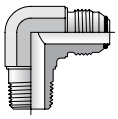
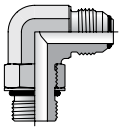
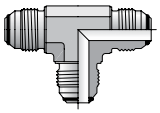
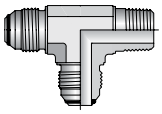
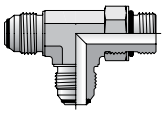
| **Straights** | **HTXO**<br>Union<br>  <br>B33 | **F5OXO**<br>SAE-ORB / 37° Flare<br>  <br>B33 | **FTXO**<br>NPTF / 37° Flare<br>  <br>B33 | **GTXO**<br>NPTF / 37° Flare<br>  <br>B33 |
| **90° Elbows** | **ETXO**<br>Union Elbow<br>  <br>B34 | **C6XO**<br>37° Swivel Elbow<br>  <br>B34 | **CTXO**<br>NPTF / 37° Flare<br>  <br>B34 | **C5OXO**<br>SAE-ORB / 37° Flare<br>  <br>B34 |
| **Tees** | **JTXO**<br>Union Tee<br>  <br>B35 | **RTXO**<br>37° Swivel Run Tee<br>  <br>B35 | **R5OXO**<br>SAE-ORB Run Tee<br>  <br>B35 | |

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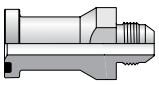
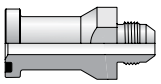
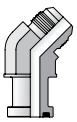
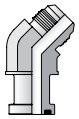
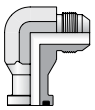
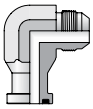
| **SAE Flange Adapters** | **XHQ1**<br>Code 61 / 37° Flare<br>  <br>L12 | **XHQ2**<br>Code 62 / 37° Flare<br>  <br>L12 | **XVQ1**<br>Code 61 / 37° Flare<br>  <br>L30 | **XVQ2**<br>Code 62 / 37° Flare<br>  <br>L30 | **XEQ1**<br>Code 61 / 37° Flare<br>  <br>L31 |
| **XEQ2**<br>Code 62 / 37° Flare<br>  <br>L31 | | | | | |



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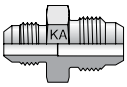
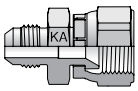
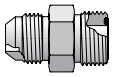
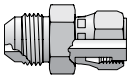
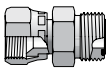
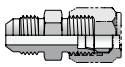
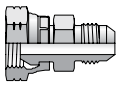
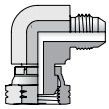
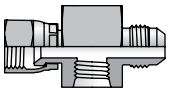
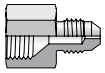
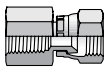
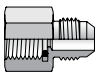
## Conversion Adapters (Shown in Sections J and K)

| | | | | | |
|---|---|---|---|---|---|
| Conversion Adapters | **XHU86**<br>Metric Swivel (EO) / 37°<br> <br>K6 | **XHMKA**<br>Komatsu 30° / 37° Flare<br>  <br>J5 | **XHMKA6**<br>Komatsu 30° Swivel /37°<br>  <br>J5 | **XHLO**<br>37° Flare / ORFS<br>  <br>K3 | **XHL6**<br>37° Flare / ORFS Swivel<br>  <br>K3 |
| **LOHX6**<br>ORFS / 37° Swivel<br>  <br>K3 | **XHBU**<br>37°Flare / Flareless<br>  <br>K4 | **XHMK46**<br>37°Flare / BSPP Swivel<br>  <br>K5 | **XEMK46**<br>37°Flare / BSPP Swivel<br>  <br>K6 | | |

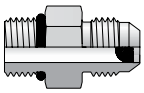
## Diagnostic and Orifice Fittings (Shown in Section M)

| | | | |
|---|---|---|---|
| Diagnostic Tee | **XHX6G5TP**<br>37° Flare / 37° Swivel / SAE-ORB<br>  <br>M5 | Orifice Fitting | **XHX7**<br>37° Flare / 37° Female with Orifice<br>  <br>M9 |

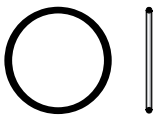
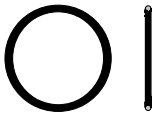
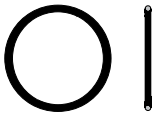
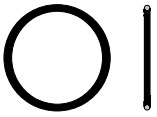
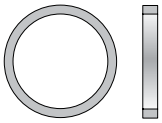
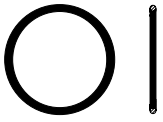
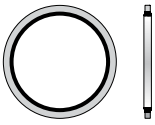
## Gauge Fittings (Shown in Section M)

| | | |
|---|---|---|
| Gauge Fittings | **G6X**<br>NPT Gauge / 37° Swivel<br>  <br>M7 | **G4MXSMO**<br>BSPP Gauge / 37° Flare<br>  <br>M6 |

## Screen Fittings (Shown in Section M)

| | |
|---|---|
| Screen Fittings | Screen Fittings<br>  <br>M12 |

## O-Rings and Seals (Shown in Section N)

| | | | | | |
|---|---|---|---|---|---|
| O-Rings and Seals | **XO O-Ring**<br>  <br>N4 | **SAE O-Ring**<br>  <br>N4 | **ISO 6149 O-Ring**<br>  <br>N5 | **Metric O-Ring**<br>  <br>N5 | **Metric Retaining Ring**<br>  <br>N5 |
| **BSPP O-Ring**<br>  <br>N6 | **BSPP Retaining Ring**<br>  <br>N6 | **EOlastic Seal Ring**<br> <br>N6 | | | |



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Tube Fittings Division
Columbus, Ohio
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# Triple-Lok

Parker Triple-Lok fittings meet the strict requirements of SAE J514 and ISO 8434-2 industry standards for 37° flare fittings. Its design is simple. It uses an easily produced flare at the tube end to seal and hold fluid under high pressure. The fitting consists of three pieces: the body, sleeve and nut. The tube is flared at a 37° angle (74° included angle) and held between the fitting nose (seat) and the sleeve (support) with the nut as shown in Fig. B1, providing a very effective seal between the fitting nose and the tube flare.

The design of Triple-Lok fittings is very efficient. The fitting incorporates the smallest seal area of all fitting types. This seal area, as seen in Fig. B1, is only slightly larger than the fluid flow area. The small seal area results in a compact design, low assembly torque, and a relatively high-pressure capability.

# How Triple-Lok Fittings Work

Tightening of the nut clamps the tube flare between the body nose (seat) producing a leak tight connection. This clamping on the 37° taper provides a measure of elasticity to the joint helping it to resist loosening under vibration. The clamping force results in a small radial load that tends to deform the fitting nose radially. The resistance of the nose to elastic deformation provides a constant preload (similar to a lockwasher) keeping it tight.

The clamping force provided by the nut resists the opposing force of the fluid under pressure. The joint remains leak tight as long as the clamping force is higher than the opposing pressure load. Properly assembled Triple-Lok fittings with appropriate tube will seal consistently under pressure until tube bursts.

Sealing in Triple-Lok fittings takes place between two smooth metal surfaces, the fitting nose and inside of the tube flare. Therefore, the sealing surfaces have to be smooth, free of any nicks, scratches, spiral tool marks, splits or weld beads. Seamless or welded and drawn fully annealed tube is recommended for Triple-Lok fittings for ease in flaring and bending. Certain types of harder tubes that are not fully annealed may not be suitable for flaring due to the potential for immediate or long-term cracking of the tube flare. For specific tube type and wall thickness recommendations, please see Table U3 in the Appendix Section.

# International Acceptance

The versatility of 37° flare fittings is a primary reason for its worldwide acceptance. To illustrate the versatility of Triple-Lok, refer to Fig. B2. The Triple-Lok adapter is attachable to either inch tube, metric tube, or a hose assembly. To adapt to metric tube, simply change the sleeve (using the standard inch adapter and nut). Please see Table U4 in the Appendix Section for a clear illustration of every “convertible sleeve” connection for the 37° design. For example, for a 25 mm tube assembly, a standard SAE -16 (1”) flare fitting and nut would be used, however, a 25 mm metric sleeve (TXS25) would replace the inch size sleeve.

Triple-Lok fittings are available with many different port options for the various international hydraulic ports available, such as SAE straight thread, NPT/NPTF, BSPP, BSPT and Metric (including ISO 6149).

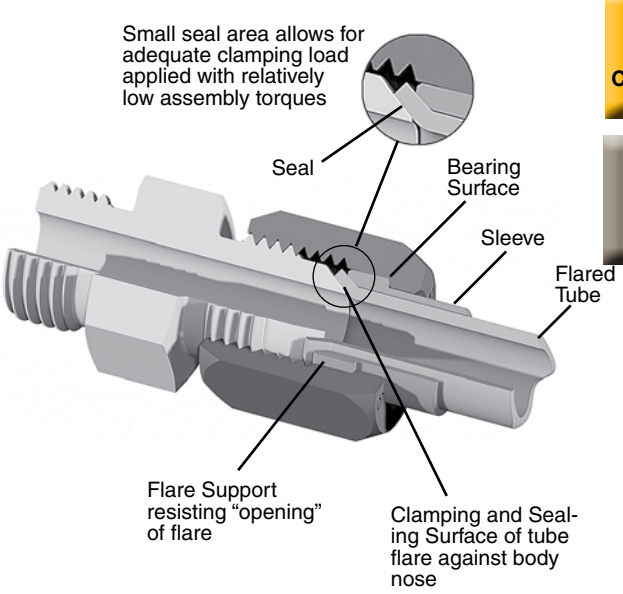


**Fig. B1 – Triple-Lok Design and Features**

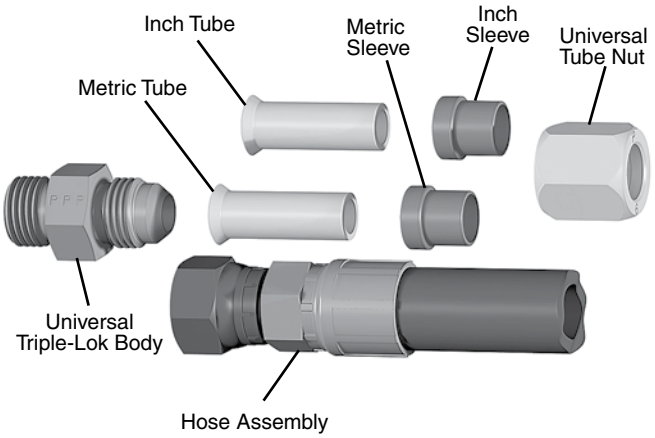


**Fig. B2 – Triple-Lok’s Adaptability to Inch Tube, Metric Tube, or Hose Assemblies**

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# Triple-Lok 2

Triple-Lok 2 combines the versatility of stainless steel Triple-Lok with the added advantage of an elastomeric seal. It incorporates an O-ring that is positioned in the nose of the 37° flare so that elastomeric sealing occurs with the mating flared tube. Similar to the standard stainless steel Triple-Lok, Triple-Lok 2 consists of three pieces: the body (with O-ring), the standard Triple-Lok sleeve and standard Triple-Lok nut. The tube end is flared at a 37° angle (74° included angle) and held between the fitting nose and sleeve with the nut as shown in Fig. B3, providing a very effective elastomeric seal between the fitting nose and the tube flare.

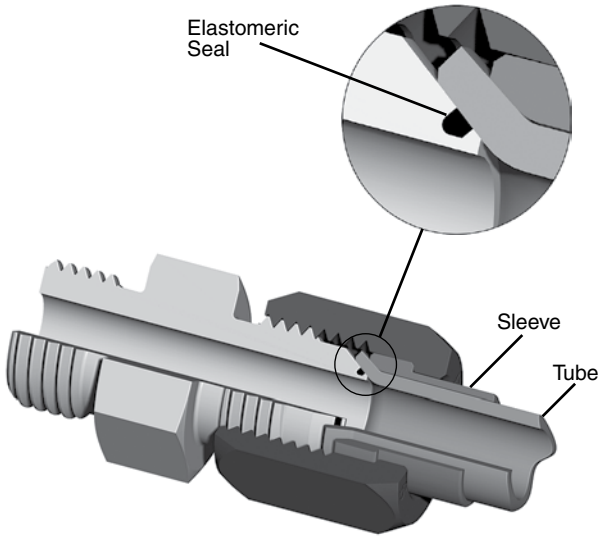



**Fig. B3 – Triple-Lok 2 Design and Features**

# The Parker Advantage

**Robust Port Stud:** The adjustable port stud is manufactured with a longer locknut designed to cover the uppermost threads completely. Since the backup washer is never exposed to the upper threads, it cannot be damaged during assembly. During assembly, exposed upper threads, as common with fittings from other fitting manufacturers, can lead to a deformed backup washer that can pinch the o-ring and create an o-ring extrusion gap that has the potential to leak. The longer locknut also provides a greater grip area for the wrench.

**Superior Plating:** Superior plating gives Parker steel tube fittings unmatched protection against red rust. In neutral salt spray test per ASTM B117, Parker Triple-Lok fittings substantially exceeded the SAE requirement of 96 hours to red rust.

**Pre-Lubricated Stainless Steel Tube Nut:** All stainless steel Triple-Lok tube nuts have a pre-applied anti-seize lubricant to prevent galling during assembly.

**Triple-Lok 2:** Triple-Lok 2 utilizes an elastomeric seal in the flare nose for improved seal reliability in applications where stainless steel fittings are required .

**Wide Selection:** Triple-Lok fittings are available as standard in steel, stainless steel, brass and aluminum materials. Coupled with its broad line of configurations and port end options, Parker is well positioned to better service the hydraulic requirements of the international markets.

# Reference locations

**Dynamic Pressure Ratings:** Please refer to the last column of the part number tables located on the following pages of this section for the appropriate dynamic pressure ratings.

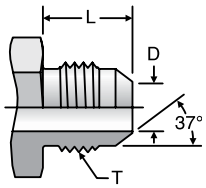
**Recommended Tube Wall Thickness:** Please refer to Table U3 located in the Appendix section.

**Assembly and Installation:** Please refer to Triple-lok Assembly located within the Assembly/Installation section of this catalog.

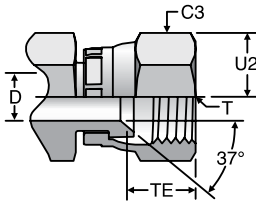
**Standard material specifications:** Please refer to Table U1 located in the Appendix section.

**Seal Material Selection:** Please refer to Table T8 in the General Technical section of this catalog.

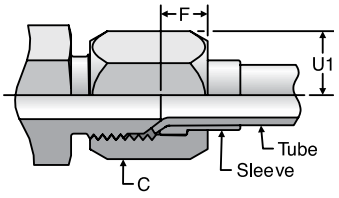
# Triple-Lok 37° Flared Tube Ends



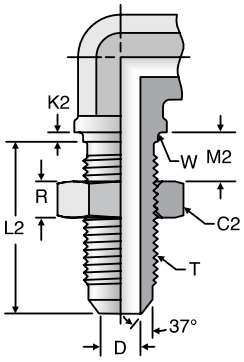

**Triple-Lok Male Flare Tube End**



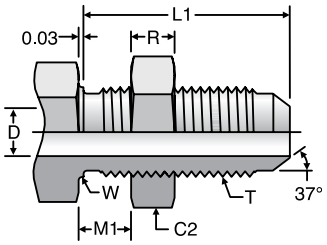

**Triple-Lok Swivel**



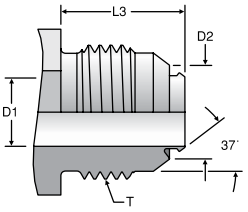

**Triple-Lok Tube End Assembly**




**Triple-Lok Shape Bulkhead**




**Triple-Lok Straight Bulkhead**




**Triple-Lok 2 Male Flare Tube End**

| SAE Dash Size | Tube O.D. | | Thread T | Tube Nut Hex C | Bulkhead Locknut Hex C2 | Swivel Nut Hex C3 | | Max Drill D | | Male Turn Back L | | Assembly Allowance F | | Bulkhead K2 | | | | | Max Bulkhead Thickness M1 | | Min. Flare Dia. D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Tube Nut | Swivel Nut | Pilot Length - Shapes | Length - Straights | Length - Shapes | Locknut Thickness R | Pilot Dia (Max) W[1] | Straights | Shapes | |
| | (in.) | (mm) | UN/UNF | (in.) | (in.) | (in.) | (mm) | (in) | (in) | (in) | (in) | (in) | (in) | (in) | (in) | (in) | (in) | (in) | (in) | (in) | (in) |
| **2** | 1/8 | — | 5/16-24 | 3/8 | 9/16 | 7/16 | — | 0.062 | — | 0.45 | — | 0.19 | 0.31 | 0.094 | 1.11 | 0.92 | 0.22 | 0.313 | 0.38 | 0.25 | — |
| **3** | 3/16 | — | 3/8-24 | 7/16 | 5/8 | 1/2 | — | 0.125 | — | 0.48 | — | 0.25 | 0.33 | 0.094 | 1.11 | 0.92 | 0.22 | 0.375 | 0.38 | 0.25 | — |
| **4** | 1/4 | 6 | 7/16-20 | 9/16 | 11/16 | 9/16 | 14 | 0.172 | 0.156 | 0.55 | 0.56 | 0.19 | 0.34 | 0.094 | 1.20 | 1.02 | 0.28 | 0.438 | 0.38 | 0.25 | 0.254 |
| **5** | 5/16 | 8 | 1/2-20 | 5/8 | 3/4 | 5/8 | 16 | 0.234 | 0.217 | 0.55 | 0.56 | 0.30 | 0.38 | 0.094 | 1.20 | 1.02 | 0.28 | 0.500 | 0.38 | 0.25 | 0.314 |
| **6** | 3/8 | 10 | 9/16-18 | 11/16 | 13/16 | 11/16 | 17 | 0.297 | 0.263 | 0.56 | 0.57 | 0.28 | 0.38 | 0.094 | 1.28 | 1.09 | 0.27 | 0.563 | 0.44 | 0.35 | 0.359 |
| **8** | 1/2 | 12 | 3/4-16 | 7/8 | 1 | 7/8 | 22 | 0.391 | 0.391 | 0.66 | 0.66 | 0.31 | 0.42 | 0.125 | 1.44 | 1.25 | 0.31 | 0.750 | 0.44 | 0.35 | 0.510 |
| **10** | 5/8 | 14<br>15<br>16 | 7/8-14 | 1 | 1 1/8 | 1 | 27 | 0.484 | 0.446 | 0.76 | 0.81 | 0.38 | 0.50 | 0.125 | 1.58 | 1.39 | 0.36 | 0.875 | 0.44 | 0.35 | 0.610 |
| **12** | 3/4 | 18<br>20 | 1 1/16-12 | 1 1/4 | 1 3/8 | 1 1/4 | 32 | 0.610 | 0.578 | 0.86 | 0.91 | 0.36 | 0.56 | 0.125 | 1.75 | 1.56 | 0.41 | 1.063 | 0.44 | 0.35 | 0.753 |
| **14** | 7/8 | 22 | 1 3/16-12 | 1 3/8 | 1 1/2 | 1 3/8 | 36 | 0.718 | 0.680 | 0.89 | 0.95 | 0.38 | 0.58 | 0.125 | 1.75 | 1.56 | 0.41 | 1.188 | 0.44 | 0.35 | 0.849 |
| **16** | 1 | 25 | 1 5/16-12 | 1 1/2 | 1 5/8 | 1 1/2 | 38 | 0.844 | 0.769 | 0.91 | 0.99 | 0.34 | 0.59 | 0.125 | 1.75 | 1.56 | 0.41 | 1.313 | 0.44 | 0.35 | 0.940 |
| **20** | 1 1/4 | 28<br>30<br>32 | 1 5/8-12 | 2 | 1 7/8 | 2 | 50 | 1.078 | 1.020 | 0.96 | 1.03 | 0.34 | 0.63 | 0.125 | 1.80 | 1.61 | 0.41 | 1.625 | 0.44 | 0.35 | 1.198 |
| **24** | 1 1/2 | 35<br>38 | 1 7/8-12 | 2 1/4 | 2 1/8 | 2 1/4 | 60 | 1.312 | 1.230 | 1.08 | 1.16 | 0.50 | 0.73 | 0.125 | 1.81 | 1.62 | 0.41 | 1.875 | 0.31 | 0.22 | 1.416 |
| **32** | 2 | — | 2 1/2-12 | 2 7/8 | 2 3/4 | 2 7/8 | — | 1.781 | 1.736 | 1.33 | 1.40 | 0.55 | 0.94 | 0.125 | 2.09 | 1.91 | 0.41 | 2.500 | 0.35 | 0.25 | 1.994 |
| **40** [2] | 2 1/2 | — | 3-12 | 3 3/8 | — | — | — | 2.281 | — | | — | 0.55 | — | 0.125 | 1.72 | 1.72 | 0.41 | 2.998 | 0.45 | 0.45 | — |

1) Recommended clearance hole = W + 0.015.
2) Not a standard SAE J514 size.

Dimensions and pressures for reference only, subject to change.



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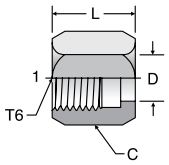
# BTX

Nut
37° Flare

SAE 070110
HPD Base # 06B



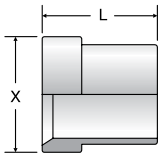

| TUBE FITTING PART # | END SIZE (in.) | END SIZE (mm) | T6 UN/UNF-2B | C HEX (in.) | D (in.) | L (in.) | Material -S | Material -SS | Material -B |
|---|---|---|---|---|---|---|---|---|---|
| **2 BTX** | 1/8 | — | 5/16 - 24 | 3/8 | 0.180 | 0.55 | • | • | • |
| **3 BTX** | 3/16 | — | 3/8 - 24 | 7/16 | 0.240 | 0.61 | • | • | • |
| **4 BTX** | 1/4 | 6 | 7/16 - 20 | 9/16 | 0.310 | 0.62 | • | • | • |
| **5 BTX** | 5/16 | 8 | 1/2 - 20 | 5/8 | 0.380 | 0.68 | • | • | • |
| **6 BTX** | 3/8 | 10 | 9/16 - 18 | 11/16 | 0.440 | 0.73 | • | • | • |
| **8 BTX** | 1/2 | 12 | 3/4 - 16 | 7/8 | 0.570 | 0.85 | • | • | • |
| **10 BTX** | 5/8 | 14, 15, 16 | 7/8 - 14 | 1 | 0.700 | 0.98 | • | • | • |
| **12 BTX** | 3/4 | 18 | 1 1/16 - 12 | 1 1/4 | 0.840 | 1.03 | • | • | • |
| **20-12 BTX** | — | 20 | 1 1/16 - 12 | 1 1/4 | 0.862 | 0.87 | • | • | • |
| **14 BTX** | 7/8 | — | 1 3/16 - 12 | 1 3/8 | 0.960 | 1.09 | • | • | • |
| **16 BTX** | 1 | 25 | 1 5/16 - 12 | 1 1/2 | 1.090 | 1.13 | • | • | • |
| **20 BTX** | 1 1/4 | 28, 30, 32 | 1 5/8 - 12 | 2 | 1.350 | 1.23 | • | • | • |
| **24 BTX** | 1 1/2 | 35, 38 | 1 7/8 - 12 | 2 1/4 | 1.620 | 1.42 | • | • | • |
| **32 BTX** | 2 | 42, 50 | 2 1/2 - 12 | 2 7/8 | 2.170 | 1.75 | • | • | • |

Note: All stainless steel nuts are coated to prevent galling at assembly.

# TX (inch)

Sleeve
37° Flare

SAE 070115
HPD Base # 06S

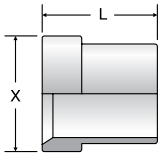



| TUBE FITTING PART # | END SIZE (in.) | L (in.) | X (in.) | Material -S | Material -SS | Material -B |
|---|---|---|---|---|---|---|
| **2 TX** | 1/8 | 0.34 | 0.27 | • | • | • |
| **3 TX** | 3/16 | 0.34 | 0.33 | • | • | • |
| **4 TX** | 1/4 | 0.41 | 0.38 | • | • | • |
| **5 TX** | 5/16 | 0.44 | 0.45 | • | • | • |
| **6 TX** | 3/8 | 0.50 | 0.50 | • | • | • |
| **8 TX** | 1/2 | 0.56 | 0.68 | • | • | • |
| **10 TX** | 5/8 | 0.66 | 0.80 | • | • | • |
| **12 TX** | 3/4 | 0.69 | 0.97 | • | • | • |
| **14 TX** | 7/8 | 0.75 | 1.10 | • | • | • |
| **16 TX** | 1 | 0.78 | 1.22 | • | • | • |
| **20 TX** | 1 1/4 | 0.91 | 1.53 | • | • | • |
| **24 TX** | 1 1/2 | 1.13 | 1.78 | • | • | • |
| **32 TX** | 2 | 1.19 | 2.41 | • | • | • |

# TX (metric)

Sleeve
37° Flare

SAE 070115




| TUBE FITTING PART # | See Note | END SIZE (mm) | FITTING DASH SIZE | L (mm) | X (mm) | Material S | Material SS | Material B |
|---|---|---|---|---|---|---|---|---|
| **TXS6** | 3 | 6 | -4 | 10.4 | 9.6 | • | • | • |
| **5 TX** | 1 | 8 | -5 | 11.2 | 11.4 | • | • | • |
| **TXS10** | 3 | 10 | -6 | 12.7 | 12.7 | • | • | • |
| **TXS12** | 3 | 12 | -8 | 14.2 | 17.3 | • | • | • |
| **TXS14** | 3 | 14 | -10 | 16.8 | 20.3 | • | • | • |
| **TXS15** | 3 | 15 | -10 | 16.8 | 20.3 | • | • | • |
| **10 TX** | 1 | 16 | -10 | 16.8 | 20.3 | • | • | • |
| **TXS18** | 3 | 18 | -12 | 17.3 | 24.6 | • | • | • |
| **20-12 TX** | 2 | 20 | -12 | 17.3 | 24.6 | • | • | • |
| **TXS22** | 3 | 22 | -14 | 19.0 | 27.8 | • | • | • |
| **TXS25** | 3 | 25 | -16 | 19.8 | 31.0 | • | • | • |
| **TXS28** | 3 | 28 | -20 | 23.1 | 38.9 | • | • | • |
| **TXS30** | 3 | 30 | -20 | 23.1 | 38.9 | • | • | • |
| **TXS32** | 3 | 32 | -20 | 23.1 | 38.9 | • | • | • |
| **TXS35** | 3 | 35 | -24 | 28.4 | 45.2 | • | • | • |
| **24 TX** | 1 | 38 | -24 | 28.4 | 45.2 | • | • | • |

1. Inch sleeve for use with metric tubing.
2. Use with 20-12 BTX.
3. The part numbers above are for steel. Use “SS” in place of “S” for ordering stainless steel. Example: TXSS12

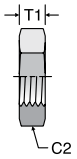
Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

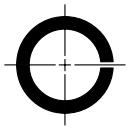
# WLN
Bulkhead Locknut

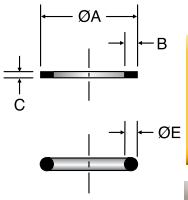
SAE 080118 and 070118
HPD Base # 53-XN




| TUBE FITTING PART # | TUBE O.D. (in.) | C2 HEX (in.) | T1 (in.) | Material -S | -SS | -B |
|---|---|---|---|---|---|---|
| 3 WLN | 3/16 | 5/8 | 0.22 | • | • | • |
| 4 WLN | 1/4 | 11/16 | 0.28 | • | • | • |
| 5 WLN | 5/16 | 3/4 | 0.28 | • | • | • |
| 6 WLN | 3/8 | 13/16 | 0.27 | • | • | • |
| 8 WLN | 1/2 | 1 | 0.31 | • | • | • |
| 10 WLN | 5/8 | 1 1/8 | 0.36 | • | • | • |
| 12 WLN | 3/4 | 1 3/8 | 0.41 | • | • | • |
| 14 WLN | 7/8 | 1 1/2 | 0.41 | • | • | • |
| 16 WLN | 1 | 1 5/8 | 0.41 | • | • | • |
| 20 WLN | 1 1/4 | 1 7/8 | 0.41 | • | • | • |
| 24 WLN | 1 1/2 | 2 1/8 | 0.41 | • | • | • |
| 32 WLN | 2 | 2 3/4 | 0.41 | • | • | • |

# SBR
Braze Ring

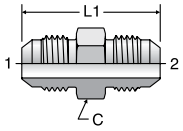





| TUBE FITTING PART # | TUBE O.D. (in.) | A DIA. (in.) | B (in.) | C (in.) | E (in.) | Material -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| 4 SBR | 1/4 | 0.260 | — | — | 0.05 | • | • | • |
| 6 SBR | 3/8 | 0.390 | 0.07 | 0.03 | — | • | • | • |
| 8 SBR | 1/2 | 0.515 | 0.07 | 0.03 | — | • | • | • |
| 10 SBR | 5/8 | 0.640 | 0.07 | 0.03 | — | • | • | • |
| 12 SBR | 3/4 | 0.765 | 0.08 | 0.04 | — | • | • | • |
| 14 SBR | 7/8 | 0.890 | — | — | 0.06 | • | • | • |
| 16 SBR | 1 | 1.015 | 0.08 | 0.04 | — | • | • | • |
| 20 SBR | 1 1/4 | 1.265 | 0.08 | 0.04 | — | • | • | • |
| 24 SBR | 1 1/2 | 1.515 | 0.08 | 0.04 | — | • | • | • |
| 32 SBR | 2 | 2.015 | — | — | 0.09 | • | • | • |

# HTX
Union
37° Flare / 37° Flare

SAE 070101
HPD Base # 0303

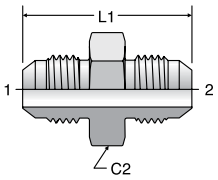



| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | C HEX (in.) | L1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| 2 HTX | 1/8 | 1/8 | 7/16 | 1.17 | 7.5 | 9.0 | 3.3 |
| 3 HTX | 3/16 | 3/16 | 7/16 | 1.23 | 7.5 | 9.0 | 3.3 |
| 4 HTX | 1/4 | 1/4 | 1/2 | 1.37 | 7.5 | 9.0 | 3.3 |
| 4-2 HTX | 1/4 | 1/8 | 1/2 | 1.27 | 7.5 | 9.0 | 3.3 |
| 4-3 HTX | 1/4 | 3/16 | 1/2 | 1.30 | 7.5 | 9.0 | 3.3 |
| 5 HTX | 5/16 | 5/16 | 9/16 | 1.37 | 6.0 | 7.2 | 3.3 |
| 5-4 HTX | 5/16 | 1/4 | 9/16 | 1.38 | 6.0 | 7.2 | 3.3 |
| 6 HTX | 3/8 | 3/8 | 5/8 | 1.41 | 6.0 | 7.2 | 3.3 |
| 6-4 HTX | 3/8 | 1/4 | 5/8 | 1.41 | 6.0 | 7.2 | 3.3 |
| 6-5 HTX | 3/8 | 5/16 | 5/8 | 1.41 | 6.0 | 7.2 | 3.3 |
| 8 HTX | 1/2 | 1/2 | 13/16 | 1.62 | 6.0 | 7.2 | 3.3 |
| 8-4 HTX | 1/2 | 1/4 | 13/16 | 1.52 | 6.0 | 7.2 | 3.3 |
| 8-6 HTX | 1/2 | 3/8 | 13/16 | 1.52 | 6.0 | 7.2 | 3.3 |
| 10 HTX | 5/8 | 5/8 | 15/16 | 1.88 | 5.0 | 6.0 | 3.3 |
| 10-8 HTX | 5/8 | 1/2 | 15/16 | 1.78 | 5.0 | 6.0 | 3.3 |
| 12 HTX | 3/4 | 3/4 | 1 1/8 | 2.16 | 5.0 | 6.0 | 3.3 |
| 12-8 HTX | 3/4 | 1/2 | 1 1/8 | 1.95 | 5.0 | 6.0 | 3.3 |
| 12-10 HTX | 3/4 | 5/8 | 1 1/8 | 2.05 | 5.0 | 6.0 | 3.3 |
| 14 HTX | 7/8 | 7/8 | 1 1/4 | 2.22 | 5.0 | 6.0 | 2.6 |
| 16 HTX | 1 | 1 | 1 3/8 | 2.25 | 4.0 | 4.8 | 2.6 |
| 16-12 HTX | 1 | 3/4 | 1 3/8 | 2.20 | 4.0 | 4.8 | 2.6 |
| 20 HTX | 1 1/4 | 1 1/4 | 1 11/16 | 2.43 | 4.0 | 4.8 | 2.6 |
| 24 HTX | 1 1/2 | 1 1/2 | 2 | 2.75 | 3.0 | 3.6 | 2.0 |
| 24-10 HTX | 1 1/2 | 5/8 | 2 | 2.42 | 3.0 | 3.6 | 2.0 |
| 24-12 HTX | 1 1/2 | 3/4 | 2 | 2.53 | 3.0 | 3.6 | 2.0 |
| 24-16 HTX | 1 1/2 | 1 | 2 | 2.58 | 3.0 | 3.6 | 2.0 |
| 32 HTX | 2 | 2 | 2 5/8 | 3.40 | 2.0 | 2.4 | 1.3 |
| 32-24 HTX | 2 | 1 1/2 | 2 5/8 | 2.81 | 2.0 | 2.4 | 1.3 |

• Contact TFD

# LHTX
Large Hex Union
37° Flare / 37° Flare

SAE 070119
HPD Base # 03L3




| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | C2 HEX (in.) | L1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| 4 LHTX | 1/4 | 1/4 | 11/16 | 1.38 | 7.5 | 9.0 | 3.3 |
| 4-3 LHTX | 1/4 | 3/16 | 11/16 | 1.30 | 7.5 | 9.0 | 3.3 |
| 5 LHTX | 5/16 | 5/16 | 3/4 | 1.37 | 6.0 | 7.2 | 3.3 |
| 6 LHTX | 3/8 | 3/8 | 13/16 | 1.41 | 6.0 | 7.2 | 3.3 |
| 6-4 LHTX | 3/8 | 1/4 | 13/16 | 1.41 | 6.0 | 7.2 | 3.3 |
| 8 LHTX | 1/2 | 1/2 | 1 | 1.62 | 6.0 | 7.2 | 3.3 |
| 8-4 LHTX | 1/2 | 1/4 | 1 | 1.52 | 6.0 | 7.2 | 3.3 |
| 8-6 LHTX | 1/2 | 3/8 | 1 | 1.52 | 6.0 | 7.2 | 3.3 |
| 10 LHTX | 5/8 | 5/8 | 1 1/8 | 1.88 | 5.0 | 6.0 | 3.3 |
| 12 LHTX | 3/4 | 3/4 | 1 3/8 | 2.16 | 5.0 | 6.0 | 3.3 |
| 12-8 LHTX | 3/4 | 1/2 | 1 3/8 | 1.95 | 5.0 | 6.0 | 3.3 |
| 16 LHTX | 1 | 1 | 1 5/8 | 2.25 | 4.0 | 4.8 | 2.6 |
| 32 LHTX | 2 | 2 | 2 3/4 | 3.40 | 2.0 | 2.4 | 1.3 |

Dimensions and pressures for reference only, subject to change.

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**Parker Hannifin Corporation**
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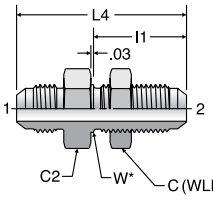
http://www.parker.com/tfd

# WTX

Bulkhead Union
37° Flare / 37° Flare

SAE 070601
HPD Base # 0353
WTX-WLN – Body with locknut
(See page B10 for WLN)



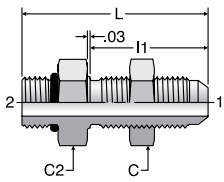

W* – Bulkhead pilot dia. recommended clearance hole +.015 over W dia.

| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | C HEX (in.) | C2 HEX (in.) | I1 (in.) | L4 (in.) | W DIA (in.) | MAX BULKHEAD WALL THICKNESS (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|
| **3 WTX** | 3/16 | 5/8 | 5/8 | 1.11 | 1.90 | 0.38 | 0.38 | 7.5 | 9.0 | 3.3 |
| **4 WTX** | 1/4 | 11/16 | 11/16 | 1.20 | 2.07 | 0.44 | 0.38 | 7.5 | 9.0 | 3.3 |
| **5 WTX** | 5/16 | 3/4 | 3/4 | 1.20 | 2.07 | 0.50 | 0.38 | 6.0 | 7.2 | 3.3 |
| **6 WTX** | 3/8 | 13/16 | 13/16 | 1.28 | 2.18 | 0.56 | 0.44 | 6.0 | 7.2 | 3.3 |
| **8 WTX** | 1/2 | 1 | 1 | 1.44 | 2.44 | 0.75 | 0.44 | 6.0 | 7.2 | 3.3 |
| **10 WTX** | 5/8 | 1 1/8 | 1 1/8 | 1.58 | 2.74 | 0.88 | 0.44 | 5.0 | 6.0 | 3.3 |
| **12 WTX** | 3/4 | 1 3/8 | 1 3/8 | 1.75 | 3.09 | 1.06 | 0.44 | 5.0 | 6.0 | 3.3 |
| **14 WTX** | 7/8 | 1 1/2 | 1 1/2 | 1.75 | 3.12 | 1.19 | 0.44 | 5.0 | 6.0 | 3.3 |
| **16 WTX** | 1 | 1 5/8 | 1 5/8 | 1.75 | 3.14 | 1.31 | 0.44 | 4.0 | 4.8 | 2.6 |
| **20 WTX** | 1 1/4 | 1 7/8 | 1 7/8 | 1.80 | 3.31 | 1.63 | 0.44 | 4.0 | 4.8 | 2.6 |
| **24 WTX** | 1 1/2 | 2 1/8 | 2 1/8 | 1.81 | 3.52 | 1.88 | 0.31 | 3.0 | 3.6 | 2.0 |
| **32 WTX** | 2 | 2 3/4 | 2 3/4 | 2.09 | 4.20 | 2.50 | 0.35 | 2.0 | 2.4 | 1.3 |

# WF5OX

SAE-ORB Bulkhead Connector
37° Flare / SAE-ORB

HPD Base # 0355
WF5OX-WLN – Body with locknut
(See page B10 for WLN)

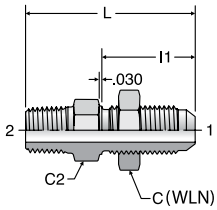



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | C HEX (in.) | C2 HEX (in.) | I1 (in.) | L (in.) | MAX BULKHEAD WALL THICKNESS (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|
| **4 WF5OX** | 1/4 | 7/16 - 20 | 11/16 | 11/16 | 1.20 | 1.84 | 0.38 | 7.5 | 9.0 | 3.3 |
| **6 WF5OX** | 3/8 | 9/16 - 18 | 13/16 | 13/16 | 1.28 | 2.02 | 0.44 | 6.0 | 7.2 | 3.3 |
| **8 WF5OX** | 1/2 | 3/4 - 16 | 1 | 1 | 1.44 | 2.19 | 0.44 | 6.0 | 7.2 | 3.3 |
| **10 WF5OX** | 5/8 | 7/8 - 14 | 1 1/8 | 1 1/8 | 1.58 | 2.47 | 0.44 | 5.0 | 6.0 | 3.3 |
| **12 WF5OX** | 3/4 | 1 1/16 - 12 | 1 3/8 | 1 3/8 | 1.75 | 2.79 | 0.44 | 5.0 | 6.0 | 3.3 |
| **16 WF5OX** | 1 | 1 5/16 - 12 | 1 5/8 | 1 5/8 | 1.75 | 2.90 | 0.44 | 4.5 | 5.4 | 2.9 |

# WFTX

Male Bulkhead Connector
37° Flare / NPTF

HPD Base # 0153
WFTX-WLN – Body with locknut
(See page B10 for WLN)




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C HEX (in.) | C2 HEX (in.) | I1 (in.) | L (in.) | MAX BULKHEAD WALL THICKNESS (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 WFTX | 1/4 | 1/8 - 27 | 11/16 | 11/16 | 1.20 | 1.88 | 0.38 | 6.0 | 6.0 | 3.3 |
| 4-4 WFTX | 1/4 | 1/4 - 18 | 11/16 | 11/16 | 1.20 | 2.10 | 0.38 | 6.0 | 6.0 | 3.3 |
| 6 WFTX | 3/8 | 1/4 - 18 | 13/16 | 13/16 | 1.28 | 2.18 | 0.44 | 6.0 | 6.0 | 3.3 |
| 6-6 WFTX | 3/8 | 3/8 - 18 | 13/16 | 13/16 | 1.28 | 2.16 | 0.44 | 6.0 | 6.0 | 3.3 |
| 6-8 WFTX | 3/8 | 1/2 - 14 | 7/8 | 13/16 | 1.28 | 2.41 | 0.44 | 6.0 | 6.0 | 3.3 |
| 8 WFTX | 1/2 | 3/8 - 18 | 1 | 1 | 1.44 | 2.34 | 0.44 | 6.0 | 6.0 | 3.3 |
| 8-8 WFTX | 1/2 | 1/2 - 14 | 1 | 1 | 1.44 | 2.60 | 0.44 | 6.0 | 6.0 | 3.3 |
| 10 WFTX | 5/8 | 1/2 - 14 | 1 1/8 | 1 1/8 | 1.58 | 2.74 | 0.44 | 5.0 | 5.0 | 3.3 |
| 12 WFTX | 3/4 | 3/4 - 14 | 1 3/8 | 1 3/8 | 1.75 | 2.95 | 0.44 | 5.0 | 5.0 | 2.6 |
| 16 WFTX | 1 | 1 - 11 1/2 | 1 5/8 | 1 5/8 | 1.75 | 3.14 | 0.44 | 4.5 | 4.5 | 2.0 |

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Dimensions and pressures for reference only, subject to change.

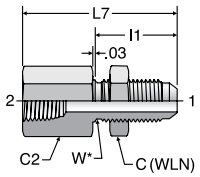


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# WGTX

Female Bulkhead Connector
37° Flare / NPTF

HPD Base # 0253
WGTX-WLN – Body with locknut
(See page B10 for WLN)

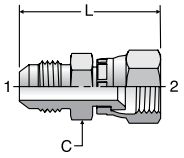



W* – Bulkhead pilot dia.
recommended clearance hole
+.015 over W dia.

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C HEX (in.) | C2 HEX (in.) | I1 (in.) | L7 (in.) | W DIA (in.) | MAX BULKHEAD WALL THICKNESS (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **4 WGTX** | 1/4 | 1/8 - 27 | 11/16 | 11/16 | 1.20 | 1.84 | 0.44 | 0.38 | 6.0 | 6.0 | 3.3 |
| **4-4 WGTX** | 1/4 | 1/4 - 18 | 11/16 | 3/4 | 1.20 | 2.11 | 0.44 | 0.38 | 6.0 | 6.0 | 3.3 |
| **6 WGTX** | 3/8 | 1/4 - 18 | 13/16 | 13/16 | 1.28 | 2.12 | 0.56 | 0.44 | 6.0 | 6.0 | 3.3 |
| **6-6 WGTX** | 3/8 | 3/8 - 18 | 13/16 | 7/8 | 1.28 | 2.24 | 0.56 | 0.44 | 6.0 | 6.0 | 3.3 |
| **8 WGTX** | 1/2 | 3/8 - 18 | 1 | 1 | 1.44 | 2.34 | 0.75 | 0.44 | 6.0 | 6.0 | 3.3 |
| **8-8 WGTX** | 1/2 | 1/2 - 14 | 1 | 1 1/8 | 1.44 | 2.61 | 0.75 | 0.44 | 5.0 | 5.0 | 3.3 |
| **10 WGTX** | 5/8 | 1/2 - 14 | 1 1/8 | 1 1/8 | 1.58 | 2.71 | 0.88 | 0.44 | 5.0 | 5.0 | 3.3 |
| **12 WGTX** | 3/4 | 3/4 - 14 | 1 3/8 | 1 3/8 | 1.75 | 2.95 | 1.06 | 0.44 | 4.0 | 4.0 | 2.6 |
| **14 WGTX** | 7/8 | 3/4 - 14 | 1 3/8 | 1 1/2 | 1.75 | 2.92 | 1.19 | 0.41 | 4.0 | 4.0 | 2.6 |
| **16 WGTX** | 1 | 1 - 11 1/2 | 1 5/8 | 1 5/8 | 1.75 | 3.19 | 1.31 | 0.44 | 3.0 | 3.0 | 2.0 |
| **24 WGTX** | 1 1/2 | 1 1/2-11 1/2 | 2 1/8 | 2 1/4 | 1.81 | 3.35 | 1.88 | 0.31 | 2.0 | 2.0 | 1.3 |

# XHX6

Extender and Expander
37° Flare / 37° Flare Swivel




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **4 XHX6** | 1/4 | 1/4 | 9/16 | 1.39 | 7.5 | 7.7 | 3.3 |
| **6 XHX6** | 3/8 | 3/8 | 5/8 | 1.50 | 6.0 | 6.0 | 3.3 |
| **6-4 XHX6** | 3/8 | 1/4 | 5/8 | 1.50 | 6.0 | 6.0 | 3.3 |
| **8 XHX6** | 1/2 | 1/2 | 13/16 | 1.71 | 6.0 | 6.0 | 3.3 |
| **8-6 XHX6** | 1/2 | 3/8 | 13/16 | 1.72 | 6.0 | 6.0 | 3.3 |
| **10 XHX6** | 5/8 | 5/8 | 1 | 2.01 | 5.0 | 5.0 | 3.3 |
| **10-8 XHX6** | 5/8 | 1/2 | 15/16 | 1.93 | 5.0 | 5.0 | 3.3 |
| **12 XHX6** | 3/4 | 3/4 | 1 1/4 | 2.20 | 5.0 | 5.0 | 3.3 |
| **12-10 XHX6** | 3/4 | 5/8 | 1 1/8 | 2.19 | 5.0 | 5.0 | 3.3 |
| **16 XHX6** | 1 | 1 | 1 1/2 | 2.47 | 4.0 | 3.0 | 2.6 |
| **16-12 XHX6** | 1 | 3/4 | 1 1/2 | 2.24 | 4.0 | 3.0 | 2.6 |
| **20-16 XHX6** | 1 1/4 | 1 | 1 11/16 | 2.50 | 4.0 | 3.0 | 2.6 |

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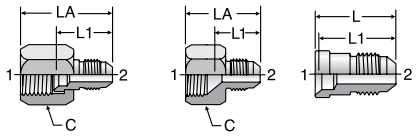
**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# TRTX / TRTXN

Reducer
37° Flare

SAE 070123 / SAE 070123A
HPD Base # 0603 (TRTXN only)




**TRTXN** 2-piece (Nut and Insert)

**TRTXN** 1-piece (Non-swivel)

**TRTX** (Insert only)

| TUBE FITTING PART # | | | END SIZE | | | | | | Dynamic Pressure (x 1,000 PSI) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **TRTXN** 2-pc. Design (with Large Nut) | **TRTXN** 1-pc. Design (Machined Female) | **TRTX** Reducer Insert (For 2-pc. Design Only) | **1** (in.) | **2** (in.) | **C HEX** (in.) | **L (TRTX)** (in.) | **LA (TRTXN)** (in.) | **L1 (TRTX & TRTXN)** (in.) | **-S** | **-SS** | **-B** |
| **4-2 TRTXN** | – | **4-2 TRTX** | 1/4 | 1/8 | 9/16 | 0.75 | 1.14 | 0.68 | 7.5 | 9.0 | 3.3 |
| – | **4-3 TRTXN** | – | 1/4 | 3/16 | 9/16 | — | 1.09 | 0.64 | 7.5 | 9.0 | 3.3 |
| – | **5-4 TRTXN** | – | 5/16 | 1/4 | 5/8 | — | 1.16 | 0.69 | 6.0 | 7.2 | 3.3 |
| **6-4 TRTXN** | – | **6-4 TRTX** | 3/8 | 1/4 | 11/16 | 0.97 | 1.40 | 0.90 | 6.0 | 7.2 | 3.3 |
| – | **6-5 TRTXN** | – | 3/8 | 5/16 | 11/16 | — | 1.19 | 0.73 | 6.0 | 7.2 | 3.3 |
| **8-4 TRTXN** | – | **8-4 TRTX** | 1/2 | 1/4 | 7/8 | 1.00 | 1.50 | 0.90 | 6.0 | 7.2 | 3.3 |
| **8-6 TRTXN** | – | **8-6 TRTX** | 1/2 | 3/8 | 7/8 | 1.00 | 1.50 | 0.90 | 6.0 | 7.2 | 3.3 |
| **10-4 TRTXN** | – | **10-4 TRTX** | 5/8 | 1/4 | 1 | 1.03 | 1.61 | 0.93 | 5.0 | 6.0 | 3.3 |
| **10-6 TRTXN** | – | **10-6 TRTX** | 5/8 | 3/8 | 1 | 1.03 | 1.61 | 0.93 | 5.0 | 6.0 | 3.3 |
| – | **10-8 TRTXN** | – | 5/8 | 1/2 | 1 | — | 1.48 | 0.85 | 5.0 | 6.0 | 3.3 |
| **12-4 TRTXN** | – | **12-4 TRTX** | 3/4 | 1/4 | 1 1/4 | 1.09 | 1.69 | 0.95 | 5.0 | 6.0 | 3.3 |
| **12-6 TRTXN** | – | **12-6 TRTX** | 3/4 | 3/8 | 1 1/4 | 1.09 | 1.69 | 0.95 | 5.0 | 6.0 | 3.3 |
| **12-8 TRTXN** | – | **12-8 TRTX** | 3/4 | 1/2 | 1 1/4 | 1.19 | 1.79 | 1.05 | 5.0 | 6.0 | 3.3 |
| – | **12-10 TRTXN** | – | 3/4 | 5/8 | 1 1/4 | — | 1.66 | 0.96 | 5.0 | 6.0 | 3.3 |
| **14-6 TRTXN** | – | **14-6 TRTX** | 7/8 | 3/8 | 1 3/8 | 1.13 | 1.78 | 1.00 | 5.0 | 6.0 | 3.3 |
| **14-10 TRTXN** | – | **14-10 TRTX** | 7/8 | 5/8 | 1 3/8 | 1.33 | 1.98 | 1.20 | 5.0 | 6.0 | 3.3 |
| – | **14-12 TRTXN** | – | 7/8 | 3/4 | 1 3/8 | — | 1.84 | 1.11 | 5.0 | 6.0 | 3.3 |
| **16-4 TRTXN** | – | **16-4 TRTX** | 1 | 1/4 | 1 1/2 | 1.22 | 1.90 | 1.09 | 4.5 | 5.4 | 2.9 |
| **16-6 TRTXN** | – | **16-6 TRTX** | 1 | 3/8 | 1 1/2 | 1.22 | 1.90 | 1.09 | 4.5 | 5.4 | 2.9 |
| **16-8 TRTXN** | – | **16-8 TRTX** | 1 | 1/2 | 1 1/2 | 1.27 | 1.95 | 1.14 | 4.5 | 5.4 | 2.9 |
| **16-10 TRTXN** | – | **16-10 TRTX** | 1 | 5/8 | 1 1/2 | 1.38 | 2.06 | 1.25 | 4.5 | 5.4 | 2.9 |
| **16-12 TRTXN** | – | **16-12 TRTX** | 1 | 3/4 | 1 1/2 | 1.47 | 2.15 | 1.34 | 4.5 | 5.4 | 2.9 |
| – | **16-14 TRTXN** | – | 1 | 7/8 | 1 1/2 | — | 1.91 | 1.15 | 4.5 | 5.4 | 2.9 |
| – | – | **20-8 TRTX** | 1 1/4 | 1/2 | | 1.41 | | 1.25 | 4.0 | 4.8 | 2.6 |
| **20-12 TRTXN** | – | **20-12 TRTX** | 1 1/4 | 3/4 | 2 | 1.53 | 2.17 | 1.37 | 4.0 | 4.8 | 2.6 |
| **20-16 TRTXN** | – | **20-16 TRTX** | 1 1/4 | 1 | 2 | 1.59 | 2.23 | 1.43 | 4.0 | 4.8 | 2.6 |
| – | – | **24-4 TRTX** | 1 1/2 | 1/4 | | 1.47 | | 1.32 | 3.0 | 3.6 | 2.0 |
| **24-8 TRTXN** | – | **24-8 TRTX** | 1 1/2 | 1/2 | 2 1/4 | 1.56 | 2.33 | 1.41 | 3.0 | 3.6 | 2.0 |
| **24-12 TRTXN** | – | **24-12 TRTX** | 1 1/2 | 3/4 | 2 1/4 | 1.63 | 2.40 | 1.48 | 3.0 | 3.6 | 2.0 |
| **24-16 TRTXN** | – | **24-16 TRTX** | 1 1/2 | 1 | 2 1/4 | 1.59 | 2.40 | 1.48 | 3.0 | 3.6 | 2.0 |
| **24-20 TRTXN** | – | **24-20 TRTX** | 1 1/2 | 1 1/4 | 2 1/4 | 1.69 | 2.46 | 1.54 | 3.0 | 3.6 | 2.0 |
| – | – | **32-12 TRTX** | 2 | 3/4 | | 2.00 | | 1.81 | 2.0 | 2.4 | 1.3 |
| – | – | **32-20 TRTX** | 2 | 1 1/4 | | 1.78 | | 1.59 | 2.0 | 2.4 | 1.3 |
| **32-24 TRTXN** | – | **32-24 TRTX** | 2 | 1 1/2 | 2 7/8 | 1.91 | 2.97 | 1.71 | 2.0 | 2.4 | 1.3 |



Dimensions and pressures for reference only, subject to change.

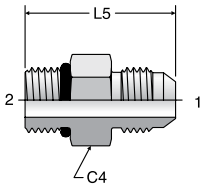


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# F5OX

Straight Thread Connector
37° Flare / SAE-ORB

SAE 070120
HPD Base # 0503

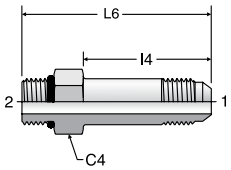



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | C4 HEX (in.) | L5 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| 2 F5OX | 1/8 | 5/16 - 24 | 7/16 | 1.06 | 7.5 | 9.0 | 3.3 |
| 3 F5OX | 3/16 | 3/8 - 24 | 1/2 | 1.10 | 7.5 | 9.0 | 3.3 |
| 3-2 F5OX | 3/16 | 5/16 - 24 | 1/2 | 1.10 | 7.5 | 9.0 | 3.3 |
| 4 F5OX | 1/4 | 7/16 - 20 | 9/16 | 1.23 | 7.5 | 9.0 | 3.3 |
| 4-2 F5OX | 1/4 | 5/16 - 24 | 9/16 | 1.17 | 7.5 | 9.0 | 3.3 |
| 4-3 F5OX | 1/4 | 3/8 - 24 | 9/16 | 1.19 | 7.5 | 9.0 | 3.3 |
| 4-5 F5OX | 1/4 | 1/2 - 20 | 5/8 | 1.23 | 6.0 | 7.2 | 3.3 |
| 4-6 F5OX | 1/4 | 9/16 - 18 | 11/16 | 1.29 | 6.0 | 7.2 | 3.3 |
| 4-8 F5OX | 1/4 | 3/4 - 16 | 7/8 | 1.38 | 6.0 | 7.2 | 3.3 |
| 4-10 F5OX | 1/4 | 7/8 - 14 | 1 | 1.49 | 5.0 | 6.0 | 3.3 |
| 5 F5OX | 5/16 | 1/2 - 20 | 5/8 | 1.23 | 6.0 | 7.2 | 3.3 |
| 5-4 F5OX | 5/16 | 7/16 - 20 | 9/16 | 1.23 | 6.0 | 7.2 | 3.3 |
| 5-6 F5OX | 5/16 | 9/16 - 18 | 11/16 | 1.30 | 6.0 | 7.2 | 3.3 |
| 5-8 F5OX | 5/16 | 3/4 - 16 | 7/8 | 1.37 | 6.0 | 7.2 | 3.3 |
| 6 F5OX | 3/8 | 9/16 - 18 | 11/16 | 1.30 | 6.0 | 7.2 | 3.3 |
| 6-4 F5OX | 3/8 | 7/16 - 20 | 5/8 | 1.27 | 6.0 | 7.2 | 3.3 |
| 6-5 F5OX | 3/8 | 1/2 - 20 | 5/8 | 1.27 | 6.0 | 7.2 | 3.3 |
| 6-8 F5OX | 3/8 | 3/4 - 16 | 7/8 | 1.38 | 6.0 | 7.2 | 3.3 |
| 6-10 F5OX | 3/8 | 7/8 - 14 | 1 | 1.50 | 5.0 | 6.0 | 3.3 |
| 6-12 F5OX | 3/8 | 1 1/16 - 12 | 1 1/4 | 1.66 | 5.0 | 6.0 | 3.3 |
| 8 F5OX | 1/2 | 3/4 - 16 | 7/8 | 1.48 | 6.0 | 7.2 | 3.3 |
| 8-4 F5OX | 1/2 | 7/16 - 20 | 13/16 | 1.50 | 6.0 | 7.2 | 3.3 |
| 8-6 F5OX | 1/2 | 9/16 - 18 | 13/16 | 1.44 | 6.0 | 7.2 | 3.3 |
| 8-10 F5OX | 1/2 | 7/8 - 14 | 1.00 | 1.60 | 5.0 | 6.0 | 3.3 |
| 8-12 F5OX | 1/2 | 1 1/16 - 12 | 1 1/4 | 1.76 | 5.0 | 6.0 | 3.3 |
| 8-16 F5OX | 1/2 | 1 5/16 - 12 | 1 1/2 | 1.78 | 4.5 | 5.4 | 2.9 |
| 10 F5OX | 5/8 | 7/8 - 14 | 1 | 1.70 | 5.0 | 6.0 | 3.3 |
| 10-6 F5OX | 5/8 | 9/16 - 18 | 11/16 | 1.71 | 5.0 | 6.0 | 3.3 |
| 10-8 F5OX | 5/8 | 3/4 - 16 | 15/16 | 1.64 | 5.0 | 6.0 | 3.3 |
| 10-12 F5OX | 5/8 | 1 1/16 - 12 | 1 1/4 | 1.86 | 5.0 | 6.0 | 3.3 |
| 10-16 F5OX | 5/8 | 1 5/16 - 12 | 1 1/2 | 1.89 | 4.5 | 5.4 | 2.9 |
| 12 F5OX | 3/4 | 1 1/16 - 12 | 1 1/4 | 1.97 | 5.0 | 6.0 | 3.3 |
| 12-8 F5OX | 3/4 | 3/4 - 16 | 1 1/8 | 1.94 | 5.0 | 6.0 | 3.3 |
| 12-10 F5OX | 3/4 | 7/8 - 14 | 1 1/8 | 1.88 | 5.0 | 6.0 | 3.3 |
| 12-14 F5OX | 3/4 | 1 3/16 - 12 | 1 3/8 | 1.96 | 5.0 | 6.0 | 3.3 |
| 12-16 F5OX | 3/4 | 1 5/16 - 12 | 1 1/2 | 1.99 | 4.5 | 5.4 | 2.9 |
| 12-20 F5OX | 3/4 | 1 5/8 - 12 | 1 7/8 | 2.08 | 4.0 | 4.8 | 2.6 |
| 14 F5OX | 7/8 | 1 3/16 - 12 | 1 3/8 | 1.99 | 5.0 | 6.0 | 3.3 |
| 14-16 F5OX | 7/8 | 1 5/16 - 12 | 1 1/2 | 2.02 | 4.5 | 5.4 | 2.9 |
| 16 F5OX | 1 | 1 5/16 - 12 | 1 1/2 | 2.04 | 4.5 | 5.4 | 2.9 |
| 16-8 F5OX | 1 | 3/4 - 16 | 1 3/8 | 1.78 | 4.5 | 5.4 | 2.9 |
| 16-10 F5OX | 1 | 7/8 - 14 | 1 3/8 | 2.08 | 4.5 | 5.4 | 2.9 |
| 16-12 F5OX | 1 | 1 1/16 - 12 | 1 3/8 | 1.99 | 4.5 | 5.4 | 2.9 |
| 16-14 F5OX | 1 | 1 3/16 - 12 | 1 3/8 | 2.05 | 4.5 | 5.4 | 2.9 |
| 16-20 F5OX | 1 | 1 5/8 - 12 | 1 7/8 | 2.12 | 4.0 | 4.8 | 2.6 |
| 16-24 F5OX | 1 | 1 7/8 - 12 | 2 1/8 | 2.20 | 3.0 | 3.6 | 2.0 |
| 20 F5OX | 1 1/4 | 1 5/8 - 12 | 1 7/8 | 2.17 | 4.0 | 4.8 | 2.6 |
| 20-12 F5OX | 1 1/4 | 1 1/16 - 12 | 1 11/16 | 2.30 | 4.0 | 4.8 | 2.6 |
| 20-16 F5OX | 1 1/4 | 1 5/16 - 12 | 1 11/16 | 2.33 | 4.0 | 4.8 | 2.6 |
| 20-24 F5OX | 1 1/4 | 1 7/8 - 12 | 2 1/8 | 2.24 | 3.0 | 3.6 | 2.0 |
| 24 F5OX | 1 1/2 | 1 7/8 - 12 | 2 1/8 | 2.38 | 3.0 | 3.6 | 2.0 |
| 24-20 F5OX | 1 1/2 | 1 5/8 - 12 | 2 | 2.53 | 3.0 | 3.6 | 2.0 |
| 24-32 F5OX | 1 1/2 | 2 1/2 - 12 | 2 3/4 | 2.53 | 2.0 | 2.4 | 1.3 |
| 32 F5OX | 2 | 2 1/2 - 12 | 2 3/4 | 2.78 | 2.0 | 2.4 | 1.3 |
| 32-24 F5OX | 2 | 1 7/8 - 12 | 2 5/8 | 2.94 | 2.0 | 2.4 | 1.3 |

# FF5OX

Long Straight Thread Connector
37° Flare / SAE-ORB

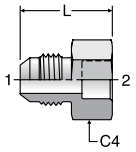
SAE 071720
HPD Base # 053E




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | C4 HEX (in.) | I4 (in.) | L6 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| 4 FF5OX | 1/4 | 7/16 - 20 | 9/16 | 1.39 | 2.08 | 7.5 | 9.0 | 3.3 |
| 4-6 FF5OX | 1/4 | 9/16 - 18 | 11/16 | 1.38 | 2.13 | 6.0 | 7.2 | 3.3 |
| 6 FF5OX | 3/8 | 9/16 - 18 | 11/16 | 1.56 | 2.31 | 6.0 | 7.2 | 3.3 |
| 8 FF5OX | 1/2 | 3/4 - 16 | 7/8 | 1.88 | 2.70 | 6.0 | 7.2 | 3.3 |
| 10 FF5OX | 5/8 | 7/8 - 14 | 1 | 2.09 | 3.04 | 5.0 | 6.0 | 3.3 |
| 12 FF5OX | 3/4 | 1 1/16 - 12 | 1 1/4 | 2.50 | 3.61 | 5.0 | 6.0 | 3.3 |
| 16 FF5OX | 1 | 1 5/16 - 12 | 1 1/2 | 2.84 | 3.98 | 4.5 | 5.4 | 2.9 |
| 20 FF5OX | 1 1/4 | 1 5/8 - 12 | 1 7/8 | 3.47 | 4.69 | 4.0 | 4.8 | 2.6 |

# XHB3

Braze Socket
37° Flare / Inch Tube Braze




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C4 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| 4 XHB3 | 1/4 | 1/4 | 9/16 | 0.97 | 7.5 | 7.5 | 3.3 |
| 6 XHB3 | 3/8 | 3/8 | 5/8 | 1.00 | 6.0 | 6.0 | 3.3 |
| 6-4 XHB3 | 3/8 | 1/4 | 5/8 | 1.00 | 6.0 | 6.0 | 3.3 |
| 6-8 XHB3 | 3/8 | 1/2 | 5/8 | 1.00 | 6.0 | 6.0 | 3.3 |
| 8 XHB3 | 1/2 | 1/2 | 13/16 | 1.12 | 6.0 | 6.0 | 3.3 |
| 8-10 XHB3 | 1/2 | 5/8 | 13/16 | 1.12 | 5.0 | 5.0 | 3.3 |
| 10 XHB3 | 5/8 | 5/8 | 15/16 | 1.21 | 5.0 | 5.0 | 3.3 |
| 10-8 XHB3 | 5/8 | 1/2 | 15/16 | 1.21 | 5.0 | 5.0 | 3.3 |
| 10-12 XHB3 | 5/8 | 3/4 | 1 1/8 | 1.37 | 5.0 | 5.0 | 3.3 |
| 12 XHB3 | 3/4 | 3/4 | 1 1/4 | 1.51 | 5.0 | 5.0 | 3.3 |
| 12-10 XHB3 | 3/4 | 5/8 | 1 1/8 | 1.51 | 5.0 | 5.0 | 3.3 |
| 12-16 XHB3 | 3/4 | 1 | 1 1/4 | 1.57 | 4.0 | 4.0 | 2.6 |
| 16 XHB3 | 1 | 1 | 1 3/8 | 1.63 | 4.0 | 4.0 | 2.6 |
| 16-20 XHB3 | 1 | 1 1/4 | 1 11/16 | 1.73 | 4.0 | 4.0 | 2.6 |
| 20 XHB3 | 1 1/4 | 1 1/4 | 1 11/16 | 1.71 | 4.0 | 4.0 | 2.6 |
| 20-24 XHB3 | 1 1/4 | 1 1/2 | 2 | 1.71 | 3.0 | 3.0 | 2.0 |
| 24 XHB3 | 1 1/2 | 1 1/2 | 2 | 1.84 | 3.0 | 3.0 | 2.0 |
| 32 XHB3 | 2 | 2 | 2 5/8 | 2.16 | 2.0 | 2.0 | 1.3 |

**Note:** Braze rings are on page B10.

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Dimensions and pressures for reference only, subject to change.

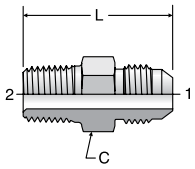


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# FTX

Male Connector
37° Flare / NPTF

SAE 070102
HPD Base # 0103

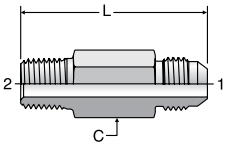



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| 2 FTX | 1/8 | 1/8 - 27 | 7/16 | 1.11 | 6.0 | 6.0 | 3.3 |
| 3 FTX | 3/16 | 1/8 - 27 | 7/16 | 1.14 | 6.0 | 6.0 | 3.3 |
| 4 FTX | 1/4 | 1/8 - 27 | 1/2 | 1.22 | 6.0 | 6.0 | 3.3 |
| 4-4 FTX | 1/4 | 1/4 - 18 | 9/16 | 1.42 | 6.0 | 6.0 | 3.3 |
| 4-6 FTX | 1/4 | 3/8 - 18 | 3/4 | 1.44 | 6.0 | 6.0 | 3.3 |
| 4-8 FTX | 1/4 | 1/2 - 14 | 7/8 | 1.69 | 6.0 | 6.0 | 3.3 |
| 5 FTX | 5/16 | 1/8 - 27 | 9/16 | 1.22 | 6.0 | 6.0 | 3.3 |
| 5-4 FTX | 5/16 | 1/4 - 18 | 9/16 | 1.42 | 6.0 | 6.0 | 3.3 |
| 5-6 FTX | 5/16 | 3/8 - 18 | 3/4 | 1.44 | 6.0 | 6.0 | 3.3 |
| 6 FTX | 3/8 | 1/4 - 18 | 5/8 | 1.43 | 6.0 | 6.0 | 3.3 |
| 6-2 FTX | 3/8 | 1/8 - 27 | 5/8 | 1.24 | 6.0 | 6.0 | 3.3 |
| 6-6 FTX | 3/8 | 3/8 - 18 | 3/4 | 1.43 | 6.0 | 6.0 | 3.3 |
| 6-8 FTX | 3/8 | 1/2 - 14 | 7/8 | 1.69 | 6.0 | 6.0 | 3.3 |
| 6-12 FTX | 3/8 | 3/4 - 14 | 1 1/8 | 1.75 | 5.5 | 5.5 | 3.3 |
| 8 FTX | 1/2 | 3/8 - 18 | 13/16 | 1.53 | 6.0 | 6.0 | 3.3 |
| 8-2 FTX | 1/2 | 1/8 - 27 | 13/16 | 1.34 | 6.0 | 6.0 | 3.3 |
| 8-4 FTX | 1/2 | 1/4 - 18 | 13/16 | 1.53 | 6.0 | 6.0 | 3.3 |
| 8-8 FTX | 1/2 | 1/2 - 14 | 7/8 | 1.79 | 6.0 | 6.0 | 3.3 |
| 8-12 FTX | 1/2 | 3/4 - 14 | 1 1/8 | 1.85 | 5.5 | 5.5 | 2.6 |
| 8-16 FTX | 1/2 | 1 - 11 1/2 | 1 3/8 | 2.05 | 4.5 | 4.5 | 2.0 |
| 10 FTX | 5/8 | 1/2 - 14 | 15/16 | 1.89 | 5.0 | 5.0 | 3.3 |
| 10-6 FTX | 5/8 | 3/8 - 18 | 15/16 | 1.70 | 5.0 | 5.0 | 3.3 |
| 10-12 FTX | 5/8 | 3/4 - 14 | 1 1/8 | 1.95 | 5.0 | 5.0 | 2.6 |
| 12 FTX | 3/4 | 3/4 - 14 | 1 1/8 | 2.06 | 5.0 | 5.0 | 2.6 |
| 12-6 FTX | 3/4 | 3/8 - 18 | 1 1/8 | 1.87 | 5.0 | 5.0 | 3.3 |
| 12-8 FTX | 3/4 | 1/2 - 14 | 1 1/8 | 2.06 | 5.0 | 5.0 | 3.3 |
| 12-16 FTX | 3/4 | 1 - 11 1/2 | 1 3/8 | 2.25 | 5.0 | 5.0 | 2.0 |
| 12-20 FTX | 3/4 | 1 1/4 - 11 1/2 | 1 11/16 | 2.36 | 3.0 | 3.0 | 1.6 |
| 14 FTX | 7/8 | 3/4 - 14 | 1 1/4 | 2.09 | 5.0 | 5.0 | 2.9 |
| 16 FTX | 1 | 1 - 11 1/2 | 1 3/8 | 2.30 | 4.5 | 4.5 | 2.0 |
| 16-8 FTX | 1 | 1/2 - 14 | 1 3/8 | 2.11 | 4.5 | 4.5 | 2.9 |
| 16-12 FTX | 1 | 3/4 - 14 | 1 3/8 | 2.11 | 4.5 | 4.5 | 2.6 |
| 16-20 FTX | 1 | 1 1/4 - 11 1/2 | 1 11/16 | 2.40 | 3.0 | 3.0 | 1.6 |
| 16-24 FTX | 1 | 1 1/2 - 11 1/2 | 2 | 2.50 | 3.0 | 3.0 | 1.3 |
| 20 FTX | 1 1/4 | 1 1/4 - 11 1/2 | 1 11/16 | 2.45 | 3.0 | 3.0 | 1.6 |
| 20-16 FTX | 1 1/4 | 1 - 11 1/2 | 1 11/16 | 2.42 | 3.0 | 3.0 | 2.0 |
| 20-24 FTX | 1 1/4 | 1 1/2 - 11 1/2 | 2 | 2.55 | 3.0 | 3.0 | 1.3 |
| 24 FTX | 1 1/2 | 1 1/2 - 11 1/2 | 2 | 2.68 | 3.0 | 3.0 | 1.3 |
| 24-16 FTX | 1 1/2 | 1 - 11 1/2 | 2 | 2.62 | 3.0 | 3.0 | 2.0 |
| 24-20 FTX | 1 1/2 | 1 1/4 - 11 1/2 | 2 | 2.66 | 3.0 | 3.0 | 1.6 |
| 24-32 FTX | 1 1/2 | 2 - 11 1/2 | 2 5/8 | 2.86 | 2.0 | 2.0 | 1.0 |
| 32 FTX | 2 | 2 - 11 1/2 | 2 5/8 | 3.11 | 2.0 | 2.0 | 1.0 |
| 32-24 FTX | 2 | 1 1/2 - 11 1/2 | 2 5/8 | 3.08 | 2.0 | 2.0 | 1.3 |
| 40 FTX | 2 1/2 | 2 1/2 - 8 | 3 1/4 | 3.38 | 1.0 | 1.0 | 0.5 |

# FFTX

Long Male Connector
37° Flare / NPTF

SAE 071802
HPD Base # 013E

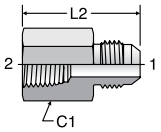



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| 4 FFTX | 1/4 | 1/8 - 27 | 1/2 | 1.81 | 6.0 | 6.0 | 3.3 |
| 4-4 FFTX | 1/4 | 1/4 - 18 | 9/16 | 2.25 | 6.0 | 6.0 | 3.3 |
| 6 FFTX | 3/8 | 1/4 - 18 | 5/8 | 2.25 | 6.0 | 6.0 | 3.3 |
| 6-6 FFTX | 3/8 | 3/8 - 18 | 3/4 | 2.50 | 6.0 | 6.0 | 3.3 |
| 8 FFTX | 1/2 | 3/8 - 18 | 13/16 | 2.75 | 6.0 | 6.0 | 3.3 |
| 8-8 FFTX | 1/2 | 1/2 - 14 | 15/16 | 2.80 | 6.0 | 6.0 | 3.3 |
| 10 FFTX | 5/8 | 1/2 - 14 | 15/16 | 3.12 | 5.0 | 5.0 | 3.3 |
| 12 FFTX | 3/4 | 3/4 - 14 | 1 1/8 | 3.50 | 5.0 | 5.0 | 2.6 |

# GTX

Female Connector
37° Flare / NPTF

SAE 070103
HPD Base # 0203




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C1 HEX (in.) | L2 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| 2 GTX | 1/8 | 1/8 - 27 | 9/16 | 1.12 | 6.0 | 6.0 | 3.3 |
| 3 GTX | 3/16 | 1/8 - 27 | 9/16 | 1.13 | 6.0 | 6.0 | 3.3 |
| 4 GTX | 1/4 | 1/8 - 27 | 9/16 | 1.19 | 6.0 | 6.0 | 3.3 |
| 4-4 GTX | 1/4 | 1/4 - 18 | 3/4 | 1.39 | 6.0 | 6.0 | 3.3 |
| 4-6 GTX | 1/4 | 3/8 - 18 | 7/8 | 1.45 | 6.0 | 6.0 | 3.3 |
| 4-8 GTX | 1/4 | 1/2 - 14 | 1 1/8 | 1.68 | 6.0 | 6.0 | 3.3 |
| 5 GTX | 5/16 | 1/8 - 27 | 9/16 | 1.17 | 6.0 | 6.0 | 3.3 |
| 5-4 GTX | 5/16 | 1/4 - 18 | 3/4 | 1.39 | 6.0 | 6.0 | 3.3 |
| 6 GTX | 3/8 | 1/4 - 18 | 3/4 | 1.40 | 6.0 | 6.0 | 3.3 |
| 6-2 GTX | 3/8 | 1/8 - 27 | 5/8 | 1.19 | 6.0 | 6.0 | 3.3 |
| 6-6 GTX | 3/8 | 3/8 - 18 | 7/8 | 1.46 | 6.0 | 6.0 | 3.3 |
| 6-8 GTX | 3/8 | 1/2 - 14 | 1 1/8 | 1.69 | 5.0 | 5.0 | 3.3 |
| 8 GTX | 1/2 | 3/8 - 18 | 7/8 | 1.56 | 6.0 | 6.0 | 3.3 |
| 8-4 GTX | 1/2 | 1/4 - 18 | 13/16 | 1.55 | 6.0 | 6.0 | 3.3 |
| 8-8 GTX | 1/2 | 1/2 - 14 | 1 1/8 | 1.79 | 5.0 | 5.0 | 3.3 |
| 8-12 GTX | 1/2 | 3/4 - 14 | 1 3/8 | 1.85 | 4.0 | 4.0 | 2.6 |
| 10 GTX | 5/8 | 1/2 - 14 | 1 1/8 | 1.89 | 5.0 | 5.0 | 3.3 |
| 10-12 GTX | 5/8 | 3/4 - 14 | 1 3/8 | 1.95 | 4.0 | 4.0 | 2.6 |
| 12 GTX | 3/4 | 3/4 - 14 | 1 3/8 | 2.06 | 4.0 | 4.0 | 2.6 |
| 12-8 GTX | 3/4 | 1/2 - 14 | 1 1/8 | 2.05 | 5.0 | 5.0 | 2.6 |
| 12-16 GTX | 3/4 | 1 - 11 1/2 | 1 5/8 | 2.30 | 3.0 | 3.0 | 2.0 |
| 14 GTX | 7/8 | 3/4 - 14 | 1 3/8 | 2.06 | 4.0 | 4.0 | 2.6 |
| 16 GTX | 1 | 1 - 11 1/2 | 1 5/8 | 2.35 | 3.0 | 3.0 | 2.0 |
| 16-12 GTX | 1 | 3/4 - 14 | 1 3/8 | 2.13 | 4.0 | 4.0 | 2.6 |
| 16-20 GTX | 1 | 1 1/4 - 11 1/2 | 2 | 2.44 | 2.5 | 2.5 | 1.6 |
| 20 GTX | 1 1/4 | 1 1/4 - 11 1/2 | 2 | 2.49 | 2.5 | 2.5 | 1.6 |
| 20-16 GTX | 1 1/4 | 1 - 11 1/2 | 1 3/4 | 2.47 | 3.0 | 3.0 | 2.0 |
| 24 GTX | 1 1/2 | 1 1/2 - 11 1/2 | 2 3/8 | 2.62 | 2.0 | 2.0 | 1.3 |
| 32 GTX | 2 | 2 - 11 1/2 | 2 7/8 | 2.97 | 1.5 | 1.5 | 1.0 |

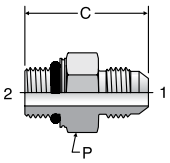
Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# F87OMX

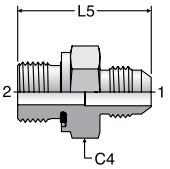
Male Connector – ISO 6149
37° Flare / ISO 6149




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 Male Metric Parallel Thread | C (mm) | P (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4M10F87OMX** | 6 | 1/4 | M10x1 | 30.0 | 14 | 7.2 | 5.0 | 3.3 |
| **5M12F87OMX** | 8 | 5/16 | M12x1.5 | 33.1 | 19 | 6.0 | 5.0 | 3.3 |
| **6M14F87OMX** | 10 | 3/8 | M14x1.5 | 34.1 | 19 | 6.0 | 5.0 | 3.3 |
| **6M16F87OMX** | 10 | 3/8 | M16x1.5 | 35.5 | 22 | 6.0 | 5.0 | 3.3 |
| **8M16F87OMX** | 12 | 1/2 | M16x1.5 | 38.0 | 22 | 6.0 | 5.0 | 3.3 |
| **8M18F87OMX** | 12 | 1/2 | M18x1.5 | 39.1 | 24 | 5.0 | 5.0 | 3.3 |
| **10M18F87OMX** | 14, 15, 16 | 5/8 | M18x1.5 | 43.1 | 24 | 5.0 | 5.0 | 3.3 |
| **10M22F87OMX** | 14, 15, 16 | 5/8 | M22x1.5 | 43.5 | 27 | 5.0 | 5.0 | 3.3 |
| **12M22F87OMX** | 18, 20 | 3/4 | M22x1.5 | 48.0 | 27 | 5.0 | 5.0 | 3.3 |
| **12M27F87OMX** | 18, 20 | 3/4 | M27x2 | 50.9 | 32 | 5.0 | 5.0 | 3.3 |
| **16M27F87OMX** | 25 | 1 | M27x2 | 50.5 | 36 | 5.0 | 5.0 | 3.3 |
| **16M33F87OMX** | 25 | 1 | M33x2 | 52.7 | 41 | 4.0 | 4.0 | 2.6 |
| **20M42F87OMX** | 30, 32 | 1 1/4 | M42x2 | 55.0 | 50 | 4.0 | 3.0 | 2.0 |
| **24M48F87OMX** | 38 | 1 1/2 | M48x2 | 59.4 | 55 | 3.0 | 2.0 | 1.3 |

# F82EDMX

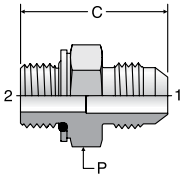
Male Connector – Metric
37° Flare / Metric-ED




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 Male Metric Parallel Thread | C4 (mm) | L5 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4M10F82EDMX** | 6 | 1/4 | M10x1 | 14 | 30.0 | 7.2 | 5.0 | 3.3 |
| **5M12F82EDMX** | 8 | 5/16 | M12x1.5 | 17 | 34.0 | 6.0 | 5.0 | 3.3 |
| **6M14F82EDMX** | 10 | 3/8 | M14x1.5 | 19 | 35.0 | 6.0 | 5.0 | 3.3 |
| **6M16F82EDMX** | 10 | 3/8 | M16x1.5 | 22 | 36.0 | 6.0 | 5.0 | 3.3 |
| **8M16F82EDMX** | 12 | 1/2 | M16x1.5 | 22 | 38.5 | 6.0 | 5.0 | 3.3 |
| **8M18F82EDMX** | 12 | 1/2 | M18x1.5 | 24 | 38.5 | 5.0 | 5.0 | 3.3 |
| **10M18F82EDMX** | 14,15,16 | 5/8 | M18x1.5 | 24 | 42.5 | 5.0 | 5.0 | 3.3 |
| **10M22F82EDMX** | 14,15,16 | 5/8 | M22x1.5 | 27 | 44.5 | 5.0 | 5.0 | 3.3 |
| **12M22F82EDMX** | 18,20 | 3/4 | M22x1.5 | 27 | 49.0 | 5.0 | 5.0 | 3.3 |
| **12M27F82EDMX** | 18,20 | 3/4 | M27x2 | 32 | 51.0 | 5.0 | 5.0 | 3.3 |
| **16M33F82EDMX** | 25 | 1 | M33x2 | 41 | 54.5 | 4.0 | 4.0 | 2.6 |
| **20M42F82EDMX** | 30,32 | 1 1/4 | M42x2 | 50 | 60.0 | 4.0 | 3.0 | 2.0 |

# F8OMX

Male Connector – Metric
37° Flare / Metric-ORR

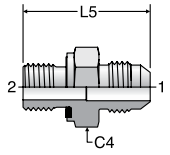



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 Male Metric Parallel Thread | C (mm) | P (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4M10F8OMX** | 6 | 1/4 | M10x1 | 30.0 | 14 | 5.0 | 5.0 | 3.3 |
| **5M12F8OMX** | 8 | 5/16 | M12x1.5 | 33.1 | 19 | 6.0 | 6.0 | 3.3 |
| **6M14F8OMX** | 10 | 3/8 | M14x1.5 | 34.1 | 19 | 5.0 | 5.0 | 3.3 |
| **8M16F8OMX** | 12 | 1/2 | M16x1.5 | 38.0 | 22 | 5.0 | 5.0 | 3.3 |
| **8M18F8OMX** | 12 | 1/2 | M18x1.5 | 39.1 | 24 | 3.6 | 3.6 | 2.3 |
| **10M18F8OMX** | 14, 15, 16 | 5/8 | M18x1.5 | 43.1 | 24 | 3.6 | 3.6 | 2.3 |
| **10M22F8OMX** | 14, 15, 16 | 5/8 | M22x1.5 | 43.5 | 27 | 3.6 | 3.6 | 2.3 |
| **12M22F8OMX** | 18, 20 | 3/4 | M22x1.5 | 48.0 | 27 | 3.6 | 3.6 | 2.3 |
| **12M24F8OMX** | 18, 20 | 3/4 | M24x1.5 | 44.5 | 30 | 3.0 | 3.0 | 2.0 |
| **12M27F8OMX** | 18, 20 | 3/4 | M27x2 | 50.9 | 32 | 3.0 | 3.0 | 2.0 |
| **16M27F8OMX** | 25 | 1 | M27x2 | 50.5 | 36 | 3.0 | 3.0 | 2.0 |
| **16M33F8OMX** | 25 | 1 | M33x2 | 52.7 | 41 | 3.0 | 3.0 | 2.0 |
| **20M42F8OMX** | 30, 32 | 1 1/4 | M42x2 | 54.9 | 50 | 3.0 | 3.0 | 2.0 |
| **24M48F8OMX** | 38 | 1 1/2 | M48x2 | 59.4 | 55 | 2.0 | 2.0 | 1.3 |

**Note:** If F8OMX is not available, use F82EDMX.

# F42EDMX

Male Connector – BSPP
37° Flare / BSPP-ED




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 BSPP | C4 (mm) | L5 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4F42EDMX** | 6 | 1/4 | 1/8 - 28 | 14 | 30.2 | 7.2 | 5.0 | 3.3 |
| **4-4F42EDMX** | 6 | 1/4 | 1/4 - 19 | 19 | 35.0 | 6.0 | 5.0 | 3.3 |
| **4-6F42EDMX** | 6 | 1/4 | 3/8 - 19 | 22 | 36.0 | 6.0 | 5.0 | 3.3 |
| **4-8F42EDMX** | 6 | 1/4 | 1/2 - 14 | 27 | 39.5 | 5.0 | 5.0 | 3.3 |
| **5F42EDMX** | 8 | 5/16 | 1/8 - 28 | 14 | 30.0 | 6.0 | 5.0 | 3.3 |
| **5-4F42EDMX** | 8 | 5/16 | 1/4 - 19 | 19 | 35.0 | 6.0 | 5.0 | 3.3 |
| **5-6F42EDMX** | 8 | 5/16 | 3/8 - 19 | 22 | 36.0 | 6.0 | 5.0 | 3.3 |
| **6-2F42EDMX** | 10 | 3/8 | 1/8 - 28 | 17 | 31.2 | 6.0 | 5.0 | 3.3 |
| **6F42EDMX** | 10 | 3/8 | 1/4 - 19 | 19 | 35.0 | 6.0 | 5.0 | 3.3 |
| **6-6F42EDMX** | 10 | 3/8 | 3/8 - 19 | 22 | 36.0 | 6.0 | 5.0 | 3.3 |
| **6-8F42EDMX** | 10 | 3/8 | 1/2 - 14 | 27 | 39.5 | 5.0 | 5.0 | 3.3 |
| **8F42EDMX** | 12 | 1/2 | 3/8 - 19 | 22 | 38.6 | 6.0 | 5.0 | 3.3 |
| **8-4F42EDMX** | 12 | 1/2 | 1/4 - 19 | 19 | 39.0 | 6.0 | 5.0 | 3.3 |
| **8-8F42EDMX** | 12 | 1/2 | 1/2 - 14 | 27 | 42.0 | 5.0 | 5.0 | 3.3 |
| **8-12F42EDMX** | 12 | 1/2 | 3/4 - 14 | 32 | 45.7 | 5.0 | 5.0 | 3.3 |
| **10F42EDMX** | 14, 15, 16 | 5/8 | 1/2 - 14 | 27 | 45.0 | 5.0 | 5.0 | 3.3 |
| **10-6F42EDMX** | 14, 15, 16 | 5/8 | 3/8 - 19 | 24 | 43.0 | 5.0 | 5.0 | 3.3 |
| **10-12F42EDMX** | 14, 15, 16 | 5/8 | 3/4 - 14 | 32 | 48.2 | 5.0 | 5.0 | 3.3 |
| **12F42EDMX** | 18, 20 | 3/4 | 3/4 - 14 | 32 | 51.0 | 5.0 | 5.0 | 3.3 |
| **12-6F42EDMX** | 18, 20 | 3/4 | 3/8 - 19 | 27 | 50.0 | 5.0 | 5.0 | 3.3 |
| **12-8F42EDMX** | 18, 20 | 3/4 | 1/2 - 14 | 27 | 49.0 | 5.0 | 5.0 | 3.3 |
| **12-16F42EDMX** | 18, 20 | 3/4 | 1 - 11 | 41 | 53.5 | 4.0 | 4.0 | 2.6 |
| **16F42EDMX** | 25 | 1 | 1 - 11 | 41 | 55.0 | 4.0 | 4.0 | 2.6 |
| **16-12F42EDMX** | 25 | 1 | 3/4 - 14 | 36 | 53.0 | 4.0 | 4.0 | 2.6 |
| **16-20F42EDMX** | 25 | 1 | 1 1/4 - 11 | 50 | 59.0 | 4.0 | 4.0 | 2.6 |
| **20-16F42EDMX** | 30, 32 | 1 1/4 | 1 - 11 | 46 | 62.0 | 4.0 | 3.0 | 2.0 |
| **20F42EDMX** | 30, 32 | 1 1/4 | 1 1/4 - 11 | 50 | 60.0 | 4.0 | 3.0 | 2.0 |
| **20-24F42EDMX** | 30, 32 | 1 1/4 | 1 1/2 - 11 | 55 | 64.0 | 3.0 | 2.0 | 1.3 |
| **24F42EDMX** | 38 | 1 1/2 | 1 1/2 - 11 | 55 | 67.0 | 3.0 | 2.0 | 1.3 |
| **24-20F42EDMX** | 38 | 1 1/2 | 1 1/4 - 11 | 50 | 62.0 | 3.0 | 3.0 | 2.0 |

Dimensions and pressures for reference only, subject to change.

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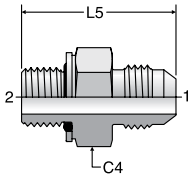
**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# F4OMX

Male Connector – BSPP
37° Flare / BSPP-ORR

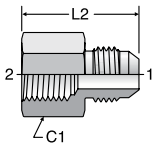



| TUBE FITTING PART # | END SIZE 1 (mm) | 1 (in.) | 2 BSPP | C4 (mm) | L5 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4F4OMX** | 6 | 1/4 | 1/8 - 28 | 17 | 28.3 | 5.0 | 5.0 | 3.3 |
| **4-4F4OMX** | 6 | 1/4 | 1/4 - 19 | 19 | 32.2 | 5.0 | 5.0 | 3.3 |
| **4-6F4OMX** | 6 | 1/4 | 3/8 - 19 | 22 | 33.1 | 5.0 | 5.0 | 3.3 |
| **4-8F4OMX** | 6 | 1/4 | 1/2 - 14 | 30 | 38.6 | 5.0 | 5.0 | 3.3 |
| **5-4F4OMX** | 8 | 5/16 | 1/4 - 19 | 19 | 32.2 | 5.0 | 5.0 | 3.3 |
| **5-6F4OMX** | 8 | 5/16 | 3/8 - 19 | 22 | 33.1 | 5.0 | 5.0 | 3.3 |
| **6F4OMX** | 10 | 3/8 | 1/4 - 19 | 19 | 32.5 | 5.0 | 5.0 | 3.3 |
| **6-6F4OMX** | 10 | 3/8 | 3/8 - 19 | 22 | 33.4 | 5.0 | 5.0 | 3.3 |
| **6-8F4OMX** | 10 | 3/8 | 1/2 - 14 | 30 | 38.0 | 5.0 | 5.0 | 3.3 |
| **8-4F4OMX** | 12 | 1/2 | 1/4 - 19 | 19 | 35.0 | 5.0 | 5.0 | 3.3 |
| **8F4OMX** | 12 | 1/2 | 3/8 - 19 | 22 | 35.9 | 5.0 | 5.0 | 3.3 |
| **8-8F4OMX** | 12 | 1/2 | 1/2 - 14 | 30 | 41.4 | 5.0 | 5.0 | 3.3 |
| **8-12F4OMX** | 12 | 1/2 | 3/4 - 14 | 36 | 42.2 | 4.0 | 4.0 | 2.6 |
| **10-6F4OMX** | 14, 15, 16 | 5/8 | 3/8 - 19 | 24 | 39.1 | 5.0 | 5.0 | 3.3 |
| **10F4OMX** | 14, 15, 16 | 5/8 | 1/2 - 14 | 30 | 43.1 | 5.0 | 5.0 | 3.3 |
| **12-8F4OMX** | 18, 20 | 3/4 | 1/2 - 14 | 30 | 46.7 | 5.0 | 5.0 | 3.3 |
| **12F4OMX** | 18, 20 | 3/4 | 3/4 - 14 | 36 | 47.5 | 4.0 | 3.6 | 2.3 |
| **12-16F4OMX** | 18, 20 | 3/4 | 1 - 11 | 46 | 52.6 | 4.0 | 3.6 | 2.3 |
| **16-12F4OMX** | 25 | 1 | 3/4 - 14 | 36 | 48.5 | 4.0 | 3.6 | 2.3 |
| **16F4OMX** | 25 | 1 | 1 - 11 | 46 | 53.6 | 4.0 | 3.6 | 2.3 |
| **16-20F4OMX** | 25 | 1 | 1 1/4 - 11 | 50 | 54.7 | 3.6 | 2.5 | 1.6 |
| **20F4OMX** | 30, 32 | 1 1/4 | 1 1/4 - 11 | 50 | 56.0 | 3.6 | 2.5 | 1.6 |
| **24-20F4OMX** | 38 | 1 1/2 | 1 1/4 - 11 | 50 | 60.4 | 3.0 | 2.0 | 1.3 |
| **24F4OMX** | 38 | 1 1/2 | 1 1/2 - 11 | 55 | 61.1 | 3.0 | 2.0 | 1.3 |

**Note:** If F4OMX is not available, use F42EDMX.

# G4MX

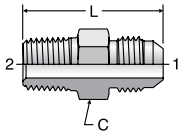
Female Connector – BSPP
37° Flare / BSPP




| TUBE FITTING PART # | END SIZE 1 (mm) | 1 (in.) | 2 BSPP | C1 (mm) | L2 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4G4MX** | 6 | 1/4 | 1/8 - 28 | 17 | 30.2 | 4.5 | 4.5 | 2.9 |
| **4-4G4MX** | 6 | 1/4 | 1/4 - 19 | 19 | 35.3 | 5.8 | 5.8 | 3.3 |
| **5G4MX** | 8 | 5/16 | 1/8 - 28 | 17 | 29.7 | 4.5 | 4.5 | 2.9 |
| **6G4MX** | 10 | 3/8 | 1/4 - 19 | 19 | 35.6 | 5.8 | 5.8 | 3.3 |
| **6-6G4MX** | 10 | 3/8 | 3/8 - 19 | 22 | 37.1 | 5.0 | 5.0 | 3.3 |
| **8G4MX** | 12 | 1/2 | 3/8 - 19 | 22 | 39.6 | 5.0 | 5.0 | 3.3 |
| **8-8G4MX** | 12 | 1/2 | 1/2 - 14 | 30 | 45.5 | 5.0 | 5.0 | 3.3 |
| **10G4MX** | 14,15,16 | 5/8 | 1/2 - 14 | 30 | 48.0 | 5.0 | 5.0 | 3.3 |
| **12G4MX** | 18, 20 | 3/4 | 3/4 - 14 | 36 | 52.3 | 4.5 | 4.5 | 2.9 |
| **16G4MX** | 25 | 1 | 1 - 11 | 46 | 59.7 | 4.0 | 4.0 | 2.6 |

# F3MX

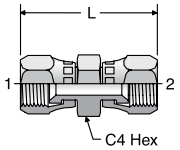
Male Connector – BSPT
37° Flare / BSPT




| TUBE FITTING PART # | END SIZE 1 (mm) | 1 (in.) | 2 BSPT | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4F3MX** | 6 | 1/4 | 1/8 - 28 | 13 | 30.7 | 4.5 | 4.5 | 2.9 |
| **4-4F3MX** | 6 | 1/4 | 1/4 - 19 | 14 | 35.3 | 4.5 | 4.5 | 2.9 |
| **5F3MX** | 8 | 5/16 | 1/8 - 28 | 14 | 30.7 | 4.5 | 4.5 | 2.9 |
| **5-4F3MX** | 8 | 5/16 | 1/4 - 19 | 14 | 35.3 | 4.5 | 4.5 | 2.9 |
| **6F3MX** | 10 | 3/8 | 1/4 - 19 | 17 | 35.6 | 4.5 | 4.5 | 2.9 |
| **6-6F3MX** | 10 | 3/8 | 3/8 - 19 | 19 | 36.4 | 4.5 | 4.5 | 2.9 |
| **6-8F3MX** | 10 | 3/8 | 1/2 - 14 | 22 | 42.9 | 4.5 | 4.5 | 2.9 |
| **8-4F3MX** | 12 | 1/2 | 1/4 - 19 | 19 | 38.1 | 4.5 | 4.5 | 2.9 |
| **8F3MX** | 12 | 1/2 | 3/8 - 19 | 19 | 38.9 | 4.5 | 4.5 | 2.9 |
| **8-8F3MX** | 12 | 1/2 | 1/2 - 14 | 22 | 45.5 | 4.5 | 4.5 | 2.9 |
| **10-6F3MX** | 14, 15, 16 | 5/8 | 3/8 - 19 | 24 | 43.2 | 4.5 | 4.5 | 2.9 |
| **10F3MX** | 14, 15, 16 | 5/8 | 1/2 - 14 | 24 | 48.0 | 4.5 | 4.5 | 2.9 |
| **10-12F3MX** | 14, 15, 16 | 5/8 | 3/4 - 14 | 27 | 48.3 | 2.3 | 2.3 | 1.5 |
| **12-8F3MX** | 18, 20 | 3/4 | 1/2 - 14 | 27 | 50.8 | 4.5 | 4.5 | 2.9 |
| **12F3MX** | 18, 20 | 3/4 | 3/4 - 14 | 27 | 50.8 | 2.3 | 2.3 | 1.5 |
| **12-16F3MX** | 18, 20 | 3/4 | 1 - 11 | 36 | 57.1 | 2.3 | 2.3 | 1.5 |
| **16-12F3MX** | 25 | 1 | 3/4 - 14 | 36 | 53.6 | 2.3 | 2.3 | 1.5 |
| **16F3MX** | 25 | 1 | 1 - 11 | 36 | 58.5 | 2.3 | 2.3 | 1.5 |
| **20-16F3MX** | 30, 32 | 1 1/4 | 1 - 11 | 46 | 61.4 | 2.3 | 2.3 | 1.5 |
| **20F3MX** | 30, 32 | 1 1/4 | 1 1/4 - 11 | 46 | 62.2 | 2.3 | 2.3 | 1.5 |
| **24F3MX** | 38 | 1 1/2 | 1 1/2 - 11 | 50 | 68.1 | 2.3 | 2.0 | 1.3 |

# HX6

Swivel Nut Union
37° Swivel / 37° Swivel




HPD Base # 0606

| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | C4 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| **4 HX6** | 1/4 | 9/16 | 1.48 | 7.5 | 7.7 | 3.3 |
| **6 HX6** | 3/8 | 11/16 | 1.75 | 6.0 | 6.0 | 3.3 |
| **8 HX6** | 1/2 | 7/8 | 2.02 | 6.0 | 6.0 | 3.3 |
| **10 HX6** | 5/8 | 1 | 2.24 | 5.0 | 5.0 | 3.3 |
| **12 HX6** | 3/4 | 1 1/4 | 2.31 | 5.0 | 5.0 | 3.3 |
| **16 HX6** | 1 | 1 1/2 | 2.75 | 4.0 | 3.0 | 2.6 |

Dimensions and pressures for reference only, subject to change.

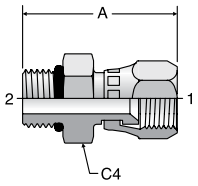


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# F65OX

Swivel Straight Thread Connector
37° Swivel / SAE-ORB

HPD Base # 0506

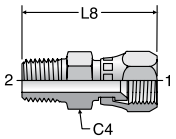



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | A (in.) | C4 HEX (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **4 F65OX** | 1/4 | 7/16 - 20 | 1.31 | 9/16 | 7.5 | 7.5 | 3.3 |
| **4-6 F65OX** | 1/4 | 9/16 - 18 | 1.33 | 11/16 | 6.0 | 7.2 | 3.3 |
| **5 F65OX** | 5/16 | 1/2 - 20 | 1.39 | 5/8 | 6.0 | 7.2 | 3.3 |
| **6 F65OX** | 3/8 | 9/16 - 18 | 1.43 | 11/16 | 6.0 | 7.2 | 3.3 |
| **6-4 F65OX** | 3/8 | 7/16 - 20 | 1.37 | 9/16 | 6.0 | 7.2 | 3.3 |
| **6-8 F65OX** | 3/8 | 3/4 - 16 | 1.50 | 7/8 | 6.0 | 7.2 | 3.3 |
| **8 F65OX** | 1/2 | 3/4 - 16 | 1.61 | 7/8 | 6.0 | 7.2 | 3.3 |
| **8-6 F65OX** | 1/2 | 9/16 - 18 | 1.54 | 13/16 | 6.0 | 7.2 | 3.3 |
| **8-10 F65OX** | 1/2 | 7/8 - 14 | 1.78 | 1 | 5.0 | 6.0 | 3.3 |
| **10 F65OX** | 5/8 | 7/8 - 14 | 1.81 | 1 | 5.0 | 6.0 | 3.3 |
| **10-8 F65OX** | 5/8 | 3/4 - 16 | 1.75 | 1 | 5.0 | 6.0 | 3.3 |
| **10-12 F65OX** | 5/8 | 1 1/16 - 12 | 1.85 | 1 1/4 | 5.0 | 6.0 | 3.3 |
| **12 F65OX** | 3/4 | 1 1/16 - 12 | 2.07 | 1 1/4 | 5.0 | 6.0 | 3.3 |
| **12-10 F65OX** | 3/4 | 7/8 - 14 | 2.10 | 1 1/4 | 5.0 | 6.0 | 3.3 |
| **12-16 F65OX** | 3/4 | 1 5/16 - 12 | 2.04 | 1 1/2 | 4.5 | 4.5 | 2.9 |
| **16 F65OX** | 1 | 1 5/16 - 12 | 2.14 | 1 1/2 | 4.0 | 4.0 | 2.6 |
| **16-12 F65OX** | 1 | 1 1/16 - 12 | 2.14 | 1 1/2 | 4.0 | 4.0 | 2.6 |
| **20 F65OX** | 1 1/4 | 1 5/8 - 12 | 2.55 | 2 | 4.0 | 4.0 | 2.6 |

# F6X

Swivel Connector
37° Swivel / NPTF

HPD Base # 0106

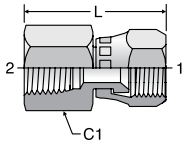



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C4 (in.) | L8 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **4 F6X** | 1/4 | 1/8 - 27 | 9/16 | 1.21 | 6.0 | 6.0 | 3.3 |
| **4-4 F6X** | 1/4 | 1/4 - 18 | 9/16 | 1.54 | 6.0 | 6.0 | 3.3 |
| **5-4 F6X** | 5/16 | 1/4 - 18 | 5/8 | 1.60 | 6.0 | 6.0 | 3.3 |
| **6 F6X** | 3/8 | 1/4 - 18 | 11/16 | 1.66 | 5.0 | 5.0 | 3.3 |
| **6-6 F6X** | 3/8 | 3/8 - 18 | 3/4 | 1.69 | 5.0 | 5.0 | 3.3 |
| **8 F6X** | 1/2 | 3/8 - 18 | 7/8 | 1.74 | 5.0 | 5.0 | 3.3 |
| **8-8 F6X** | 1/2 | 1/2 - 14 | 7/8 | 1.97 | 5.0 | 5.0 | 3.3 |
| **10 F6X** | 5/8 | 1/2 - 14 | 1 | 2.05 | 5.0 | 5.0 | 3.3 |
| **10-6 F6X** | 5/8 | 3/8 - 18 | 1 | 1.84 | 5.0 | 5.0 | 3.3 |
| **12 F6X** | 3/4 | 3/4 - 14 | 1 1/4 | 2.15 | 5.0 | 5.0 | 3.3 |
| **12-8 F6X** | 3/4 | 1/2 - 14 | 1 1/4 | 2.15 | 5.0 | 5.0 | 3.3 |
| **16 F6X** | 1 | 1 - 11 1/2 | 1 1/2 | 2.50 | 3.6 | 3.6 | 2.3 |
| **16-12 F6X** | 1 | 3/4 - 14 | 1 1/2 | 2.33 | 3.6 | 3.6 | 2.3 |
| **20 F6X** | 1 1/4 | 1 1/4 - 11 1/2 | 2 | 2.76 | 3.0 | 3.0 | 2.0 |
| **24 F6X** | 1 1/2 | 1 1/2 - 11 1/2 | 2 1/4 | 3.05 | 2.5 | 2.5 | 1.6 |
| **32 F6X** | 2 | 2 - 11 1/2 | 2 5/8 | 3.53 | 2.0 | 2.0 | 1.3 |

# G6X

Swivel Nut Female Connector
37° Swivel / NPTF

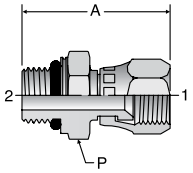
HPD Base # 0206




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C1 (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **4 G6X** | 1/4 | 1/8 - 27 | 9/16 | 1.27 | 6.0 | 6.0 | 3.3 |
| **4-4 G6X** | 1/4 | 1/4 - 18 | 3/4 | 1.43 | 6.0 | 6.0 | 3.3 |
| **6 G6X** | 3/8 | 1/4 - 18 | 3/4 | 1.44 | 5.0 | 5.0 | 3.3 |
| **6-6 G6X** | 3/8 | 3/8 - 18 | 7/8 | 1.54 | 5.0 | 5.0 | 3.3 |
| **6-8 G6X** | 3/8 | 1/2 - 14 | 1 1/8 | 1.80 | 5.0 | 5.0 | 3.3 |
| **8 G6X** | 1/2 | 3/8 - 18 | 7/8 | 1.69 | 5.0 | 5.0 | 3.3 |
| **8-8 G6X** | 1/2 | 1/2 - 14 | 1 1/8 | 1.94 | 5.0 | 5.0 | 3.3 |
| **10 G6X** | 5/8 | 1/2 - 14 | 1 1/8 | 1.98 | 5.0 | 5.0 | 3.3 |
| **12 G6X** | 3/4 | 3/4 - 14 | 1 3/8 | 2.01 | 4.0 | 4.0 | 2.6 |
| **12-8 G6X** | 3/4 | 1/2 - 14 | 1 1/4 | 2.00 | 5.0 | 5.0 | 3.3 |
| **16 G6X** | 1 | 1 - 11 1/2 | 1 5/8 | 2.48 | 3.0 | 3.0 | 2.0 |
| **20 G6X** | 1 1/4 | 1 1/4 - 11 1/2 | 2 | 2.86 | 2.5 | 2.5 | 1.6 |
| **24 G6X** | 1 1/2 | 1 1/2 - 11 1/2 | 2 3/8 | 3.01 | 2.0 | 2.0 | 1.3 |
| **32 G6X** | 2 | 2 - 11 1/2 | 2 7/8 | 3.40 | 1.5 | 1.5 | 1.0 |

# F687OMX

Swivel – ISO 6149 Connector
37° Swivel / ISO 6149




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 Male Metric Parallel Thread | A (mm) | P (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4M10F687OMX** | 6 | 1/4 | M10x1 | 31.9 | 14 | 7.2 | 5.0 | 3.3 |
| **5M12F687OMX** | 8 | 5/16 | M12x1.5 | 35.6 | 17 | 6.0 | 5.0 | 3.3 |
| **6M14F687OMX** | 10 | 3/8 | M14x1.5 | 37.2 | 19 | 5.0 | 5.0 | 3.3 |
| **8M16F687OMX** | 12 | 1/2 | M16x1.5 | 41.8 | 22 | 5.0 | 5.0 | 3.3 |
| **10M22F687OMX** | 14, 15, 16 | 5/8 | M22x1.5 | 47.6 | 27 | 5.0 | 5.0 | 3.3 |
| **12M27F687OMX** | 18, 20 | 3/4 | M27x2 | 51.7 | 32 | 5.0 | 5.0 | 3.3 |
| **16M33F687OMX** | 25 | 1 | M33x2 | 56.9 | 41 | 3.6 | 3.6 | 2.3 |

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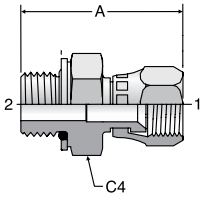
Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# F68OMX

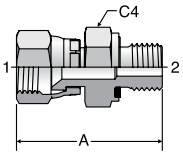
Swivel Metric ORR Connector
Metric-ORR / 37° Swivel




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 Male Metric Parallel Thread | A (mm) | C4 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4M10F68OMX** | 6 | 1/4 | M10x1 | 30.2 | 14 | 5.0 | 5.0 | 3.3 |
| **5M12F68OMX** | 8 | 5/16 | M12x1.5 | 35.6 | 17 | 6.0 | 6.0 | 3.3 |
| **6M14F68OMX** | 10 | 3/8 | M14x1.5 | 37.2 | 19 | 5.0 | 5.0 | 3.3 |
| **8M16F68OMX** | 12 | 1/2 | M16x1.5 | 42.4 | 22 | 3.6 | 3.6 | 2.3 |
| **10M22F68OMX** | 14, 15, 16 | 5/8 | M22x1.5 | 47.9 | 27 | 3.6 | 3.6 | 2.3 |
| **12M27F68OMX** | 18, 20 | 3/4 | M27x2 | 52.3 | 32 | 3.0 | 3.0 | 2.0 |
| **16M33F68OMX** | 25 | 1 | M33x2 | 57.4 | 41 | 3.0 | 3.0 | 2.0 |

# F682EDMX

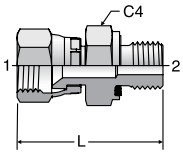
Metric-ED / 37° Swivel




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 Male Metric Parallel Thread | A (mm) | C4 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4M10F682EDMX** | 6 | 1/4 | M10x1 | 29.7 | 14 | 7.2 | 5.0 | 3.3 |
| **5M12F682EDMX** | 8 | 5/16 | M12x1.5 | 36.6 | 17 | 6.0 | 5.0 | 3.3 |
| **6M14F682EDMX** | 10 | 3/8 | M14x1.5 | 38.2 | 19 | 5.0 | 5.0 | 3.3 |
| **8M16F682EDMX** | 12 | 1/2 | M16x1.5 | 42.3 | 22 | 5.0 | 5.0 | 3.3 |
| **10M22F682EDMX** | 14, 15, 16 | 5/8 | M22x1.5 | 48.6 | 27 | 5.0 | 5.0 | 3.3 |
| **12M27F682EDMX** | 18, 20 | 3/4 | M27x2 | 51.7 | 32 | 5.0 | 5.0 | 3.3 |
| **16M33F682EDMX** | 25 | 1 | M33x2 | 59.0 | 41 | 3.6 | 3.6 | 2.3 |

# F642EDMX

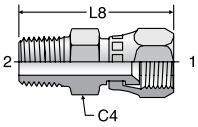
Swivel – BSPP Connector
37° Swivel / BSPP-ED




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 BSPP | C4 (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4F642EDMX** | 6 | 1/4 | 1/8 - 28 | 14 | 29.7 | 7.2 | 5.0 | 3.3 |
| **4-4F642EDMX** | 6 | 1/4 | 1/4 - 19 | 19 | 35.2 | 6.0 | 5.0 | 3.3 |
| **5F642EDMX** | 8 | 5/16 | 1/8 - 28 | 14 | 32.8 | 6.0 | 5.0 | 3.3 |
| **5-4F642EDMX** | 8 | 5/16 | 1/4 - 19 | 19 | 37.2 | 6.0 | 6.0 | 3.3 |
| **6F642EDMX** | 10 | 3/8 | 1/4 - 19 | 19 | 38.7 | 5.0 | 5.0 | 3.3 |
| **6-6F642EDMX** | 10 | 3/8 | 3/8 - 19 | 22 | 39.2 | 5.0 | 5.0 | 3.3 |
| **8F642EDMX** | 12 | 1/2 | 3/8 - 19 | 22 | 42.3 | 5.0 | 5.0 | 3.3 |
| **8-4F642EDMX** | 12 | 1/2 | 1/4 - 19 | 19 | 42.3 | 5.0 | 5.0 | 3.3 |
| **10F642EDMX** | 14, 15, 16 | 5/8 | 1/2 - 14 | 27 | 48.6 | 5.0 | 5.0 | 3.3 |
| **10-6F642EDMX** | 14, 15, 16 | 5/8 | 3/8 - 19 | 22 | 46.6 | 5.0 | 5.0 | 3.3 |
| **12F642EDMX** | 18, 20 | 3/4 | 3/4 - 14 | 32 | 51.7 | 5.0 | 5.0 | 3.3 |
| **12-8F642EDMX** | 18, 20 | 3/4 | 1/2 - 14 | 27 | 49.7 | 5.0 | 5.0 | 3.3 |
| **16F642EDMX** | 25 | 1 | 1 - 11 | 41 | 59.0 | 3.6 | 3.6 | 2.3 |
| **16-12F642EDMX** | 25 | 1 | 3/4 - 14 | 32 | 57.0 | 3.6 | 3.6 | 2.3 |
| **20F642EDMX** | 28, 30, 32 | 1 1/4 | 1 1/4 - 11 | 50 | 63.4 | 3.6 | 3.0 | 2.0 |
| **20-16F642EDMX** | 28, 30, 32 | 1 1/4 | 1 - 11 | 41 | 65.9 | 3.6 | 3.0 | 2.0 |
| **24F642EDMX** | 35, 38 | 1 1/2 | 1 1/2 - 11 | 55 | 74.1 | 2.5 | 2.0 | 1.3 |
| **24-20F642EDMX** | 35, 38 | 1 1/2 | 1 1/4 - 11 | 50 | 69.1 | 2.5 | 2.0 | 1.3 |

# F63MX

Swivel – BSPT Connector
37° Swivel / BSPT




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 BSPT | C4 (mm) | L8 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|
| **4F63MX** | 6 | 1/4 | 1/8 - 20 | 13 | 31.0 | 4.5 | 4.5 | 2.9 |
| **4-4F63MX** | 6 | 1/4 | 1/4 - 19 | 14 | 35.7 | 4.5 | 4.5 | 2.9 |
| **5-4F63MX** | 8 | 5/16 | 1/4 - 19 | 14 | 38.4 | 4.5 | 4.5 | 2.9 |
| **6F63MX** | 10 | 3/8 | 1/4 - 19 | 14 | 39.7 | 4.5 | 4.5 | 2.9 |
| **6-6F63MX** | 10 | 3/8 | 3/8 - 19 | 19 | 39.7 | 4.5 | 4.5 | 2.9 |
| **8-4F63MX** | 12 | 1/2 | 1/4 - 19 | 19 | 42.8 | 4.5 | 4.5 | 2.9 |
| **8F63MX** | 12 | 1/2 | 3/8 - 19 | 19 | 42.8 | 4.5 | 4.5 | 2.9 |
| **10F63MX** | 14, 15, 16 | 5/8 | 1/2 - 14 | 22 | 51.2 | 4.5 | 4.5 | 2.9 |
| **12-8F63MX** | 20 | 3/4 | 1/2 - 14 | 27 | 53.2 | 4.5 | 4.5 | 2.9 |
| **12F63MX** | 18, 20 | 3/4 | 3/4 - 14 | 27 | 53.2 | 2.3 | 2.3 | 1.5 |
| **16-12F63MX** | 25 | 1 | 3/4 - 14 | 32 | 55.7 | 2.3 | 2.3 | 1.5 |
| **16F63MX** | 25 | 1 | 1 - 11 | 36 | 62.5 | 2.3 | 2.3 | 1.5 |
| **20F63MX** | 30, 32 | 1 1/4 | 1 1/4 - 11 | 46 | 70.6 | 2.3 | 2.3 | 1.5 |

Dimensions and pressures for reference only, subject to change.

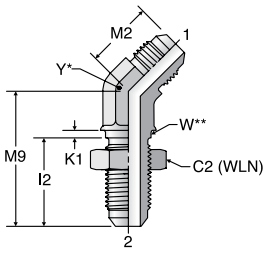


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# WNTX

45° Blulkhead Union Elbow
37° Flare / 37° Flare

SAE 070801
HPD Base # 3353
WNTX-WLN – Body with locknut
(See page B10 for WLN)



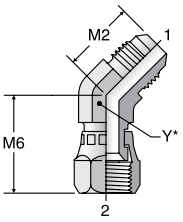

Y* – Across wrench flats.
W** – Bulkhead pilot dia. recommended clearance hole +.015 over W dia.

| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | C2 HEX (in.) | I2 (in.) | K1 (in.) | M2 (in.) | M9 (in.) | W DIA (in.) | MAX BULKHEAD WALL THICKNESS (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 WNTX | 1/4 | 11/16 | 1.02 | 0.09 | 0.72 | 1.53 | 0.44 | 0.25 | 7/16 | 7.5 | 7.7 | 3.3 |
| 5 WNTX | 5/16 | 3/4 | 1.02 | 0.09 | 0.77 | 1.66 | 0.56 | 0.25 | 9/16 | 6.0 | 6.0 | 3.3 |
| 6 WNTX | 3/8 | 13/16 | 1.09 | 0.09 | 0.83 | 1.67 | 0.56 | 0.35 | 9/16 | 6.0 | 6.0 | 3.3 |
| 8 WNTX | 1/2 | 1 | 1.25 | 0.13 | 0.98 | 1.94 | 0.75 | 0.35 | 3/4 | 6.0 | 6.0 | 3.3 |
| 10 WNTX | 5/8 | 1 1/8 | 1.39 | 0.13 | 1.11 | 2.17 | 0.82 | 0.35 | 7/8 | 5.0 | 5.0 | 3.3 |
| 12 WNTX | 3/4 | 1 3/8 | 1.56 | 0.13 | 1.28 | 2.44 | 1.06 | 0.35 | 1 1/16 | 5.0 | 5.0 | 2.9 |
| 16 WNTX | 1 | 1 5/8 | 1.56 | 0.13 | 1.47 | 2.56 | 1.31 | 0.35 | 1 5/16 | 4.0 | 3.5 | 2.3 |
| 20 WNTX | 1 1/4 | 1 7/8 | 1.61 | 0.13 | 1.59 | 2.66 | 1.63 | 0.35 | 1 5/8 | 4.0 | 3.0 | 2.0 |

# V6X

45° Swivel Nut Elbow
37° Flare / 37° Swivel

SAE 070321
HPD Base # 3703



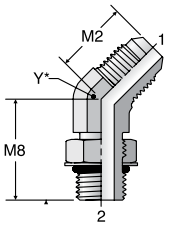

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | M2 (in.) | M6 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| 4 V6X | 1/4 | 0.72 | 0.94 | 7/16 | 7.5 | 7.7 | 3.3 |
| 5 V6X | 5/16 | 0.77 | 1.00 | 9/16 | 6.0 | 6.0 | 3.3 |
| 6 V6X | 3/8 | 0.83 | 1.12 | 9/16 | 6.0 | 6.0 | 3.3 |
| 8 V6X | 1/2 | 0.98 | 1.28 | 3/4 | 6.0 | 6.0 | 3.3 |
| 10 V6X | 5/8 | 1.11 | 1.44 | 7/8 | 5.0 | 5.0 | 3.3 |
| 12 V6X | 3/4 | 1.28 | 1.50 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| 14 V6X | 7/8 | 1.45 | 1.62 | 1 3/16 | 5.0 | 5.0 | 3.3 |
| 16 V6X | 1 | 1.47 | 1.75 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| 20 V6X | 1 1/4 | 1.59 | 2.03 | 1 5/8 | 4.0 | 3.0 | 2.6 |
| 24 V6X | 1 1/2 | 1.78 | 2.18 | 1 7/8 | 3.0 | 2.5 | 2.0 |
| 32 V6X | 2 | 2.22 | 2.76 | 2 1/2 | 2.0 | 1.5 | 1.3 |

# V5OX

45° Straight Thread Elbow
37° Flare / SAE-ORB

SAE 070320
HPD Base # 3503

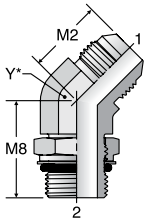



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | M2 (in.) | M8 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| 4 V5OX | 1/4 | 7/16 - 20 | 0.72 | 1.05 | 7/16 | 6.0 | 6.0 | 3.3 |
| 4-6 V5OX | 1/4 | 9/16 - 18 | 0.82 | 1.14 | 9/16 | 6.0 | 5.4 | 3.3 |
| 5 V5OX | 5/16 | 1/2 - 20 | 0.77 | 1.05 | 9/16 | 6.0 | 5.4 | 3.3 |
| 6 V5OX | 3/8 | 9/16 - 18 | 0.83 | 1.14 | 9/16 | 6.0 | 5.4 | 3.3 |
| 6-4 V5OX | 3/8 | 7/16 - 20 | 0.83 | 1.08 | 9/16 | 6.0 | 5.4 | 3.3 |
| 6-8 V5OX | 3/8 | 3/4 - 16 | 0.86 | 1.30 | 3/4 | 6.0 | 5.4 | 3.3 |
| 8 V5OX | 1/2 | 3/4 - 16 | 0.98 | 1.30 | 3/4 | 6.0 | 5.4 | 3.3 |
| 8-6 V5OX | 1/2 | 9/16 - 18 | 0.98 | 1.09 | 3/4 | 6.0 | 5.4 | 3.3 |
| 8-10 V5OX | 1/2 | 7/8 - 14 | 1.00 | 1.52 | 7/8 | 5.0 | 5.4 | 3.3 |
| 8-12 V5OX | 1/2 | 1 1/16 - 12 | 1.04 | 1.73 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| 10 V5OX | 5/8 | 7/8 - 14 | 1.11 | 1.52 | 7/8 | 5.0 | 5.4 | 3.3 |
| 10-8 V5OX | 5/8 | 3/4 - 16 | 1.11 | 1.38 | 7/8 | 5.0 | 5.4 | 3.3 |
| 10-12 V5OX | 5/8 | 1 1/16 - 12 | 1.16 | 1.73 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| 12 V5OX | 3/4 | 1 1/16 - 12 | 1.28 | 1.73 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| 12-10 V5OX | 3/4 | 7/8 - 14 | 1.28 | 1.58 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| 12-16 V5OX | 3/4 | 1 5/16 - 12 | 1.42 | 1.86 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| 14 V5OX | 7/8 | 1 3/16 - 12 | 1.45 | 1.86 | 1 5/16 | 5.0 | 5.4 | 3.3 |
| 16 V5OX | 1 | 1 5/16 - 12 | 1.47 | 1.86 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| 16-12 V5OX | 1 | 1 1/16 - 12 | 1.47 | 1.86 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| 16-20 V5OX | 1 | 1 5/8 - 12 | 1.55 | 1.91 | 1 5/8 | 3.0 | 2.5 | 2.0 |
| 20 V5OX | 1 1/4 | 1 5/8 - 12 | 1.59 | 1.91 | 1 5/8 | 3.0 | 2.5 | 2.0 |
| 20-16 V5OX | 1 1/4 | 1 5/16 - 12 | 1.59 | 1.91 | 1 5/8 | 4.0 | 2.5 | 2.0 |
| 24 V5OX | 1 1/2 | 1 7/8 - 12 | 1.78 | 1.91 | 1 7/8 | 3.0 | 2.0 | 1.5 |
| 32 V5OX | 2 | 2 1/2 - 12 | 2.22 | 1.86 | 2 1/2 | 2.0 | 1.5 | 1.3 |

# V87OMX

Male 45° Elbow – ISO 6149
37° Flare / ISO 6149




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 Male Metric Parallel Thread | M2 (mm) | M8 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| 4M12V87OMX | 6 | 1/4 | M12X1.5 | 19.6 | 27.0 | 13 | 6.0 | 6.0 | 3.3 |
| 6M14V87OMX | 10 | 3/8 | M14X1.5 | 21.1 | 28.0 | 14 | 6.0 | 6.0 | 3.3 |
| 8M16V87OMX | 12 | 1/2 | M16 X 1.5 | 24.9 | 33.0 | 19 | 5.0 | 5.0 | 3.3 |
| 10M22V87OMX | 14, 15, 16 | 5/8 | M22 X 1.5 | 28.2 | 37.5 | 22 | 5.0 | 5.0 | 3.3 |
| 12M27V87OMX | 18, 20 | 3/4 | M27 X 2.0 | 32.5 | 46.0 | 27 | 5.0 | 5.0 | 3.3 |
| 16M33V87OMX | 25 | 1 | M33 X 2.0 | 37.3 | 45.5 | 33 | 4.0 | 4.0 | 2.6 |

Dimensions and pressures for reference only, subject to change.

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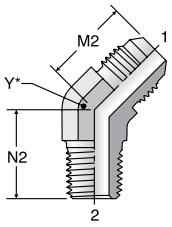
**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# VTX

45° Male Elbow
37° Flare / NPTF

SAE 070302
HPD Base # 3103

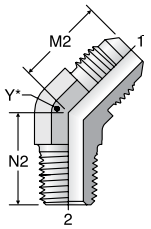



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M2 (in.) | N2 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **2 VTX** | 1/8 | 1/8 - 27 | 0.69 | 0.53 | 7/16 | 6.0 | 6.0 | 3.3 |
| **3 VTX** | 3/16 | 1/8 - 27 | 0.69 | 0.52 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4 VTX** | 1/4 | 1/8 - 27 | 0.72 | 0.64 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4-4 VTX** | 1/4 | 1/4 - 18 | 0.82 | 0.86 | 9/16 | 6.0 | 6.0 | 3.3 |
| **4-6 VTX** | 1/4 | 3/8 - 18 | 0.85 | 0.95 | 3/4 | 6.0 | 6.0 | 3.3 |
| **5 VTX** | 5/16 | 1/8 - 27 | 0.77 | 0.64 | 9/16 | 6.0 | 6.0 | 3.3 |
| **5-4 VTX** | 5/16 | 1/4 - 18 | 0.82 | 0.86 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 VTX** | 3/8 | 1/4 - 18 | 0.83 | 0.86 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6-2 VTX** | 3/8 | 1/8 - 27 | 0.83 | 0.67 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6-6 VTX** | 3/8 | 3/8 - 18 | 0.87 | 0.95 | 3/4 | 6.0 | 6.0 | 3.3 |
| **6-8 VTX** | 3/8 | 1/2 - 14 | 0.88 | 1.17 | 7/8 | 6.0 | 6.0 | 3.3 |
| **8 VTX** | 1/2 | 3/8 - 18 | 0.98 | 0.95 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8-4 VTX** | 1/2 | 1/4 - 18 | 0.98 | 0.95 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8-8 VTX** | 1/2 | 1/2 - 14 | 0.99 | 1.17 | 7/8 | 6.0 | 6.0 | 3.3 |
| **8-12 VTX** | 1/2 | 3/4 - 14 | 1.04 | 1.20 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **10 VTX** | 5/8 | 1/2 - 14 | 1.11 | 1.17 | 7/8 | 5.0 | 5.0 | 3.3 |
| **10-6 VTX** | 5/8 | 3/8 - 18 | 1.11 | 0.98 | 7/8 | 5.0 | 5.0 | 3.3 |
| **10-12 VTX** | 5/8 | 3/4 - 14 | 1.28 | 1.20 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **12 VTX** | 3/4 | 3/4 - 14 | 1.28 | 1.20 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **12-8 VTX** | 3/4 | 1/2 - 14 | 1.28 | 1.20 | 1 1/16 | 5.0 | 5.0 | 2.9 |
| **12-16 VTX** | 3/4 | 1 - 11 1/2 | 1.42 | 1.49 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **14 VTX** | 7/8 | 3/4 - 14 | 1.45 | 1.30 | 1 5/16 | 4.0 | 4.0 | 2.3 |
| **16 VTX** | 1 | 1 - 11 1/2 | 1.47 | 1.48 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **16-12 VTX** | 1 | 3/4 - 14 | 1.47 | 1.29 | 1 5/16 | 4.0 | 4.0 | 2.3 |
| **16-20 VTX** | 1 | 1 1/4 - 11 1/2 | 1.59 | 1.67 | 1 5/8 | 2.5 | 2.5 | 1.6 |
| **20 VTX** | 1 1/4 | 1 1/4 - 11 1/2 | 1.59 | 1.67 | 1 5/8 | 2.5 | 2.5 | 1.6 |
| **20-16 VTX** | 1 1/4 | 1 - 11 1/2 | 1.59 | 1.63 | 1 5/8 | 3.0 | 3.0 | 2.0 |
| **24 VTX** | 1 1/2 | 1 1/2 - 11 1/2 | 1.78 | 1.77 | 1 7/8 | 2.5 | 2.5 | 1.6 |
| **32 VTX** | 2 | 2 - 11 1/2 | 2.22 | 2.11 | 2 1/2 | 2.0 | 2.0 | 1.3 |

# V3MX

Male 45° Elbow – BSPT
37° Flare / BSPT

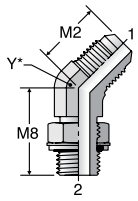



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 BSPT | M2 (mm) | N2 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **4V3MX** | 6 | 1/4 | 1/8 - 28 | 18.3 | 16.3 | 11 | 4.5 | 4.5 | 2.9 |
| **4-4V3MX** | 6 | 1/4 | 1/4 - 19 | 20.8 | 21.8 | 14 | 4.5 | 4.5 | 2.9 |
| **6V3MX** | 10 | 3/8 | 1/4 - 19 | 21.1 | 21.8 | 14 | 4.5 | 4.5 | 2.9 |
| **6-6V3MX** | 10 | 3/8 | 3/8 - 19 | 22.1 | 24.1 | 19 | 4.5 | 4.5 | 2.9 |
| **8V3MX** | 12 | 1/2 | 3/8 - 19 | 24.9 | 24.1 | 19 | 4.5 | 4.5 | 2.9 |
| **8-8V3MX** | 12 | 1/2 | 1/2 - 14 | 25.2 | 29.7 | 22 | 4.5 | 4.5 | 2.9 |
| **12V3MX** | 18, 20 | 3/4 | 3/4 - 14 | 32.5 | 30.5 | 27 | 2.3 | 2.3 | 1.5 |

# V4OMX

Male 45° Elbow – BSPP
37° Flare / BSPP-ORR



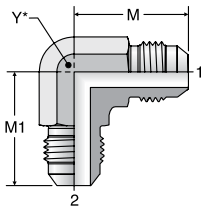

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 BSPP | M2 (mm) | M8 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **4V4OMX** | 6 | 1/4 | 1/8 - 28 | 18.3 | 26.5 | 11 | 3.6 | 3.6 | 2.3 |
| **6V4OMX** | 10 | 3/8 | 1/4 - 19 | 21.1 | 29.0 | 14 | 3.6 | 3.6 | 2.3 |
| **8V4OMX** | 12 | 1/2 | 3/8 - 19 | 24.9 | 33.0 | 19 | 3.6 | 3.6 | 2.3 |
| **10V4OMX** | 14,15,16 | 5/8 | 1/2 - 14 | 28.2 | 38.5 | 22 | 3.6 | 3.6 | 2.3 |
| **12V4OMX** | 18,20 | 3/4 | 3/4 - 14 | 32.5 | 44.0 | 27 | 3.6 | 3.6 | 2.3 |
| **16V4OMX** | 25 | 1 | 1 - 11 | 37.3 | 47.0 | 33 | 3.6 | 3.6 | 2.3 |

# ETX

Union Elbow
37° Flare / 37° Flare

SAE 070201
HPD Base # 2303




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | M (in.) | M1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **2 ETX** | 1/8 | 1/8 | 0.78 | 0.78 | 7/16 | 7.5 | 7.7 | 3.3 |
| **3 ETX** | 3/16 | 3/16 | 0.83 | 0.83 | 7/16 | 7.5 | 7.7 | 3.3 |
| **4 ETX** | 1/4 | 1/4 | 0.89 | 0.89 | 7/16 | 7.5 | 7.7 | 3.3 |
| **5 ETX** | 5/16 | 5/16 | 0.97 | 0.97 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 ETX** | 3/8 | 3/8 | 1.06 | 1.06 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6-4 ETX** | 3/8 | 1/4 | 1.06 | 1.05 | 9/16 | 6.0 | 6.0 | 3.3 |
| **8 ETX** | 1/2 | 1/2 | 1.25 | 1.25 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8-6 ETX** | 1/2 | 3/8 | 1.25 | 1.14 | 3/4 | 6.0 | 6.0 | 3.3 |
| **10 ETX** | 5/8 | 5/8 | 1.45 | 1.45 | 7/8 | 5.0 | 5.0 | 3.3 |
| **10-8 ETX** | 5/8 | 1/2 | 1.45 | 1.33 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 ETX** | 3/4 | 3/4 | 1.66 | 1.66 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **12-8 ETX** | 3/4 | 1/2 | 1.66 | 1.42 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **12-10 ETX** | 3/4 | 5/8 | 1.66 | 1.54 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **14 ETX** | 7/8 | 7/8 | 1.80 | 1.80 | 1 3/16 | 5.0 | 5.0 | 3.3 |
| **16 ETX** | 1 | 1 | 1.81 | 1.81 | 1 5/16 | 4.0 | 3.5 | 2.3 |
| **16-12 ETX** | 1 | 3/4 | 1.81 | 1.77 | 1 5/16 | 4.0 | 3.5 | 2.3 |
| **20 ETX** | 1 1/4 | 1 1/4 | 2.06 | 2.06 | 1 5/8 | 4.0 | 3.0 | 2.0 |
| **24 ETX** | 1 1/2 | 1 1/2 | 2.33 | 2.33 | 1 7/8 | 3.0 | 2.0 | 1.3 |
| **32 ETX** | 2 | 2 | 3.06 | 3.06 | 2 1/2 | 2.0 | 1.5 | 1.0 |

Dimensions and pressures for reference only, subject to change.

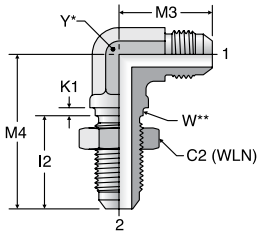


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# WETX

Bulkhead Union Elbow
37° Flare / 37° Flare

SAE 070701
HPD Base # 2353
WETX-WLN – Body with locknut
(See page B10 for WLN)



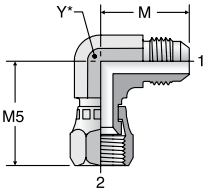

Y* – Across wrench flats.
W** – Bulkhead pilot dia. recommended clearance hole +.015 over W dia.

| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | C2 HEX (in.) | I2 (in.) | K1 (in.) | M3 (in.) | M4 (in.) | W DIA (in.) | MAX BULKHEAD WALL THICKNESS (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3 WETX** | 3/16 | 5/8 | 0.92 | 0.09 | 0.94 | 1.50 | 0.38 | 0.25 | 7/16 | 7.5 | 7.7 | 3.3 |
| **4 WETX** | 1/4 | 11/16 | 1.20 | 0.09 | 0.97 | 1.59 | 0.44 | 0.25 | 7/16 | 7.5 | 7.7 | 3.3 |
| **5 WETX** | 5/16 | 3/4 | 1.02 | 0.09 | 1.06 | 1.72 | 0.50 | 0.25 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 WETX** | 3/8 | 13/16 | 1.09 | 0.09 | 1.09 | 1.81 | 0.56 | 0.35 | 9/16 | 6.0 | 6.0 | 3.3 |
| **8 WETX** | 1/2 | 1 | 1.25 | 0.13 | 1.36 | 2.11 | 0.75 | 0.35 | 3/4 | 6.0 | 6.0 | 3.3 |
| **10 WETX** | 5/8 | 1 1/8 | 1.39 | 0.13 | 1.56 | 2.39 | 0.88 | 0.35 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 WETX** | 3/4 | 1 3/8 | 1.56 | 0.13 | 1.78 | 2.67 | 1.06 | 0.35 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **14 WETX** | 7/8 | 1 1/2 | 1.56 | 0.13 | 1.92 | 2.80 | 1.19 | 0.35 | 1 5/8 | 5.0 | 5.0 | 3.3 |
| **16 WETX** | 1 | 1 5/8 | 1.56 | 0.13 | 1.94 | 2.80 | 1.31 | 0.35 | 1 5/8 | 4.0 | 3.5 | 2.3 |
| **20 WETX** | 1 1/4 | 1 7/8 | 1.61 | 0.13 | 2.17 | 3.13 | 1.63 | 0.35 | 1 5/8 | 4.0 | 3.0 | 2.0 |

# C6X

Swivel Nut Elbow
37° Flare / 37° Swivel

SAE 070221
HPD Base # 3903



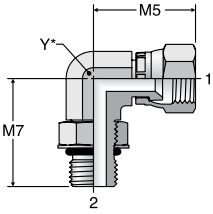

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | M (in.) | M5 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **3 C6X** | 3/16 | 3/16 | 0.83 | 1.00 | 7/16 | 7.5 | 7.7 | 3.3 |
| **4 C6X** | 1/4 | 1/4 | 0.89 | 1.00 | 7/16 | 7.5 | 7.7 | 3.3 |
| **5 C6X** | 5/16 | 5/16 | 0.95 | 1.06 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 C6X** | 3/8 | 3/8 | 1.06 | 1.25 | 9/16 | 6.0 | 6.0 | 3.3 |
| **8 C6X** | 1/2 | 1/2 | 1.25 | 1.38 | 3/4 | 6.0 | 6.0 | 3.3 |
| **10 C6X** | 5/8 | 5/8 | 1.45 | 1.62 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 C6X** | 3/4 | 3/4 | 1.66 | 1.75 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **12-24 C6X** | 3/4 | 1 1/2 | 2.11 | 2.59 | 1 7/8 | 3.0 | 2.5 | 2.0 |
| **14 C6X** | 7/8 | 7/8 | 1.81 | 1.78 | 1 5/16 | 5.0 | 5.0 | 3.3 |
| **16 C6X** | 1 | 1 | 1.81 | 2.00 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **16-12 C6X** | 1 | 3/4 | 1.81 | 1.87 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **20 C6X** | 1 1/4 | 1 1/4 | 2.06 | 2.31 | 1 5/8 | 4.0 | 3.0 | 2.6 |
| **24 C6X** | 1 1/2 | 1 1/2 | 2.33 | 2.59 | 1 7/8 | 3.0 | 2.5 | 2.0 |
| **32 C6X** | 2 | 2 | 3.06 | 3.51 | 2 1/2 | 2.0 | 1.5 | 1.3 |

# AOEX6

Swivel Elbow Straight
Thread Connector
SAE-ORB / 37° Swivel

HPD Base # 2506




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 UN/UNF-2A | M5 (in.) | M7 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **4 AOEX6** | 1/4 | 7/16 - 20 | 1.00 | 1.03 | 7/16 | 6.0 | 6.0 | 3.3 |
| **6 AOEX6** | 3/8 | 9/16 - 18 | 1.25 | 1.25 | 9/16 | 6.0 | 6.0 | 3.3 |
| **8 AOEX6** | 1/2 | 3/4 - 16 | 1.38 | 1.45 | 3/4 | 6.0 | 6.0 | 3.3 |
| **10 AOEX6** | 5/8 | 7/8 - 14 | 1.62 | 1.70 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 AOEX6** | 3/4 | 1 1/16 - 12 | 1.75 | 1.94 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **16 AOEX6** | 1 | 1 5/16 - 12 | 2.00 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |

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Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
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Columbus, Ohio
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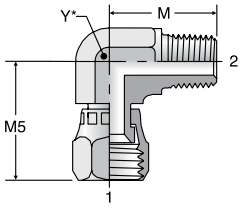
# X6EF

Swivel Elbow Connector
37° Swivel / NPTF

HPD Base # 2106



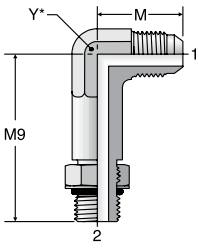

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M (in.) | M5 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **4 X6EF** | 1/4 | 1/8 - 27 | 0.78 | 1.01 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4-4 X6EF** | 1/4 | 1/4 - 18 | 1.09 | 1.13 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 X6EF** | 3/8 | 1/4 - 18 | 1.09 | 1.25 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6-6 X6EF** | 3/8 | 3/8 - 18 | 1.22 | 1.27 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8 X6EF** | 1/2 | 3/8 - 18 | 1.22 | 1.38 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8-8 X6EF** | 1/2 | 1/2 - 14 | 1.47 | 1.48 | 7/8 | 6.0 | 6.0 | 3.3 |
| **10 X6EF** | 5/8 | 1/2 - 14 | 1.47 | 1.62 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 X6EF** | 3/4 | 3/4 - 14 | 1.59 | 1.75 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **16 X6EF** | 1 | 1 - 11 | 1.97 | 2.01 | 1 5/16 | 3.0 | 3.0 | 2.0 |

# CC5OX

Long Straight Thread Elbow
37° Flare / SAE-ORB

SAE 071620
HPD Base # 5503



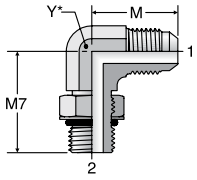

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | M (in.) | M9 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **4 CC5OX** | 1/4 | 7/16 - 20 | 0.89 | 1.73 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 CC5OX** | 3/8 | 9/16 - 18 | 1.06 | 2.08 | 9/16 | 6.0 | 5.4 | 3.3 |
| **8 CC5OX** | 1/2 | 3/4 - 16 | 1.25 | 2.50 | 7/8 | 6.0 | 5.4 | 3.3 |
| **10 CC5OX** | 5/8 | 7/8 - 14 | 1.45 | 2.89 | 7/8 | 5.0 | 5.4 | 3.3 |
| **12 CC5OX** | 3/4 | 1 1/16 - 12 | 1.66 | 3.34 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **16 CC5OX** | 1 | 1 5/16 - 12 | 1.81 | 3.72 | 1 5/16 | 4.0 | 3.0 | 2.6 |

# C5OX

Straight Thread Elbow
37° Flare / SAE-ORB

SAE 070220
HPD Base # 2503




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | M (in.) | M7 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **2 C5OX** | 1/8 | 5/16 - 24 | 0.77 | 0.94 | 7/16 | 5.0 | 6.0 | 3.3 |
| **3 C5OX** | 3/16 | 3/8 - 24 | 0.83 | 0.94 | 7/16 | 5.0 | 6.0 | 3.3 |
| **4 C5OX** | 1/4 | 7/16 - 20 | 0.89 | 1.03 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4-2 C5OX** | 1/4 | 5/16 - 24 | 0.89 | 0.92 | 7/16 | 5.0 | 6.0 | 3.3 |
| **4-6 C5OX** | 1/4 | 9/16 - 18 | 1.05 | 1.25 | 9/16 | 6.0 | 5.4 | 3.3 |
| **4-8 C5OX** | 1/4 | 3/4 - 16 | 1.13 | 1.45 | 3/4 | 6.0 | 5.4 | 3.3 |
| **5 C5OX** | 5/16 | 1/2 - 20 | 0.95 | 1.13 | 9/16 | 6.0 | 5.4 | 3.3 |
| **5-4 C5OX** | 5/16 | 7/16 - 20 | 0.95 | 1.13 | 9/16 | 6.0 | 5.4 | 3.3 |
| **5-6 C5OX** | 5/16 | 9/16 - 18 | 1.06 | 1.25 | 9/16 | 6.0 | 5.4 | 3.3 |
| **6 C5OX** | 3/8 | 9/16 - 18 | 1.06 | 1.25 | 9/16 | 6.0 | 5.4 | 3.3 |
| **6-4 C5OX** | 3/8 | 7/16 - 20 | 1.06 | 1.19 | 9/16 | 6.0 | 5.4 | 3.3 |
| **6-5 C5OX** | 3/8 | 1/2 - 20 | 1.06 | 1.19 | 9/16 | 6.0 | 5.4 | 3.3 |
| **6-8 C5OX** | 3/8 | 3/4 - 16 | 1.14 | 1.45 | 3/4 | 6.0 | 5.4 | 3.3 |
| **6-10 C5OX** | 3/8 | 7/8 - 14 | 1.23 | 1.70 | 7/8 | 6.0 | 5.4 | 3.3 |
| **8 C5OX** | 1/2 | 3/4 - 16 | 1.25 | 1.45 | 3/4 | 6.0 | 5.4 | 3.3 |
| **8-4 C5OX** | 1/2 | 7/16 - 20 | 1.25 | 1.26 | 3/4 | 6.0 | 5.4 | 3.3 |
| **8-6 C5OX** | 1/2 | 9/16 - 18 | 1.25 | 1.34 | 3/4 | 6.0 | 5.4 | 3.3 |
| **8-10 C5OX** | 1/2 | 7/8 - 14 | 1.33 | 1.70 | 7/8 | 5.0 | 5.4 | 3.3 |
| **8-12 C5OX** | 1/2 | 1 1/16 - 12 | 1.42 | 1.94 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **8-16 C5OX** | 1/2 | 1 5/16 - 12 | 1.52 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **10 C5OX** | 5/8 | 7/8 - 14 | 1.45 | 1.70 | 7/8 | 5.0 | 5.4 | 3.3 |
| **10-6 C5OX** | 5/8 | 9/16 - 18 | 1.45 | 1.41 | 7/8 | 5.0 | 5.4 | 3.3 |
| **10-8 C5OX** | 5/8 | 3/4 - 16 | 1.45 | 1.55 | 7/8 | 5.0 | 5.4 | 3.3 |
| **10-12 C5OX** | 5/8 | 1 1/16 - 12 | 1.53 | 1.94 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **10-16 C5OX** | 5/8 | 1 5/16 - 12 | 1.64 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **12 C5OX** | 3/4 | 1 1/16 - 12 | 1.66 | 1.94 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **12-8 C5OX** | 3/4 | 3/4 - 16 | 1.66 | 1.63 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **12-10 C5OX** | 3/4 | 7/8 - 14 | 1.66 | 1.78 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **12-14 C5OX** | 3/4 | 1 3/16 - 12 | 1.77 | 2.00 | 1 5/16 | 5.0 | 5.4 | 3.3 |
| **12-16 C5OX** | 3/4 | 1 5/16 - 12 | 1.76 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **12-20 C5OX** | 3/4 | 1 5/8 - 12 | 1.97 | 2.25 | 1 5/8 | 3.0 | 3.0 | 2.6 |
| **14 C5OX** | 7/8 | 1 3/16 - 12 | 1.80 | 2.05 | 1 5/16 | 5.0 | 5.4 | 3.3 |
| **16 C5OX** | 1 | 1 5/16 - 12 | 1.81 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **16-12 C5OX** | 1 | 1 1/16 - 12 | 1.81 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **16-14 C5OX** | 1 | 1 3/16 - 12 | 1.81 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **16-20 C5OX** | 1 | 1 5/8 - 12 | 2.01 | 2.25 | 1 5/8 | 3.0 | 2.5 | 2.0 |
| **16-24 C5OX** | 1 | 1 7/8 - 12 | 2.16 | 2.39 | 1 7/8 | 3.0 | 2.5 | 2.0 |
| **20 C5OX** | 1 1/4 | 1 5/8 - 12 | 2.06 | 2.25 | 1 5/8 | 3.0 | 2.5 | 2.0 |
| **20-16 C5OX** | 1 1/4 | 1 5/16 - 12 | 2.06 | 2.25 | 1 5/8 | 4.0 | 2.5 | 2.0 |
| **20-24 C5OX** | 1 1/4 | 1 7/8 - 12 | 2.20 | 2.39 | 1 7/8 | 3.0 | 2.5 | 2.0 |
| **24 C5OX** | 1 1/2 | 1 7/8 - 12 | 2.33 | 2.39 | 1 7/8 | 3.0 | 2.0 | 1.5 |
| **24-20 C5OX** | 1 1/2 | 1 5/8 - 12 | 2.33 | 2.39 | 1 7/8 | 3.0 | 2.0 | 1.5 |
| **32 C5OX** | 2 | 2 1/2 - 12 | 3.06 | 2.89 | 2 1/2 | 2.0 | 1.5 | 1.3 |
| **32-24 C5OX** | 2 | 1 7/8 - 12 | 3.06 | 2.89 | 2 1/2 | 2.0 | 1.5 | 1.3 |

Dimensions and pressures for reference only, subject to change.

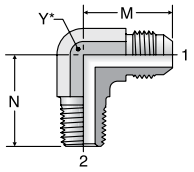


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# CTX

Male Elbow
37° Flare / NPTF

SAE 070202
HPD Base # 2103



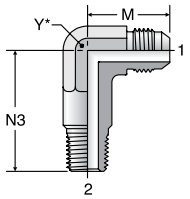

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **2 CTX** | 1/8 | 1/8 - 27 | 0.77 | 0.72 | 5/16 | 6.0 | 6.0 | 3.3 |
| **3 CTX** | 3/16 | 1/8 - 27 | 0.83 | 0.72 | 3/8 | 6.0 | 6.0 | 3.3 |
| **4 CTX** | 1/4 | 1/8 - 27 | 0.89 | 0.78 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4-4 CTX** | 1/4 | 1/4 - 18 | 1.05 | 1.09 | 9/16 | 6.0 | 6.0 | 3.3 |
| **4-6 CTX** | 1/4 | 3/8 - 18 | 1.12 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **4-8 CTX** | 1/4 | 1/2 - 14 | 1.21 | 1.47 | 7/8 | 6.0 | 6.0 | 3.3 |
| **5 CTX** | 5/16 | 1/8 - 27 | 0.95 | 0.78 | 9/16 | 6.0 | 6.0 | 3.3 |
| **5-4 CTX** | 5/16 | 1/4 - 18 | 1.05 | 1.09 | 9/16 | 6.0 | 6.0 | 3.3 |
| **5-6 CTX** | 5/16 | 3/8 - 18 | 1.12 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **6 CTX** | 3/8 | 1/4 - 18 | 1.06 | 1.09 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6-2 CTX** | 3/8 | 1/8 - 27 | 1.06 | 0.90 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6-6 CTX** | 3/8 | 3/8 - 18 | 1.14 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **6-8 CTX** | 3/8 | 1/2 - 14 | 1.22 | 1.47 | 7/8 | 6.0 | 6.0 | 3.3 |
| **6-12 CTX** | 3/8 | 3/4 - 14 | 1.31 | 1.59 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **8 CTX** | 1/2 | 3/8 - 18 | 1.25 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8-4 CTX** | 1/2 | 1/4 - 18 | 1.25 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8-8 CTX** | 1/2 | 1/2 - 14 | 1.33 | 1.47 | 7/8 | 6.0 | 6.0 | 3.3 |
| **8-12 CTX** | 1/2 | 3/4 - 14 | 1.42 | 1.59 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **8-16 CTX** | 1/2 | 1 - 11 1/2 | 1.52 | 1.97 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **10 CTX** | 5/8 | 1/2 - 14 | 1.45 | 1.47 | 7/8 | 5.0 | 5.0 | 3.3 |
| **10-6 CTX** | 5/8 | 3/8 - 18 | 1.45 | 1.28 | 7/8 | 5.0 | 5.0 | 3.3 |
| **10-12 CTX** | 5/8 | 3/4 - 14 | 1.53 | 1.59 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **10-16 CTX** | 5/8 | 1 - 11 1/2 | 1.64 | 1.97 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **12 CTX** | 3/4 | 3/4 - 14 | 1.66 | 1.59 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **12-6 CTX** | 3/4 | 3/8 - 18 | 1.66 | 1.40 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **12-8 CTX** | 3/4 | 1/2 - 14 | 1.66 | 1.59 | 1 1/16 | 5.0 | 5.0 | 2.9 |
| **12-16 CTX** | 3/4 | 1 - 11 1/2 | 1.76 | 1.97 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **14 CTX** | 7/8 | 3/4 - 14 | 1.80 | 1.69 | 1 5/16 | 4.0 | 4.0 | 2.3 |
| **16 CTX** | 1 | 1 - 11 1/2 | 1.81 | 1.97 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **16-8 CTX** | 1 | 1/2 - 14 | 1.81 | 1.66 | 1 5/16 | 4.0 | 4.0 | 2.3 |
| **16-12 CTX** | 1 | 3/4 - 14 | 1.81 | 1.78 | 1 5/16 | 4.0 | 4.0 | 2.3 |
| **16-20 CTX** | 1 | 1 1/4 - 11 1/2 | 2.01 | 2.38 | 1 5/8 | 2.5 | 2.5 | 1.6 |
| **20 CTX** | 1 1/4 | 1 1/4 - 11 1/2 | 2.06 | 2.38 | 1 5/8 | 2.5 | 2.5 | 1.6 |
| **20-16 CTX** | 1 1/4 | 1 - 11 1/2 | 2.06 | 2.06 | 1 5/8 | 3.0 | 3.0 | 2.0 |
| **20-24 CTX** | 1 1/4 | 1 1/2 - 11 1/2 | 2.21 | 2.64 | 1 7/8 | 2.5 | 2.5 | 1.6 |
| **24 CTX** | 1 1/2 | 1 1/2 - 11 1/2 | 2.33 | 2.64 | 1 7/8 | 2.5 | 2.5 | 1.6 |
| **24-20 CTX** | 1 1/2 | 1 1/4 - 11 1/2 | 2.33 | 2.25 | 1 7/8 | 2.5 | 2.5 | 1.6 |
| **24-32 CTX** | 1 1/2 | 2 - 11 1/2 | 2.81 | 3.00 | 2 1/2 | 2.0 | 2.0 | 1.3 |
| **32 CTX** | 2 | 2 - 11 1/2 | 3.06 | 3.00 | 2 1/2 | 2.0 | 2.0 | 1.3 |
| **32-24 CTX** | 2 | 1 1/2 - 11 1/2 | 3.06 | 2.97 | 2 1/2 | 2.0 | 2.0 | 1.3 |
| **40 CTX** | 2 1/2 | 2 1/2 - 8 | 2.86 | 3.57 | 3 1/4 | 1.0 | 1.0 | 0.6 |

# CCTX

Long Male Elbow
37° Flare / NPTF

SAE 071502
HPD Base # 5603



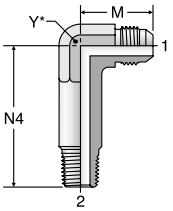

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M (in.) | N3 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **4 CCTX** | 1/4 | 1/8 - 27 | 0.89 | 1.17 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4-4 CCTX** | 1/4 | 1/4 - 18 | 1.05 | 1.58 | 9/16 | 6.0 | 6.0 | 3.3 |
| **5 CCTX** | 5/16 | 1/8 - 27 | 0.95 | 1.17 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 CCTX** | 3/8 | 1/4 - 18 | 1.06 | 1.58 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6-6 CCTX** | 3/8 | 3/8 - 18 | 1.14 | 1.82 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8 CCTX** | 1/2 | 3/8 - 18 | 1.25 | 1.82 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8-8 CCTX** | 1/2 | 1/2 - 14 | 1.33 | 2.17 | 7/8 | 6.0 | 6.0 | 3.3 |
| **8-12 CCTX** | 1/2 | 3/4 - 14 | 1.42 | 2.44 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **10 CCTX** | 5/8 | 1/2 - 14 | 1.45 | 2.17 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 CCTX** | 3/4 | 3/4 - 14 | 1.66 | 2.44 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **14 CCTX** | 7/8 | 3/4 - 14 | 1.80 | 2.59 | 1 5/16 | 4.0 | 4.0 | 2.3 |
| **16 CCTX** | 1 | 1 - 11 1/2 | 1.81 | 3.01 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **20 CCTX** | 1 1/4 | 1 1/4 - 11 1/2 | 2.06 | 3.69 | 1 5/8 | 2.5 | 2.5 | 1.6 |

# CCCTX

Extra Long Male Elbow
37° Flare / NPTF

SAE 071602
HPD Base # 5703




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M (in.) | N4 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **4 CCCTX** | 1/4 | 1/8 - 27 | 0.89 | 1.56 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4-4 CCCTX** | 1/4 | 1/4 - 18 | 1.05 | 2.07 | 9/16 | 6.0 | 6.0 | 3.3 |
| **5 CCCTX** | 5/16 | 1/8 - 27 | 0.97 | 1.63 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 CCCTX** | 3/8 | 1/4 - 18 | 1.06 | 2.07 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6-6 CCCTX** | 3/8 | 3/8 - 18 | 1.14 | 2.34 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8 CCCTX** | 1/2 | 3/8 - 18 | 1.25 | 2.34 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8-8 CCCTX** | 1/2 | 1/2 - 14 | 1.33 | 2.87 | 7/8 | 6.0 | 6.0 | 3.3 |
| **10 CCCTX** | 5/8 | 1/2 - 14 | 1.45 | 2.87 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 CCCTX** | 3/4 | 3/4 - 14 | 1.66 | 3.28 | 1 1/16 | 4.0 | 4.0 | 2.3 |
| **16 CCCTX** | 1 | 1 - 11 1/2 | 1.81 | 4.05 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **20 CCCTX** | 1 1/4 | 1 1/4 - 11 1/2 | 2.06 | 5.00 | 1 5/8 | 2.5 | 2.5 | 1.6 |

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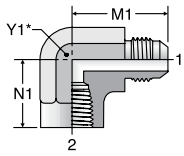
**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# DTX

Femle Elbow
37° Flare / NPTF

SAE 070203
HPD Base # 2203

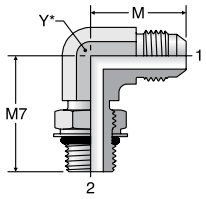



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M1 (in.) | N1 (in.) | Y1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **4 DTX** | 1/4 | 1/8 - 27 | 1.08 | 0.66 | 9/16 | 5.0 | 5.0 | 3.3 |
| **4-4 DTX** | 1/4 | 1/4 - 18 | 1.22 | 0.88 | 3/4 | 5.0 | 5.0 | 3.3 |
| **5 DTX** | 5/16 | 1/8 - 27 | 1.08 | 0.66 | 9/16 | 5.0 | 5.0 | 3.3 |
| **5-4 DTX** | 5/16 | 1/4 - 18 | 1.22 | 0.88 | 3/4 | 5.0 | 5.0 | 3.3 |
| **6 DTX** | 3/8 | 1/4 - 18 | 1.23 | 0.88 | 3/4 | 5.0 | 5.0 | 3.3 |
| **6-2 DTX** | 3/8 | 1/8 - 27 | 1.23 | 0.67 | 9/16 | 5.0 | 5.0 | 3.3 |
| **6-6 DTX** | 3/8 | 3/8 - 18 | 1.31 | 1.02 | 7/8 | 4.5 | 4.5 | 2.9 |
| **8 DTX** | 1/2 | 3/8 - 18 | 1.42 | 1.02 | 7/8 | 4.5 | 4.5 | 2.9 |
| **8-4 DTX** | 1/2 | 1/4 - 18 | 1.42 | 1.01 | 3/4 | 4.5 | 4.5 | 2.9 |
| **8-8 DTX** | 1/2 | 1/2 - 14 | 1.52 | 1.23 | 1 1/16 | 3.0 | 3.0 | 2.0 |
| **10 DTX** | 5/8 | 1/2 - 14 | 1.64 | 1.23 | 1 1/16 | 3.0 | 3.0 | 2.0 |
| **12 DTX** | 3/4 | 3/4 - 14 | 1.89 | 1.36 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **12-8 DTX** | 3/4 | 1/2 - 14 | 1.89 | 1.35 | 1 1/16 | 3.0 | 3.0 | 2.0 |
| **14 DTX** | 7/8 | 3/4 - 14 | 1.86 | 1.42 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **16 DTX** | 1 | 1 - 11 1/2 | 2.17 | 1.62 | 1 5/8 | 1.8 | 1.8 | 1.2 |
| **20 DTX** | 1 1/4 | 1 1/4 - 11 1/2 | 2.33 | 1.70 | 1 7/8 | 1.5 | 1.5 | 1.0 |
| **24 DTX** | 1 1/2 | 1 1/2 - 11 1/2 | 2.89 | 2.08 | 2 1/2 | 1.5 | 1.5 | 1.0 |

# C87OMX

Male Elbow – ISO 6149
37° Flare / ISO 6149

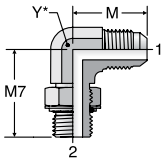



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 Male Metric Parallel Thread | M (mm) | M7 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **4M10C87OMX** | 6 | 1/4 | M10x1 | 22.6 | 27.1 | 11 | 6.0 | 5.0 | 3.3 |
| **5M12C87OMX** | 8 | 5/16 | M12x1.5 | 24.1 | 30.5 | 13 | 6.0 | 5.0 | 3.3 |
| **6M14C87OMX** | 10 | 3/8 | M14x1.5 | 26.9 | 33.5 | 14 | 6.0 | 5.0 | 3.3 |
| **8M16C87OMX** | 12 | 1/2 | M16x1.5 | 31.8 | 38.0 | 19 | 5.0 | 5.0 | 3.3 |
| **8M18C87OMX** | 12 | 1/2 | M18x1.5 | 31.8 | 38.0 | 19 | 5.0 | 5.0 | 3.3 |
| **10M18C87OMX** | 14, 15, 16 | 5/8 | M18x1.5 | 36.8 | 41.5 | 22 | 5.0 | 5.0 | 3.3 |
| **10M22C87OMX** | 14, 15, 16 | 5/8 | M22x1.5 | 36.8 | 42.5 | 22 | 5.0 | 5.0 | 3.3 |
| **12M22C87OMX** | 18, 20 | 3/4 | M22x.15 | 42.2 | 45.0 | 27 | 5.0 | 5.0 | 3.3 |
| **12M27C87OMX** | 18, 20 | 3/4 | M27x2 | 42.2 | 51.0 | 27 | 5.0 | 5.0 | 3.3 |
| **16M33C87OMX** | 25 | 1 | M33x2 | 46.0 | 53.0 | 33 | 4.0 | 4.0 | 2.6 |

# C8OMX

Male Elbow – Metric-ORR
37° Flare / Metric-ORR




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 1 (in.) | END SIZE 2 Male Metric Parallel Thread | M (mm) | M7 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **4M10C8OMX** | 6 | 1/4 | M10x1 | 22.6 | 27.1 | 11 | 3.6 | 3.6 | 2.3 |
| **5M12C8OMX** | 8 | 5/16 | M12x1.5 | 24.1 | 30.5 | 13 | 3.6 | 3.6 | 2.3 |
| **6M14C8OMX** | 10 | 3/8 | M14x1.5 | 26.9 | 33.5 | 14 | 3.6 | 3.6 | 2.3 |
| **8M16C8OMX** | 12 | 1/2 | M16x1.5 | 31.8 | 38.0 | 19 | 3.6 | 3.6 | 2.3 |
| **8M18C8OMX** | 12 | 1/2 | M18x1.5 | 31.8 | 38.0 | 19 | 3.6 | 3.6 | 2.3 |
| **10M18C8OMX** | 14, 15, 16 | 5/8 | M18x1.5 | 36.8 | 41.5 | 22 | 3.6 | 3.6 | 2.3 |
| **10M22C8OMX** | 14, 15, 16 | 5/8 | M22x1.5 | 36.8 | 42.5 | 22 | 3.6 | 3.6 | 2.3 |
| **12M22C8OMX** | 18, 20 | 3/4 | M22x.1.5 | 42.2 | 45.0 | 27 | 3.6 | 3.6 | 2.3 |
| **12M27C8OMX** | 18, 20 | 3/4 | M27x2.0 | 42.2 | 51.0 | 27 | 2.5 | 2.5 | 1.6 |
| **16M33C8OMX** | 25 | 1 | M33x2.0 | 46.0 | 53.0 | 33 | 2.0 | 2.0 | 1.3 |

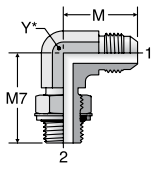
Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# C4OMX

Male Elbow – BSPP
37° Flare / BSPP-ORR

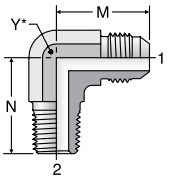



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (mm) | 1 (in.) | 2 BSPP | M (mm) | M7 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **4C4OMX** | 6 | 1/4 | 1/8-28 | 22.6 | 26.5 | 11 | 3.6 | 3.6 | 2.3 |
| **4-4C4OMX** | 6 | 1/4 | 1/4-19 | 26.9 | 32.0 | 14 | 3.6 | 2.9 | 1.9 |
| **5C4OMX** | 8 | 5/16 | 1/8-28 | 24.1 | 27.0 | 13 | 3.6 | 3.6 | 2.3 |
| **5-4C4OMX** | 8 | 5/16 | 1/4-19 | 26.6 | 32.0 | 14 | 3.6 | 2.9 | 1.9 |
| **5-6C4OMX** | 8 | 5/16 | 3/8-19 | 28.5 | 37.0 | 19 | 3.6 | 2.9 | 1.9 |
| **6C4OMX** | 10 | 3/8 | 1/4-19 | 26.9 | 32.0 | 14 | 3.6 | 2.9 | 1.9 |
| **6-6C4OMX** | 10 | 3/8 | 3/8-19 | 29.0 | 37.0 | 19 | 3.6 | 2.9 | 1.9 |
| **8-4C4OMX** | 12 | 1/2 | 1/4-19 | 31.8 | 37.0 | 19 | 3.6 | 2.9 | 1.9 |
| **8C4OMX** | 12 | 1/2 | 3/8-19 | 31.8 | 37.0 | 19 | 3.6 | 2.9 | 1.9 |
| **8-8C4OMX** | 12 | 1/2 | 1/2-14 | 33.8 | 43.0 | 22 | 3.6 | 2.9 | 1.9 |
| **10-6C4OMX** | 16 | 5/8 | 3/8-19 | 36.8 | 36.0 | 22 | 3.6 | 2.9 | 1.9 |
| **10C4OMX** | 14,15,16 | 5/8 | 1/2-14 | 36.8 | 43.0 | 22 | 3.6 | 2.9 | 1.9 |
| **10-12C4OMX** | 15 | 5/8 | 3/4-14 | 39.2 | 49.5 | 27 | 3.6 | 2.9 | 1.9 |
| **12-8C4OMX** | 18,20 | 3/4 | 1/2-14 | 42.2 | 49.5 | 27 | 3.6 | 2.9 | 1.9 |
| **12C4OMX** | 18,20 | 3/4 | 3/4-14 | 42.2 | 49.5 | 27 | 3.6 | 2.9 | 1.9 |
| **12-16C4OMX** | 18 | 3/4 | 1-11 | 44.7 | 52.0 | 33 | 3.6 | 2.9 | 1.9 |
| **16-12C4OMX** | 25 | 1 | 3/4-14 | 46.0 | 47.0 | 33 | 3.6 | 2.9 | 1.9 |
| **16C4OMX** | 25 | 1 | 1-11 | 46.0 | 52.0 | 33 | 3.6 | 2.9 | 1.9 |
| **20-16C4OMX** | 30,32 | 1 1/4 | 1-11 | 52.3 | 57.0 | 41 | 3.6 | 2.3 | 1.5 |
| **20C4OMX** | 30,32 | 1 1/4 | 1 1/4-11 | 52.3 | 57.0 | 41 | 3.0 | 2.3 | 1.5 |
| **24-20C4OMX** | 38 | 1 1/2 | 1 1/4-11 | 59.2 | 60.5 | 48 | 3.0 | 2.0 | 1.3 |
| **24C4OMX** | 38 | 1 1/2 | 1 1/2-11 | 59.2 | 60.5 | 48 | 2.0 | 2.0 | 1.3 |

# C3MX

Male Elbow – BSPT
37° Flare / BSPT



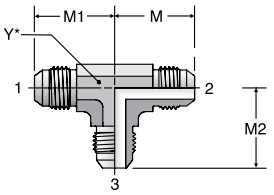

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (mm) | 1 (in.) | 2 BSPT | M (mm) | N (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **4C3MX** | 6 | 1/4 | 1/8 - 28 | 22.6 | 19.8 | 11 | 4.5 | 4.5 | 2.9 |
| **4-4C3MX** | 6 | 1/4 | 1/4 - 19 | 26.6 | 27.7 | 14 | 4.5 | 4.5 | 2.9 |
| **5C3MX** | 8 | 5/16 | 1/8 - 28 | 24.1 | 19.8 | 13 | 4.5 | 4.5 | 2.9 |
| **5-4C3MX** | 8 | 5/16 | 1/4 - 19 | 26.6 | 27.7 | 14 | 4.5 | 4.5 | 2.9 |
| **6C3MX** | 10 | 3/8 | 1/4 - 19 | 26.9 | 27.7 | 14 | 4.5 | 4.5 | 2.9 |
| **6-6C3MX** | 10 | 3/8 | 3/8 - 19 | 29.0 | 31.0 | 19 | 4.5 | 4.5 | 2.9 |
| **6-8C3MX** | 10 | 3/8 | 1/2 - 14 | 31.0 | 37.3 | 22 | 4.5 | 4.5 | 2.9 |
| **8-4C3MX** | 12 | 1/2 | 1/4 - 19 | 31.8 | 31.0 | 19 | 4.5 | 4.5 | 2.9 |
| **8C3MX** | 12 | 1/2 | 3/8 - 19 | 31.8 | 31.0 | 19 | 4.5 | 4.5 | 2.9 |
| **8-8C3MX** | 12 | 1/2 | 1/2 - 14 | 33.8 | 37.3 | 22 | 4.5 | 4.5 | 2.9 |
| **10-6C3MX** | 14,15,16 | 5/8 | 3/8 - 19 | 36.8 | 32.5 | 22 | 4.5 | 4.5 | 2.9 |
| **10C3MX** | 14,15,16 | 5/8 | 1/2 - 14 | 36.8 | 37.3 | 22 | 4.5 | 4.5 | 2.9 |
| **10-12C3MX** | 14,15,16 | 5/8 | 3/4 - 14 | 39.2 | 40.4 | 27 | 2.3 | 2.3 | 1.5 |
| **12-8C3MX** | 18,20 | 3/4 | 1/2 - 14 | 42.2 | 40.4 | 27 | 4.5 | 4.5 | 2.9 |
| **12C3MX** | 18,20 | 3/4 | 3/4 - 14 | 42.2 | 40.4 | 27 | 2.3 | 2.3 | 1.5 |
| **16-12C3MX** | 25 | 1 | 3/4 - 14 | 46.0 | 45.2 | 33 | 2.3 | 2.3 | 1.5 |
| **16C3MX** | 25 | 1 | 1 - 11 | 46.0 | 50.0 | 33 | 2.3 | 2.3 | 1.5 |
| **20-16C3MX** | 30,32 | 1 1/4 | 1 - 11 | 52.3 | 59.7 | 41 | 2.3 | 2.3 | 1.5 |
| **20C3MX** | 30,32 | 1 1/4 | 1 1/4 - 11 | 52.3 | 60.5 | 41 | 2.3 | 2.3 | 1.5 |
| **24C3MX** | 38 | 1 1/2 | 1 1/2 - 11 | 59.2 | 67.1 | 48 | 2.3 | 2.0 | 1.3 |

# JTX

Union Tee
37° Flare (all three ends)

SAE 070401
HPD Base # 033T




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 (in.) | M (in.) | M1 (in.) | M2 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|
| **2 JTX** | 1/8 | 1/8 | 1/8 | 0.77 | 0.77 | 0.77 | 5/16 | 7.5 | 7.7 | 3.3 |
| **3 JTX** | 3/16 | 3/16 | 3/16 | 0.83 | 0.83 | 0.83 | 7/16 | 7.5 | 7.7 | 3.3 |
| **4 JTX** | 1/4 | 1/4 | 1/4 | 0.89 | 0.89 | 0.89 | 7/16 | 7.5 | 7.7 | 3.3 |
| **4-4-3 JTX** | 1/4 | 1/4 | 3/16 | 0.89 | 0.89 | 0.81 | 7/16 | 7.5 | 7.7 | 3.3 |
| **5 JTX** | 5/16 | 5/16 | 5/16 | 0.95 | 0.95 | 0.95 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 JTX** | 3/8 | 3/8 | 3/8 | 1.06 | 1.06 | 1.06 | 9/16 | 6.0 | 6.0 | 3.3 |
| **8 JTX** | 1/2 | 1/2 | 1/2 | 1.25 | 1.25 | 1.25 | 3/4 | 6.0 | 6.0 | 3.3 |
| **10 JTX** | 5/8 | 5/8 | 5/8 | 1.45 | 1.45 | 1.45 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 JTX** | 3/4 | 3/4 | 3/4 | 1.66 | 1.66 | 1.66 | 1 1/16 | 5.0 | 5.0 | 2.9 |
| **12-12-8 JTX** | 3/4 | 3/4 | 1/2 | 1.66 | 1.66 | 1.42 | 1 1/16 | 5.0 | 5.0 | 2.9 |
| **12-16-12 JTX** | 3/4 | 1 | 3/4 | 1.77 | 1.81 | 1.77 | 1 5/16 | 4.0 | 3.5 | 2.3 |
| **14 JTX** | 7/8 | 7/8 | 7/8 | 1.80 | 1.80 | 1.80 | 1 5/16 | 5.0 | 5.0 | 2.9 |
| **16 JTX** | 1 | 1 | 1 | 1.81 | 1.81 | 1.81 | 1 5/16 | 4.0 | 3.5 | 2.3 |
| **20 JTX** | 1 1/4 | 1 1/4 | 1 1/4 | 2.06 | 2.06 | 2.06 | 1 5/8 | 4.0 | 3.0 | 2.0 |
| **24 JTX** | 1 1/2 | 1 1/2 | 1 1/2 | 2.33 | 2.33 | 2.33 | 1 7/8 | 3.0 | 2.0 | 1.5 |
| **24-16-16 JTX** | 1 1/2 | 1 | 1 | 2.33 | 2.16 | 2.16 | 1 7/8 | 3.0 | 2.0 | 1.5 |
| **32 JTX** | 2 | 2 | 2 | 3.06 | 3.06 | 3.06 | 2 1/2 | 2.0 | 1.5 | 1.0 |

Dimensions and pressures for reference only, subject to change.

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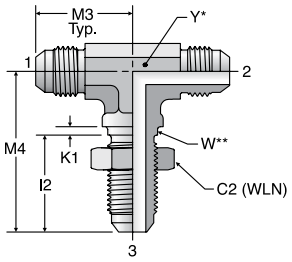
**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# WJTX

Bulkhead Branch Tee
37° Flare (all three ends)

SAE 070959
HPD Base # 543T
WJTX-WLN – Body with locknut
(See page B10 for WLN)




Y* – Across wrench flats.

W** – Bulkhead pilot dia. recommended clearance hole +.015 over W dia.

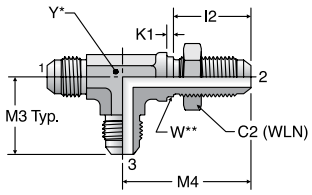
| TUBE FITTING PART # | END SIZE 1 - 3 (in.) | C2 HEX (in.) | I2 (in.) | K1 (in.) | M3 (in.) | M4 (in.) | W DIA (in.) | MAX BULKHEAD WALL THICKNESS (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4 WJTX** | 1/4 | 11/16 | 1.02 | 0.09 | 0.97 | 1.59 | 0.44 | 0.25 | 7/16 | 7.5 | 7.7 | 3.3 |
| **6 WJTX** | 3/8 | 13/16 | 1.09 | 0.09 | 1.09 | 1.81 | 0.56 | 0.35 | 9/16 | 6.0 | 6.0 | 3.3 |
| **8 WJTX** | 1/2 | 1 | 1.25 | 0.13 | 1.36 | 2.11 | 0.75 | 0.35 | 3/4 | 6.0 | 6.0 | 3.3 |
| **10 WJTX** | 5/8 | 1 1/8 | 1.39 | 0.13 | 1.56 | 2.39 | 0.88 | 0.35 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **12 WJTX** | 3/4 | 1 3/8 | 1.56 | 0.13 | 1.78 | 2.67 | 1.06 | 0.35 | 1 1/16 | 5.0 | 5.0 | 2.9 |
| **16 WJTX** | 1 | 1 5/8 | 1.56 | 0.13 | 1.94 | 2.80 | 1.31 | 0.35 | 1 5/16 | 4.0 | 3.5 | 2.3 |
| **20 WJTX*** ** | 1 1/4 | 1 7/8 | 1.61 | 0.13 | 2.17 | 3.12 | 1.63 | 0.35 | 1 5/8 | 4.0 | 3.0 | 2.0 |

***Machined from one-piece milled bar stock.

# WJJTX

Bulkhead Run Tee
37° Flare (all three ends)

SAE 070958
HPD Base # 533T
WJJTX-WLN – Body with locknut
(See page B10 for WLN)




Y* – Across wrench flats.

W** – Bulkhead pilot dia. recommended clearance hole +.015 over W dia.

| TUBE FITTING PART # | END SIZE 1-3 (in.) | C2 HEX (in.) | I2 (in.) | K1 (in.) | M3 (in.) | M4 (in.) | W DIA (in.) | MAX BULKHEAD WALL THICKNESS (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4 WJJTX** | 1/4 | 11/16 | 1.02 | 0.09 | 0.97 | 1.59 | 0.44 | 0.25 | 7/16 | 7.5 | 7.7 | 3.3 |
| **6 WJJTX** | 3/8 | 13/16 | 1.09 | 0.09 | 1.09 | 1.81 | 0.56 | 0.35 | 9/16 | 6.0 | 6.0 | 3.3 |
| **8 WJJTX** | 1/2 | 1 | 1.25 | 0.13 | 1.36 | 2.11 | 0.75 | 0.35 | 3/4 | 6.0 | 6.0 | 3.3 |
| **10 WJJTX** | 5/8 | 1 1/8 | 1.39 | 0.13 | 1.56 | 2.39 | 0.88 | 0.35 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 WJJTX** | 3/4 | 1 3/8 | 1.56 | 0.13 | 1.78 | 2.67 | 1.06 | 0.35 | 1 1/16 | 5.0 | 5.0 | 2.9 |
| **16 WJJTX*** ** | 1 | 1 5/8 | 1.56 | 0.13 | 1.94 | 2.80 | 1.31 | 0.35 | 1 7/16 | 4.0 | 3.5 | 2.3 |
| **20 WJJTX*** ** | 1 1/4 | 1 7/8 | 1.61 | 0.13 | 2.17 | 3.12 | 1.63 | 0.35 | 1 5/8 | 4.0 | 3.0 | 2.0 |

***Machined from one-piece milled bar stock.

Dimensions and pressures for reference only, subject to change.

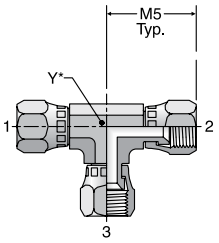


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# JX6

Swivel Nut Union Tee
37° Swivel (all three ends)

HPD Base # 069T



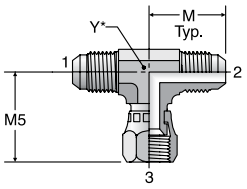

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1-3 (in.) | M5 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| **4 JX6** | 1/4 | 1.00 | 7/16 | 7.5 | 7.7 | 3.3 |
| **6 JX6** | 3/8 | 1.25 | 9/16 | 6.0 | 6.0 | 3.3 |
| **8 JX6** | 1/2 | 1.38 | 3/4 | 6.0 | 6.0 | 3.3 |
| **10 JX6** | 5/8 | 1.62 | 3/4 | 5.0 | 5.0 | 3.3 |
| **12 JX6** | 3/4 | 1.75 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **16 JX6** | 1 | 2.00 | 1 3/16 | 4.0 | 3.0 | 2.6 |

# S6X

Swivel Nut Branch Tee
37° Flare / 37° Flare /
37° Swivel

SAE 070433
HPD Base # 393T



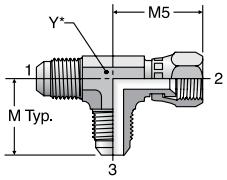

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1-3 (in.) | M (in.) | M5 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **4 S6X** | 1/4 | 0.89 | 1.00 | 7/16 | 7.5 | 7.7 | 3.3 |
| **5 S6X** | 5/16 | 0.95 | 1.06 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 S6X** | 3/8 | 1.06 | 1.25 | 9/16 | 6.0 | 6.0 | 3.3 |
| **8 S6X** | 1/2 | 1.25 | 1.38 | 3/4 | 6.0 | 6.0 | 3.3 |
| **10 S6X** | 5/8 | 1.45 | 1.62 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 S6X** | 3/4 | 1.66 | 1.75 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **14 S6X** | 7/8 | 1.80 | 1.78 | 1 5/16 | 5.0 | 5.0 | 3.3 |
| **16 S6X** | 1 | 1.81 | 2.00 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **20 S6X** | 1 1/4 | 2.06 | 2.31 | 1 5/8 | 4.0 | 3.0 | 2.6 |
| **24 S6X** | 1 1/2 | 2.33 | 2.59 | 1 7/8 | 3.0 | 2.5 | 2.0 |

# R6X

Swivel Nut Run Tee
37° Flare / 37° Swivel /
37° Flare

SAE 070432
HPD Base # 063T




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1-3 (in.) | M (in.) | M5 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **4 R6X** | 1/4 | 0.89 | 1.00 | 7/16 | 7.5 | 7.7 | 3.3 |
| **5 R6X** | 5/16 | 0.95 | 1.06 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 R6X** | 3/8 | 1.06 | 1.25 | 9/16 | 6.0 | 6.0 | 3.3 |
| **8 R6X** | 1/2 | 1.25 | 1.38 | 3/4 | 6.0 | 6.0 | 3.3 |
| **10 R6X** | 5/8 | 1.45 | 1.62 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 R6X** | 3/4 | 1.66 | 1.75 | 1 1/16 | 5.0 | 5.0 | 3.3 |
| **14 R6X** | 7/8 | 1.80 | 1.78 | 1 5/16 | 5.0 | 5.0 | 3.3 |
| **16 R6X** | 1 | 1.81 | 2.00 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **20 R6X** | 1 1/4 | 2.06 | 2.31 | 1 5/8 | 4.0 | 3.0 | 2.6 |
| **24 R6X** | 1 1/2 | 2.33 | 2.59 | 1 7/8 | 3.0 | 2.5 | 2.0 |

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Dimensions and pressures for reference only, subject to change.

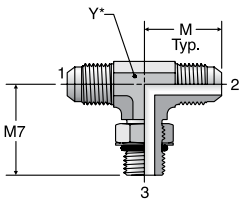


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# S5OX

Straight Thread Branch Tee
37° Flare / 37° Flare /
SAE-ORB

SAE 070429
HPD Base # 253T



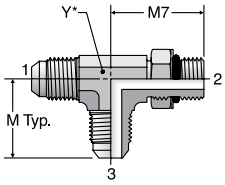

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 UN/UNF-2A | M (in.) | M7 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|
| **4 S5OX** | 1/4 | 1/4 | 7/16 - 20 | 0.89 | 1.03 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4-4-6 S5OX** | 1/4 | 1/4 | 9/16 - 18 | 1.05 | 1.25 | 9/16 | 6.0 | 5.4 | 3.3 |
| **5 S5OX** | 5/16 | 5/16 | 1/2 - 20 | 0.97 | 1.13 | 9/16 | 6.0 | 5.4 | 3.3 |
| **6 S5OX** | 3/8 | 3/8 | 9/16 - 18 | 1.06 | 1.25 | 9/16 | 6.0 | 5.4 | 3.3 |
| **6-6-8 S5OX** | 3/8 | 3/8 | 3/4 - 16 | 1.14 | 1.45 | 3/4 | 6.0 | 5.4 | 3.3 |
| **8 S5OX** | 1/2 | 1/2 | 3/4 - 16 | 1.25 | 1.45 | 3/4 | 6.0 | 5.4 | 3.3 |
| **8-8-10 S5OX** | 1/2 | 1/2 | 7/8 - 14 | 1.33 | 1.70 | 7/8 | 5.0 | 5.4 | 3.3 |
| **10 S5OX** | 5/8 | 5/8 | 7/8 - 14 | 1.45 | 1.70 | 7/8 | 5.0 | 5.4 | 3.3 |
| **10-10-12 S5OX** | 5/8 | 5/8 | 1 1/16 - 12 | 1.53 | 1.94 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **12 S5OX** | 3/4 | 3/4 | 1 1/16 - 12 | 1.66 | 1.94 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **12-12-16 S5OX** | 3/4 | 3/4 | 1 5/16 - 12 | 1.76 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **16 S5OX** | 1 | 1 | 1 5/16 - 12 | 1.81 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **20 S5OX** | 1 1/4 | 1 1/4 | 1 5/8 - 12 | 2.06 | 2.25 | 1 5/8 | 3.0 | 2.5 | 2.0 |
| **24 S5OX** | 1 1/2 | 1 1/2 | 1 7/8 - 12 | 2.33 | 2.39 | 1 7/8 | 3.0 | 2.0 | 1.5 |
| **32 S5OX** | 2 | 2 | 2 1/2 - 12 | 3.06 | 2.89 | 2 1/2 | 2.0 | 1.5 | 1.3 |

# R5OX

Straight Thread Run Tee
37° Flare / SAE-ORB /
37° Flare

SAE 070428
HPD Base # 053T




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 UN/UNF-2A | 3 (in.) | M (in.) | M7 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|
| **4 R5OX** | 1/4 | 7/16 - 20 | 1/4 | 0.89 | 1.03 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4-6-4 R5OX** | 1/4 | 9/16 - 18 | 1/4 | 1.05 | 1.25 | 9/16 | 6.0 | 5.4 | 3.3 |
| **5 R5OX** | 5/16 | 1/2 - 20 | 5/16 | 0.97 | 1.13 | 9/16 | 6.0 | 5.4 | 3.3 |
| **6 R5OX** | 3/8 | 9/16 - 18 | 3/8 | 1.06 | 1.25 | 9/16 | 6.0 | 5.4 | 3.3 |
| **6-8-6 R5OX** | 3/8 | 3/4 - 16 | 3/8 | 1.14 | 1.45 | 3/4 | 6.0 | 5.4 | 3.3 |
| **8 R5OX** | 1/2 | 3/4 - 16 | 1/2 | 1.25 | 1.45 | 3/4 | 6.0 | 5.4 | 3.3 |
| **8-6-8 R5OX** | 1/2 | 9/16 - 18 | 1/2 | 1.25 | 1.33 | 3/4 | 6.0 | 5.4 | 3.3 |
| **8-10-8 R5OX** | 1/2 | 7/8 - 14 | 1/2 | 1.33 | 1.70 | 7/8 | 5.0 | 5.4 | 3.3 |
| **8-12-8 R5OX** | 1/2 | 1 1/16 - 12 | 1/2 | 1.42 | 1.94 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **10 R5OX** | 5/8 | 7/8 - 14 | 5/8 | 1.45 | 1.70 | 7/8 | 5.0 | 5.4 | 3.3 |
| **10-12-10 R5OX** | 5/8 | 1 1/16 - 12 | 5/8 | 1.53 | 1.94 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **12 R5OX** | 3/4 | 1 1/16 - 12 | 3/4 | 1.66 | 1.94 | 1 1/16 | 5.0 | 5.4 | 3.3 |
| **12-16-12 R5OX** | 3/4 | 1 5/16 - 12 | 3/4 | 1.76 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **16 R5OX** | 1 | 1 5/16 - 12 | 1 | 1.81 | 2.05 | 1 5/16 | 4.0 | 3.0 | 2.6 |
| **20 R5OX** | 1 1/4 | 1 5/8 - 12 | 1 1/4 | 2.06 | 2.25 | 1 5/8 | 3.0 | 2.5 | 2.0 |
| **24 R5OX** | 1 1/2 | 1 7/8 - 12 | 1 1/2 | 2.33 | 2.39 | 1 7/8 | 3.0 | 2.0 | 1.5 |
| **32 R5OX** | 2 | 2 1/2 - 12 | 2 | 3.06 | 2.89 | 2 1/2 | 2.0 | 1.5 | 1.3 |

Dimensions and pressures for reference only, subject to change.

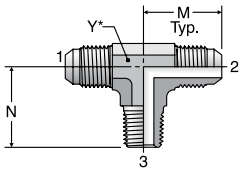


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# STX

Male Branch Tee
37° Flare / 37° Flare / NPTF

SAE 070425
HPD Base # 213T



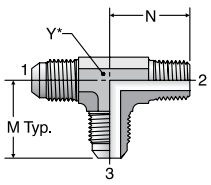

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | END SIZE 3 NPTF | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **3 STX** | 3/16 | 1/8 - 27 | 0.83 | 0.72 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4 STX** | 1/4 | 1/8 - 27 | 0.89 | 0.78 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4-4-4 STX** | 1/4 | 1/4 - 18 | 1.05 | 1.09 | 9/16 | 6.0 | 6.0 | 3.3 |
| **4-4-6 STX** | 1/4 | 3/8 - 18 | 1.12 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **5 STX** | 5/16 | 1/8 - 27 | 0.95 | 0.78 | 9/16 | 6.0 | 6.0 | 3.3 |
| **5-5-4 STX** | 5/16 | 1/4 - 18 | 1.05 | 1.09 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 STX** | 3/8 | 1/4 - 18 | 1.06 | 1.09 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6-6-6 STX** | 3/8 | 3/8 - 18 | 1.14 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8 STX** | 1/2 | 3/8 - 18 | 1.25 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8-8-8 STX** | 1/2 | 1/2 - 14 | 1.33 | 1.47 | 7/8 | 6.0 | 6.0 | 3.3 |
| **10 STX** | 5/8 | 1/2 - 14 | 1.45 | 1.47 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 STX** | 3/4 | 3/4 - 14 | 1.66 | 1.59 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **14 STX** | 7/8 | 3/4 - 14 | 1.80 | 1.69 | 1 5/16 | 4.0 | 4.0 | 2.3 |
| **16 STX** | 1 | 1 - 11 1/2 | 1.81 | 1.97 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **20 STX** | 1 1/4 | 1 1/4 - 11 1/2 | 2.06 | 2.38 | 1 5/8 | 2.5 | 2.5 | 1.6 |
| **24 STX** | 1 1/2 | 1 1/2 - 11 1/2 | 2.33 | 2.64 | 1 7/8 | 2.5 | 2.5 | 1.6 |

# RTX

Male Run Tee
37° Flare / NPTF / 37° Flare

SAE 070424
HPD Base # 013T



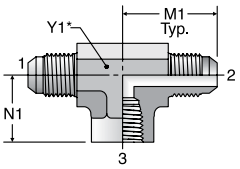

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 & 3 (in.) | END SIZE 2 NPTF | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **3 RTX** | 3/16 | 1/8 - 27 | 0.83 | 0.72 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4 RTX** | 1/4 | 1/8 - 27 | 0.89 | 0.78 | 7/16 | 6.0 | 6.0 | 3.3 |
| **4-4-4 RTX** | 1/4 | 1/4 - 18 | 1.05 | 1.09 | 9/16 | 6.0 | 6.0 | 3.3 |
| **5 RTX** | 5/16 | 1/8 - 27 | 0.95 | 0.78 | 9/16 | 6.0 | 6.0 | 3.3 |
| **5-4-5 RTX** | 5/16 | 1/4 - 18 | 1.05 | 1.09 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6 RTX** | 3/8 | 1/4 - 18 | 1.06 | 1.09 | 9/16 | 6.0 | 6.0 | 3.3 |
| **6-6-6 RTX** | 3/8 | 3/8 - 18 | 1.14 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8 RTX** | 1/2 | 3/8 - 18 | 1.25 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **8-8-8 RTX** | 1/2 | 1/2 - 14 | 1.33 | 1.47 | 7/8 | 6.0 | 6.0 | 3.3 |
| **10 RTX** | 5/8 | 1/2 - 14 | 1.45 | 1.47 | 7/8 | 5.0 | 5.0 | 3.3 |
| **12 RTX** | 3/4 | 3/4 - 14 | 1.66 | 1.59 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **12-8-12 RTX** | 3/4 | 1/2 - 14 | 1.66 | 1.59 | 1 1/16 | 5.0 | 5.0 | 2.9 |
| **14 RTX** | 7/8 | 3/4 - 14 | 1.80 | 1.69 | 1 5/16 | 4.0 | 4.0 | 2.3 |
| **16 RTX** | 1 | 1 - 11 1/2 | 1.81 | 1.97 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **20 RTX** | 1 1/4 | 1 1/4 - 11 1/2 | 2.06 | 2.38 | 1 5/8 | 2.5 | 2.5 | 1.6 |
| **24 RTX** | 1 1/2 | 1 1/2 - 11 1/2 | 2.33 | 2.64 | 1 7/8 | 2.5 | 2.5 | 1.6 |

# OTX

Female Branch Tee
37° Flare / 37° Flare / NPTF

SAE 070427
HPD Base # 223T



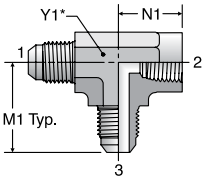

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | END SIZE 3 NPTF | M1 (in.) | N1 (in.) | Y1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **4 OTX** | 1/4 | 1/8 - 27 | 1.08 | 0.66 | 9/16 | 5.0 | 5.0 | 3.3 |
| **4-4-4 OTX** | 1/4 | 1/4 - 18 | 1.13 | 0.88 | 3/4 | 5.0 | 5.0 | 3.3 |
| **5 OTX** | 5/16 | 1/8 - 27 | 1.08 | 0.66 | 9/16 | 5.0 | 5.0 | 3.3 |
| **6 OTX** | 3/8 | 1/4 - 18 | 1.23 | 0.88 | 3/4 | 5.0 | 5.0 | 3.3 |
| **6-6-6 OTX** | 3/8 | 3/8 - 18 | 1.23 | 1.02 | 7/8 | 4.5 | 4.5 | 2.9 |
| **8 OTX** | 1/2 | 3/8 - 18 | 1.42 | 1.02 | 7/8 | 4.5 | 4.5 | 2.9 |
| **8-8-8 OTX** | 1/2 | 1/2 - 14 | 1.42 | 1.23 | 1 1/16 | 3.0 | 3.0 | 2.0 |
| **10 OTX** | 5/8 | 1/2 - 14 | 1.64 | 1.23 | 1 1/16 | 3.0 | 3.0 | 2.0 |
| **12 OTX** | 3/4 | 3/4 - 14 | 1.89 | 1.36 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **14 OTX** | 7/8 | 3/4 - 14 | 1.86 | 1.42 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **16 OTX** | 1 | 1 - 11 1/2 | 2.17 | 1.62 | 1 5/8 | 1.8 | 1.8 | 1.2 |
| **20 OTX** | 1 1/4 | 1 1/4 - 11 1/2 | 2.33 | 1.70 | 1 7/8 | 1.5 | 1.5 | 1.0 |
| **24 OTX** | 1 1/2 | 1 1/2 - 11 1/2 | 2.89 | 2.08 | 2 1/2 | 1.5 | 1.5 | 1.0 |

# MTX

Female Run Tee
37° Flare / NPTF / 37° Flare

SAE 070426
HPD Base # 023T




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 & 3 (in.) | END SIZE 2 NPTF | M1 (in.) | N1 (in.) | Y1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **4 MTX** | 1/4 | 1/8 - 27 | 1.08 | 0.66 | 9/16 | 5.0 | 5.0 | 3.3 |
| **4-4-4 MTX** | 1/4 | 1/4 - 18 | 1.13 | 0.88 | 3/4 | 5.0 | 5.0 | 3.3 |
| **6 MTX** | 3/8 | 1/4 - 18 | 1.23 | 0.88 | 3/4 | 5.0 | 5.0 | 3.3 |
| **8 MTX** | 1/2 | 3/8 - 18 | 1.42 | 1.02 | 7/8 | 4.5 | 4.5 | 2.9 |
| **8-8-8 MTX** | 1/2 | 1/2 - 14 | 1.42 | 1.23 | 1 1/16 | 3.0 | 3.0 | 2.0 |
| **10 MTX** | 5/8 | 1/2 - 14 | 1.64 | 1.23 | 1 1/16 | 3.0 | 3.0 | 2.0 |
| **12 MTX** | 3/4 | 3/4 - 14 | 1.89 | 1.36 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **14 MTX** | 7/8 | 3/4 - 14 | 1.86 | 1.42 | 1 5/16 | 3.0 | 3.0 | 2.0 |
| **16 MTX** | 1 | 1 - 11 1/2 | 2.17 | 1.62 | 1 5/8 | 1.8 | 1.8 | 1.2 |
| **20 MTX** | 1 1/4 | 1 1/4 - 11 1/2 | 2.33 | 1.70 | 1 7/8 | 1.5 | 1.5 | 1.0 |
| **24 MTX** | 1 1/2 | 1 1/2 - 11 1/2 | 2.89 | 2.08 | 2 1/2 | 1.5 | 1.5 | 1.0 |

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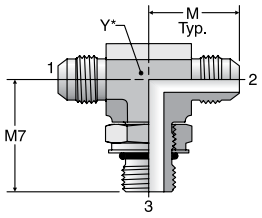
**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# S87OMX

ISO 6149 Branch Tee
37° Flare / 37° Flare / ISO 6149

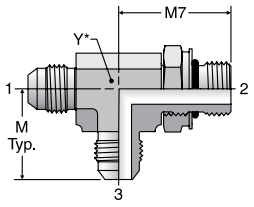



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 1 & 2 (in.) | END SIZE 3 Male Metric Parallel Thread | M (mm) | M7 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **6M14S87OMX** | 10 | 3/8 | M14 x 1.5 | 26.9 | 33.5 | 14 | 6.0 | 6.0 | 3.3 |
| **8M16S87OMX** | 12 | 1/2 | M16 x 1.5 | 31.8 | 38.0 | 19 | 5.0 | 5.0 | 3.3 |
| **10M22S87OMX** | 14,15,16 | 5/8 | M22 x 1.5 | 36.8 | 42.5 | 22 | 5.0 | 5.0 | 3.3 |
| **12M27S87OMX** | 18,20 | 3/4 | M27 x 2 | 42.2 | 51.0 | 27 | 5.0 | 5.0 | 3.3 |

# R87OMX

ISO 6149 Run Tee
37° Flare / ISO 6149 / 37° Flare

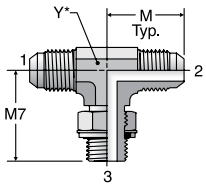



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 & 3 (mm) | END SIZE 1 & 3 (in.) | END SIZE 2 Male Metric Parallel Thread | M (mm) | M7 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **6M14R87OMX** | 10 | 3/8 | M14 x 1.5 | 26.9 | 33.5 | 14 | 6.0 | 6.0 | 3.3 |
| **8M16R87OMX** | 12 | 1/2 | M16 x 1.5 | 31.8 | 38.0 | 19 | 5.0 | 5.0 | 3.3 |
| **10M22R87OMX** | 14,15,16 | 5/8 | M22 x 1.5 | 36.8 | 42.5 | 22 | 5.0 | 5.0 | 3.3 |
| **12M27R87OMX** | 18, 20 | 3/4 | M27 x 1.5 | 42.2 | 51.0 | 27 | 5.0 | 5.0 | 3.3 |

# S4OMX

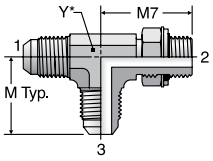
Male Branch Tee – BSPP
37° Flare / 37° Flare /
BSPP-ORR




Y* – Across wrench flats

# R4OMX

Male Run Tee – BSPP
37° Flare / BSPP-ORR /
37° Flare




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 1 & 2 (in.) | END SIZE 3 BSPP | M (mm) | M7 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **4S4OMX** | 6 | 1/4 | 1/8 - 28 | 22.6 | 26.5 | 11 | 3.6 | 3.6 | 2.3 |
| **6S4OMX** | 10 | 3/8 | 1/4 - 19 | 26.9 | 32.0 | 14 | 3.6 | 2.9 | 1.9 |
| **8S4OMX** | 12 | 1/2 | 3/8 - 19 | 31.8 | 37.0 | 19 | 3.6 | 2.9 | 1.9 |
| **10S4OMX** | 14,15,16 | 5/8 | 1/2 - 14 | 36.8 | 43.0 | 22 | 3.6 | 2.9 | 1.9 |
| **12S4OMX** | 18,20 | 3/4 | 3/4 - 14 | 42.2 | 49.5 | 27 | 3.6 | 2.9 | 1.9 |
| **16S4OMX** | 25 | 1 | 1 - 11 | 46.0 | 52.0 | 33 | 3.6 | 2.9 | 1.9 |

| TUBE FITTING PART # | END SIZE 1 & 3 (mm) | END SIZE 1 & 3 (in.) | END SIZE 2 BSPP | M (mm) | M7 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **4R4OMX** | 6 | 1/4 | 1/8 - 28 | 22.6 | 26.5 | 11 | 3.6 | 3.6 | 2.3 |
| **6R4OMX** | 10 | 3/8 | 1/4 - 19 | 26.6 | 32.0 | 14 | 3.6 | 2.9 | 1.9 |
| **8R4OMX** | 12 | 1/2 | 3/8 - 19 | 31.8 | 36.8 | 19 | 3.6 | 2.9 | 1.9 |
| **10R4OMX** | 14,15,16 | 5/8 | 1/2 - 14 | 36.8 | 43.0 | 22 | 3.6 | 2.9 | 1.9 |
| **12R4OMX** | 18,20 | 3/4 | 3/4 - 14 | 42.2 | 49.5 | 27 | 3.6 | 2.9 | 1.9 |
| **16R4OMX** | 25 | 1 | 1 - 11 | 46.0 | 52.0 | 33 | 3.6 | 2.9 | 1.9 |
| **20R4OMX** | 28, 30, 32 | 1 1/4 | 1 1/4 - 11 | 52.3 | 57.0 | 41 | 3.0 | 2.3 | 1.5 |

Dimensions and pressures for reference only, subject to change.

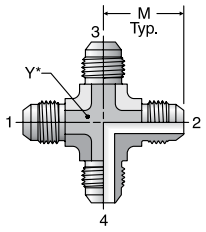


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# KTX

Union Cross
37° Flare (all four ends)

SAE 070501
HPD Base # 033X



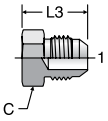

Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1-4 (in.) | M (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| 4 KTX | 1/4 | 0.89 | 7/16 | 7.5 | 7.7 | 3.3 |
| 5 KTX | 5/16 | 0.95 | 9/16 | 6.0 | 6.0 | 3.3 |
| 6 KTX | 3/8 | 1.06 | 9/16 | 6.0 | 6.0 | 3.3 |
| 8 KTX | 1/2 | 1.25 | 3/4 | 6.0 | 6.0 | 3.3 |
| 10 KTX | 5/8 | 1.45 | 7/8 | 5.0 | 5.0 | 3.3 |
| 12 KTX | 3/4 | 1.66 | 1 1/16 | 5.0 | 5.0 | 2.9 |
| 16 KTX | 1 | 1.81 | 1 5/16 | 4.0 | 3.5 | 2.3 |

# PNTX

Plug
37° Flare

SAE 070109
HPD Base # 03CP

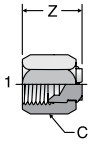



| TUBE FITTING PART # | END SIZE 1 (in.) | C HEX (in.) | L3 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| 2 PNTX | 1/8 | 7/16 | 0.70 | 7.5 | 9 | 3.3 |
| 3 PNTX | 3/16 | 7/16 | 0.73 | 7.5 | 9 | 3.3 |
| 4 PNTX | 1/4 | 1/2 | 0.80 | 7.5 | 9 | 3.3 |
| 5 PNTX | 5/16 | 9/16 | 0.80 | 6.0 | 7.2 | 3.3 |
| 6 PNTX | 3/8 | 5/8 | 0.84 | 6.0 | 7.2 | 3.3 |
| 8 PNTX | 1/2 | 13/16 | 0.94 | 6.0 | 7.2 | 3.3 |
| 10 PNTX | 5/8 | 15/16 | 1.10 | 5.0 | 6.0 | 3.3 |
| 12 PNTX | 3/4 | 1 1/8 | 1.28 | 5.0 | 6.0 | 3.3 |
| 14 PNTX | 7/8 | 1 1/4 | 1.31 | 5.0 | 5.0 | 3.3 |
| 16 PNTX | 1 | 1 3/8 | 1.33 | 4.5 | 5.4 | 2.9 |
| 20 PNTX | 1 1/4 | 1 11/16 | 1.45 | 4.0 | 4.8 | 2.6 |
| 24 PNTX | 1 1/2 | 2 | 1.65 | 4.0 | 4.8 | 2.6 |
| 32 PNTX | 2 | 2 5/8 | 2.05 | 2.0 | 2.4 | 1.3 |

# FNTX

Cap
37° Flare

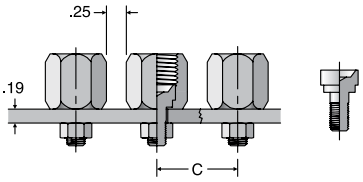
SAE 070112A
HPD Base # 06CP




| TUBE FITTING PART # | END SIZE 1 (in.) | C HEX (in.) | Z (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| 2 FNTX | 1/8 | 3/8 | 0.60 | 7.5 | 9.0 | 3.3 |
| 3 FNTX | 3/16 | 7/16 | 0.66 | 7.5 | 9.0 | 3.3 |
| 4 FNTX | 1/4 | 9/16 | 0.67 | 7.5 | 9.0 | 3.3 |
| 5 FNTX | 5/16 | 5/8 | 0.77 | 6.0 | 7.2 | 3.3 |
| 6 FNTX | 3/8 | 11/16 | 0.81 | 6.0 | 7.2 | 3.3 |
| 8 FNTX | 1/2 | 7/8 | 0.94 | 6.0 | 7.2 | 3.3 |
| 10 FNTX | 5/8 | 1 | 1.07 | 5.0 | 6.0 | 3.3 |
| 12 FNTX | 3/4 | 1 1/4 | 1.24 | 5.0 | 6.0 | 3.3 |
| 14 FNTX | 7/8 | 1 3/8 | 1.26 | 5.0 | 6.0 | 3.3 |
| 16 FNTX | 1 | 1 1/2 | 1.29 | 4.5 | 5.4 | 2.9 |
| 20 FNTX | 1 1/4 | 2 | 1.39 | 4.0 | 4.8 | 2.6 |
| 24 FNTX | 1 1/2 | 2 1/4 | 1.70 | 3.0 | 3.6 | 2.0 |
| 32 FNTX | 2 | 2 7/8 | 2.01 | 2.0 | 2.4 | 1.3 |

# T22X

Mountie Cap




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UNC/UNF-2A | C (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| 4 T22X | 1/4 | 1/4 - 20 | 0.91 | 0.72 | 7.5 | 9.0 | 3.3 |
| 6 T22X | 3/8 | 1/4 - 20 | 1.08 | 0.81 | 6.0 | 7.2 | 3.3 |
| 8 T22X | 1/2 | 5/16 - 18 | 1.25 | 0.97 | 6.0 | 7.2 | 3.3 |

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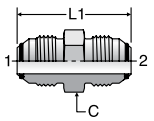
## HTXO

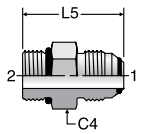
Union
37° Flare




| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | C HEX (in.) | L1 (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|
| 4 HTXO | 1/4 | 1/2 | 1.39 | 9.0 |
| 6 HTXO | 3/8 | 5/8 | 1.42 | 7.7 |
| 8 HTXO | 1/2 | 13/16 | 1.66 | 7.7 |
| 10 HTXO | 5/8 | 15/16 | 1.98 | 6.0 |
| 12 HTXO | 3/4 | 1 1/8 | 2.24 | 6.0 |
| 16 HTXO | 1 | 1 3/8 | 2.41 | 5.4 |
| 20 HTXO | 1 1/4 | 1 11/16 | 2.58 | 5.0 |
| 24 HTXO | 1 1/2 | 2 | 2.90 | 5.0 |

## F5OXO

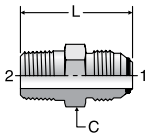
Straight Thread Connector
37° Flare / SAE-ORB




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | C4 HEX (in.) | L5 (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|
| 4 F5OXO | 1/4 | 7/16 - 20 | 9/16 | 1.23 | 9.0 |
| 4-6 F5OXO | 1/4 | 9/16 - 18 | 11/16 | 1.28 | 7.7 |
| 6 F5OXO | 3/8 | 9/16 - 18 | 11/16 | 1.30 | 7.7 |
| 6-4 F5OXO | 3/8 | 7/16 - 20 | 5/8 | 1.27 | 7.7 |
| 6-8 F5OXO | 3/8 | 3/4 - 16 | 7/8 | 1.38 | 7.7 |
| 8 F5OXO | 1/2 | 3/4 - 16 | 7/8 | 1.48 | 7.7 |
| 8-6 F5OXO | 1/2 | 9/16 - 18 | 13/16 | 1.44 | 7.7 |
| 10 F5OXO | 5/8 | 7/8 - 14 | 1 | 1.75 | 6.0 |
| 12 F5OXO | 3/4 | 1 1/16 - 12 | 1 1/4 | 1.97 | 6.0 |
| 16 F5OXO | 1 | 1 5/16 - 12 | 1 1/2 | 2.05 | 5.4 |
| 20 F5OXO | 1 1/4 | 1 5/8 - 12 | 1 7/8 | 2.17 | 5.0 |
| 24 F5OXO | 1 1/2 | 1 7/8 - 12 | 2 1/8 | 2.37 | 4.0 |
| 32 F5OXO | 2 | 2 1/2 - 12 | 2 3/4 | 2.78 | 2.4 |

## FTXO

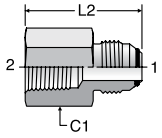
Male Connector
37° Flare / NPTF




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|
| 4 FTXO | 1/4 | 1/8 - 27 | 1/2 | 1.23 | 6.0 |
| 4-4 FTXO | 1/4 | 1/4 - 18 | 9/16 | 1.43 | 6.0 |
| 6 FTXO | 3/8 | 1/4 - 18 | 5/8 | 1.45 | 6.0 |
| 6-6 FTXO | 3/8 | 3/8 - 18 | 3/4 | 1.46 | 6.0 |
| 8 FTXO | 1/2 | 3/8 - 18 | 13/16 | 1.53 | 6.0 |
| 8-8 FTXO | 1/2 | 1/2 - 14 | 7/8 | 1.78 | 6.0 |
| 10 FTXO | 5/8 | 1/2 - 14 | 15/16 | 1.94 | 5.0 |
| 12 FTXO | 3/4 | 3/4 - 14 | 1 1/8 | 2.10 | 5.0 |
| 16 FTXO | 1 | 1 - 11 1/2 | 1 3/8 | 2.38 | 4.5 |
| 20 FTXO | 1 1/4 | 1 1/4 - 11 1/2 | 1 11/16 | 2.52 | 3.0 |
| 24 FTXO | 1 1/2 | 1 1/2 - 11 1/2 | 2 | 2.76 | 3.0 |
| 32 FTXO | 2 | 2 - 11 1/2 | 2 5/8 | 3.18 | 2.0 |

## GTXO

Female Connector
37° Flare / NPTF




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C1 HEX (in.) | L2 (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|
| 4 GTXO | 1/4 | 1/8 - 27 | 9/16 | 1.20 | 6.0 |
| 6 GTXO | 3/8 | 1/4 - 18 | 3/4 | 1.41 | 6.0 |
| 8 GTXO | 1/2 | 3/8 - 18 | 7/8 | 1.58 | 6.0 |
| 10 GTXO | 5/8 | 1/2 - 14 | 1 1/8 | 1.94 | 5.0 |
| 12 GTXO | 3/4 | 3/4 - 14 | 1 3/8 | 2.10 | 4.8 |
| 16 GTXO | 1 | 1 - 11 1/2 | 1 5/8 | 2.43 | 3.6 |
| 20 GTXO | 1 1/4 | 1 1/4 - 11 1/2 | 2 | 2.56 | 3.0 |
| 24 GTXO | 1 1/2 | 1 1/2 - 11 1/2 | 2 3/8 | 2.70 | 2.4 |

Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
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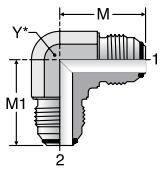
## ETXO

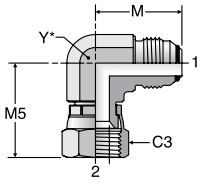
Union Elbow
37° Flare / 37° Flare




| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | M (in.) | M1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|
| 4 ETXO | 1/4 | 0.90 | 0.90 | 7/16 | 7.7 |
| 6 ETXO | 3/8 | 1.08 | 1.08 | 9/16 | 6.0 |
| 8 ETXO | 1/2 | 1.25 | 1.25 | 3/4 | 6.0 |
| 10 ETXO | 5/8 | 1.50 | 1.50 | 7/8 | 5.0 |
| 12 ETXO | 3/4 | 1.70 | 1.70 | 1 1/16 | 5.0 |
| 16 ETXO | 1 | 1.89 | 1.89 | 1 5/16 | 5.0 |
| 20 ETXO | 1 1/4 | 2.13 | 2.13 | 1 5/8 | 5.0 |
| 24 ETXO | 1 1/2 | 2.33 | 2.33 | 1 7/8 | 5.0 |

## C6XO

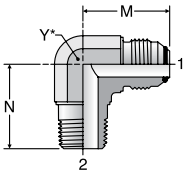
Swivel Nut Elbow
37° Flare / 37° Swivel




| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | C3 HEX (in.) | M (in.) | M5 (in.) | M10 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| 4 C6XO | 1/4 | 9/16 | 0.90 | 1.00 | 0.66 | 7/16 | 7.7 |
| 6 C6XO | 3/8 | 11/16 | 1.08 | 1.25 | 0.88 | 9/16 | 6.0 |
| 8 C6XO | 1/2 | 7/8 | 1.25 | 1.38 | 0.95 | 3/4 | 6.0 |
| 10 C6XO | 5/8 | 1 | 1.50 | 1.62 | 1.13 | 7/8 | 5.0 |
| 12 C6XO | 3/4 | 1 1/4 | 1.70 | 1.75 | 1.19 | 1 1/16 | 5.0 |
| 16 C6XO | 1 | 1 1/2 | 1.89 | 2.00 | 1.41 | 1 5/16 | 2.5 |
| 20 C6XO | 1 1/4 | 2 | 2.13 | 2.31 | 1.69 | 1 5/8 | 2.5 |

## CTXO

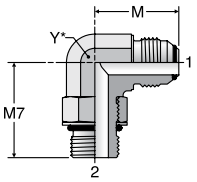
Male Elbow
37° Flare / NPTF




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| 4 CTXO | 1/4 | 1/8 - 27 | 0.90 | 0.78 | 7/16 | 6.0 |
| 4-4 CTXO | 1/4 | 1/4 - 18 | 1.06 | 1.09 | 9/16 | 6.0 |
| 6 CTXO | 3/8 | 1/4 - 18 | 1.08 | 1.09 | 9/16 | 6.0 |
| 6-6 CTXO | 3/8 | 3/8 - 18 | 1.16 | 1.22 | 3/4 | 6.0 |
| 8 CTXO | 1/2 | 3/8 - 18 | 1.25 | 1.22 | 3/4 | 6.0 |
| 8-8 CTXO | 1/2 | 1/2 - 14 | 1.33 | 1.47 | 7/8 | 6.0 |
| 10 CTXO | 5/8 | 1/2 - 14 | 1.51 | 1.47 | 7/8 | 5.0 |
| 12 CTXO | 3/4 | 3/4 - 14 | 1.70 | 1.59 | 1 1/16 | 4.0 |
| 16 CTXO | 1 | 1 - 11 1/2 | 1.89 | 1.97 | 1 5/16 | 3.0 |
| 20 CTXO | 1 1/4 | 1 1/4 - 11 1/2 | 2.13 | 2.38 | 1 5/8 | 2.5 |
| 24 CTXO | 1 1/2 | 1 1/2 - 11 1/2 | 2.41 | 2.64 | 1 7/8 | 2.5 |
| 32 CTXO | 2 | 2 - 11 1/2 | 3.13 | 3.00 | 2 1/2 | 2.0 |

## C5OXO

Straight Thread Elbow
37° Flare / SAE-ORB




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | M (in.) | M7 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| 4 C5OXO | 1/4 | 7/16 - 20 | 0.90 | 1.03 | 7/16 | 6.0 |
| 6 C5OXO | 3/8 | 9/16 - 18 | 1.08 | 1.25 | 9/16 | 5.4 |
| 8 C5OXO | 1/2 | 3/4 - 16 | 1.25 | 1.45 | 3/4 | 5.4 |
| 10 C5OXO | 5/8 | 7/8 - 14 | 1.50 | 1.70 | 7/8 | 5.4 |
| 12 C5OXO | 3/4 | 1 1/16 - 12 | 1.70 | 1.94 | 1 1/16 | 5.4 |
| 16 C5OXO | 1 | 1 5/16 - 12 | 1.89 | 2.05 | 1 5/16 | 3.7 |
| 20 C5OXO | 1 1/4 | 1 5/8 - 12 | 2.13 | 2.25 | 1 5/8 | 2.8 |
| 24 C5OXO | 1 1/2 | 1 7/8 - 12 | 2.41 | 2.39 | 1 7/8 | 2.5 |
| 32 C5OXO | 2 | 2 1/2 - 12 | 3.13 | 2.89 | 2 1/2 | 1.5 |

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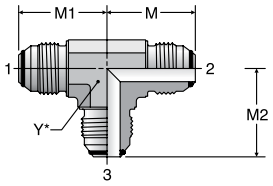
## JTXO

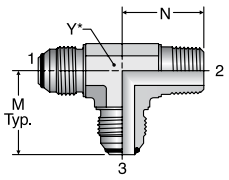
Union Tee
37° Flare (all three ends)




| TUBE FITTING PART # | END SIZE 1 - 3 (in.) | M (in.) | M1 (in.) | M2 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 JTXO** | 1/4 | 0.90 | 0.90 | 0.90 | 7/16 | 7.7 |
| **6 JTXO** | 3/8 | 1.08 | 1.08 | 1.08 | 9/16 | 6.0 |
| **8 JTXO** | 1/2 | 1.25 | 1.25 | 1.25 | 3/4 | 6.0 |
| **10 JTXO** | 5/8 | 1.50 | 1.50 | 1.50 | 7/8 | 5.0 |
| **12 JTXO** | 3/4 | 1.70 | 1.70 | 1.70 | 1 1/16 | 5.0 |
| **16 JTXO** | 1 | 1.89 | 1.89 | 1.89 | 1 5/16 | 5.0 |
| **20 JTXO** | 1 1/4 | 2.13 | 2.13 | 2.13 | 1 5/8 | 5.0 |
| **24 JTXO** | 1 1/2 | 2.41 | 2.41 | 2.41 | 1 7/8 | 5.0 |

## RTXO

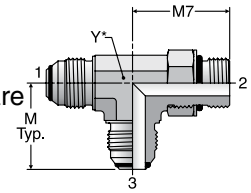
Male Run Tee
37° Flare / NPTF / 37° Flare




| TUBE FITTING PART # | END SIZE 1 & 3 (in.) | END SIZE 2 NPTF | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 RTXO** | 1/4 | 1/8 - 27 | 0.90 | 0.78 | 7/16 | 6.0 |
| **6 RTXO** | 3/8 | 1/4 - 18 | 1.08 | 1.09 | 9/16 | 6.0 |
| **8 RTXO** | 1/2 | 3/8 - 18 | 1.25 | 1.22 | 3/4 | 6.0 |
| **10 RTXO** | 5/8 | 1/2 - 14 | 1.51 | 1.47 | 7/8 | 5.0 |
| **12 RTXO** | 3/4 | 3/4 - 14 | 1.70 | 1.59 | 1 1/16 | 4.0 |
| **16 RTXO** | 1 | 1 - 11 1/2 | 1.89 | 1.97 | 1 5/16 | 3.0 |
| **20 RTXO** | 1 1/4 | 1 1/4 - 11 1/2 | 2.13 | 2.38 | 1 5/8 | 2.5 |
| **24 RTXO** | 1 1/2 | 1 1/2 - 11 1/2 | 2.41 | 2.64 | 1 7/8 | 2.5 |

## R5OXO

Straight Thread Run Tee
37° Flare / SAE-ORB / 37° Flare




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | M (in.) | M7 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 R5OXO** | 1/4 | 7/16 - 20 | 0.90 | 1.03 | 7/16 | 6.0 |
| **6 R5OXO** | 3/8 | 9/16 - 18 | 1.08 | 1.25 | 9/16 | 5.4 |
| **8 R5OXO** | 1/2 | 3/4 - 16 | 1.25 | 1.45 | 3/4 | 5.4 |
| **10 R5OXO** | 5/8 | 7/8 - 14 | 1.51 | 1.70 | 7/8 | 5.4 |
| **12 R5OXO** | 3/4 | 1 1/16 - 12 | 1.70 | 1.94 | 1 1/16 | 5.4 |
| **16 R5OXO** | 1 | 1 5/16 - 12 | 1.89 | 2.05 | 1 5/16 | 3.7 |
| **20 R5OXO** | 1 1/4 | 1 5/8 - 12 | 2.13 | 2.25 | 1 5/8 | 2.8 |

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# Ferulok® Flareless Bite Type Fittings

C

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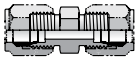
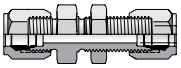
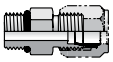
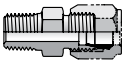
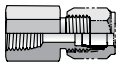
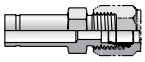
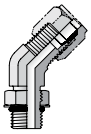
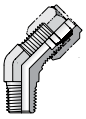
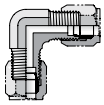
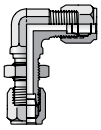
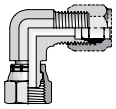
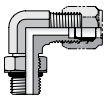
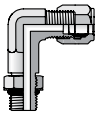
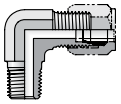
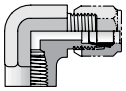
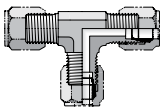
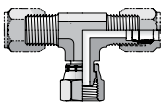
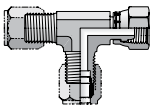
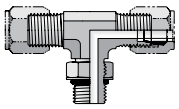
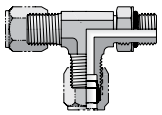
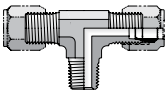
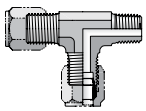
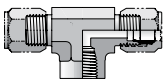
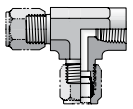
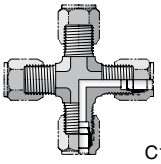
| | | | | | |
|---|---|---|---|---|---|
| **Nuts, Ferrules, Locknuts** | **BU**<br>Nut<br> <br>C7 | **TU**<br>Ferrules<br> <br>C7 | **WLN**<br>Bulkhead Locknut<br> <br>C7 | **Straights** | **HBU**<br>Union<br>  <br>C7 |
| **WBU**<br>Bulkhead Union<br>  <br>C8 | **F5BU**<br>SAE-ORB / Flareless<br>  <br>C8 | **FBU**<br>NPTF / Flareless<br>  <br>C8 | **GBU**<br>NPTF / Flareless<br>  <br>C9 | **TRBU**<br>Tube End Reducer<br>  <br>C9 | |
| **45° Elbows** | **V5BU**<br>SAE-ORB / Flareless<br>  <br>C9 | **VBU**<br>NPTF / Flareless<br>  <br>C9 | **90° Elbows** | **EBU**<br>Union Elbow<br>  <br>C10 | **WEBU**<br>Bulkhead Union Elbow<br>  <br>C10 |
| **C6BU**<br>Flareless Swivel/Flareless<br>  <br>C10 | **C5BU**<br>SAE-ORB / Flareless<br>  <br>C10 | **CC5BU**<br>SAE-ORB / Flareless<br>  <br>C11 | **CBU**<br>NPTF / Flareless<br>  <br>C11 | **DBU**<br>NPTF / Flareless<br>  <br>C11 | |
| **Tees** | **JBU**<br>Union Tee<br>  <br>C12 | **S6BU**<br>Swivel Branch Tee<br>  <br>C12 | **R6BU**<br>Swivel Run Tee<br>  <br>C12 | **S5BU**<br>SAE-ORB Branch Tee<br>  <br>C12 | **R5BU**<br>SAE-ORB Run Tee<br>  <br>C13 |
| **SBU**<br>NPTF Branch Tee<br>  <br>C13 | **RBU**<br>NPTF Run Tee<br>  <br>C13 | **OBU**<br>NPTF Branch Tee<br>  <br>C13 | **MBU**<br>NPTF Run Tee<br>  <br>C14 | **Cross** | **KBU**<br>Union Cross<br>  <br>C14 |
| **Plugs and Caps** | **PNU**<br>Plug<br> <br>C14 | **FNU**<br>Cap<br> <br>C14 | | | |

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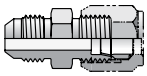
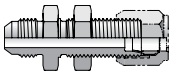
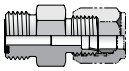
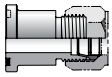
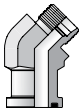
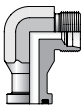
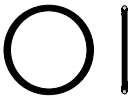
## Conversion Adapters (Shown in Section K)

| Conversion Adapters | XHBU<br>37° Flare / Flareless | XHBU2<br>37° / Flareless Bulkhead | BUHLO<br>ORFS / 24° Flareless |
|---|---|---|---|
| |  <br>K4 |  <br>K4 |  <br>K4 |

## Flange Adapters (Shown in Section L)

| Flange Adapters | BUHQ1<br>Code 61 / Flareless | BUVQ1<br>Code 61 / Flareless | BUEQ1<br>Code 61 / Flareless |
|---|---|---|---|
| |  <br>L12 |  <br>L30 |  <br>L31 |

## O-Rings and Seals (Shown in Section N)

| O-Rings | SAE O-Ring |
|---|---|
| |  <br>N4 |

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**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# Introduction

The Ferulok fitting design and performance capabilities far exceed the strict requirements of SAE J514 and Military Standards. The Ferulok fitting is a flareless fitting that consists of a body, a one-piece ferrule, and a nut. On assembly, the ferrule "bites" into the outer surface of the tube with sufficient strength to hold the tube against pressure and seal the fluid, without considerable distortion of the inside tube diameter. Ferulok fittings have a visible bite, allowing the fitting assembler to visually inspect the bite quality, thus significantly minimizing the risk of improper assembly and related service problems. Ferulok fittings are especially suitable for use with tube wall thickness ranging from medium to extra heavy.

# How Ferulok Fittings Work

The ferrule in the Ferulok fitting forms pressure tight seals with the tube and the fitting body. These seals are the result of several key characteristics graphically shown in Fig. C1. Below are detailed explanations of each of these key features.

A. When properly assembled, the wedging action of the Ferulok design will cause the end of the tube to press firmly against the seat in the body. This action will cause the tube to develop a small indentation circumferentially on the bottom of the tube. This indentation serves as a good post assembly inspection criterion.

B. As the ferrule moves forward, it contacts the tapered seat of the body, which causes the ferrule to cam inward into the tube. The leading edge of the hardened ferrule makes a clean 360° cut into the outside diameter of the tube. This cut is often termed a "bite" and thus "bite type fitting". As the ferrule makes its bite, a small ridge of material is plowed up in front of the ferrule. This intimate contact of the tube ridge with the ferrule's front face and bite edge gives the fitting its ability to retain high pressure without leaking or blowing off. A second seal point is also created between the now bowed ferrule and the fitting body seat.

C. As the ferrule bites into the tube, the mid section will bow and the inside diameter of the back area firmly grips the tube. This action keeps the stresses, caused by flexural and vibration loading, from being concentrated in the bite area. The "compression grip" at the back end is a key factor for long life in rigorous applications.

All Ferulok parts come with the ferrule, and nut. However, Ferulok fittings can be purchased without nuts and sleeves for use with hose crimp fittings (Fig. C2). This can be done by dropping the 'B' from the part number. For example, (4 CBU-S, 4 CU-S). Sealing occurs between the 24° cone of the fitting body and the hose swivel as shown.

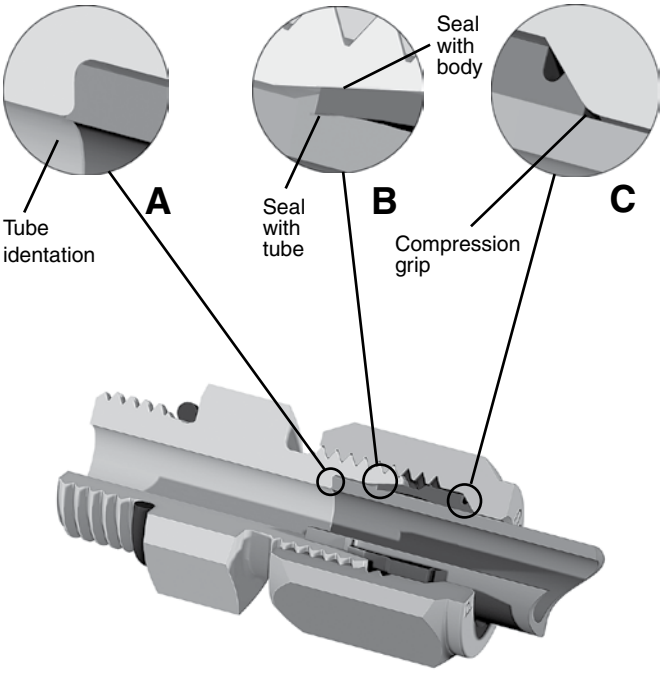


**Fig. C1 – Assembled Ferulok Fitting with Tube**

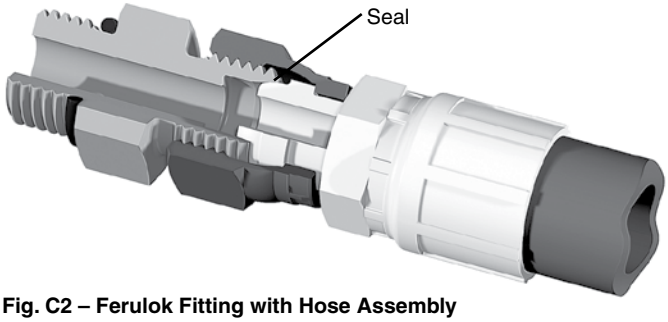


**Fig. C2 – Ferulok Fitting with Hose Assembly**

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**Parker Hannifin Corporation**
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# The Parker Advantage

**Robust Port Stud:** The adjustable port stud is manufactured with a longer locknut designed to cover the uppermost threads completely. Since the backup washer is never exposed to the upper threads, it cannot be damaged during assembly. During assembly, exposed upper threads, as common with fittings from other fitting manufacturers, can lead to a deformed backup washer that can pinch the o-ring and create an o-ring extrusion gap that has the potential to leak. The longer locknut also provides a greater grip area for the wrench.

**Visible bite:** The style A (SAE 08115A) ferrule design allows for an easy inspection of the bite in the tubing. A verification can quickly be achieved which reduces time and assures proper assembly. This assurance also eliminates the risk of leaks and catastrophic failures.

**Rear compression grip:** The ferrule is also designed with a rear bevel to firmly hold the nut and tubing. This enhancement dampens the effects of vibration in the connection; thus extending the life of the joint.

**Metal-to-metal sealing:** The metal to metal sealing function broadens the range of both temperatures and media types. The temperature and media range of Ferulok is not limited by an elastomeric seal, but by the range of steel and stainless steel (see page T9 of the General Technical section for material temperature and media compatibility).

**Superior Plating:** Superior plating gives Parker steel tube fittings unmatched protection against red rust. In neutral salt spray test per ASTM B117, Parker Ferulok fittings substantially exceeded the SAE requirement of 96 hours to red rest.

**No special tooling required:** Neither flaring nor flanging tools are required to make a Ferulok connection. Smaller sizes of Ferulok can be assembled by a wrench thus reducing tooling costs and assembly time. However, portable presetting equipment is available for larger sizes and/or high production (see Section R of the catalog for equipment available).

# Reference locations

**Standard Material Specifications:** Refer to Table U1 in Appendix page U2.

**Assembly and Installation:** Please refer to Ferulok Assembly located within the Assembly/Installation section of this catalog.

**Recommended Tube Wall Thickness:** Please refer to Table U3 located in the Appendix section.

**Dynamic Pressure Ratings:** Please refer to the last column of the part number tables located on the following pages of this section for the appropriate dynamic pressure ratings.

**Seal Material Selection:** Please refer to Table T8 in the General Technical section of this catalog for elastomeric seal information.

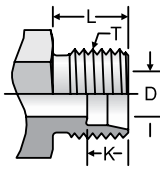
# Tube Recommendation

Maximum tube wall thickness is based on the pressure holding capability of Ferulok fittings. Tubes above the recommended range can be used. However, the pressure holding capability of the assembly will be limited to the fitting capacity. The proper Ferulok assembly procedures as outlined on pages S23 - S26 of this catalog are critical to the performance of the fitting. Steel Ferulok works best with seamless or welded and drawn fully annealed tube, SAE J356, SAE J524, SAE J525 (max. hardness, RB72) or equivalent specification steel tube. For stainless steel Ferulok fittings, types 304 and 316 of ASTM A269, ASTM A213 (max. hardness, RB90) or equivalent stainless steel tube is recommended.

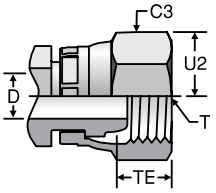
Ferulok fittings are also suitable for use with soft metal tube and various types of plastic tubes such as nylon, polyethylene, etc. When used with plastic tube, it is strongly recommended that a tube insert, such as T23UI, be used to prevent tube pull out due to tensile loading.

See Table U3 in Appendix on Page U3. Consult the Parker Hannifin Tube Fittings Division for other combinations of tube and tube fitting materials not shown.

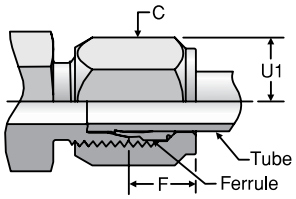
# Ferulok Flareless Tube Ends



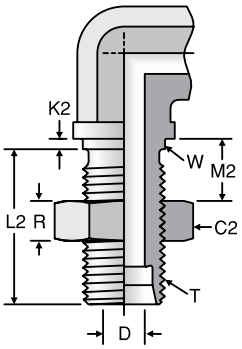

**Ferulok Male Stud Tube End**



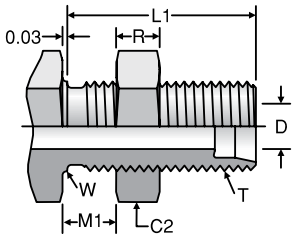

**Ferulok Female Swivel End**




**Ferulok Tube End Assembly**




**Ferulok Shape Bulkhead**




**Ferulok Straight Bulkhead**

| | | Thread | Tube Nut Hex | Bulhkead Locknut Hex | Swivel Nut Hex | Max Drill | Allowance | | Male Turn Back | Bulkhead | | | | | Max Bulkhead Thickness | | Thread Engage-ment | Across Corners | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Tube Nut Assembled | Tube | | Pilot Length Shapes | Length - Straights | Length - Shapes | Locknut Thickness | Pilot Dia | Straights | Shapes | | Tube Nut Hex | Swivel Nut Hex |
| **SAE Dash Size** | **Tube O.D.** (in.) | **T** UN/UNF | **C** (in.) | **C2** (in.) | **C3** (in.) | **D** (in) | **F** (in) | **K** (in) | **L** (in) | **K2** (in) | **L1** (in) | **L2** (in) | **R** (in) | **W**[1)] (in) | **M1** (in) | **M2** (in) | **TE** (in | **U1** (in) | **U2** (in) |
| **2** | 1/8 | 5/16-24 | 3/8 | 9/16 | 7/16 | 0.093 | 0.31 | 0.19 | 0.375 | 0.09 | 1.02 | 0.83 | 0.22 | 0.31 | 0.28 | 0.38 | 0.22 | 0.22 | 0.25 |
| **3** | 3/16 | 3/8-24 | 7/16 | 5/8 | 1/2 | 0.125 | 0.34 | 0.24 | 0.422 | 0.09 | 1.06 | 0.88 | 0.22 | 0.37 | 0.28 | 0.38 | 0.25 | 0.25 | 0.29 |
| **4** | 1/4 | 7/16-20 | 9/16 | 11/16 | 9/16 | 0.203 | 0.42 | 0.24 | 0.453 | 0.09 | 1.12 | 0.94 | 0.28 | 0.44 | 0.38 | 0.28 | 0.29 | 0.33 | 0.33 |
| **5** | 5/16 | 1/2-20 | 5/8 | 3/4 | 5/8 | 0.234 | 0.42 | 0.26 | 0.453 | 0.09 | 1.12 | 0.94 | 0.28 | 0.50 | 0.28 | 0.38 | 0.31 | 0.36 | 0.36 |
| **6** | 3/8 | 9/16-18 | 11/16 | 13/16 | 11/16 | 0.281 | 0.47 | 0.26 | 0.469 | 0.09 | 1.17 | 0.98 | 0.27 | 0.56 | 0.40 | 0.31 | 0.34 | 0.40 | 0.40 |
| **8** | 1/2 | 3/4-16 | 7/8 | 1 | 7/8 | 0.422 | 0.50 | 0.31 | 0.562 | 0.13 | 1.31 | 1.12 | 0.31 | 0.75 | 0.40 | 0.31 | 0.32 | 0.51 | 0.51 |
| **10** | 5/8 | 7/8-14 | 1 | 1 1/8 | 1 | 0.500 | 0.53 | 0.36 | 0.625 | 0.13 | 1.45 | 1.27 | 0.36 | 0.88 | 0.44 | 0.38 | 0.37 | 0.58 | 0.59 |
| **12** | 3/4 | 1 1/16-12 | 1 1/4 | 1 3/8 | 1 1/4 | 0.656 | 0.56 | 0.36 | 0.688 | 0.13 | 1.56 | 1.38 | 0.41 | 1.06 | 0.44 | 0.38 | 0.42 | 0.72 | 0.73 |
| **14** | 7/8 | 1 3/16-12 | 1 3/8 | 1 1/2 | 1 3/8 | 0.719 | 0.53 | 0.36 | 0.688 | 0.13 | 1.56 | 1.38 | 0.41 | 1.19 | 0.44 | 0.38 | 0.34 | 0.79 | 0.79 |
| **16** | 1 | 1 5/16-12 | 1 1/2 | 1 5/8 | 1 1/2 | 0.875 | 0.66 | 0.42 | 0.688 | 0.13 | 1.56 | 1.38 | 0.41 | 1.31 | 0.44 | 0.38 | 0.32 | 0.87 | 0.88 |
| **20** | 1 1/4 | 1 5/8-12 | 2 | 1 7/8 | 2 | 1.094 | 0.72 | 0.42 | 0.688 | 0.13 | 1.56 | 1.38 | 0.41 | 1.62 | 0.44 | 0.38 | 0.33 | 1.15 | 1.17 |
| **24** | 1 1/2 | 1 7/8-12 | 2 1/4 | 2 1/8 | 2 1/4 | 1.344 | 0.72 | 0.49 | 0.688 | 0.13 | 1.56 | 1.38 | 0.41 | 1.87 | 0.44 | 0.38 | 0.34 | 1.30 | 1.29 |
| **32** | 2 | 2 1/2-12 | 2 7/8 | 2 3/4 | 2 7/8 | 1.813 | 0.84 | 0.49 | 0.688 | 0.13 | 1.77 | 1.58 | 0.41 | 2.50 | 0.63 | 0.56 | 0.34 | 1.66 | 1.64 |

1) Recommended clearance hole +0.015 over W dia.
Note: For port and stud end dimensions reference Section F: Pipe Fittings and Port Adapters.

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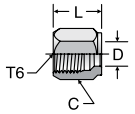
# BU

Nut
Flareless



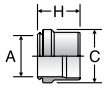

SAE 080110

| TUBE FITTING PART # | TUBE O.D. (in.) | T6 UN/UNF-2B | C HEX (in.) | D DRILL (in.) | L (in.) | Material -S | Material -SS |
|---|---|---|---|---|---|---|---|
| 2 BU | 1/8 | 5/16 - 24 | 3/8 | 0.130 | 0.53 | • | • |
| 3 BU | 3/16 | 3/8 - 24 | 7/16 | 0.193 | 0.61 | • | • |
| 4 BU | 1/4 | 7/16 - 20 | 9/16 | 0.255 | 0.70 | • | • |
| 5 BU | 5/16 | 1/2 - 20 | 5/8 | 0.318 | 0.72 | • | • |
| 6 BU | 3/8 | 9/16 - 18 | 11/16 | 0.380 | 0.75 | • | • |
| 8 BU | 1/2 | 3/4 - 16 | 7/8 | 0.505 | 0.84 | • | • |
| 10 BU | 5/8 | 7/8 - 14 | 1 | 0.631 | 0.92 | • | • |
| 12 BU | 3/4 | 1 1/16 - 12 | 1 1/4 | 0.756 | 0.97 | • | • |
| 14 BU | 7/8 | 1 3/16 - 12 | 1 3/8 | 0.881 | 1.00 | • | • |
| 16 BU | 1 | 1 5/16 - 12 | 1 1/2 | 1.006 | 1.05 | • | • |
| 20 BU | 1 1/4 | 1 5/8 - 12 | 2 | 1.260 | 1.05 | • | • |
| 24 BU | 1 1/2 | 1 7/8 - 12 | 2 1/4 | 1.510 | 1.03 | • | • |
| 32 BU | 2 | 2 1/2 - 12 | 2 7/8 | 2.014 | 1.12 | • | • |

Note: All stainless steel nuts are coated to prevent galling at assembly.

# TU

Ferrule
Flareless



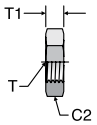

SAE 080115A

| TUBE FITTING PART # | TUBE O.D. (in.) | A (in.) | C (in.) | H (in.) | Material -S | Material -SS |
|---|---|---|---|---|---|---|
| 2 TU | 1/8 | 0.13 | 0.24 | 0.29 | • | • |
| 3 TU | 3/16 | 0.19 | 0.31 | 0.33 | • | • |
| 4 TU | 1/4 | 0.26 | 0.37 | 0.36 | • | • |
| 5 TU | 5/16 | 0.32 | 0.43 | 0.37 | • | • |
| 6 TU | 3/8 | 0.38 | 0.50 | 0.39 | • | • |
| 8 TU | 1/2 | 0.51 | 0.66 | 0.43 | • | • |
| 10 TU | 5/8 | 0.63 | 0.78 | 0.44 | • | • |
| 12 TU | 3/4 | 0.76 | 0.93 | 0.48 | • | • |
| 14 TU | 7/8 | 0.88 | 1.06 | 0.48 | • | • |
| 16 TU | 1 | 1.01 | 1.19 | 0.48 | • | • |
| 20 TU | 1 1/4 | 1.26 | 1.45 | 0.48 | • | • |
| 24 TU | 1 1/2 | 1.51 | 1.69 | 0.48 | • | • |
| 32 TU | 2 | 2.01 | 2.21 | 0.51 | • | • |

Steel TU sleeves are plated with a zinc phos.

# WLN

Bulkhead Locknut
Flareless

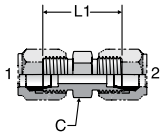



SAE 080118 and 070118

| TUBE FITTING PART # | TUBE O.D. (in.) | T UN/UNF-2B | C2 HEX (in.) | T1 (in.) | Material -S | Material -SS |
|---|---|---|---|---|---|---|
| 3 WLN | 3/16 | 3/8 - 24 | 5/8 | 0.22 | • | • |
| 4 WLN | 1/4 | 7/16 - 20 | 11/16 | 0.28 | • | • |
| 5 WLN | 5/16 | 1/2 - 20 | 3/4 | 0.28 | • | • |
| 6 WLN | 3/8 | 9/16 - 18 | 13/16 | 0.27 | • | • |
| 8 WLN | 1/2 | 3/4 - 16 | 1 | 0.31 | • | • |
| 10 WLN | 5/8 | 7/8 - 14 | 1 1/8 | 0.36 | • | • |
| 12 WLN | 3/4 | 1 1/16 - 12 | 1 3/8 | 0.41 | • | • |
| 14 WLN | 7/8 | 1 3/16 - 12 | 1 1/2 | 0.41 | • | • |
| 16 WLN | 1 | 1 5/16 - 12 | 1 5/8 | 0.41 | • | • |
| 20 WLN | 1 1/4 | 1 5/8 - 12 | 1 7/8 | 0.41 | • | • |
| 24 WLN | 1 1/2 | 1 7/8 - 12 | 2 1/8 | 0.41 | • | • |
| 32 WLN | 2 | 2 1/2 - 12 | 2 3/4 | 0.41 | • | • |

# HBU

Union
Flareless / Flareless




SAE 080101

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C HEX (in.) | L1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| 2 HBU | 1/8 | 1/8 | 7/16 | 1.02 | 6.0 | 6.0 |
| 3 HBU | 3/16 | 3/16 | 7/16 | 1.11 | 6.0 | 6.0 |
| 4 HBU | 1/4 | 1/4 | 1/2 | 1.19 | 6.0 | 6.0 |
| 5 HBU | 5/16 | 5/16 | 9/16 | 1.19 | 6.0 | 6.0 |
| 6 HBU | 3/8 | 3/8 | 5/8 | 1.24 | 6.0 | 6.0 |
| 6-4 HBU | 3/8 | 1/4 | 5/8 | 1.22 | 6.0 | 6.0 |
| 8 HBU | 1/2 | 1/2 | 13/16 | 1.42 | 5.0 | 5.0 |
| 8-6 HBU | 1/2 | 3/8 | 13/16 | 1.33 | 5.0 | 5.0 |
| 10 HBU | 5/8 | 5/8 | 15/16 | 1.61 | 5.0 | 5.0 |
| 10-8 HBU | 5/8 | 1/2 | 15/16 | 1.55 | 5.0 | 5.0 |
| 12 HBU | 3/4 | 3/4 | 1 1/8 | 1.81 | 4.5 | 4.5 |
| 14 HBU | 7/8 | 7/8 | 1 1/4 | 1.81 | 4.0 | 4.0 |
| 16 HBU | 1 | 1 | 1 3/8 | 1.81 | 4.0 | 4.0 |
| 20 HBU | 1 1/4 | 1 1/4 | 1 11/16 | 1.89 | 3.0 | 3.0 |
| 24 HBU | 1 1/2 | 1 1/2 | 2 | 1.96 | 2.0 | 2.0 |
| 32 HBU | 2 | 2 | 2 5/8 | 2.11 | 1.5 | 1.5 |

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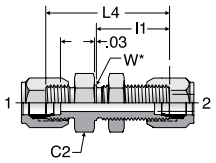
# WBU

Bulkhead Union
Flareless / Flareless Bulkhead

SAE 080601




* W – Bulkhead pilot dia. recommended clearance hole is +.015 over W dia.

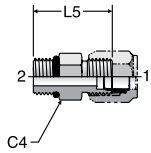
| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C2 HEX (in.) | I1 (in.) | L4 (in.) | W (in.) | Max. Bulkhead Thickness | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|
| **4 WBU** | 1/4 | 1/4 | 11/16 | 1.12 | 1.89 | 0.44 | 0.38 | 6.0 | 6.0 |
| **6 WBU** | 3/8 | 3/8 | 13/16 | 1.17 | 1.98 | 0.56 | 0.40 | 6.0 | 6.0 |
| **8 WBU** | 1/2 | 1/2 | 1 | 1.31 | 2.22 | 0.75 | 0.40 | 5.0 | 5.0 |
| **10 WBU** | 5/8 | 5/8 | 1 1/8 | 1.45 | 2.48 | 0.88 | 0.44 | 5.0 | 5.0 |
| **12 WBU** | 3/4 | 3/4 | 1 3/8 | 1.56 | 2.72 | 1.06 | 0.44 | 4.5 | 4.5 |
| **16 WBU** | 1 | 1 | 1 5/8 | 1.56 | 2.72 | 1.31 | 0.44 | 4.0 | 4.0 |

Part comes with the WLN locknut.

# F5BU

Straight Thread Connector
Flareless / SAE-ORB

SAE 080120

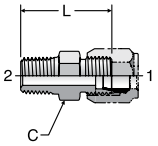



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | C4 HEX (in.) | L5 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **2 F5BU** | 1/8 | 5/16 - 24 | 7/16 | 0.99 | 6.0 | 6.0 |
| **3 F5BU** | 3/16 | 3/8 - 24 | 1/2 | 1.05 | 6.0 | 6.0 |
| **4 F5BU** | 1/4 | 7/16 - 20 | 9/16 | 1.13 | 6.0 | 6.0 |
| **4-5 F5BU** | 1/4 | 1/2 - 20 | 5/8 | 1.13 | 6.0 | 6.0 |
| **4-6 F5BU** | 1/4 | 9/16 - 18 | 11/16 | 1.20 | 6.0 | 6.0 |
| **5 F5BU** | 5/16 | 1/2 - 20 | 5/8 | 1.13 | 6.0 | 6.0 |
| **6 F5BU** | 3/8 | 9/16 - 18 | 11/16 | 1.22 | 6.0 | 6.0 |
| **6-4 F5BU** | 3/8 | 7/16 - 20 | 5/8 | 1.19 | 6.0 | 6.0 |
| **6-8 F5BU** | 3/8 | 3/4 - 16 | 7/8 | 1.28 | 6.0 | 6.0 |
| **8 F5BU** | 1/2 | 3/4 - 16 | 7/8 | 1.38 | 5.0 | 5.0 |
| **8-6 F5BU** | 1/2 | 9/16 - 18 | 13/16 | 1.28 | 5.0 | 5.0 |
| **8-10 F5BU** | 1/2 | 7/8 - 14 | 1 | 1.50 | 5.0 | 5.0 |
| **8-12 F5BU** | 1/2 | 1 1/16 - 12 | 1 1/4 | 1.67 | 4.5 | 4.5 |
| **10 F5BU** | 5/8 | 7/8 - 14 | 1 | 1.56 | 5.0 | 5.0 |
| **10-12 F5BU** | 5/8 | 1 1/16 - 12 | 1 1/4 | 1.73 | 4.5 | 4.5 |
| **12 F5BU** | 3/4 | 1 1/16 - 12 | 1 1/4 | 1.78 | 4.5 | 4.5 |
| **12-8 F5BU** | 3/4 | 3/4 - 16 | 1 1/8 | 1.75 | 4.5 | 4.5 |
| **12-16 F5BU** | 3/4 | 1 5/16 - 12 | 1 1/2 | 1.81 | 4.0 | 4.0 |
| **16 F5BU** | 1 | 1 5/16 - 12 | 1 1/2 | 1.81 | 4.0 | 4.0 |
| **16-12 F5BU** | 1 | 1 1/16 - 12 | 1 3/8 | 1.81 | 4.0 | 4.0 |
| **16-20 F5BU** | 1 | 1 5/8 - 12 | 1 7/8 | 1.91 | 3.0 | 3.0 |
| **20 F5BU** | 1 1/4 | 1 5/8 - 12 | 1 7/8 | 1.91 | 3.0 | 3.0 |
| **24 F5BU** | 1 1/2 | 1 7/8 - 12 | 2 1/8 | 1.97 | 3.0 | 3.0 |
| **32 F5BU** | 2 | 2 1/2 - 12 | 2 3/4 | 2.13 | 2.0 | 2.0 |

# FBU

Male Connector
Flareless / NPTF

SAE 080102




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **2 FBU** | 1/8 | 1/8 - 27 | 7/16 | 1.04 | 6.0 | 6.0 |
| **2-4 FBU** | 1/8 | 1/4 - 18 | 9/16 | 1.24 | 6.0 | 6.0 |
| **3 FBU** | 3/16 | 1/8 - 27 | 7/16 | 1.09 | 6.0 | 6.0 |
| **4 FBU** | 1/4 | 1/8 - 27 | 1/2 | 1.12 | 6.0 | 6.0 |
| **4-4 FBU** | 1/4 | 1/4 - 18 | 9/16 | 1.32 | 6.0 | 6.0 |
| **4-6 FBU** | 1/4 | 3/8 - 18 | 3/4 | 1.33 | 6.0 | 6.0 |
| **4-8 FBU** | 1/4 | 1/2 - 14 | 7/8 | 1.58 | 6.0 | 6.0 |
| **5 FBU** | 5/16 | 1/8 - 27 | 9/16 | 1.12 | 6.0 | 6.0 |
| **5-4 FBU** | 5/16 | 1/4 - 18 | 9/16 | 1.32 | 6.0 | 6.0 |
| **6 FBU** | 3/8 | 1/4 - 18 | 5/8 | 1.34 | 6.0 | 6.0 |
| **6-2 FBU** | 3/8 | 1/8 - 27 | 5/8 | 1.15 | 6.0 | 6.0 |
| **6-6 FBU** | 3/8 | 3/8 - 18 | 3/4 | 1.35 | 6.0 | 6.0 |
| **6-8 FBU** | 3/8 | 1/2 - 14 | 15/16 | 1.60 | 6.0 | 6.0 |
| **8 FBU** | 1/2 | 3/8 - 18 | 13/16 | 1.44 | 5.0 | 5.0 |
| **8-4 FBU** | 1/2 | 1/4 - 18 | 13/16 | 1.44 | 5.0 | 5.0 |
| **8-8 FBU** | 1/2 | 1/2 - 14 | 7/8 | 1.69 | 5.0 | 5.0 |
| **8-12 FBU** | 1/2 | 3/4 - 14 | 1 1/8 | 1.76 | 4.0 | 4.0 |
| **10 FBU** | 5/8 | 1/2 - 14 | 15/16 | 1.75 | 4.5 | 4.5 |
| **10-6 FBU** | 5/8 | 3/8 - 18 | 15/16 | 1.56 | 4.5 | 4.5 |
| **10-12 FBU** | 5/8 | 3/4 - 14 | 1 1/8 | 1.82 | 4.0 | 4.0 |
| **12 FBU** | 3/4 | 3/4 - 14 | 1 1/8 | 1.88 | 4.0 | 4.0 |
| **12-8 FBU** | 3/4 | 1/2 - 14 | 1 1/8 | 1.88 | 4.0 | 4.0 |
| **14 FBU** | 7/8 | 3/4 - 14 | 1 1/4 | 1.88 | 3.0 | 3.0 |
| **16 FBU** | 1 | 1 - 11 1/2 | 1 3/8 | 2.07 | 3.0 | 3.0 |
| **16-12 FBU** | 1 | 3/4 - 14 | 1 3/8 | 1.88 | 3.0 | 3.0 |
| **20 FBU** | 1 1/4 | 1 1/4 - 11 1/2 | 1 11/16 | 2.18 | 2.5 | 2.5 |
| **24 FBU** | 1 1/2 | 1 1/2 - 11 1/2 | 2 | 2.28 | 2.5 | 2.5 |
| **32 FBU** | 2 | 2 - 11 1/2 | 2 3/4 | 2.46 | 2.0 | 2.0 |

Dimensions and pressures for reference only, subject to change.



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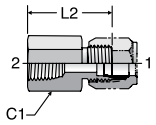
# GBU

Female Connector
Flareless / NPTF

SAE 080103

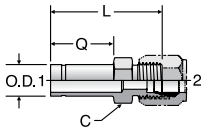



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C1 HEX (in.) | L2 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **2 GBU** | 1/8 | 1/8 - 27 | 9/16 | 1.05 | 5.0 | 5.0 |
| **4 GBU** | 1/4 | 1/8 - 27 | 9/16 | 1.09 | 5.0 | 5.0 |
| **4-4 GBU** | 1/4 | 1/4 - 18 | 3/4 | 1.29 | 5.0 | 5.0 |
| **5 GBU** | 5/16 | 1/8 - 27 | 9/16 | 1.08 | 5.0 | 5.0 |
| **6 GBU** | 3/8 | 1/4 - 18 | 3/4 | 1.31 | 5.0 | 5.0 |
| **6-6 GBU** | 3/8 | 3/8 - 18 | 7/8 | 1.34 | 5.0 | 5.0 |
| **6-8 GBU** | 3/8 | 1/2 - 14 | 1 1/8 | 1.59 | 5.0 | 5.0 |
| **8 GBU** | 1/2 | 3/8 - 18 | 7/8 | 1.47 | 5.0 | 5.0 |
| **8-4 GBU** | 1/2 | 1/4 - 18 | 7/8 | 1.46 | 5.0 | 5.0 |
| **8-8 GBU** | 1/2 | 1/2 - 14 | 1 1/8 | 1.69 | 5.0 | 5.0 |
| **10 GBU** | 5/8 | 1/2 - 14 | 1 1/8 | 1.77 | 4.5 | 4.5 |
| **12 GBU** | 3/4 | 3/4 - 14 | 1 3/8 | 1.89 | 4.0 | 4.0 |
| **14 GBU** | 7/8 | 3/4 - 14 | 1 3/8 | 1.86 | 3.0 | 3.0 |
| **16 GBU** | 1 | 1 - 11 1/2 | 1 5/8 | 2.13 | 3.0 | 3.0 |
| **20 GBU** | 1 1/4 | 1 1/4 - 11 1/2 | 2 | 2.22 | 2.5 | 2.5 |
| **24 GBU** | 1 1/2 | 1 1/2 - 11 1/2 | 2 3/8 | 2.23 | 2.5 | 2.5 |

# TRBU

Tube End Reducer
Tube / Flareless

SAE 080123

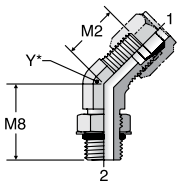



| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C HEX (in.) | L (in.) | Q (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **6-4 TRBU** | 3/8 | 1/4 | 1/2 | 1.61 | 0.88 | 6.0 | 6.0 |
| **8-4 TRBU** | 1/2 | 1/4 | 9/16 | 1.73 | 1.00 | 5.0 | 5.0 |
| **8-6 TRBU** | 1/2 | 3/8 | 5/8 | 1.77 | 1.00 | 5.0 | 5.0 |
| **10-6 TRBU** | 5/8 | 3/8 | 11/16 | 1.86 | 1.09 | 5.0 | 5.0 |
| **10-8 TRBU** | 5/8 | 1/2 | 13/16 | 1.95 | 1.09 | 4.5 | 4.5 |
| **12-6 TRBU** | 3/4 | 3/8 | 13/16 | 1.94 | 1.16 | 4.5 | 4.5 |
| **12-8 TRBU** | 3/4 | 1/2 | 13/16 | 2.03 | 1.16 | 4.5 | 4.5 |
| **12-10 TRBU** | 3/4 | 5/8 | 15/16 | 2.16 | 1.16 | 4.5 | 4.5 |
| **14-10 TRBU** | 7/8 | 5/8 | 15/16 | 2.14 | 1.16 | 4.0 | 4.0 |
| **16-8 TRBU** | 1 | 1/2 | 1 1/16 | 2.05 | 1.13 | 4.0 | 4.0 |
| **16-10 TRBU** | 1 | 5/8 | 1 1/16 | 2.11 | 1.13 | 4.0 | 4.0 |
| **16-12 TRBU** | 1 | 3/4 | 1 1/8 | 2.25 | 1.13 | 4.0 | 4.0 |
| **20-16 TRBU** | 1 1/4 | 1 | 1 3/8 | 2.28 | 1.16 | 3.0 | 3.0 |
| **24-12 TRBU** | 1 1/2 | 3/4 | 1 5/8 | 2.45 | 1.25 | 2.0 | 2.0 |
| **24-16 TRBU** | 1 1/2 | 1 | 1 5/8 | 2.45 | 1.25 | 2.0 | 2.0 |
| **24-20 TRBU** | 1 1/2 | 1 1/4 | 1 7/8 | 2.45 | 1.25 | 2.0 | 2.0 |

# V5BU

45° Straight Thread Elbow
Flareless / SAE-ORB

SAE 080320



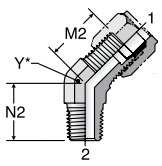

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | M2 (in.) | M8 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 V5BU** | 1/4 | 7/16 - 20 | 0.70 | 1.05 | 7/16 | 5.0 | 5.0 |
| **6 V5BU** | 3/8 | 9/16 - 18 | 0.83 | 1.14 | 9/16 | 5.0 | 5.0 |
| **8 V5BU** | 1/2 | 3/4 - 16 | 0.98 | 1.30 | 3/4 | 5.0 | 5.0 |
| **12 V5BU** | 3/4 | 1 1/16 - 12 | 1.27 | 1.73 | 1 1/16 | 4.0 | 4.0 |
| **16 V5BU** | 1 | 1 5/16 - 12 | 1.36 | 1.86 | 1 5/16 | 3.0 | 3.0 |

# VBU

45° Male Elbow
Flareless / NPTF

SAE 080302




* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M2 (in.) | N2 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **3 VBU** | 3/16 | 1/8 - 27 | 0.64 | 0.52 | 7/16 | 5.0 | 5.0 |
| **4 VBU** | 1/4 | 1/8 - 27 | 0.70 | 0.64 | 7/16 | 5.0 | 5.0 |
| **4-4 VBU** | 1/4 | 1/4 - 18 | 0.81 | 0.86 | 9/16 | 5.0 | 5.0 |
| **5 VBU** | 5/16 | 1/8 - 27 | 0.75 | 0.66 | 9/16 | 5.0 | 5.0 |
| **6 VBU** | 3/8 | 1/4 - 18 | 0.83 | 0.86 | 9/16 | 5.0 | 5.0 |
| **8 VBU** | 1/2 | 3/8 - 18 | 0.98 | 0.95 | 3/4 | 5.0 | 5.0 |
| **10 VBU** | 5/8 | 1/2 - 14 | 1.08 | 1.17 | 7/8 | 4.5 | 4.5 |
| **12 VBU** | 3/4 | 3/4 - 14 | 1.27 | 1.20 | 1 1/16 | 4.0 | 4.0 |
| **14 VBU** | 7/8 | 3/4 - 14 | 1.34 | 1.30 | 1 5/16 | 3.0 | 3.0 |
| **16 VBU** | 1 | 1 - 11 1/2 | 1.36 | 1.48 | 1 5/16 | 3.0 | 3.0 |
| **20 VBU** | 1 1/4 | 1 1/4 - 11 1/2 | 1.45 | 1.67 | 1 5/8 | 2.5 | 2.5 |

Dimensions and pressures for reference only, subject to change.





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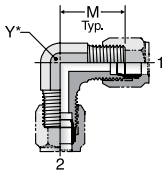
# EBU

Union Elbow
Flareless / Flareless

SAE 080201

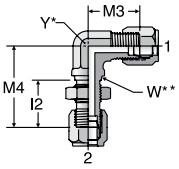



* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | M (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **2 EBU** | 1/8 | 1/8 | 0.78 | 7/16 | 5.0 | 5.0 |
| **4 EBU** | 1/4 | 1/4 | 0.89 | 7/16 | 5.0 | 5.0 |
| **5 EBU** | 5/16 | 5/16 | 0.95 | 9/16 | 5.0 | 5.0 |
| **6 EBU** | 3/8 | 3/8 | 1.05 | 9/16 | 5.0 | 5.0 |
| **8 EBU** | 1/2 | 1/2 | 1.25 | 3/4 | 5.0 | 5.0 |
| **10 EBU** | 5/8 | 5/8 | 1.42 | 7/8 | 4.5 | 4.5 |
| **12 EBU** | 3/4 | 3/4 | 1.58 | 1 1/16 | 4.0 | 4.0 |
| **14 EBU** | 7/8 | 7/8 | 1.66 | 1 5/16 | 3.0 | 3.0 |
| **16 EBU** | 1 | 1 | 1.73 | 1 5/16 | 3.0 | 3.0 |
| **20 EBU** | 1 1/4 | 1 1/4 | 1.89 | 1 5/8 | 2.5 | 2.5 |
| **24 EBU** | 1 1/2 | 1 1/2 | 2.02 | 1 7/8 | 2.0 | 2.0 |
| **32 EBU** | 2 | 2 | 2.45 | 2 1/2 | 1.5 | 1.5 |

# WEBU

Bulkhead Union Elbow
Flareless / Flareless Bulkhead




* Y – Across wrench flats.
W** – Bulkhead pilot dia. recommended clearance hole is +.015 over W dia.

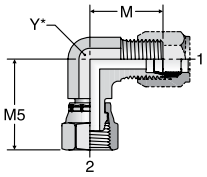
| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | I2 (in.) | M3 (in.) | M4 (in.) | W DIA (in.) | Y (in.) | Max. Bulkhead Thickness | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|---|
| **4 WEBU** | 1/4 | 1/4 | 0.94 | 0.95 | 1.52 | 0.44 | 7/16 | 0.28 | 5.0 | 5.0 |
| **6 WEBU** | 3/8 | 3/8 | 0.98 | 1.08 | 1.70 | 0.56 | 9/16 | 0.26 | 5.0 | 5.0 |
| **8 WEBU** | 1/2 | 1/2 | 1.12 | 1.33 | 1.97 | 0.75 | 3/4 | 0.30 | 5.0 | 5.0 |
| **10 WEBU** | 5/8 | 5/8 | 1.27 | 1.52 | 2.27 | 0.88 | 7/8 | 0.38 | 4.5 | 4.5 |
| **12 WEBU** | 3/4 | 3/4 | 1.38 | 1.64 | 2.48 | 1.06 | 1 1/16 | 0.38 | 4.0 | 4.0 |
| **16 WEBU** | 1 | 1 | 1.38 | 1.73 | 2.61 | 1.31 | 1 5/16 | 0.38 | 3.0 | 3.0 |

Includes WLN locknut.

# C6BU

Swivel Nut Elbow
Flareless / Flareless Swivel

SAE 080221



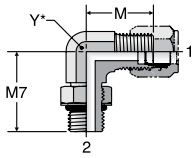

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | M (in.) | M5 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 C6BU** | 1/4 | 1/4 | 0.89 | 1.00 | 7/16 | 5.0 | 5.0 |
| **6 C6BU** | 3/8 | 3/8 | 1.05 | 1.25 | 9/16 | 5.0 | 5.0 |
| **8 C6BU** | 1/2 | 1/2 | 1.25 | 1.38 | 3/4 | 5.0 | 5.0 |
| **10 C6BU** | 5/8 | 5/8 | 1.42 | 1.62 | 7/8 | 4.5 | 4.5 |
| **12 C6BU** | 3/4 | 3/4 | 1.58 | 1.75 | 1 1/16 | 4.0 | 4.0 |
| **16 C6BU** | 1 | 1 | 1.73 | 2.00 | 1 5/16 | 3.0 | 3.0 |
| **20 C6BU** | 1 1/4 | 1 1/4 | 1.89 | 2.31 | 1 5/8 | 2.5 | 2.5 |

# C5BU

Straight Thread Elbow
Flareless / SAE-ORB

SAE 080220




* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | M (in.) | M7 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **3 C5BU** | 3/16 | 3/8 - 24 | 0.84 | 0.94 | 7/16 | 5.0 | 5.0 |
| **4 C5BU** | 1/4 | 7/16 - 20 | 0.89 | 1.03 | 7/16 | 5.0 | 5.0 |
| **5 C5BU** | 5/16 | 1/2 - 20 | 0.95 | 1.13 | 9/16 | 5.0 | 5.0 |
| **6 C5BU** | 3/8 | 9/16 - 18 | 1.05 | 1.25 | 9/16 | 5.0 | 5.0 |
| **6-8 C5BU** | 3/8 | 3/4 - 16 | 1.14 | 1.45 | 3/4 | 5.0 | 5.0 |
| **8 C5BU** | 1/2 | 3/4 - 16 | 1.25 | 1.45 | 3/4 | 5.0 | 5.0 |
| **8-6 C5BU** | 1/2 | 9/16 - 18 | 1.27 | 1.33 | 3/4 | 5.0 | 5.0 |
| **8-10 C5BU** | 1/2 | 7/8 - 14 | 1.34 | 1.70 | 7/8 | 4.5 | 4.5 |
| **8-12 C5BU** | 1/2 | 1 1/16 - 12 | 1.43 | 1.94 | 1 1/16 | 4.0 | 4.0 |
| **10 C5BU** | 5/8 | 7/8 - 14 | 1.42 | 1.70 | 7/8 | 4.5 | 4.5 |
| **12 C5BU** | 3/4 | 1 1/16 - 12 | 1.58 | 1.94 | 1 1/16 | 4.0 | 4.0 |
| **12-8 C5BU** | 3/4 | 3/4 - 16 | 1.58 | 1.63 | 1 1/16 | 4.0 | 4.0 |
| **12-10 C5BU** | 3/4 | 7/8 - 14 | 1.58 | 1.78 | 1 1/16 | 4.0 | 4.0 |
| **12-16 C5BU** | 3/4 | 1 5/16 - 12 | 1.73 | 2.05 | 1 5/16 | 3.0 | 3.0 |
| **16 C5BU** | 1 | 1 5/16 - 12 | 1.73 | 2.05 | 1 5/16 | 3.0 | 3.0 |
| **16-12 C5BU** | 1 | 1 1/16 - 12 | 1.73 | 2.05 | 1 5/16 | 3.0 | 3.0 |
| **20 C5BU** | 1 1/4 | 1 5/8 - 12 | 1.89 | 2.25 | 1 5/8 | 2.5 | 2.5 |
| **24 C5BU** | 1 1/2 | 1 7/8 - 12 | 2.02 | 2.39 | 1 7/8 | 2.0 | 2.0 |
| **32 C5BU** | 2 | 2 1/2 - 12 | 2.45 | 2.89 | 2 1/2 | 1.5 | 1.5 |

Dimensions and pressures for reference only, subject to change.

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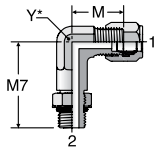
**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# CC5BU

Straight Thread Elbow
Flareless / SAE-ORB Long



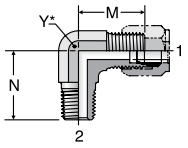

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2A | M (in.) | M7 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 CC5BU** | 1/4 | 7/16 - 20 | 0.89 | 1.43 | 7/16 | 5.0 | 5.0 |
| **6 CC5BU** | 3/8 | 9/16 - 18 | 1.05 | 1.72 | 9/16 | 5.0 | 5.0 |
| **8 CC5BU** | 1/2 | 3/4 - 16 | 1.25 | 2.02 | 3/4 | 5.0 | 5.0 |
| **10 CC5BU** | 5/8 | 7/8 - 14 | 1.42 | 2.39 | 7/8 | 4.5 | 4.5 |
| **12 CC5BU** | 3/4 | 1 1/16 - 12 | 1.58 | 2.69 | 1 1/16 | 4.0 | 4.0 |
| **16 CC5BU** | 1 | 1 5/16 - 12 | 1.73 | 3.13 | 1 5/16 | 3.0 | 3.0 |

# CBU

Male Elbow
Flareless / NPTF

SAE 080202



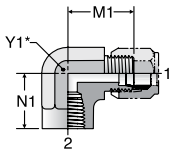

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **2 CBU** | 1/8 | 1/8 - 27 | 0.77 | 0.72 | 7/16 | 5.0 | 5.0 |
| **3 CBU** | 3/16 | 1/8 - 27 | 0.83 | 0.72 | 7/16 | 5.0 | 5.0 |
| **4 CBU** | 1/4 | 1/8 - 27 | 0.89 | 0.78 | 7/16 | 5.0 | 5.0 |
| **4-4 CBU** | 1/4 | 1/4 - 18 | 1.03 | 1.09 | 9/16 | 5.0 | 5.0 |
| **4-6 CBU** | 1/4 | 3/8 - 18 | 1.12 | 1.22 | 3/4 | 5.0 | 5.0 |
| **5 CBU** | 5/16 | 1/8 - 27 | 0.95 | 0.81 | 9/16 | 5.0 | 5.0 |
| **5-4 CBU** | 5/16 | 1/4 - 18 | 1.03 | 1.09 | 9/16 | 5.0 | 5.0 |
| **6 CBU** | 3/8 | 1/4 - 18 | 1.05 | 1.09 | 9/16 | 5.0 | 5.0 |
| **6-2 CBU** | 3/8 | 1/8 - 27 | 1.05 | 0.90 | 9/16 | 5.0 | 5.0 |
| **6-6 CBU** | 3/8 | 3/8 - 18 | 1.14 | 1.22 | 3/4 | 5.0 | 5.0 |
| **6-8 CBU** | 3/8 | 1/2 - 14 | 1.24 | 1.47 | 7/8 | 5.0 | 5.0 |
| **8 CBU** | 1/2 | 3/8 - 18 | 1.25 | 1.22 | 3/4 | 5.0 | 5.0 |
| **8-4 CBU** | 1/2 | 1/4 - 18 | 1.25 | 1.16 | 3/4 | 5.0 | 5.0 |
| **8-8 CBU** | 1/2 | 1/2 - 14 | 1.35 | 1.47 | 7/8 | 5.0 | 5.0 |
| **8-12 CBU** | 1/2 | 3/4 - 14 | 1.43 | 1.59 | 1 1/16 | 4.0 | 4.0 |
| **10 CBU** | 5/8 | 1/2 - 14 | 1.42 | 1.47 | 7/8 | 4.5 | 4.5 |
| **10-6 CBU** | 5/8 | 3/8 - 18 | 1.42 | 1.28 | 7/8 | 4.5 | 4.5 |
| **12 CBU** | 3/4 | 3/4 - 14 | 1.58 | 1.59 | 1 1/16 | 4.0 | 4.0 |
| **12-8 CBU** | 3/4 | 1/2 - 14 | 1.58 | 1.59 | 1 1/16 | 4.0 | 4.0 |
| **14 CBU** | 7/8 | 3/4 - 14 | 1.66 | 1.69 | 1 5/16 | 3.0 | 3.0 |
| **16 CBU** | 1 | 1 - 11 1/2 | 1.73 | 1.97 | 1 5/16 | 3.0 | 3.0 |
| **16-12 CBU** | 1 | 3/4 - 14 | 1.73 | 1.78 | 1 5/16 | 3.0 | 3.0 |
| **20 CBU** | 1 1/4 | 1 1/4 - 11 1/2 | 1.89 | 2.38 | 1 5/8 | 2.5 | 2.5 |
| **24 CBU** | 1 1/2 | 1 1/2 - 11 1/2 | 2.02 | 2.64 | 1 7/8 | 2.5 | 2.5 |
| **32 CBU** | 2 | 2 - 11 1/2 | 2.45 | 3.00 | 2 1/2 | 2.0 | 2.0 |

# DBU

Female Elbow
Flareless / NPTF

SAE 080203




* Y1 – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M1 (in.) | N1 (in.) | Y1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 DBU** | 1/4 | 1/8 - 27 | 0.89 | 0.66 | 9/16 | 5.0 | 5.0 |
| **4-4 DBU** | 1/4 | 1/4 - 18 | 1.03 | 0.88 | 3/4 | 5.0 | 5.0 |
| **5 DBU** | 5/16 | 1/8 - 27 | 0.95 | 0.66 | 9/16 | 5.0 | 5.0 |
| **6 DBU** | 3/8 | 1/4 - 18 | 1.05 | 0.88 | 3/4 | 5.0 | 5.0 |
| **6-6 DBU** | 3/8 | 3/8 - 18 | 1.13 | 1.02 | 7/8 | 4.5 | 4.5 |
| **8 DBU** | 1/2 | 3/8 - 18 | 1.23 | 1.02 | 7/8 | 3.0 | 3.0 |
| **8-4 DBU** | 1/2 | 1/4 - 18 | 1.23 | 0.88 | 3/4 | 5.0 | 5.0 |
| **8-8 DBU** | 1/2 | 1/2 - 14 | 1.34 | 1.23 | 1 1/16 | 3.0 | 3.0 |
| **10 DBU** | 5/8 | 1/2 - 14 | 1.42 | 1.23 | 1 1/16 | 3.0 | 3.0 |
| **12 DBU** | 3/4 | 3/4 - 14 | 1.58 | 1.36 | 1 5/16 | 3.0 | 3.0 |
| **14 DBU** | 7/8 | 3/4 - 14 | 1.62 | 1.42 | 1 5/16 | 3.0 | 3.0 |
| **16 DBU** | 1 | 1 - 11 1/2 | 1.73 | 1.63 | 1 5/8 | 1.7 | 1.7 |
| **20 DBU** | 1 1/4 | 1 1/4 - 11 1/2 | 2.08 | 1.70 | 1 7/8 | 1.5 | 1.5 |
| **24 DBU** | 1 1/2 | 1 1/2 - 11 1/2 | 2.58 | 2.08 | 2 1/2 | 1.0 | 1.0 |



Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
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Columbus, Ohio
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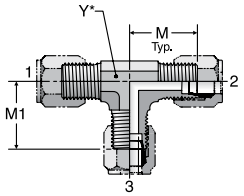
# JBU

Union Tee
Flareless (all three ends)

SAE 080401



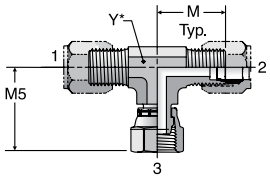

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 (in.) | M (in.) | M1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|
| **2 JBU** | 1/8 | 1/8 | 1/8 | 0.77 | 0.77 | 7/16 | 5.0 | 5.0 |
| **3 JBU** | 3/16 | 3/16 | 3/16 | 0.84 | 0.84 | 7/16 | 5.0 | 5.0 |
| **4 JBU** | 1/4 | 1/4 | 1/4 | 0.89 | 0.89 | 7/16 | 5.0 | 5.0 |
| **5 JBU** | 5/16 | 5/16 | 5/16 | 0.95 | 0.95 | 9/16 | 5.0 | 5.0 |
| **6 JBU** | 3/8 | 3/8 | 3/8 | 1.05 | 1.05 | 9/16 | 5.0 | 5.0 |
| **8 JBU** | 1/2 | 1/2 | 1/2 | 1.25 | 1.25 | 3/4 | 5.0 | 5.0 |
| **8-8-6 JBU** | 1/2 | 1/2 | 3/8 | 1.25 | 1.14 | 3/4 | 5.0 | 5.0 |
| **10 JBU** | 5/8 | 5/8 | 5/8 | 1.42 | 1.42 | 7/8 | 4.5 | 4.5 |
| **12 JBU** | 3/4 | 3/4 | 3/4 | 1.58 | 1.58 | 1 1/16 | 4.0 | 4.0 |
| **14 JBU** | 7/8 | 7/8 | 7/8 | 1.66 | 1.66 | 1 5/16 | 3.0 | 3.0 |
| **16 JBU** | 1 | 1 | 1 | 1.73 | 1.73 | 1 5/16 | 3.0 | 3.0 |
| **20 JBU** | 1 1/4 | 1 1/4 | 1 1/4 | 1.89 | 1.89 | 1 5/8 | 2.5 | 2.5 |
| **24 JBU** | 1 1/2 | 1 1/2 | 1 1/2 | 2.02 | 2.02 | 1 7/8 | 2.0 | 2.0 |

# S6BU

Swivel Nut Branch Tee
Flareless / Flareless
Swivel

SAE 080433



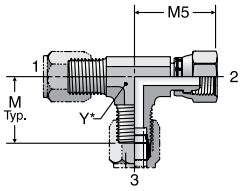

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 (in.) | M (in.) | M5 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|
| **4 S6BU** | 1/4 | 1/4 | 1/4 | 0.89 | 1.00 | 7/16 | 5.0 | 5.0 |
| **6 S6BU** | 3/8 | 3/8 | 3/8 | 1.05 | 1.25 | 9/16 | 5.0 | 5.0 |
| **8 S6BU** | 1/2 | 1/2 | 1/2 | 1.25 | 1.38 | 3/4 | 5.0 | 5.0 |
| **12 S6BU** | 3/4 | 3/4 | 3/4 | 1.58 | 1.75 | 1 1/16 | 4.0 | 4.0 |
| **16 S6BU** | 1 | 1 | 1 | 1.73 | 2.00 | 15/16 | 3.0 | 3.0 |

# R6BU

Swivel Nut Run Tee
Flareless / Flareless
Swivel

SAE 080432



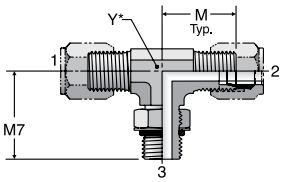

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 (in.) | M (in.) | M5 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|
| 4 R6BU | 1/4 | 1/4 | 1/4 | 0.89 | 1.00 | 7/16 | 5.0 | 5.0 |
| 6 R6BU | 3/8 | 3/8 | 3/8 | 1.05 | 1.25 | 9/16 | 5.0 | 5.0 |
| 8 R6BU | 1/2 | 1/2 | 1/2 | 1.25 | 1.38 | 3/4 | 5.0 | 5.0 |
| 12 R6BU | 3/4 | 3/4 | 3/4 | 1.58 | 1.75 | 1 1/16 | 4.0 | 4.0 |
| 16 R6BU | 1 | 1 | 1 | 1.73 | 2.00 | 1 5/16 | 3.0 | 3.0 |

# S5BU

Straight Thread
Branch Tee
Flareless / SAE-ORB

SAE 080429




* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 UN/UNF-2A | M (in.) | M7 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|
| **4 S5BU** | 1/4 | 1/4 | 7/16 - 20 | 0.89 | 1.03 | 7/16 | 5.0 | 5.0 |
| **6 S5BU** | 3/8 | 3/8 | 9/16 - 18 | 1.05 | 1.25 | 9/16 | 5.0 | 5.0 |
| **8 S5BU** | 1/2 | 1/2 | 3/4 - 16 | 1.25 | 1.45 | 3/4 | 5.0 | 5.0 |
| **12 S5BU** | 3/4 | 3/4 | 1 1/16 - 12 | 1.58 | 1.94 | 1 1/16 | 4.0 | 4.0 |
| **16 S5BU** | 1 | 1 | 1 5/16 - 12 | 1.73 | 2.05 | 1 5/16 | 3.0 | 3.0 |

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Tube Fittings Division
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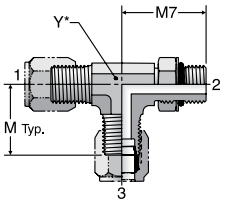
# R5BU

Straight Thread Run Tee
Flareless / SAE-ORB

SAE 080428



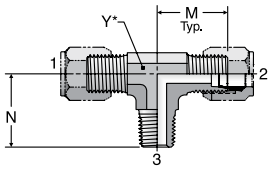

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 UN/UNF-2A | 3 (in.) | M (in.) | M7 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|
| **4 R5BU** | 1/4 | 7/16 - 20 | 1/4 | 0.89 | 1.03 | 7/16 | 5.0 | 5.0 |
| **6 R5BU** | 3/8 | 9/16 - 18 | 3/8 | 1.05 | 1.25 | 9/16 | 5.0 | 5.0 |
| **8 R5BU** | 1/2 | 3/4 - 16 | 1/2 | 1.25 | 1.45 | 3/4 | 5.0 | 5.0 |
| **10 R5BU** | 5/8 | 7/8 - 14 | 5/8 | 1.42 | 1.70 | 7/8 | 4.5 | 4.5 |
| **12 R5BU** | 3/4 | 1 1/16 - 12 | 3/4 | 1.58 | 1.94 | 1 1/16 | 4.0 | 4.0 |
| **16 R5BU** | 1 | 1 5/16 - 12 | 1 | 1.73 | 2.05 | 1 5/16 | 3.0 | 3.0 |

# SBU

Male Branch Tee
Flareless / NPTF

SAE 080425



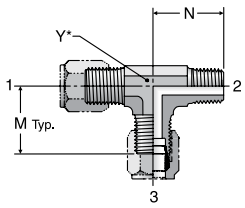

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 NPTF | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|
| **2 SBU** | 1/8 | 1/8 | 1/8 - 27 | 0.77 | 0.72 | 7/16 | 5.0 | 5.0 |
| **4 SBU** | 1/4 | 1/4 | 1/8 - 27 | 0.89 | 0.78 | 7/16 | 5.0 | 5.0 |
| **4-4-4 SBU** | 1/4 | 1/4 | 1/4 - 18 | 1.03 | 1.09 | 9/16 | 5.0 | 5.0 |
| **5 SBU** | 5/16 | 5/16 | 1/8 - 27 | 0.95 | 0.81 | 9/16 | 5.0 | 5.0 |
| **6 SBU** | 3/8 | 3/8 | 1/4 - 18 | 1.05 | 1.09 | 9/16 | 5.0 | 5.0 |
| **8 SBU** | 1/2 | 1/2 | 3/8 - 18 | 1.25 | 1.22 | 3/4 | 5.0 | 5.0 |
| **8-8-8 SBU** | 1/2 | 1/2 | 1/2 - 14 | 1.35 | 1.47 | 7/8 | 5.0 | 5.0 |
| **10 SBU** | 5/8 | 5/8 | 1/2 - 14 | 1.42 | 1.47 | 7/8 | 4.5 | 4.5 |
| **12 SBU** | 3/4 | 3/4 | 3/4 - 14 | 1.58 | 1.59 | 1 1/16 | 4.0 | 4.0 |
| **14 SBU** | 7/8 | 7/8 | 3/4 - 14 | 1.66 | 1.69 | 1 5/16 | 3.0 | 3.0 |
| **16 SBU** | 1 | 1 | 1 - 11 1/2 | 1.73 | 1.97 | 1 5/16 | 3.0 | 3.0 |

# RBU

Male Run Tee
Flareless / NPTF

SAE 080424



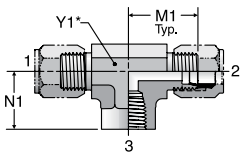

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 NPTF | 3 (in.) | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|
| **4 RBU** | 1/4 | 1/8 - 27 | 1/4 | 0.89 | 0.78 | 7/16 | 5.0 | 5.0 |
| **4-4-4 RBU** | 1/4 | 1/4 - 18 | 1/4 | 1.03 | 1.09 | 9/16 | 5.0 | 5.0 |
| **5 RBU** | 5/16 | 1/8 - 27 | 5/16 | 0.95 | 0.81 | 9/16 | 5.0 | 5.0 |
| **6 RBU** | 3/8 | 1/4 - 18 | 3/8 | 1.05 | 1.09 | 9/16 | 5.0 | 5.0 |
| **8 RBU** | 1/2 | 3/8 - 18 | 1/2 | 1.25 | 1.22 | 3/4 | 5.0 | 5.0 |
| **8-8-8 RBU** | 1/2 | 1/2 - 14 | 1/2 | 1.35 | 1.47 | 7/8 | 5.0 | 5.0 |
| **10 RBU** | 5/8 | 1/2 - 14 | 5/8 | 1.42 | 1.47 | 7/8 | 4.5 | 4.5 |
| **12 RBU** | 3/4 | 3/4 - 14 | 3/4 | 1.58 | 1.59 | 1 1/16 | 4.0 | 4.0 |
| **14 RBU** | 7/8 | 3/4 - 14 | 7/8 | 1.66 | 1.69 | 1 5/16 | 3.0 | 3.0 |
| **16 RBU** | 1 | 1 - 11 1/2 | 1 | 1.73 | 1.97 | 1 5/16 | 3.0 | 3.0 |

# OBU

Female Branch Tee
Flareless / NPTF

SAE 080427




* Y1 – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 NPTF | M1 (in.) | N1 (in.) | Y1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|
| **4 OBU** | 1/4 | 1/4 | 1/8 - 27 | 0.89 | 0.66 | 9/16 | 5.0 | 5.0 |
| **4-4-4 OBU** | 1/4 | 1/4 | 1/4 - 18 | 1.03 | 0.88 | 3/4 | 5.0 | 5.0 |
| **6 OBU** | 3/8 | 3/8 | 1/4 - 18 | 1.05 | 0.88 | 3/4 | 5.0 | 5.0 |
| **8 OBU** | 1/2 | 1/2 | 3/8 - 18 | 1.23 | 1.02 | 7/8 | 3.0 | 3.0 |
| **10 OBU** | 5/8 | 5/8 | 1/2 - 14 | 1.42 | 1.23 | 1 1/16 | 3.0 | 3.0 |
| **12 OBU** | 3/4 | 3/4 | 3/4 - 14 | 1.58 | 1.36 | 1 5/16 | 3.0 | 3.0 |
| **14 OBU** | 7/8 | 7/8 | 3/4 - 14 | 1.62 | 1.42 | 1 5/16 | 3.0 | 3.0 |
| **16 OBU** | 1 | 1 | 1 - 11 1/2 | 1.73 | 1.63 | 1 5/8 | 1.7 | 1.7 |
| **20 OBU** | 1 1/4 | 1 1/4 | 1 1/4 - 11 1/2 | 2.08 | 1.70 | 1 7/8 | 1.5 | 1.5 |



Dimensions and pressures for reference only, subject to change.

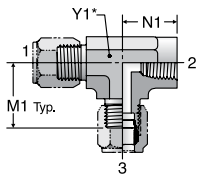


**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# MBU

Female Run Tee
Flareless / NPTF

SAE 080426



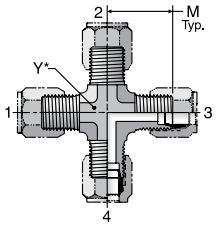

* Y1 – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 NPTF | 3 (in.) | M1 (in.) | N1 (in.) | Y1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|---|
| **4 MBU** | 1/4 | 1/8 - 27 | 1/4 | 0.89 | 0.66 | 9/16 | 5.0 | 5.0 |
| **6 MBU** | 3/8 | 1/4 - 18 | 3/8 | 1.05 | 0.88 | 3/4 | 5.0 | 5.0 |
| **8 MBU** | 1/2 | 3/8 - 18 | 1/2 | 1.23 | 1.02 | 7/8 | 3.0 | 3.0 |
| **10 MBU** | 5/8 | 1/2 - 14 | 5/8 | 1.42 | 1.23 | 1 1/16 | 3.0 | 3.0 |
| **12 MBU** | 3/4 | 3/4 - 14 | 3/4 | 1.58 | 1.36 | 1 5/16 | 3.0 | 3.0 |
| **16 MBU** | 1 | 1 - 11 1/2 | 1 | 1.73 | 1.62 | 1 5/8 | 1.7 | 1.7 |

# KBU

Union Cross
Flareless (all four ends)

SAE 080501



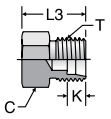

* Y – Across wrench flats

| TUBE FITTING PART # | END SIZE 1-4 (in.) | M (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|
| **4 KBU** | 1/4 | 0.89 | 7/16 | 5.0 | 5.0 |
| **6 KBU** | 3/8 | 1.05 | 9/16 | 5.0 | 5.0 |
| **8 KBU** | 1/2 | 1.25 | 3/4 | 5.0 | 5.0 |
| **12 KBU** | 3/4 | 1.58 | 1 1/16 | 4.0 | 4.0 |

# PNU

Plug
Flareless

SAE 080109

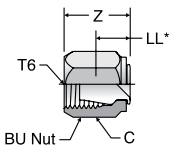



| TUBE FITTING PART # | TUBE O.D. (in.) | T TUBE END UN/UNF-2A | C HEX (in.) | K (in.) | L3 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS |
|---|---|---|---|---|---|---|---|
| **2 PNU** | 1/8 | 5/16 - 24 | 7/16 | 0.19 | 0.63 | 6.0 | 6.0 |
| **4 PNU** | 1/4 | 7/16 - 20 | 1/2 | 0.24 | 0.72 | 6.0 | 6.0 |
| **5 PNU** | 5/16 | 1/2 - 20 | 9/16 | 0.26 | 0.72 | 6.0 | 6.0 |
| **6 PNU** | 3/8 | 9/16 - 18 | 5/8 | 0.26 | 0.75 | 6.0 | 6.0 |
| **8 PNU** | 1/2 | 3/4 - 16 | 13/16 | 0.31 | 0.84 | 5.0 | 5.0 |
| **10 PNU** | 5/8 | 7/8 - 14 | 15/16 | 0.36 | 0.97 | 5.0 | 5.0 |
| **12 PNU** | 3/4 | 1 1/16 - 12 | 1 1/8 | 0.36 | 1.09 | 4.5 | 4.5 |
| **16 PNU** | 1 | 1 5/16 - 12 | 1 3/8 | 0.42 | 1.09 | 4.0 | 4.0 |

# FNU

Cap
Flareless Swivel

SAE 080112




* LL – Fitting end to rear of plug

| TUBE FITTING PART # | TUBE O.D. (in.) | T6 UN/UNF-2B | C HEX (in.) | LL (in.) | Z (in.) |
|---|---|---|---|---|---|
| **2 FNU** | 1/8 | 5/16 - 24 | 3/8 | 0.34 | 0.55 |
| **4 FNU** | 1/4 | 7/16 - 20 | 9/16 | 0.36 | 0.73 |
| **5 FNU** | 5/16 | 1/2 - 20 | 5/8 | 0.40 | 0.77 |
| **6 FNU** | 3/8 | 9/16 - 18 | 11/16 | 0.42 | 0.80 |
| **8 FNU** | 1/2 | 3/4 - 16 | 7/8 | 0.44 | 0.87 |
| **10 FNU** | 5/8 | 7/8 - 14 | 1 | 0.47 | 0.98 |
| **12 FNU** | 3/4 | 1 1/16 - 12 | 1 1/4 | 0.48 | 1.00 |
| **16 FNU** | 1 | 1 5/16 - 12 | 1 1/2 | 0.58 | 1.08 |
| **20 FNU** | 1 1/4 | 1 5/8 - 12 | 2 | 0.64 | 1.11 |

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Dimensions and pressures for reference only, subject to change.



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# Intru-lok® Flareless Bite Type Fittings

D

Parker

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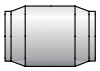
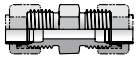
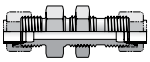
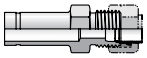
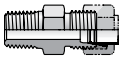
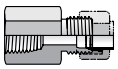
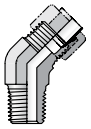
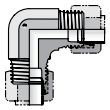
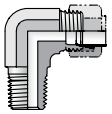
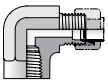
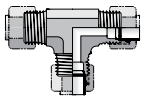
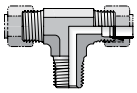
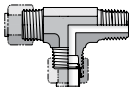
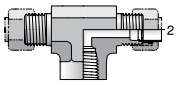
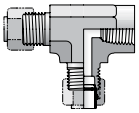
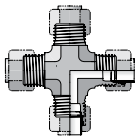
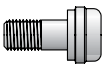
|---|---|---|---|---|---|
| **Nuts, Ferrules, Inserts** | **BIP**<br>Knurled Nut<br> <br>D5 | **BI2**<br>Nut<br> <br>D5 | **BTI2**<br>Nut and Ferrule<br> <br>D5 | **TI2**<br>Ferrule<br> <br>D5 | **TIP**<br>Expander / Insert<br>  <br>D5 |
| **T23UI**<br>Insert<br> <br>D5 | **Straights** | **HBI2**<br>Union<br>  <br>D6 | **WBI2**<br>Bulkhead Union<br>  <br>D6 | **TRBI2**<br>Tube End Reducer<br>  <br>D6 | **FBI2**<br>NPTF / Intru-Lok<br>  <br>D6 |
| **GBI2**<br>NPTF / Intru-Lok<br>  <br>D6 | **45° Elbow** | **VBI2**<br>NPTF / Intru-Lok<br>  <br>D6 | **90° Elbows** | **EBI2**<br>Union Elbow<br>  <br>D7 | **CBI2**<br>NPTF / Intru-Lok<br>  <br>D7 |
| **DBI2**<br>NPTF / Intru-Lok<br>  <br>D7 | **Tees** | **JBI2**<br>Union Tee<br>  <br>D7 | **SBI2**<br>NPTF Branch Tee<br>  <br>D7 | **RBI2**<br>NPTF Run Tee<br>  <br>D7 | **OBI2**<br>NPTF Branch Tee<br>  <br>D8 |
| **MBI2**<br>NPTF Run Tee<br>  <br>D8 | **Cross** | **KBI2**<br>Union Cross<br>  <br>D8 | **Plugs and Caps** | **PNI**<br>Plug<br> <br>D8 | **FNI**<br>Cap<br> <br>D8 |
| **T22X**<br>Mountie<br>  <br>B32 | | | | | |

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# Intru-Lok Flareless Bite Type Fittings

The Intru-Lok bite type fitting was developed by Parker Hannifin and introduced to the U.S. market in the late 1950's. This fitting addresses those applications that require a bite by the ferrule in brass, copper, aluminum and plastic tubing systems. The Intru-Lok fitting is a flareless fitting that consists of a body, a one-piece precision-machined ferrule, and a nut (Fig. D1). On assembly, the ferrule "bites" into the outer surface of the tube with sufficient strength to hold the tube against pressure. The ferrule also forms a pressure seal against the fitting body.

Intru-Lok fittings allow the fitting assembler to visually inspect the bite quality, thus significantly minimizing the risk of improper assembly and related service problems.

Intru-Lok fittings are routinely used in markets, such as: Machine tools, chemical, oil refineries, paper making, thermoplastics processing, air and lube lines, pilot lines, panel boards, etc.

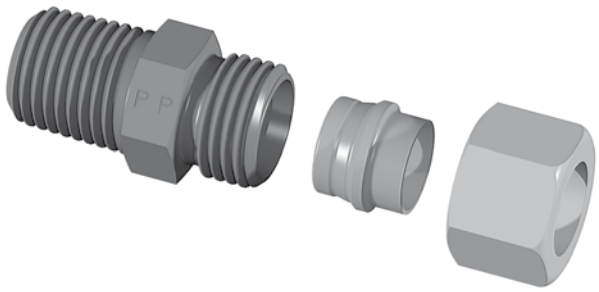

**Fig. D1 – Intru-Lok Components: Body, Ferrule and Nut**



# Design and Construction

The three components of Intru-Lok fittings are designed and manufactured to produce a reliable, leak free joint upon assembly. The ferrules are precision machined with all dimensions and surfaces, particularly the critical bite edge, monitored on an ongoing basis.

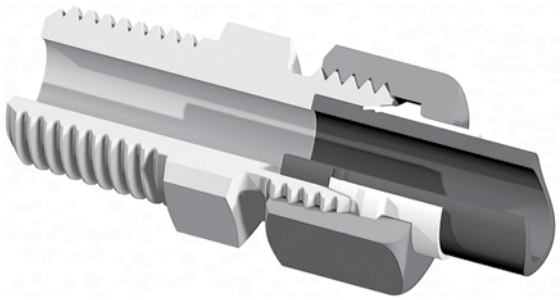

**Fig. D2 – Assembled Intru-Lok Fitting**

# How Intru-Lok Fittings Work

In assembly, the ferrule is driven forward on the tube by the nut during pre-set. As the ferrule moves forward it contacts the tapered seat area of the body, which causes the ferrule to cam inward into the tube. The leading edge of the ferrule is thus able to make a clean 360 degree cut into the outside diameter of the tubing. This cut in the tubing is often referred to as a "Bite"; thus the term: **Bite Type Fitting**. As the ferrule makes its bite, a small ridge of tube material is raised up in front of the ferrule.

# The Parker Advantage - Intru-Lok

**Bite Type Connection:** The Intru-Lok design includes a precision machined ferrule to assure a safe, leak-free, and vibration resistant connection compared to compression fittings. This provides a more reliable fitting where proper assembly can be verified by a visible bite by the ferrule into the tubing.

**Ease of Assembly:** Intru-Lok products include a ferrule and nut that do not need to be removed prior to insertion of the associated tubing for final assembly. Along with the low assembly torque require, the overall installation process is reduced, saving time and money.

**Knurled Nut:** In areas where wrench clearance are not available Parker offers an alternative knurled BIP nut. This nut can be tightened by hand allowing for quick assembly and disassembly without the use of tools.

# Reference locations

**Dynamic Pressure Ratings:** Please refer to the last column of the part number tables located on the following pages of this section for the appropriate dynamic pressure ratings.

**Assembly and Installation:** Please refer to Intru-Lok Assembly located within the Assembly/Installation section of this catalog.

**Standard material specifications:** Please refer to Table U1 located in the Appendix section.

Dimensions and pressures for reference only, subject to change.



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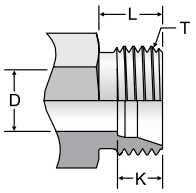
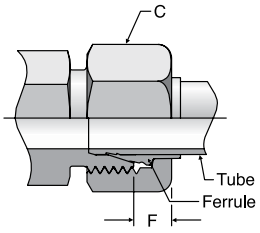
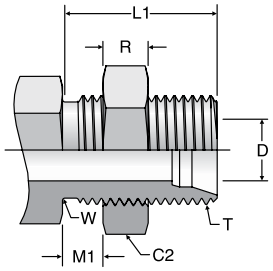
# Intrulok Flareless Tube Ends




**Intrulok Male Stud Tube End**




**Intrulok Tube End Assembly**




**Intrulok Straight Bulkhead**

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| | | Thread | Tube Nut Hex | Bulhkead Locknut Hex | Max Drill | Allowance | | Male Turn Back | Bulkhead | | | Max Bulkhead Thickness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tube Nut Assembled | Tube | | Length | Locknut Thickness | Pilot Dia | |
| **SAE Dash Size** | **Tube O.D.** (in.) | **T** UN/UNF | **C** (in.) | **C2** (in.) | **D** (in) | **F** (in) | **K** (in) | **L** (in) | **L1** (in) | **R** (in) | **W[1)]** (in) | **M1** (in) |
| **2** | 1/8 | 5/16-24 | 3/8 | 9/16 | 0.093 | 0.13 | 0.19 | 0.28 | NA | NA | NA | NA |
| **3** | 3/16 | 3/8-24 | 7/16 | 5/8 | 0.125 | 0.15 | 0.24 | 0.25 | NA | NA | NA | NA |
| **4** | 1/4 | 7/16-20 | 1/2 | 11/16 | 0.203 | 0.16 | 0.24 | 0.30 | 0.88 | 0.28 | 0.44 | 0.28 |
| **5** | 5/16 | 1/2-20 | 9/16 | 3/4 | 0.234 | 0.18 | 0.26 | 0.33 | NA | NA | NA | NA |
| **6** | 3/8 | 9/16-18 | 5/8 | 13/16 | 0.282 | 0.19 | 0.26 | 0.36 | 0.94 | 0.27 | 0.56 | 0.31 |
| **8** | 1/2 | 3/4-16 | 7/8 | 1 | 0.422 | 0.23 | 0.31 | 0.44 | 1.06 | 0.31 | 0.75 | 0.31 |

1) Recommended clearance hole +0.015 over W dia

Dimensions and pressures for reference only, subject to change.



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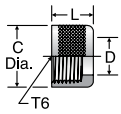
## BIP*

Knurled Nut
Intru-Lok

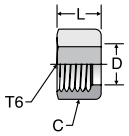



| TUBE FITTING PART # | END SIZE (in.) | T6 TUBE END UN/UNF-2B | D2 DIA. (in.) | D (in.) | L (in.) |
|---|---|---|---|---|---|
| 4 BIP | 1/4 | 7/16 - 20 | 0.50 | 0.26 | 0.39 |
| 6 BIP | 3/8 | 9/16 - 18 | 0.63 | 0.38 | 0.42 |

* For use with thermoplastic tube and TIP expander / insert.

## BI2

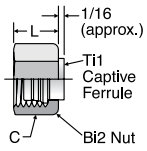
Nut
Intru-Lok




| TUBE FITTING PART # | END SIZE (in.) | T6 TUBE END UN/UNF-2B | C HEX (in.) | D (in.) | L (in.) |
|---|---|---|---|---|---|
| 2 BI2 | 1/8 | 5/16 - 24 | 3/8 | 0.17 | 0.36 |
| 3 BI2 | 3/16 | 3/8 - 24 | 7/16 | 0.23 | 0.34 |
| 4 BI2 | 1/4 | 7/16 - 20 | 1/2 | 0.30 | 0.44 |
| 5 BI2 | 5/16 | 1/2 - 20 | 9/16 | 0.36 | 0.45 |
| 6 BI2 | 3/8 | 9/16 - 18 | 5/8 | 0.42 | 0.45 |
| 8 BI2 | 1/2 | 3/4 - 16 | 7/8 | 0.56 | 0.58 |

## BTI2

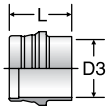
Nut and Ferrule
Intru-Lok




| TUBE FITTING PART # | END SIZE (in.) | C HEX (in.) | L (in.) |
|---|---|---|---|
| 2 BTI2 | 1/8 | 3/8 | 0.36 |
| 3 BTI2 | 3/16 | 7/16 | 0.34 |
| 4 BTI2 | 1/4 | 1/2 | 0.44 |
| 5 BTI2 | 5/16 | 9/16 | 0.45 |
| 6 BTI2 | 3/8 | 5/8 | 0.45 |
| 8 BTI2 | 1/2 | 7/8 | 0.58 |

## TI2

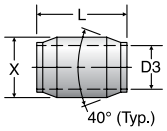
Ferrule
Intru-Lok




| TUBE FITTING PART # | TUBE O.D. (in.) | D3 (in.) | L (in.) |
|---|---|---|---|
| 2 TI2 | 1/8 | 0.13 | 0.35 |
| 3 TI2 | 3/16 | 0.19 | 0.39 |
| 4 TI2 | 1/4 | 0.26 | 0.40 |
| 5 TI2 | 5/16 | 0.32 | 0.42 |
| 6 TI2 | 3/8 | 0.38 | 0.41 |
| 8 TI2 | 1/2 | 0.51 | 0.52 |

## TIP*

Expander / Insert

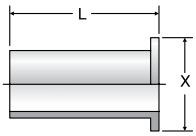



| TUBE FITTING PART # | TUBE O.D. (in.) | D3 (in.) | L (in.) | X DIA (in.) |
|---|---|---|---|---|
| 4 TIP | 1/4 | 0.14 | 0.45 | 0.22 |
| 6 TIP | 3/8 | 0.22 | 0.45 | 0.30 |

* For use with thermoplastic tube and BIP nut.

## T23UI

Insert




| TUBE FITTING PART # | TUBE O.D. (in.) | TUBE WALL THICKNESS (in.) | L (in.) | X DIA (in.) |
|---|---|---|---|---|
| 4 T23UI | 1/4 | 0.040 | 0.53 | 0.23 |
| 5 T23UI | 5/16 | 0.062 | 0.56 | 0.29 |
| 6 T23UI | 3/8 | 0.062 | 0.56 | 0.35 |
| 8 T23UI | 1/2 | 0.062 | 0.64 | 0.47 |

Dimensions and pressures for reference only, subject to change.



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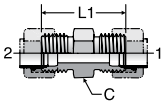
# HBI2

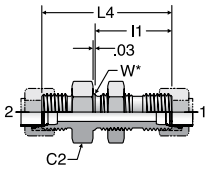
Union
Intru-Lok / Intru-Lok




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C HEX (in.) | L1 (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|
| 2 HBI2 | 1/8 | 1/8 | 3/8 | 0.81 | 1.5 |
| 3 HBI2 | 3/16 | 3/16 | 3/8 | 0.75 | 1.5 |
| 4 HBI2 | 1/4 | 1/4 | 7/16 | 0.84 | 1.5 |
| 5 HBI2 | 5/16 | 5/16 | 1/2 | 0.91 | 1.5 |
| 6 HBI2 | 3/8 | 3/8 | 9/16 | 1.03 | 1.5 |
| 8 HBI2 | 1/2 | 1/2 | 3/4 | 1.19 | 1.5 |

# WBI2

Bulkhead Union
Intru-Lok / Intru-Lok




* W – Pilot drill diameter

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C2 HEX (in.) | I1 (in.) | L4 (in.) | W DIA (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|---|
| 4 WBI2 | 1/4 | 1/4 | 9/16 | 0.88 | 1.34 | 0.44 | 1.5 |
| 6 WBI2 | 3/8 | 3/8 | 11/16 | 0.94 | 1.56 | 0.56 | 1.5 |
| 8 WBI2 | 1/2 | 1/2 | 7/8 | 1.06 | 1.75 | 0.75 | 1.5 |

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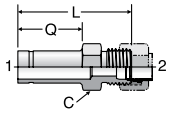
# TRBI2

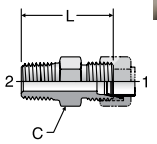
Tube End Reducer
Intru-Lok




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C HEX (in.) | L (in.) | Q (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|
| 4-3 TRBI2 | 1/4 | 3/16 | 7/16 | 1.00 | 0.56 | 1.5 |
| 6-4 TRBI2 | 3/8 | 1/4 | 7/16 | 1.06 | 0.59 | 1.5 |
| 8-4 TRBI2 | 1/2 | 1/4 | 9/16 | 1.30 | 0.75 | 1.5 |

# FBI2

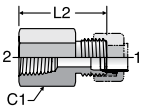
Male Connector
Intru-Lok / NPTF




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|
| 2 FBI2 | 1/8 | 1/8 - 27 | 7/16 | 0.86 | 1.5 |
| 3 FBI2 | 3/16 | 1/8 - 27 | 7/16 | 0.81 | 1.5 |
| 4 FBI2 | 1/4 | 1/8 - 27 | 7/16 | 0.88 | 1.5 |
| 4-4 FBI2 | 1/4 | 1/4 - 18 | 9/16 | 1.08 | 1.5 |
| 4-8 FBI2 | 1/4 | 1/2 - 14 | 7/8 | 1.31 | 1.5 |
| 5 FBI2 | 5/16 | 1/8 - 27 | 1/2 | 0.94 | 1.5 |
| 5-4 FBI2 | 5/16 | 1/4 - 18 | 9/16 | 1.14 | 1.5 |
| 6 FBI2 | 3/8 | 1/4 - 18 | 9/16 | 1.17 | 1.5 |
| 6-2 FBI2 | 3/8 | 1/8 - 27 | 9/16 | 0.97 | 1.5 |
| 6-6 FBI2 | 3/8 | 3/8 - 18 | 11/16 | 1.19 | 1.5 |
| 6-8 FBI2 | 3/8 | 1/2 - 14 | 7/8 | 1.42 | 1.5 |
| 8 FBI2 | 1/2 | 3/8 - 18 | 3/4 | 1.28 | 1.5 |
| 8-4 FBI2 | 1/2 | 1/4 - 18 | 3/4 | 1.27 | 1.5 |
| 8-8 FBI2 | 1/2 | 1/2 - 14 | 7/8 | 1.50 | 1.5 |

# GBI2

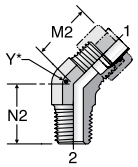
Female Connector
Intru-Lok / NPTF




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C1 HEX (in.) | L2 (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|
| 2 GBI2 | 1/8 | 1/8 - 27 | 9/16 | 0.78 | 1.5 |
| 3 GBI2 | 3/16 | 1/8 - 27 | 9/16 | 0.75 | 1.5 |
| 4 GBI2 | 1/4 | 1/8 - 27 | 9/16 | 0.80 | 1.5 |
| 4-4 GBI2 | 1/4 | 1/4 - 18 | 3/4 | 0.97 | 1.5 |
| 6 GBI2 | 3/8 | 1/4 - 18 | 3/4 | 0.98 | 1.5 |
| 6-2 GBI2 | 3/8 | 1/8 - 27 | 9/16 | 0.86 | 1.5 |
| 6-6 GBI2 | 3/8 | 3/8 - 18 | 7/8 | 1.08 | 1.5 |
| 6-8 GBI2 | 3/8 | 1/2 - 14 | 1 1/8 | 1.23 | 1.5 |
| 8 GBI2 | 1/2 | 3/8 - 18 | 7/8 | 1.16 | 1.5 |
| 8-4 GBI2 | 1/2 | 1/4 - 18 | 13/16 | 1.16 | 1.5 |
| 8-8 GBI2 | 1/2 | 1/2 - 14 | 1 1/8 | 1.31 | 1.5 |

# VBI2

45° Male Elbow
Intru-Lok / NPTF




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M2 (in.) | N2 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|
| 4 VBI2 | 1/4 | 1/8 - 27 | 0.50 | 0.63 | 7/16 | 1.5 |
| 5 VBI2 | 5/16 | 1/8 - 27 | 0.59 | 0.63 | 9/16 | 1.5 |
| 6 VBI2 | 3/8 | 1/4 - 18 | 0.69 | 0.84 | 9/16 | 1.5 |

Dimensions and pressures for reference only, subject to change.



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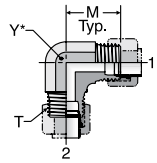
http://www.parker.com/tfd

# EBI2

Union Elbow
Intru-Lok / Intru-Lok

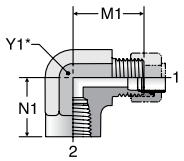



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | M (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|
| 4 EBI2 | 1/4 | 1/4 | 0.67 | 7/16 | 1.5 |
| 6 EBI2 | 3/8 | 3/8 | 0.78 | 9/16 | 1.5 |
| 8 EBI2 | 1/2 | 1/2 | 0.89 | 3/4 | 1.5 |

# DBI2

Female Elbow
Intru-Lok / NPTF

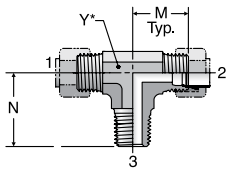



Y1* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 1 NPTF | M1 (in.) | N1 (in.) | Y1 (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|
| 2 DBI2 | 1/8 | 1/8 - 27 | 0.69 | 0.53 | 9/16 | 1.5 |
| 3 DBI2 | 3/16 | 1/8 - 27 | 0.66 | 0.53 | 9/16 | 1.5 |
| 4 DBI2 | 1/4 | 1/8 - 27 | 0.72 | 0.55 | 9/16 | 1.5 |
| 4-4 DBI2 | 1/4 | 1/4 - 18 | 0.84 | 0.69 | 3/4 | 1.5 |
| 6 DBI2 | 3/8 | 1/4 - 18 | 0.92 | 0.69 | 3/4 | 1.5 |
| 6-6 DBI2 | 3/8 | 3/8 - 18 | 1.00 | 0.81 | 7/8 | 1.5 |
| 8-8 DBI2 | 1/2 | 1/2 - 14 | 1.13 | 0.94 | 1 | 1.5 |

# SBI2

Male Branch Tee
Intru-Lok / Intru-Lok / NPTF

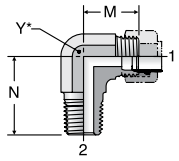



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | END SIZE 3 NPTF | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|---|
| 2 SBI2 | 1/8 | 1/8 | 1/8 - 27 | 0.63 | 0.69 | 11/32 | 1.5 |
| 4 SBI2 | 1/4 | 1/4 | 1/8 - 27 | 0.63 | 0.69 | 3/8 | 1.5 |
| 4-4-4 SBI2 | 1/4 | 1/4 | 1/4 - 18 | 0.73 | 0.97 | 9/16 | 1.5 |
| 6 SBI2 | 3/8 | 3/8 | 1/4 - 18 | 0.72 | 0.91 | 9/16 | 1.5 |

# CBI2

Male Elbow
Intru-Lok / NPTF

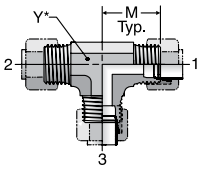



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|
| 2 CBI2 | 1/8 | 1/8 - 27 | 0.59 | 0.69 | 5/16 | 1.5 |
| 3 CBI2 | 3/16 | 1/8 - 27 | 0.61 | 0.69 | 3/8 | 1.5 |
| 4 CBI2 | 1/4 | 1/8 - 27 | 0.63 | 0.69 | 3/8 | 1.5 |
| 4-4 CBI2 | 1/4 | 1/4 - 18 | 0.73 | 0.92 | 9/16 | 1.5 |
| 5 CBI2 | 5/16 | 1/8 - 27 | 0.66 | 0.72 | 9/16 | 1.5 |
| 5-4 CBI2 | 5/16 | 1/4 - 18 | 0.75 | 0.97 | 9/16 | 1.5 |
| 6 CBI2 | 3/8 | 1/4 - 18 | 0.78 | 0.97 | 9/16 | 1.5 |
| 6-2 CBI2 | 3/8 | 1/8 - 27 | 0.72 | 0.81 | 9/16 | 1.5 |
| 6-6 CBI2 | 3/8 | 3/8 - 18 | 0.86 | 1.00 | 3/4 | 1.5 |
| 6-8 CBI2 | 3/8 | 1/2 - 14 | 1.00 | 1.38 | 5/8 | 1.5 |
| 8 CBI2 | 1/2 | 3/8 - 18 | 0.88 | 1.00 | 3/4 | 1.5 |
| 8-4 CBI2 | 1/2 | 1/4 - 18 | 0.88 | 1.06 | 3/4 | 1.5 |
| 8-8 CBI2 | 1/2 | 1/2 - 14 | 1.09 | 1.38 | 7/8 | 1.5 |

# JBI2

Union Tee
Intru-Lok (all three ends)

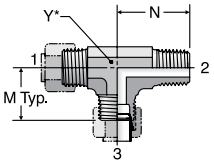



Y1* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | END SIZE 3 (in.) | M (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|
| 2 JBI2 | 1/8 | 1/8 | 1/8 | 0.63 | 5/16 | 1.5 |
| 3 JBI2 | 3/16 | 3/16 | 3/16 | 0.59 | 3/8 | 1.5 |
| 4 JBI2 | 1/4 | 1/4 | 1/4 | 0.59 | 3/8 | 1.5 |
| 5 JBI2 | 5/16 | 5/16 | 5/16 | 0.66 | 9/16 | 1.5 |
| 6 JBI2 | 3/8 | 3/8 | 3/8 | 0.72 | 9/16 | 1.5 |
| 8 JBI2 | 1/2 | 1/2 | 1/2 | 0.88 | 3/4 | 1.5 |

# RBI2

Male Run Tee
Intru-Lok / NPTF / Intru-Lok




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | END SIZE 3 (in.) | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|---|
| 2 RBI2 | 1/8 | 1/8 - 27 | 1/8 | 0.63 | 0.69 | 5/16 | 1.5 |
| 3 RBI2 | 3/16 | 1/8 - 27 | 3/16 | 0.59 | 0.69 | 3/8 | 1.5 |
| 4 RBI2 | 1/4 | 1/8 - 27 | 1/4 | 0.59 | 0.69 | 3/8 | 1.5 |
| 4-4-4 RBI2 | 1/4 | 1/4 - 18 | 1/4 | 0.75 | 0.98 | 9/16 | 1.5 |
| 6 RBI2 | 3/8 | 1/4 - 18 | 3/8 | 1.05 | 1.07 | 9/16 | 1.5 |

Dimensions and pressures for reference only, subject to change.

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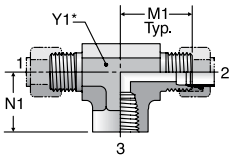
# OBI2

Female Branch Tee
Intru-Lok / NPTF

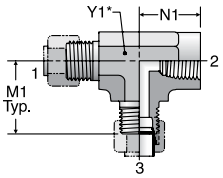



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 NPTF | M1 (in.) | N1 (in.) | Y1 (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|---|
| 4 OBI2 | 1/4 | 1/4 | 1/8 - 27 | 0.72 | 0.53 | 9/16 | 1.5 |
| 4-4-4 OBI2 | 1/4 | 1/4 | 1/4 - 18 | 0.86 | 0.69 | 3/4 | 1.5 |
| 6 OBI2 | 3/8 | 3/8 | 1/4 - 18 | 0.92 | 0.69 | 3/4 | 1.5 |
| 8 OBI2 | 1/2 | 1/2 | 3/8 - 18 | 1.09 | 0.81 | 7/8 | 1.5 |

# MBI2

Female Run Tee
Intru-Lok / NPTF / Intru-Lok




Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 NPTF | 3 (in.) | M1 (in.) | N1 (in.) | Y1 (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|---|
| 4 MBI2 | 1/4 | 1/8 - 27 | 1/4 | 0.72 | 0.53 | 9/16 | 1.5 |
| 6 MBI2 | 3/8 | 1/4 - 18 | 3/8 | 0.92 | 0.69 | 3/4 | 1.5 |

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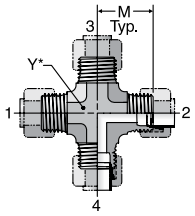
# KBI2

Union Cross
Intru-Lok (all four ends)

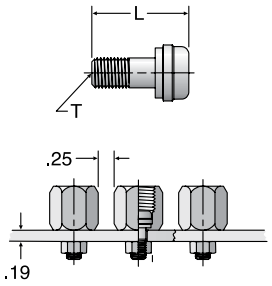



Y* – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 (in.) | 4 (in.) | M (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|---|---|
| 4 KBI2 | 1/4 | 1/4 | 1/4 | 1/4 | 0.66 | 7/16 | 1.5 |
| 6 KBI2 | 3/8 | 3/8 | 3/8 | 3/8 | 0.78 | 1/2 | 1.5 |

# T22I

Mountie



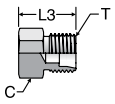

Typical application

| TUBE FITTING PART # | TUBE O.D. (in.) | T TUBE END UN/UNF-2A | L (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|
| 4 T22I | 1/4 | 1/4 - 20 | 0.81 | 1.5 |
| 6 T22I* | 3/8 | 1/4 - 20 | 0.81 | 1.5 |

*Non standard

# PNI

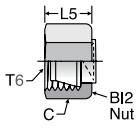
Plug
Intru-Lok




| TUBE FITTING PART # | TUBE O.D. (in.) | T TUBE END UN/UNF-2A | C HEX (in.) | L3 (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|---|
| 4 PNI | 1/4 | 7/16 - 20 | 7/16 | 0.50 | 1.5 |
| 5 PNI | 5/16 | 1/2 - 20 | 1/2 | 0.52 | 1.5 |
| 6 PNI | 3/8 | 9/16 - 18 | 9/16 | 0.59 | 1.5 |
| 8 PNI | 1/2 | 3/4 - 16 | 3/4 | 0.67 | 1.5 |

# FNI

Cap
Intru-Lok




| TUBE FITTING PART # | TUBE O.D. (in.) | C HEX (in.) | L5 (in.) | Dynamic Pressure (x 1,000 PSI) -B |
|---|---|---|---|---|
| 2 FNI | 1/8 | 3/8 | 0.36 | 1.5 |
| 3 FNI | 3/16 | 7/16 | 0.34 | 1.5 |
| 4 FNI | 1/4 | 1/2 | 0.44 | 1.5 |
| 5 FNI | 5/16 | 9/16 | 0.45 | 1.5 |
| 6 FNI | 3/8 | 5/8 | 0.45 | 1.5 |
| 8 FNI | 1/2 | 7/8 | 0.58 | 1.5 |

Dimensions and pressures for reference only, subject to change.



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# E0 and E0-2 Metric Bite Type Fittings

E

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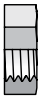
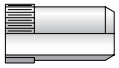
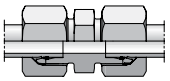
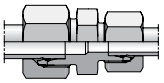
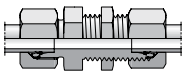
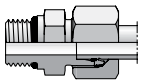
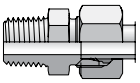
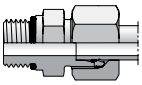
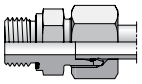
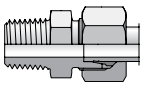
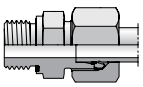
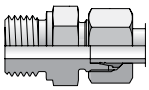
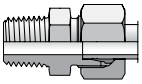
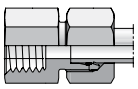
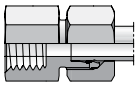
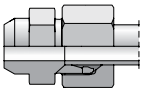
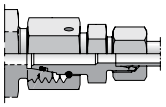
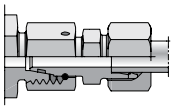
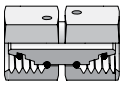
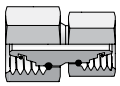
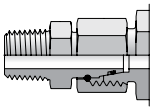
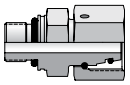
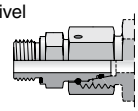
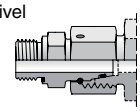
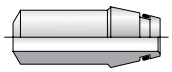
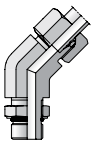
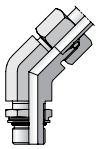
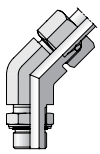
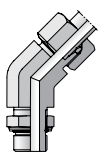
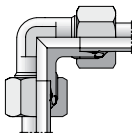
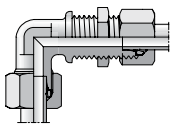
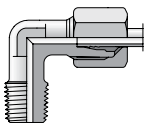
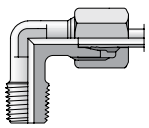
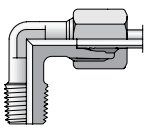
| **GM**<br>Bulkhead Locknut<br>  <br>E15 | **E**<br>Insert for Plastic Tube<br> <br>E15 | **VH**<br>Insert for Metal Tube<br>  <br>E15 | **Straights** | **G**<br>Union<br>  <br>E16 | **GR**<br>Reducer Union<br>  <br>E16 |
| **SV**<br>Bulkhead Union<br>  <br>E17 | **ESV**<br>Weld Bulkhead Union<br> <br>E17 | **GE-UNF/UN**<br>SAE-ORB / Flareless<br>  <br>E18 | **GE-NPT**<br>NPT / Flareless<br>  <br>E18 | **GEO**<br>ISO 6149 / Flareless<br>  <br>E19 | **GE-R-ED**<br>BSPP-ED / Flareless<br>  <br>E19 |
| **GE-R**<br>BSPP / Flareless<br> <br>E20 | **GE-R keg**<br>BSPT / Flareless<br>  <br>E20 | **GE-M-ED**<br>Metric-ED / Flareless<br>  <br>E21 | **GE-M**<br>Metric / Flareless<br>  <br>E22 | **GE-M keg**<br>Metric Taper / Flareless<br>  <br>E22 | **GAI-R**<br>Female BSPP / Flareless<br>  <br>E22 |
| **GAI-M**<br>Female Metric / Flareless<br>  <br>E23 | **AS**<br>Butt Weld / Flareless<br>  <br>E23 | **Straight Swivels** | **RED**<br>Tube End Reducer<br>  <br>E24 | **DA**<br>Extender<br>  <br>E25 | **GZ**<br>Swivel Union<br>  <br>E25 |
| **GZR**<br>Swivel Union Reducer<br>  <br>E25 | **EGE-NPT**<br>NPT / Flareless Swivel<br>  <br>E25 | **EGEO**<br>ISO 6149 / Flareless Swivel<br>  <br>E26 | **EGE-R-ED**<br>BSPP-ED / Flareless Swivel<br>  <br>E26 | **EGE-M-ED**<br>Metric-ED / Flareless Swivel<br>  <br>E26 | **SKA**<br>Butt Weld / Flareless Swivel<br>  <br>E26 |
| **45° Elbows** | **VEE-UNF/UN**<br>SAE-ORB / Flareless<br>  <br>E27 | **VEE-OR**<br>ISO 6149 / Flareless<br>  <br>E27 | **VEE-R**<br>BSPP-ORR / Flareless<br>  <br>E28 | **VEE-M**<br>Metric-ORR / Flareless<br>  <br>E28 | |
| **90° Elbows** | **W**<br>Union Elbow<br>  <br>E29 | **WSV**<br>Bulkhead Union Elbow<br>  <br>E30 | **WE-NPT**<br>NPT / Flareless<br>  <br>E30 | **WE-R keg**<br>BSPT / Flareless<br>  <br>E31 | **WE-M keg**<br>Metric Taper / Flareless<br>  <br>E31 |



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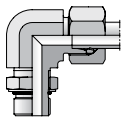
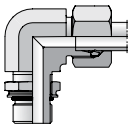
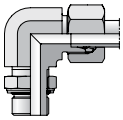
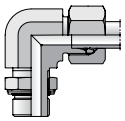
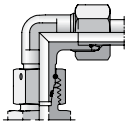
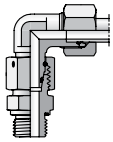
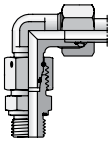
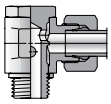
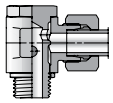
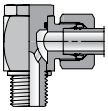
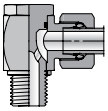
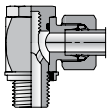
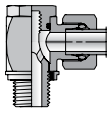
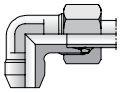
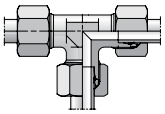
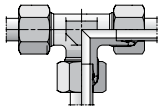
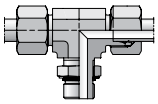
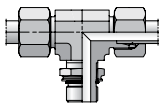
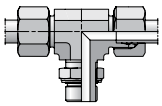
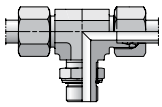
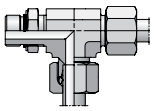
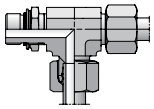
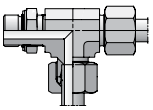
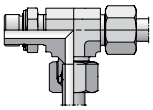
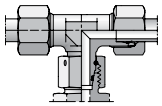
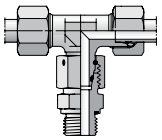
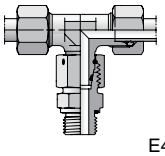
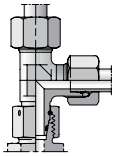
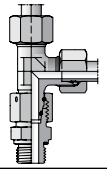
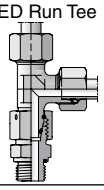
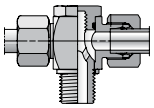
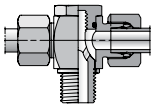
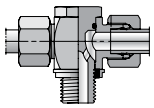
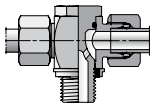
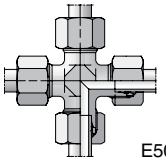
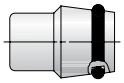
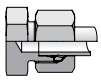
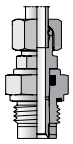
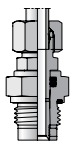
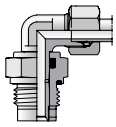
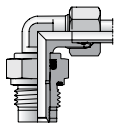
| **WEE-UNF/UN**<br>SAE-ORB / Flareless<br>  <br>E32 | **WEE-OR**<br>ISO 6149 / Flareless<br>  <br>E32 | **WEE-R**<br>BSPP-ORR / Flareless<br>  <br>E33 | **WEE-M**<br>Metric-ORR / Flareless<br>  <br>E33 | **EW**<br>Flareless Swivel / Flare-less<br>  <br>E34 | **EW-R-ED**<br>BSPP-ED / Flareless<br>  <br>E35 |
| **EW-M-ED**<br>Metric-ED / Flareless<br>  <br>E35 | **SWVE-R**<br>Banjo BSPP / Flareless<br>  <br>E36 | **SWVE-M**<br>Banjo Metric / Flareless<br>  <br>E36 | **WH-R**<br>Banjo BSPP / Flareless<br>  <br>E37 | **WH-M**<br>Banjo Metric / Flareless<br>  <br>E37 | **WH-R-KDS**<br>Banjo BSPP / Flareless<br>  <br>E38 |
| **WH-M-KDS**<br>Banjo Metric / Flareless<br>  <br>E38 | **WAS**<br>Butt Weld / Flareless<br>  <br>E39 | **Tees** | **T**<br>Union Tee<br>  <br>E39 | **TR**<br>Reducer Tee<br>  <br>E40 | **TEE-UNF/UN**<br>SAE-ORB Branch Tee<br>  <br>E41 |
| **TEE-OR**<br>ISO 6149 Branch Tee<br>  <br>E42 | **TEE-R**<br>BSPP-ORR Branch Tee<br>  <br>E42 | **TEE-M**<br>Metric-ORR Branch Tee<br>  <br>E43 | **LEE-UNF/UN**<br>SAE-ORB Run Tee<br>  <br>E43 | **LEE-OR**<br>ISO 6149 Run Tee<br>  <br>E44 | **LEE-R**<br>BSPP-ORR Run Tee<br>  <br>E44 |
| **LEE-M**<br>Metric-ORR Run Tee<br>  <br>E44 | **ET**<br>Swivel Branch Tee<br>  <br>E45 | **ET-R-ED**<br>BSPP-ED Branch Tee<br>  <br>E45 | **ET-M-ED**<br>Metric-ED Branch Tee<br>  <br>E46 | **EL**<br>Swivel Run Tee<br>  <br>E46 | **EL-R-ED**<br>BSPP-ED Run Tee<br>  <br>E47 |
| **EL-M-ED**<br>Metric-ED Run Tee<br>  <br>E47 | **TH-R**<br>Banjo BSPP Branch Tee<br>  <br>E48 | **TH-M**<br>Banjo Metric Branch Tee<br>  <br>E48 | **TH-R-KDS**<br>Banjo BSPP Branch Tee<br>  <br>E49 | **TH-M-KDS**<br>Banjo Metric Branch Tee<br>  <br>E49 | |
| **Cross** | **K**<br>Union Cross<br>  <br>E50 | **Caps and Plugs** | **VKA**<br>Flareless Cap<br>  <br>E50 | **ROV**<br>Flareless Plug<br>  <br>E50 | |
| **Plain Bear-ing Rotary Fittings** | **DVGE-R**<br>BSPP-ED / Flareless<br>  <br>E51 | **DVGE-M**<br>Metric-ED / Flareless<br>  <br>E52 | **DVWE-R**<br>BSPP-ED / Flareless<br>  <br>E51 | **DVWE-M**<br>Metric-ED / Flareless<br>  <br>E52 | |



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
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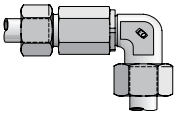
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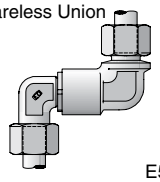
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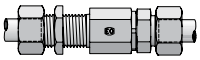
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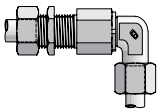
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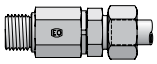
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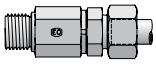
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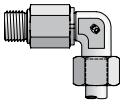
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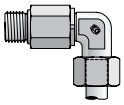
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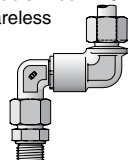
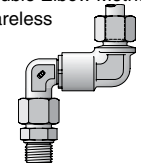
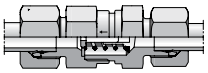
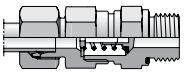
**DG106-R**
Double Elbow BSPP / Flareless

E55

**DG106-M**
Double Elbow Metric / Flareless

E55

**Check Valves**

**RHD**
Union

E56

**RHV-R-ED**
BSPP-ED / Flareless

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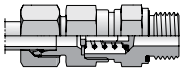
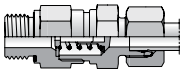
**RHV-M-ED**
Metric-ED / Flareless

E57

**RHZ-R-ED**
BSPP-ED / Flareless

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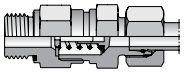
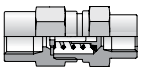
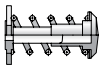
**RHZ-M-ED**
Metric-ED / Flareless

E58

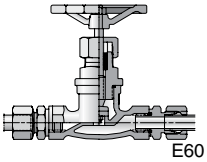
**RHDI**
Female BSPP Union

E58

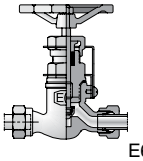
**RVP**
Cartridge

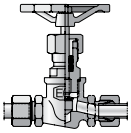
E59

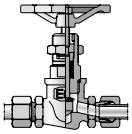
**I-TL**
Internal Parts

E59

**Shut-Off Valves**

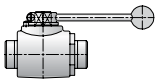
**DV**
Low Pressure

E60

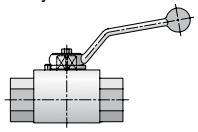
**LD**
Medium Pressure

E60

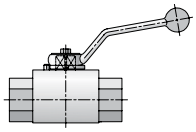
**VDHA**
High Pressure

E61

**VDHB**
High Pressure – Panel Mount

E61

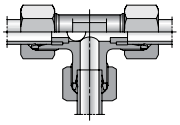
**Ball Valves**

**KH**
2-Way Flareless Union

E62

**KH-NPT**
2-Way Female NPT

E64

**KH-R**
2-Way Female BSPP

E64

**Alternating Valves**

**WV**
Union Tee

E65



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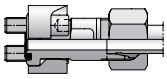
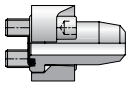
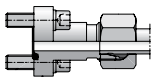
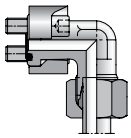
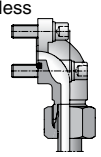
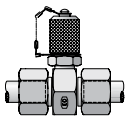
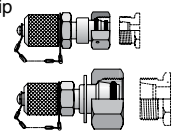
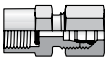
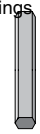
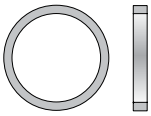
## Flange Adapters (Shown in Section L)

| | | | | | |
|---|---|---|---|---|---|
| **Flange Adapters** | **GFS**<br>Code 61, 62 / Metric Flareless<br>  <br>L14 | **AS**<br>Code 61, 62 / Weld Butt – Tube Metric<br>  <br>L26 | **BFG**<br>DIN Flange / Metric Flareless<br>  <br>L15 | **WFS**<br>Code 61, 62 / Metric Flareless<br>  <br>L33 | **BFW**<br>DIN Flange / Metric Flareless<br>  <br>L34 |

## Diagnostic and Specialty Adapters (Shown in Section M)

| | | | | |
|---|---|---|---|---|
| **Test Point Connectors** | **GMA3**<br>EO Tube / EO Tube / EMA-3 Diagnostic Tip<br>  <br>M5 | **VKA3**<br>EO Swivel / Diagnostic Tip<br>  <br>M8 | **MAVE**<br>BSPP Gauge / EO Swivel<br> <br>M6 | **MAV**<br>BSPP Gauge / EO Tube<br>  <br>M6 |

## O-Rings and Seals (Shown in Section N)

| | | | | | |
|---|---|---|---|---|---|
| **O-Rings and Seals** | **KDS**<br>Bonded Seal for Banjo Fittings<br> <br>N8 | **DKA**<br>Metal Seal for Banjo Fittings<br>  <br>N8 | **DKI**<br>Pressure Gauge Sealing Ring<br> <br>N9 | **EO**<br>EOlastic Seal Ring<br> <br>N6 | **OR**<br>EO O-Ring<br> <br>N10 |
| **DOZ**<br>EO-2 Sealing Ring<br> <br>N7 | **RR**<br>Metric Retaining Ring<br>  <br>N5 | | | | |



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# EO Progressive Ring Fittings — Introduction

The flareless bite type fitting was pioneered by Ermeto in Germany in the early 1930's. When Parker Hannifin acquired Ermeto, it introduced the EO fittings to the US. Today, the EO fittings are the most widely used bite type fittings in the world.

The EO progressive ring fitting is a flareless metric fitting (for metric tube)that consists of a body, a progressive ring (ferrule) and a nut. On assembly, two cutting edges of the progressive ring "bite" into the outer surface of the tube ensuring the necessary holding power and seal for high operating pressures.

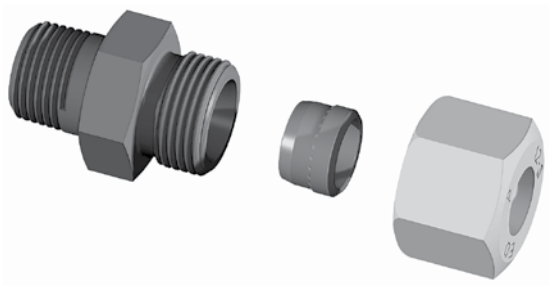

**Fig. E1 — EO fitting components: Body, progressive ring and nut**

The fittings and components listed in this catalog are intended solely for the assembly of connections for fluid applications.

Three series of EO tube fittings (LL, L and S) and accessories are manufactured in accordance with DIN 2353 (summary) which today is represented by international standard 8434-1 on the basis of decades of experience.*

To ensure functional safety of EO tube fittings, only EO parts should be used in their assembly. Routing of tubes should be carried out in accordance with Parker/EO recommended practices. Assembly instructions are available.

# Design and Construction

The three components of EO fittings are designed and manufactured to produce a strong, reliable, leak-free joint upon proper assembly.

**The EO Body.** EO fitting bodies are available in over thirty configurations. The shaped products (i.e., elbows, tees, crosses) are hot forged, then machined to the stringent EO fitting specifications. The forging process used by Parker further improves the strength and metallurgical properties of the fitting material.

Straight products are made from cold drawn bar stock. The cold drawing operation ensures consistently tight dimensional tolerances, as well as significantly improved strength.

**The EO Progressive Ring (Cutting Ring).** EO progressive rings are precision machined with all dimensions and surfaces, particularly the critical bite edges, monitored on an ongoing basis. The rings are then heat treated in a manner that provides the hardness, strength, and toughness necessary to satisfy the demanding service conditions that exist in industry today. The original progressive ring, known as DPR, is now being replaced with the new generation, called PSR. PSR is stronger and features a "positive stop" to eliminate over-tightening.

**The EO Nut.** EO fitting nuts are either cold formed, hot formed or machined from cold drawn material. The cold forming and cold drawing operations provide a more tightly packed grain structure, thus improving the material's strength. In addition, cold forming significantly improves the fatigue properties or endurance limits of the nuts.

# Standard Material Specifications

**Steel fittings:**
EO tube fittings – Materials according to DIN 3859-1

**Stainless steel fittings:**
EO tube fittings – X6CrNIMoTi 17122 in accordance with DIN 17440 / EN 10088, material no. 1.4571.

**Brass fittings:**
EO tube fittings – CUZN35Ni2 in accordance with DIN 17660, material no. 2.0540.

**Elastomer seals:** NBR (BUNA-N), FKM (Fluorocarbon)

**Surface Finish - Steel fittings:**

| | | |
|---|---|---|
| Standard<br>LL Series | Body, Nuts, and Rings | – Zinc clear chromate, Chromium 6 Free |
| L+S Series | Body and Nuts | – Zinc clear chromate, Chromium 6 Free |
| | Progressive Rings (PSR) | – Zinc clear chromate, Chromium 6 Free |

Short codes for surface protection procedure in accordance with DIN 267 part 9 or DIN 50942.

# How EO Fittings Work: Function of Progressive Ring Fittings

The EO progressive ring fitting produces a low to high pressure, leak free connection of tubes and components in fluid systems. The basic function of the EO progressive ring is the controlled progressive bite of the ring into the tube due to a unique internal geometry.

The front cutting edge has already started cutting into the tube before the second cutting edge starts. As soon as both cutting edges have cut the tube to the designed depth further advance is limited by the stop edge.

Owing to the design of both cutting edges and stop edge all forces arising are equally distributed. This distribution along with the specially designed interior collar of the ring guarantees increased robustness, particularly with regard to vibration and flexure stresses. The design and function of the progressive cutting ring ensure that service vibration loading is not present in the areas of the tubing where the bite is made.

*The selection of LL, L or S design should be made by the user on the basis of intended system pressure. The pertinent maximum recommended working pressures are shown throughout this catalog in individual data charts of the various fitting configurations.



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The stop edge causes a sharp increase in tightening forces which is clearly perceptible. After assembly, a visible collar of cut tube material must completely fill the space in front of the first cutting edge. With stainless steel tube and hose connections made from free cutting steel, the collar is less due to the harder material.

During assembly, it is absolutely essential that the tube is held firmly against the stop in the inner cone of the fitting; if not, the cutting process will not take place satisfactorily. Reassembly can be performed an unlimited number of times.

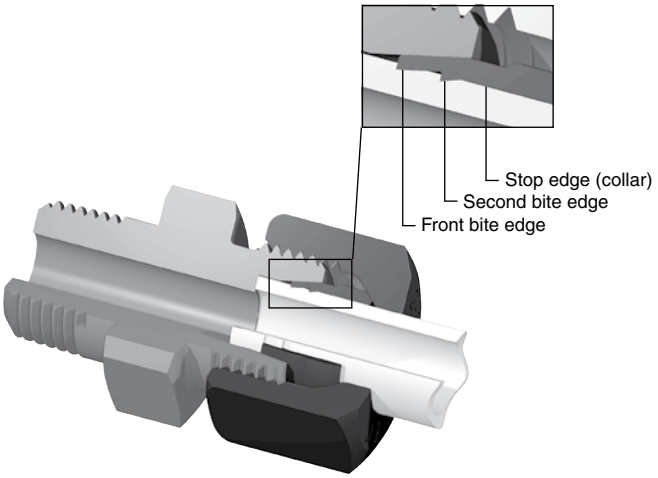


**Fig. E2 — How EO fittings work**

# Assembly and Installation

Please refer to Section S for the assembly and installation instructions for EO and EO-2 Metric Bite type fittings.

## Weld Nipples

EO weld nipple fittings with an O-ring seal between weld nipple and body give impressive pull out resistance and sealing integrity, and a sensible alternative to the progressive ring. Fittings bodies and nuts are fully interchangeable for weld nipple and progressive ring fittings of the same series and tube outside diameter. Weld nipples SKA conform to DIN 3865 form A, which today is represented by international standard ISO 8434-4.

## Ball Bearing Rotary Fittings

**DG Ball Bearing Rotary Fittings:** These compact, maintenance-free construction, service proven fittings combine ball and plain bearings with constant lubrication and relatively wear resistant annular piston seals. They are rated for working pressures up to 250 bar, have a low starting torque and have a suitable pressure/RPM rate.

Ball bearing rotary fittings are designed for connecting a fixed point to a rotating, swiveling or moving machine part via tubing or hoses. Thus axial torsion of tubing or hoses can be prevented. They are suitable for hydraulic oils and lubricants of mineral oil base, not suitable for water or gases. Nominal temperature range is -25°C to +80°C.

**Fitting Instructions:**

The life of rotary fitting depends considerably in a stress-free line connection. Therefore, the direct connection with tube is to be avoided. For connection to hoses the use of swivel nut fittings is recommended with short, straight lines (approx. length 5x hose O.D.). Thus shocks and vibrations can be absorbed.

Assemble tube ends in accordance with the Tube End Assembly Information on pages S12 through S13. Assemble BSPP and metric stud ends in accordance with torque values on page S5.

| Tube O.D. | Nominal bore (mm) | Permissible number of revolutions (rpm) under a working pressure** of: | | | | | Torque at 250 bar/Nm |
|---|---|---|---|---|---|---|---|
| | | 25 bar | 64 bar | 100 bar | 160 bar | 250 bar | |
| 6<br>8 | 5.0 | 1500 | 750 | 400 | 200 | 85 | 0.08 |
| 12<br>16 | 9.5 | 800 | 400 | 200 | 100 | 45 | 0.24 |
| 20<br>25 | 16.0 | 300 | 150 | 75 | 38 | 15 | 0.8 |
| 30<br>38 | 26.0 | 200 | 100 | 50 | 25 | 10 | 2.0 |

**Table E1 — Ball Bearing Recommended RPM and Starting Torques**

**A minimum working pressure of 10 bar is necessary.

## Plain Bearing Rotary Fittings

**Plain Bearing Rotary Fittings:** These compact, maintenance-free construction, service proven fittings are rated for low pressure tube and hose with slow rotating, swiveling or moving machine parts up to 64 bar (L series) and 160 bar (S series).

Plain bearing rotary fittings are designed for connecting a fixed point to a rotating, swiveling or moving machine part via tubing or hoses. Thus axial torsion of tubing or hoses can be prevented. They are suitable for hydraulic oils and lubricants of mineral oil base, not suitable for water or gases. Nominal temperature range is -35°C to +100°C.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Series L** Tube O.D. | 6 | 8 | 10 | 12 | 15 | 18 | 22 | 28 | 35 | |
| Permissible RPM | 28 | 28 | 21 | 17 | 13 | 10 | 10 | 7 | 7 | |
| **Series S** Tube O.D. | 6 | 8 | 10 | 12 | 14 | 16 | 20 | 25 | 30 | 38 |
| Permissible RPM | 11 | 11 | 9 | 7 | 5 | 5 | 4 | 4 | 3 | 3 |

**Table E2 — Plain Bearing Recommended RPM**



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**Fitting Instructions:**

The life of a rotary fitting depends considerably in a stress-free line connection. Therefore, the direct connection with tube is to be avoided. For connection to hoses, the use of swivel nut fittings is recommended with short, straight lines (approx. length 5x hose O.D.). Thus, shocks and vibrations can be absorbed.

## Non-Return Valves

**Characteristics:** Sealing is achieved by using a 90° cone with a packing washer of synthetic material. Valve has a lift stop which provides safe free outlet, shock-absorbing, muffled opening and no reduction of cross section. Maximum flow velocity not more than 8 m/sec (for higher flow velocities special tests are required).

**Opening Pressure:** Approximately 1 bar standard (on request also 0.2, 0.5, 2, 3, 4, 5 & 6 bar are available). Please specify nonstandard opening pressures on order as follows: Tube Fitting part number, opening pressure, material. Ex: RHD12L2BCF is a RHD12LCF with 2 bar opening pressure. Tolerance of (cracking) pressure is ±20%.

# Tube Recommendations

**For steel and stainless steel tube recommendations, as well as tube wall thickness information, please refer to Metric Tube, Section Q.**

Seamless cold drawn steel tubes made from material St. 35.4 or from conditioned base material St. 37.4 in accordance with DIN 1630, state of delivery NBK (normal annealed) with tube outer and inner diameter tolerances in accordance with DIN 2391/ISO 3304. Max. hardness: HRB 75.

**For stainless steel fittings:**
**Material no. 1.4571 and 1.4541**

Seamless drawn tubes made from austenitic, stainless steel materials no. 1.4571 and 1.4541, in accordance with DIN/EN/ISO 1127. Max. hardness: HRB 90.

These tubes are particularly recommended for tube fittings, since the tube outer diameter and wall thickness, tolerances correspond to those of steel tubes in accordance with DIN 2391/ISO 3304.

**For brass fittings:**

Seamless drawn copper tube made from material with short code SF-Cu F37 in accordance with DIN 1786.

**Tube wall thicknesses:**

In order to determine the necesary tube wall thicknesses for applications, refer to the calculated pressures provided in the tables for EO metric tubing. The calculated pressures DIN 2413-I are for static and DIN 2413-III for dynamic loads.

The maximum wall thickness is based on the pressure holding capacity of the fitting. In some cases, the wall thickness of the tube might be too thin for reliable service and an insert must be used to prevent excessive tube collapse. See assembly section for recommended tube wall thicknesses.

**Plastic tube:**

EO fittings are suitable for use with various types of plastic tubes such as nylon, polyethylene, etc. When used with plastic tube, an insert (see page E15) must be used to prevent tube pull out due to tensile loading.

# Features, Advantages & Benefits

- **Visible Bite —** The critical front bite of the progressive ring is clearly visible to tube fitters & inspectors. The presence of the recommended bite virtually eliminates any risk of catastrophic blow-off. This is a very important safety feature.
- **Sealing Capability —** EO fittings have demonstrated a remarkable ability to remain leak free under various service conditions ranging from sealing high vacuum and small molecules gases to high pressure hydraulic fluids.
- **Distributed Stresses —** Stresses due to service flexural loading are distributed at several points in the joint, thus stress concentration in the bite is minimized.
- **Vibration Control —** The rear bevel of the ferrule firmly grips tubing, thus dampening the effects of system vibration in the joint.
- **Progressive Ring Design —** The progressive ring design provides a second bite for improved reliability and higher working pressure capability. This design also decreases the risk of improper assembly because of the sharp, high torque rise which occurs when the fitting is properly tightened.
- **Envelope Size —** EO fittings are relatively small and compact, making it a suitable selection for plumbing in limited or tight space.
- **Temperature Rating —** EO fittings are suitable for sub-zero through elevated temperature applications. Service temperature rating is limited by the material chosen.
- **Compatibility —** Since EO fittings can be manufactured from a wide range of metals, its compatibility factor with various fluids and atmospheric conditions is virtually limitless. One simply has to select and specify EO fittings from an acceptable material that best satisfies the service conditions.
- **Tube Wall —** EO fittings are suitable for use with light wall, medium wall, heavy wall, and extra heavy wall tubing. (Light wall tube may require support sleeve (VH), as shown in Assembly/Installation Section.)
- **Re-Usability / Remakeability —** Joints can be disassembled and reassembled many times to facilitate system maintenance. This reduces the labor and material costs that would otherwise result from tube and fittings replacement.
- **Assembly —** No expensive, complicated tooling is necessary to assemble EO fittings. Assembly is simple when the procedures described in the Assembly / Installation section are followed (see pages S28 - S33).
- **Materials —** EO fittings can be manufactured from almost any metallic material. The more popular materials currently used for EO fittings are: stainless steel, carbon steel, and brass. On request, the Tube Fitting Division will machine EO fittings from other appropriate material specified by users.
- **Manufacture —** EO fittings are manufactured under tight quality control which ensures that the product routinely satisfies or surpasses the requirements of the pertinent industrial standards.
- **World Wide Popularity —** The bite type fitting design has worldwide acceptance and is especially popular in Europe.
- **Superior Plating:** Superior plating gives Parker steel tube fittings unmatched protection against red rust. In neutral salt spray test per ASTM B117, Parker EO and EO2 fittings substantially exceeded the SAE requirement of 96 hours to red rest.



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- **Finish —** Steel EO fittings have a zinc clear Chromium-6 Free finish. This finish provides good corrosion protection.
- **Silver Plated Nuts —** Stainless steel tube nuts are pre-lubricated with silver plated threads (size 15L-42L, 12S-38S). Thread galling is eliminated and assembly torque is reduced as much as 40 percent. This increases the speed and efficiency for stainless steel fitting assembly.
- **Availability —** EO fittings are available as standard in over thirty different configurations, and as many as twenty-seven different size combinations in some configurations.
- **Configurations —** Popular configurations for EO fittings are shown in the Visual Index. Other configurations can be manufactured on request.

# EO-2 Fitting System — Introduction

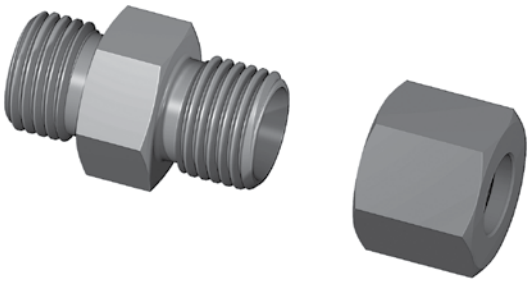

**Fig. E3 — EO-2: Fitting body and functional nut**

The EO-2 high pressure tube fitting generation is the most recent development of the Tube Fitting Division Europe. It was introduced in an effort to eliminate leakage in all fluid systems.

The common feature of all EO-2 fittings is elastomeric seals on all joints. This assures leakfree operation without retightening — even under severe working conditions. Another breakthrough in bite-type technology is the simple assembly and cost-saving handling of the unique EO-2 Functional Nut.

EO-2 is a true metric design according to 24° bite-type standards such as: ISO 8434-1, DIN 2353 or DIN 3861. It covers all three series (LL, L and S) of the broad EO tube fitting program.

This resulted in a great acceptance with equipment manufactures that are targeting an absolute leakfree systems without sacrificing the convenience of using metric bite type fittings.

# Design and Construction

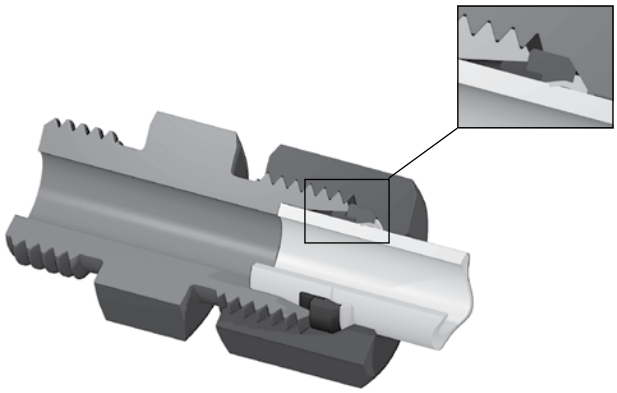

**Fig. E4 — EO-2: The metallic support of the sealing ring acts just like an integrated preassembly tool.**

## Elastomeric Sealing

The elastomeric seal assures a hermetically sealed tube joint. It is located in between the inner cone of the fitting body and the tube surface, thus blocking the only possible leak path. Due to its large cross-section, the seal effectively compensates for all manufacturing tolerances on tube and fitting cone.

The sealing effect is pressure supported which makes the EO-2 fitting suitable for high pressure applications. The static compression also eliminates air-ingress into the fluid system at underpressure conditions.

Elastomerically sealed EO-2 fittings do not require any retightening even in heavy-duty applications. Seal extrusion is prevented by proper housing without gaps or dead volume. The sealing lip is bonded to a metallic support ring.

# Standard Material Specifications

**Steel fittings:**
EO-2 tube fittings – Materials according to DIN 3859-1

**Stainless steel fittings:**
EO-2 tube fittings – X6CrNIMoTi 17122 in accordance with DIN 17440 / EN 10088, material no. 1.4571.

**Brass fittings:**
EO-2 tube fittings – CUZN35Ni2 in accordance with DIN 17660, material no. 2.0540.

**Elastomer seals:** NBR (BUNA-N), FPM (Fluorocarbon)

**Surface Finish - Steel fittings:**
Standard

| | | |
|---|---|---|
| LL Series | Body, Nuts, and Rings | - Zinc clear chromate, Chromium 6 Free |
| L+S Series | Body and Nuts | - Zinc clear chromate, Chromium 6 Free |

Short codes for surface protection procedure in accordance with DIN 267 part 9 or DIN 50942.



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# How EO-2 Fittings Work

The retaining ring bites into the tube in accordance to the proven bite ring principle. The elastomeric seal reduces the danger of over- or underassembly by a special EO-2 design feature: Before assembly there is a gap in between the flat surfaces of the retaining ring and the metallic support ring of the seal. As soon as the retaining ring has reached the proper incision depth, the gap closes, resulting in a sharp increase of assembly torque. This results in uniform and reliable fitting assemblies. The assembly result can easily be inspected by just checking if the gap is closed.

The separation of sealing and holding functions to two separate elements finally allows a more effective solution of the over-and undertightening problems typically associated with bite type fittings.

# Assembly and Installation

Please refer to Section S for the assembly and installation instructions for EO and EO-2 Metric Bite type fittings.

## Integrated Assembly Tool

The metallic support ring of the seal is made of a specially designed material and heat-treatment to act as an assembly tool. This makes sure that the retaining ring securely cuts into the tube surface without damaging the sensitive inner cone of the fitting body.

This unique feature of EO-2 fittings even allows direct assembly of tube without any additional pre-assembly process. An EOMAT machine (or other hydraulic tool) is strongly recommended to allow easy assembly of large dimension tube and drastically save total assembly time, effort and costs. The integrated assembly tool of EO-2 fittings even helps to save further costs and trouble when using an EOMAT-type presetting machine: As the presetting cone is only in contact with the elastomeric sealing lip, it cannot be worn out or damaged even after thousands of assemblies. This not only saves replacement costs but also avoids leakage problems caused by worn presetting tools.

## The Functional Nut

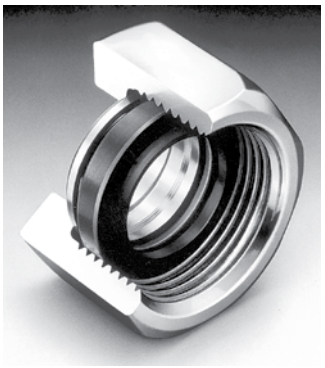

**Fig. E5 — The unique Functional Nut allows easy handling and quick assembly.**

The unique Functional Nut simplifies handling of fitting components and helps to minimize storage and procurement costs. The sealing and retaining rings are combined as a pair and are inserted into the internal thread of the nut in such a manner that they cannot fall out, so that these three parts form one functional element.

Individual components such as seal or retaining ring cannot be forgotten, confused or assembled in the wrong orientation. Time and cost are saved by eliminating searching and arranging the components to make up individual joints.

Functional Nuts are completely interchangeable with the full range of EO tube fitting ends.

After assembly and disassembly, the sealing ring can be replaced individually without cutting off the tube end.

# Tube Recommendations

**For steel fittings:**

Seamless cold drawn steel tubes made from material St. 35.4 or from conditioned base material St. 37.4 in accordance with DIN 1630, state of delivery NBK (normal annealed) with tube outer and inner diameter tolerances in accordance with DIN 2391/ISO 3304. Max. hardness: HRB 75.

**For stainless steel fittings:**
**Material no. 1.4571 and 1.4541**

Seamless drawn tubes made from austenitic, stainless steel materials no. 1.4571 and 1.4541, in accordance with DIN/EN/ISO 1127. Max. hardness: HRB 90.

These tubes are particularly recommended for tube fittings, since the tube outer diameter and wall thickness, tolerances correspond to those of steel tubes in accordance with DIN 2391/ISO 3304.

**Tube wall thicknesses:**

In order to determine the necesary tube wall thicknesses for applications, refer to the calculated pressures provided in the tables for EO metric tubing. The calculated pressures DIN 2413-I are for static and DIN 2413-III for dynamic loads.

The maximum wall thickness is based on the pressure holding capacity of the fitting. In some cases, the wall thickness of the tube might be too thin for reliable service and an insert must be used to prevent excessive tube collapse. See assembly section for recommended tube wall thicknesses.

**Plastic tube:**

EO-2 fittings are suitable for use with various types of plastic tubes such as nylon, polyethylene, etc. When used with plastic tube, an insert (see page E15) must be used to prevent tube pull out due to tensile loading.



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# Features, Advantages and Benefits of the EO-2 Fitting System

In addition to the general advantages of the EO tube fitting system, the unique EO-2 fitting features offer even more specific benefits:

- **Sealing Capability —** An elastomeric seal forms the primary sealing element, thus assuring leak-free sealing. Even low-viscosity media such as water or gas are hermetically sealed. Hydraulic systems, therefore, do not "sweat" at fittings.
- **High Pressure Resistance —** EO-2 fittings are rated up to Pmax 900 bar. Sealing lip and seal arrangements have both been designed so that the sealing effect is supported by system pressure. The interaction of the retaining ring and the integrated preassembly tool results in uniform and reliable fitting assembly.
- **Durability —** The elastomeric seal does not require any retightening even after years of operation under severe working conditions.
- **Bite Control —** The ideal bite depth is controlled by the fitting design rather than by the fitters force. Closing the gap at the end of the manual assembly, the fitter gets clear signal that setting is completed and the joint is ready for inspection.
- **Functional Nut —** Individual components such as the retaining ring or seal cannot be lost, forgotten, confused or assembled in the wrong orientation. This dramatically saves assembly cost and helps to avoid dangerous assembly errors.
- **Assembly Cost —** With less than 10 seconds cycle time on the EOMAT III/A (actual presetting process: 1.4 seconds), the cost of presetting EO-2 is extremely low.
- **Integrated Preassembly Tool —** Each EO-2 Functional Nut comes assembled with an integrated assembly tool that makes sure that the retaining ring securely cuts into the tube surface without damaging the sensitive inner cone of the fitting body. This greatly reduces the danger of tube blow-off, even when using stainless steel tube.
- **Unlimited Presetting Tool Lifetime —** When EOMAT machines are used for cost-efficient presetting, the preassembly tools do not wear out as they are only in contact with the rubber seal. This avoids dangerous blow-off which can result when traditional bite-type fittings are assembled using worn presetting tools.
- **Make-up —** From the wrench-tight position of the preset EO-2 joint, one short pull on the wrench (approx. 1/6 to 1/4 turn) gives the assembly a quick high rise to required torque. EO-2 fittings have a solid "hit-home-feel" and excellent over-torque resistance.
- **Visible Inspection —** There is no doubt if an EO-2 Functional Nut has been preset correctly or not. Inspection is as simple as checking if the gap between retaining ring and sealing ring is completely closed. The tube end does not have to be disassembled out of the fitting for bite inspection.
- **No Phantom Leaks —** Lubrication is not mandatory for the assembly of steel EO-2 fittings. The machine operator will not be irritated about lubricant coming out of the fittings once the hydraulic system gets hot.
- **Re-Usability / Remakeability —** EO-2 fittings can be disassembled and reassembled many times. There is no wear or widening of the vulnerable inner cone. Damaged seals can easily be replaced. All spare DOZ-seals are marked by size-code (e.g.: 12-L).
- **On-Site Maintenance —** For the maintenance and replacement of EO-2 fittings a set of wrenches is sufficient. Additional in line components, such as test points (GMA), ball valves (KH) or T-fittings can be added to an existing assembly within minutes.
- **Interchangeability —** The EO-2 Functional Nut can be used for the whole variety of the broad range of more than 50 configurations in some 25 sizes of standard EO LL, L and S-series fittings. Changeover from Progressive ring or weld nipple is easy by the simple use of EO-2 Functional Nuts.
- **Reliability —** Millions of EO-2 fittings are working trouble-free in applications like: Mobile construction equipment, stationary machine tools, hydraulic presses, plastic injection molding machines, shipbuilding, offshore exploration, submarines, railway trains and military equipment. Leakage does not occur on EO-2 pipework.
- **Trouble-Free —** Regular bite type fittings allow typical assembly-errors such as: confusion of bite type ring material and size. Also, the use of worn-out preassembly tool may result in fitting failure. The clever EO-2 design eliminates most of these mistakes without making the assembly process more complicated.
- **Popularity —** EO-2 fittings are as easy to assemble as traditional bite type fittings, but they eliminate most of their typical assembly problems. EO-2 fittings are therefore appreciated by an increasing number of original equipment manufacturers. EO-2 also has become the fitting of choice of end-users that appreciate the leakfree performance, the easy maintenance and the global availability of the metric soft-seal bite type system.



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# EO and EO-2 Metric Tube Ends

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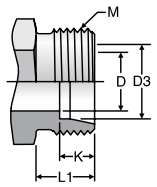
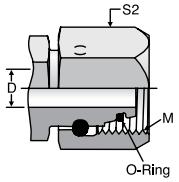
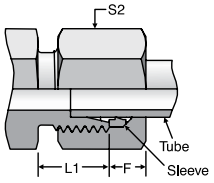


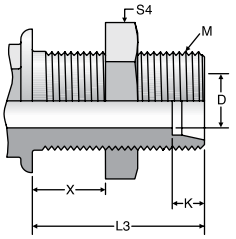

**EO/EO-2 Male Tube End**




**EO/EO-2 Swivel**




**EO/EO-2 Assembly**




**EO/EO-2 Bulkhead**

| Size | End Size D3 (mm) | Thread M Metric | Drill D (mm) | Tube Nut Assembled Allowance F (mm) | Tube Depth K (mm) | Male Turn Back L1 (mm) | Bulkhead Length L3 (mm) | Tube/Swivel Nut Hex S2 (mm) | Bulkhead Nut Hex S4 (mm) | Max Bulkhead Thickness X (mm) |
|---|---|---|---|---|---|---|---|---|---|---|
| **4LL** | 4 | M8x1 | 3 | 5.5 | 4.2 | 8 | — | 10 | — | — |
| **6LL** | 6 | M10x1 | 4.5 | 6 | 5.7 | 8 | — | 12 | — | — |
| **8LL** | 8 | M12x1 | 6 | 6 | 5.7 | 9 | — | 14 | — | — |
| **10LL** | 10 | M14x1 | 8 | 6 | 5.7 | 9 | — | 17 | — | — |
| **12LL** | 12 | M16x1 | 10 | 6 | 6.2 | 9 | — | 19 | — | — |
| **6L** | 6 | M12x1.5 | 4 | 8 | 7.2 | 10 | 34 | 14 | 17 | 16 |
| **8L** | 8 | M14x1.5 | 6 | 8 | 7.2 | 10 | 34 | 17 | 19 | 16 |
| **10L** | 10 | M16x1.5 | 8 | 8 | 7.2 | 11 | 35 | 19 | 22 | 16 |
| **12L** | 12 | M18x1.5 | 10 | 8 | 7.2 | 11 | 36 | 22 | 24 | 16 |
| **15L** | 15 | M22x1.5 | 12 | 8 | 7.2 | 12 | 38 | 27 | 30 | 16 |
| **18L** | 18 | M26x1.5 | 15 | 9 | 7.7 | 12 | 40 | 32 | 36 | 16 |
| **22L** | 22 | M30x2 | 19 | 9 | 7.7 | 14 | 42 | 36 | 41 | 16 |
| **28L** | 28 | M36x2 | 24 | 9 | 7.7 | 14 | 43 | 41 | 46 | 16 |
| **35L** | 35 | M45x2 | 30 | 11 | 10.7 | 16 | 47 | 50 | 55 | 16 |
| **42L** | 42 | M52x2 | 36 | 12 | 11.2 | 16 | 47 | 60 | 65 | 16 |
| **6S** | 6 | M14x1.5 | 4 | 8 | 7.2 | 12 | 36 | 17 | 19 | 16 |
| **8S** | 8 | M16x1.5 | 5 | 8 | 7.2 | 12 | 36 | 19 | 22 | 16 |
| **10S** | 10 | M18x1.5 | 7 | 9 | 7.7 | 12 | 37 | 22 | 24 | 16 |
| **12S** | 12 | M20x1.5 | 8 | 9 | 7.7 | 12 | 38 | 24 | 27 | 16 |
| **14S** | 14 | M22x1.5 | 10 | 10 | 8.2 | 14 | 40 | 27 | 30 | 16 |
| **16S** | 16 | M24x1.5 | 12 | 10 | 8.7 | 14 | 41 | 30 | 32 | 16 |
| **20S** | 20 | M30x2 | 16 | 11 | 10.7 | 16 | 44 | 36 | 41 | 16 |
| **25S** | 25 | M36x2 | 20 | 12 | 12.2 | 18 | 47 | 46 | 46 | 16 |
| **30S** | 30 | M42x2 | 25 | 13 | 13.7 | 20 | 51 | 50 | 50 | 16 |
| **38S** | 38 | M52x2 | 32 | 15 | 16.2 | 22 | 53 | 60 | 65 | 16 |

Note: For port and stud end dimensions reference section F: Pipe Fittings and Port Adapters.

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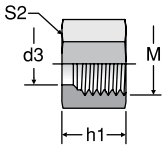
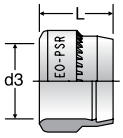
## M
Nut




| STANDARD FROM STOCK TUBE FITTING PART # | | | d3 Tube O.D. | M Metric | S2 | h1 |
|---|---|---|---|---|---|---|
| STEEL | STAINLESS | BRASS | (mm) | Thread | (mm) | (mm) |
| M04LLCFX | M04LL71X | M04LLMSX | 4 | M8 x 1 | 10 | 11.0 |
| M06LLCFX | M06LL71X | M06LLMSX | 6 | M10 x 1 | 12 | 11.5 |
| M08LLCFX | M08LL71X | M08LLMSX | 8 | M12 x 1 | 14 | 12.0 |
| M10LLCFX | — | M10LLMSX | 10 | M14 x 1 | 17 | 12.5 |
| M12LLCFX | — | M12LLMSX | 12 | M16 x 1 | 19 | 13.0 |
| M06LCFX | M06LEODURX | M06LMSX | 6 | M12 x 1.5 | 14 | 14.5 |
| M08LCFX | M08LEODURX | M08LMSX | 8 | M14 x 1.5 | 17 | 14.5 |
| M10LCFX | M10LEODURX | M10LMSX | 10 | M16 x 1.5 | 19 | 15.5 |
| M12LCFX | M12LEODURX | M12LMSX | 12 | M18 x 1.5 | 22 | 15.5 |
| M15LCFX | M15LEODURX | M15LMSX | 15 | M22 x 1.5 | 27 | 17.0 |
| M18LCFX | M18LEODURX | M18LMSX | 18 | M26 x 1.5 | 32 | 18.0 |
| M22LCFX | M22LEODURX | M22LMSX | 22 | M30 x 2 | 36 | 20.0 |
| M28LCFX | M28LEODURX | M28LMSX | 28 | M36 x 2 | 41 | 21.0 |
| M35LCFX | M35LEODURX | M35LMSX | 35 | M45 x 2 | 50 | 24.0 |
| M42LCFX | M42LEODURX | M42LMSX | 42 | M52 x 2 | 60 | 24.0 |
| M06SCFX | M06SEODURX | M06SMSX | 6 | M14 x 1.5 | 17 | 16.5 |
| M08SCFX | M08SEODURX | M08SMSX | 8 | M16 x 1.5 | 19 | 16.5 |
| M10SCFX | M10SEODURX | M10SMSX | 10 | M18 x 1.5 | 22 | 17.5 |
| M12SCFX | M12SEODURX | M12SMSX | 12 | M20 x 1.5 | 24 | 17.5 |
| M14SCFX | M14SEODURX | M14SMSX | 14 | M22 x 1.5 | 27 | 20.5 |
| M16SCFX | M16SEODURX | M16SMSX | 16 | M24 x 1.5 | 30 | 20.5 |
| M20SCFX | M20SEODURX | M20SMSX | 20 | M30 x 2 | 36 | 24.0 |
| M25SCFX | M25SEODURX | M25SMSX | 25 | M36 x 2 | 46 | 27.0 |
| M30SCFX | M30SEODURX | M30SMSX | 30 | M42 x 2 | 50 | 29.0 |
| M38SCFX | M38SEODURX | M38SMSX | 38 | M52 x 2 | 60 | 32.5 |

## PSR
Progressive Ring
For L and S series only

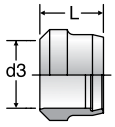



| STANDARD FROM STOCK TUBE FITTING PART # | d3 Tube O.D. | L |
|---|---|---|
| STEEL | (mm) | (mm) |
| PSR06LX* | 6 | 9.5 |
| PSR08LX* | 8 | 9.5 |
| PSR10LX* | 10 | 10.0 |
| PSR12LX* | 12 | 10.0 |
| PSR15LX | 15 | 10.0 |
| PSR18LX | 18 | 10.0 |
| PSR22LX | 22 | 10.5 |
| PSR28LX | 28 | 10.5 |
| PSR35LX | 35 | 13.0 |
| PSR42LX | 42 | 13.0 |
| PSR14SX | 14 | 10.0 |
| PSR16SX | 16 | 10.0 |
| PSR20SX | 20 | 13.0 |
| PSR25SX | 25 | 13.0 |
| PSR30SX | 30 | 13.0 |
| PSR38SX | 38 | 13.0 |

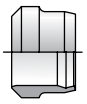
* PSR Progressive Rings in sizes 6, 8, 10 and 12mm are the same for both Series L and S.

PSR Progressive Rings: Zinc plated and clear chromated

## DPR
Progressive Ring
For L and S series only




DPR:
Progressive Ring



D:
Cutting Ring

## D
Cutting (Locking) Ring
For LL series and all brass

| STANDARD FROM STOCK TUBE FITTING PART # | | | d3 Tube O.D. | L |
|---|---|---|---|---|
| STEEL | STAINLESS | BRASS | (mm) | (mm) |
| D04LLX | — | D04LLMSX | 4 | 6.0 |
| D06LLX | D06LL71X | D06LLMSX | 6 | 7.0 |
| D08LLX | D08LL71X | D08LLMSX | 8 | 7.0 |
| D10LLX | — | D10LLMSX | 10 | 7.0 |
| D12LLX | — | D12LLMSX | 12 | 7.5 |
| — | DPR06L71X* | D06LMSX* | 6 | 9.0 |
| — | DPR08L71X* | D08LMSX* | 8 | 9.0 |
| — | DPR10L71X* | D10LMSX* | 10 | 9.5 |
| — | DPR12L71X* | D12LMSX* | 12 | 9.8 |
| — | DPR15L71X | D15LMSX | 15 | 9.5 |
| — | DPR18L71X | D18LMSX | 18 | 9.5 |
| — | DPR22L71X | D22LMSX | 22 | 10.5 |
| — | DPR28L71X | D28LMSX | 28 | 11.0 |
| — | DPR35L71X | D35LMSX | 35 | 13.5 |
| — | DPR42L71X | D42LMSX | 42 | 13.5 |
| — | DPR14S71X | D14SMSX | 14 | 9.5 |
| — | DPR16S71X | D16SMSX | 16 | 9.5 |
| — | DPR20S71X | D20SMSX | 20 | 12.5 |
| — | DPR25S71X | D25SMSX | 25 | 12.5 |
| — | DPR30S71X | D30SMSX | 30 | 12.5 |
| — | DPR38S71X | D38SMSX | 38 | 13.0 |

* DPR Progressive Rings in sizes 6, 8, 10 and 12mm are the same for both Series L and S.

Cutting (locking) Rings, Series LL: Zinc plated and clear chromate (CF)

Dimensions and pressures for reference only, subject to change.



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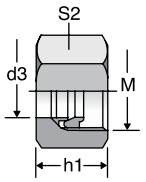
# FM

EO-2 Dual Funtion Nut




| TUBE FITTING PART # | SERIES | d3 END SIZE (mm) | M Metric Thread | h1 (mm) | S2 (mm) | STANDARD FROM STOCK | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CF | SSA | VITCF | VITSSA | 71 |
| **FM04LL** | LL | 4 | M8 x 1 | 11.0 | 10 | • | • | • | • | • |
| **FM06LL** | very light | 6 | M10 x 1 | 11.5 | 12 | • | • | • | • | • |
| **FM06L** | L | 6 | M12 x 1.5 | 14.5 | 14 | • | • | • | • | • |
| **FM08L** | light | 8 | M14 x 1.5 | 14.5 | 17 | • | • | • | • | • |
| **FM10L** | | 10 | M16 x 1.5 | 15.5 | 19 | • | • | • | • | • |
| **FM12L** | | 12 | M18 x 1.5 | 15.5 | 22 | • | • | • | • | • |
| **FM15L** | | 15 | M22 x 1.5 | 17.0 | 27 | • | • | • | • | • |
| **FM18L** | | 18 | M26 x 1.5 | 18.0 | 32 | • | • | • | • | • |
| **FM22L** | | 22 | M30 x 2 | 20.0 | 36 | • | • | • | • | • |
| **FM28L** | | 28 | M36 x 2 | 21.0 | 41 | • | • | • | • | • |
| **FM35L** | | 35 | M45 x 2 | 24.0 | 50 | • | • | • | • | • |
| **FM42L** | | 42 | M52 x 2 | 24.0 | 60 | • | • | • | • | • |
| **FM06S** | S | 6 | M14 x 1.5 | 16.5 | 17 | • | • | • | • | • |
| **FM08S** | heavy | 8 | M16 x 1.5 | 16.5 | 19 | • | • | • | • | • |
| **FM10S** | | 10 | M18 x 1.5 | 17.5 | 22 | • | • | • | • | • |
| **FM12S** | | 12 | M20 x 1.5 | 17.5 | 24 | • | • | • | • | • |
| **FM14S** | | 14 | M22 x 1.5 | 20.5 | 27 | • | • | • | • | • |
| **FM16S** | | 16 | M24 x 1.5 | 20.5 | 30 | • | • | • | • | • |
| **FM20S** | | 20 | M30 x 2 | 24.0 | 36 | • | • | • | • | • |
| **FM25S** | | 25 | M36 x 2 | 27.0 | 46 | • | • | • | • | • |
| **FM30S** | | 30 | M42 x 2 | 29.0 | 50 | • | • | • | • | • |
| **FM38S** | | 38 | M52 x 2 | 32.5 | 60 | • | • | • | • | • |

## FM Component Breakdown by Material

| | Nut | Bite Ring | Seal Ring | Elastomer | Nut Finish |
|---|---|---|---|---|---|
| CF | Steel | Steel | Steel | NBR | Zinc Clear |
| SSA | Steel | Stainless Steel | Steel | NBR | Zinc Clear |
| VITCF | Steel | Steel | Steel | FKM | Zinc Clear |
| VITSSA | Steel | Stainless Steel | Steel | FKM | Zinc Clear |
| 71 | Stainless Steel | Stainless Steel | Stainless Steel | FKM | Passivated |

Dimensions and pressures for reference only, subject to change.



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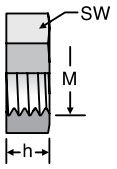
# GM

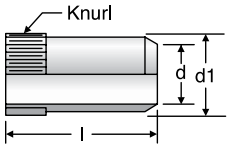
Bulkhead Locknout




| TUBE FITTING PART # | FOR USE WITH | | h (mm) | M Metric Thread | SW (mm) | STANDARD FROM STOCK | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CFX | 71X | MSX |
| **GM06L** | 6L | | 6 | M12 x 1.5 | 17 | • | | |
| **GM08L** | 8L | 6S | 6 | M14 x 1.5 | 19 | • | | |
| **GM10L** | 10L | 8S | 6 | M16 x 1.5 | 22 | • | | |
| **GM12L** | 12L | 10S | 6 | M18 x 1.5 | 24 | • | • | |
| **GM12S** | | 12S | 6 | M20 x 1.5 | 27 | • | | |
| **GM15L** | 15L | 14S | 7 | M22 x 1.5 | 30 | • | • | |
| **GM16S** | | 16S | 7 | M24 x 1.5 | 32 | • | | |
| **GM18L** | 18L | | 8 | M26 x 1.5 | 36 | • | | |
| **GM22L** | 22L | 20S | 8 | M30 x 2 | 41 | • | | |
| **GM28L** | 28L | 25S | 9 | M36 x 2 | 46 | • | | |
| **GM30S** | | 30S | 9 | M42 x 2 | 50 | • | | |
| **GM35L** | 35L | | 9 | M45 x 2 | 55 | • | | |
| **GM42L** | 42L | 38S | 10 | M52 x 2 | 65 | | | |

# VH

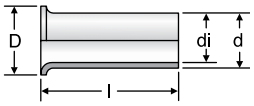
Tube Insert
For Thin Walled Metal Tube




| TUBE FITTING PART # | FOR TUBE I.D. Ø (mm) | d (mm) | d1 (mm) | L (mm) | STANDARD FROM STOCK | | |
|---|---|---|---|---|---|---|---|
| | | | | | CFX | 71X | MSX |
| **VH04** | 4 | 2.6 | 3.8 | 14 | • | | • |
| **VH04.5** | 4.5 | 3.1 | 4.3 | 14 | | | |
| **VH05** | 5 | 3.6 | 4.8 | 14 | | | |
| **VH06** | 6 | 4.6 | 5.8 | 14 | • | | • |
| **VH07** | 7 | 5.6 | 6.8 | 15.5 | • | | |
| **VH08** | 8 | 6.6 | 7.8 | 15.5 | • | • | • |
| **VH09** | 9 | 7.6 | 8.8 | 15.5 | | | • |
| **VH10** | 10 | 8.6 | 9.8 | 15.5 | • | • | • |
| **VH12** | 12 | 10.2 | 11.8 | 17 | • | | |
| **VH13** | 13 | 11.2 | 12.8 | 17 | | • | • |
| **VH14** | 14 | 12.2 | 13.8 | 17 | • | | |
| **VH15** | 15 | 13.2 | 14.8 | 20 | • | | |
| **VH16** | 16 | 14.2 | 15.8 | 20 | | | |
| **VH17** | 17 | 15.2 | 16.8 | 20 | • | | |
| **VH18** | 18 | 16.2 | 17.8 | 20 | • | | |
| **VH19** | 19 | 17.2 | 18.8 | 16 | | | • |
| **VH20** | 20 | 18.2 | 19.8 | 21.5 | | | • |
| **VH21** | 21 | 19.2 | 20.8 | 21.5 | | | |
| **VH22** | 22 | 20.2 | 21.8 | 23.5 | | | |
| **VH24** | 24 | 22.2 | 23.8 | 23.5 | | | |
| **VH25** | 25 | 23.2 | 24.8 | 23.5 | | | • |
| **VH26** | 26 | 24.2 | 25.8 | 23.5 | | | |
| **VH27** | 27 | 25.2 | 26.8 | 23.5 | | | |
| **VH30** | 30 | 27.8 | 29.8 | 26.5 | | | |
| **VH31** | 31 | 28.8 | 30.8 | 26.5 | | | • |
| **VH32** | 32 | 29.8 | 31.8 | 26.5 | | | |
| **VH33** | 33 | 30.8 | 32.8 | 26.5 | | | |
| **VH38** | 38 | 35.8 | 37.8 | 21 | • | | |

# E

Tube Insert
For Plastic Tube




| TUBE FITTING PART # | USE WITH TUBE O.D. ø | USE WITH TUBE I.D. ø | d (mm) | D (mm) | di (mm) | l (mm) |
|---|---|---|---|---|---|---|
| **E04/02X** | 4 | 2.0 | 2.0 | 3.5 | 1.3 | 8 |
| **E04/2.5X** | 4 | 2.5 | 2.5 | 4.0 | 1.7 | 8 |
| **E0506/03X** | 5 | 3.0 | 3.0 | 5.0 | 2.2 | 14 |
| **E0506/03X** | 6 | 3.0 | 3.0 | 5.0 | 2.2 | 14 |
| **E0506/04X** | 5 | 4.0 | 4.0 | 5.0 | 3.2 | 14 |
| **E0506/04X** | 6 | 4.0 | 4.0 | 5.0 | 3.2 | 14 |
| **E08/04X** | 8 | 4.0 | 4.0 | 6.6 | 3.2 | 14 |
| **E06/05X** | 6 | 5.0 | 5.0 | 6.0 | 4.0 | 14 |
| **E08/05X** | 8 | 5.0 | 5.0 | 8.0 | 4.0 | 14 |
| **E10/05X** | 10 | 5.0 | 5.0 | 8.5 | 4.0 | 15 |
| **E0810/06X** | 8 | 6.0 | 6.0 | 8.0 | 5.0 | 15 |
| **E0810/06X** | 10 | 6.0 | 5.0 | 8.5 | 4.0 | 15 |
| **E10/08X** | 10 | 8.0 | 8.0 | 10.0 | 6.7 | 15 |
| **E12/08X** | 12 | 8.0 | 8.0 | 12.0 | 6.7 | 15 |
| **E12/09X** | 12 | 9.0 | 9.0 | 12.0 | 7.7 | 15 |
| **E1215/10X** | 12 | 10.0 | 10.0 | 12.0 | 8.7 | 15 |
| **E1215/10X** | 15 | 10.0 | 10.0 | 12.0 | 8.7 | 15 |
| **E1215/10X** | 16 | 10.0 | 10.0 | 12.0 | 8.7 | 15 |
| **E15/12X** | 15 | 12.0 | 12.0 | 14.0 | 10.7 | 15 |
| **E1516/12.5X** | 15 | 12.5 | 12.5 | 14.8 | 11.2 | 15 |
| **E1516/12.5X** | 16 | 12.5 | 12.5 | 14.8 | 11.2 | 15 |
| **E18/14X** | 18 | 14.0 | 14.0 | 17.8 | 12.7 | 15 |
| **E1820/16X** | 18 | 16.0 | 16.0 | 17.8 | 14.7 | 20 |
| **E1820/16X** | 20 | 16.0 | 16.0 | 17.8 | 14.7 | 20 |
| **E22/18X** | 22 | 18.0 | 18.0 | 21.8 | 16.7 | 16 |

**Note:** E inserts are made of brass.

Dimensions and pressures for reference only, subject to change.



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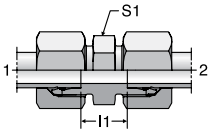
# G

Union
24° Flareless / 24° Flareless

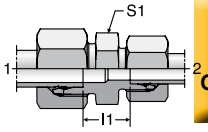



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 (mm) | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| G04LL | 4 | 4 | 12 | 9 | 100 | 100 | 63 | 100 | 100 |
| G06LL | 6 | 6 | 9 | 11 | 100 | 100 | 63 | 100 | 100 |
| G08LL | 8 | 8 | 12 | 12 | 100 | 100 | 63 | — | — |
| G10LL | 10 | 10 | 12 | 14 | 100 | 100 | 63 | — | — |
| G12LL | 12 | 12 | 11 | 17 | 100 | 100 | 63 | — | — |
| G06L | 6 | 6 | 10 | 12 | 500 | 315 | 200 | 500 | 315 |
| G08L | 8 | 8 | 11 | 14 | 500 | 315 | 200 | 500 | 315 |
| G10L | 10 | 10 | 13 | 17 | 500 | 315 | 200 | 500 | 315 |
| G12L | 12 | 12 | 14 | 19 | 400 | 315 | 200 | 400 | 315 |
| G15L | 15 | 15 | 16 | 24 | 400 | 315 | 200 | 400 | 315 |
| G18L | 18 | 18 | 16 | 27 | 400 | 315 | 200 | 400 | 315 |
| G22L | 22 | 22 | 20 | 32 | 250 | 160 | 100 | 250 | 160 |
| G28L | 28 | 28 | 21 | 41 | 250 | 160 | 100 | 250 | 160 |
| G35L | 35 | 35 | 20 | 46 | 250 | 160 | 100 | 250 | 160 |
| G42L | 42 | 42 | 21 | 55 | 250 | 160 | 100 | 250 | 160 |
| G06S | 6 | 6 | 16 | 14 | 800 | 630 | 400 | 800 | 630 |
| G08S | 8 | 8 | 18 | 17 | 800 | 630 | 400 | 800 | 630 |
| G10S | 10 | 10 | 17 | 19 | 800 | 630 | 400 | 800 | 630 |
| G12S | 12 | 12 | 19 | 22 | 630 | 630 | 400 | 630 | 630 |
| G14S | 14 | 14 | 22 | 24 | 630 | 630 | 400 | 630 | 630 |
| G16S | 16 | 16 | 21 | 27 | 630 | 400 | 250 | 630 | 400 |
| G20S | 20 | 20 | 23 | 32 | 420 | 400 | 250 | 420 | 400 |
| G25S | 25 | 25 | 26 | 41 | 420 | 400 | 250 | 420 | 400 |
| G30S | 30 | 30 | 27 | 46 | 420 | 400 | 250 | 420 | 400 |
| G38S | 38 | 38 | 29 | 55 | 420 | 315 | 205 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series. Example: G06ZLCF**

# GR

Union Reducer
24° Flareless / 24° Flareless




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 (mm) | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| GR06/04LL | 6 | 4 | 10.5 | 11 | 100 | 100 | 63 | 100 | 100 |
| GR08/04LL | 8 | 4 | 12.5 | 12 | 100 | 100 | 63 | 100 | 100 |
| GR08/06LL | 8 | 6 | 11.0 | 12 | 100 | 100 | 63 | 100 | 100 |
| GR08/06L | 8 | 6 | 11.0 | 14 | 500 | 315 | 200 | 500 | 315 |
| GR10/06L | 10 | 6 | 12.0 | 17 | 500 | 315 | 200 | 500 | 315 |
| GR10/08L | 10 | 8 | 12.0 | 17 | 500 | 315 | 200 | 500 | 315 |
| GR12/06L | 12 | 6 | 13.0 | 19 | 400 | 315 | 200 | 400 | 315 |
| GR12/08L | 12 | 8 | 13.0 | 19 | 400 | 315 | 200 | 400 | 315 |
| GR12/10L | 12 | 10 | 14.0 | 19 | 400 | 315 | 200 | 400 | 315 |
| GR15/10L | 15 | 10 | 15.0 | 24 | 400 | 315 | 200 | 400 | 315 |
| GR15/12L | 15 | 12 | 15.0 | 24 | 400 | 315 | 200 | 400 | 315 |
| GR18/10L | 18 | 10 | 15.5 | 27 | 400 | 315 | 200 | 400 | 315 |
| GR18/12L | 18 | 12 | 15.5 | 27 | 400 | 315 | 200 | 400 | 315 |
| GR18/15L | 18 | 15 | 16.5 | 27 | 400 | 315 | 200 | 400 | 315 |
| GR22/12L | 22 | 12 | 17.5 | 32 | 250 | 160 | 100 | 250 | 160 |
| GR22/15L | 22 | 15 | 18.5 | 32 | 250 | 160 | 100 | 250 | 160 |
| GR22/18L | 22 | 18 | 18.0 | 32 | 250 | 160 | 100 | 250 | 160 |
| GR28/18L | 28 | 18 | 19.0 | 41 | 250 | 160 | 100 | 250 | 160 |
| GR28/22L | 28 | 22 | 21.0 | 41 | 250 | 160 | 100 | 250 | 160 |
| GR35/22L | 35 | 22 | 21.0 | 46 | 250 | 160 | 100 | 250 | 160 |
| GR35/28L | 35 | 28 | 21.0 | 46 | 250 | 160 | 100 | 250 | 160 |
| GR08/06S | 8 | 6 | 18.0 | 17 | 800 | 630 | 400 | 800 | 630 |
| GR10/06S | 10 | 6 | 17.5 | 19 | 800 | 630 | 400 | 800 | 630 |
| GR10/08S | 10 | 8 | 17.5 | 19 | 800 | 630 | 400 | 800 | 630 |
| GR12/06S | 12 | 6 | 19.5 | 22 | 630 | 630 | 400 | 630 | 630 |
| GR12/08S | 12 | 8 | 19.5 | 22 | 630 | 630 | 400 | 630 | 630 |
| GR12/10S | 12 | 10 | 19.0 | 22 | 630 | 630 | 400 | 630 | 630 |
| GR14/10S | 14 | 10 | 20.5 | 24 | 630 | 630 | 400 | 630 | 630 |
| GR14/12S | 14 | 12 | 20.5 | 24 | 630 | 630 | 400 | 630 | 630 |
| GR16/12S | 16 | 12 | 20.0 | 27 | 630 | 400 | 250 | 630 | 400 |
| GR16/14S | 16 | 14 | 21.5 | 27 | 630 | 400 | 250 | 630 | 400 |
| GR20/10S | 20 | 10 | 22.0 | 32 | 420 | 400 | 250 | 420 | 400 |
| GR20/12S | 20 | 12 | 22.0 | 32 | 420 | 400 | 250 | 420 | 400 |
| GR20/16S | 20 | 16 | 23.0 | 32 | 420 | 400 | 250 | 420 | 400 |
| GR25/16S | 25 | 16 | 25.5 | 41 | 420 | 400 | 250 | 420 | 400 |
| GR25/20S | 25 | 20 | 25.5 | 41 | 420 | 400 | 250 | 420 | 400 |
| GR30/20S | 30 | 20 | 26.0 | 46 | 420 | 400 | 250 | 420 | 400 |
| GR30/25S | 30 | 25 | 26.5 | 46 | 420 | 400 | 250 | 420 | 400 |
| GR38/30S | 38 | 30 | 29.5 | 55 | 420 | 315 | 200 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series. Example: GR06/04ZLLCF**

Dimensions and pressures for reference only, subject to change.



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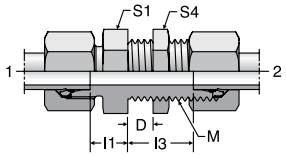
E

# SV

Bulkhead Union
24° Flareless / 24° Flareless



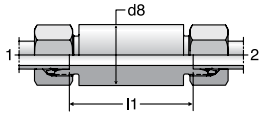

D = 16mm, max. bulkhead thickness

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 (mm) | M Metric Thread | l 1 (mm) | l 3 (mm) | S1 (mm) | S4 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SV06L** | 6 | 6 | M12 x 1.5 | 7 | 27.0 | 17 | 17 | 500 | 315 | 200 | 500 | 315 |
| **SV08L** | 8 | 8 | M14 x 1.5 | 8 | 27.0 | 19 | 19 | 500 | 315 | 200 | 500 | 315 |
| **SV10L** | 10 | 10 | M16 x 1.5 | 10.0 | 28.0 | 22 | 22 | 500 | 315 | 200 | 500 | 315 |
| **SV12L** | 12 | 12 | M18 x 1.5 | 10.0 | 29.0 | 24 | 24 | 400 | 315 | 200 | 400 | 315 |
| **SV15L** | 15 | 15 | M22 x 1.5 | 12.0 | 31.0 | 27 | 30 | 400 | 315 | 200 | 400 | 315 |
| **SV18L** | 18 | 18 | M26 x 1.5 | 13.5 | 32.5 | 32 | 36 | 400 | 315 | 200 | 400 | 315 |
| **SV22L** | 22 | 22 | M30 x 2 | 16.5 | 34.5 | 36 | 41 | 250 | 160 | 100 | 250 | 160 |
| **SV28L** | 28 | 28 | M36 x 2 | 18.5 | 35.5 | 41 | 46 | 250 | 160 | 100 | 250 | 160 |
| **SV35L** | 35 | 35 | M45 x 2 | 18.5 | 36.5 | 50 | 55 | 250 | 160 | 100 | 250 | 160 |
| **SV42L** | 42 | 42 | M52 x 2 | 19.0 | 36.0 | 60 | 65 | 250 | 160 | 100 | 250 | 160 |
| **SV06S** | 6 | 6 | M14 x 1.5 | 12.0 | 29.0 | 19 | 19 | 800 | 630 | 400 | 800 | 630 |
| **SV08S** | 8 | 8 | M16 x 1.5 | 13.0 | 29.0 | 22 | 22 | 800 | 630 | 400 | 800 | 630 |
| **SV10S** | 10 | 10 | M18 x 1.5 | 14.5 | 29.5 | 24 | 24 | 800 | 630 | 400 | 800 | 630 |
| **SV12S** | 12 | 12 | M20 x 1.5 | 14.5 | 30.5 | 27 | 27 | 630 | 630 | 400 | 630 | 630 |
| **SV14S** | 14 | 14 | M22 x 1.5 | 17.0 | 32.0 | 30 | 30 | 630 | 630 | 400 | 630 | 630 |
| **SV16S** | 16 | 16 | M24 x 1.5 | 16.5 | 31.5 | 32 | 32 | 630 | 400 | 250 | 630 | 400 |
| **SV20S** | 20 | 20 | M30 x 2 | 17.5 | 33.5 | 41 | 41 | 420 | 400 | 250 | 420 | 400 |
| **SV25S** | 25 | 25 | M36 x 2 | 20.0 | 35.0 | 46 | 46 | 420 | 400 | 250 | 420 | 400 |
| **SV30S** | 30 | 30 | M42 x 2 | 21.5 | 37.5 | 50 | 50 | 420 | 400 | 250 | 420 | 400 |
| **SV38S** | 38 | 38 | M52 x 2 | 22.0 | 37.0 | 65 | 65 | 420 | 315 | 205 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series. Example: SV06ZLCF**

# ESV

Weld Bulkhead Fitting
24° Flareless / 24° Flareless




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 (mm) | d8 (mm) | l 1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|
| **ESV06L** | 6 | 6 | 18 | 56 | 500 | 315 | 500 | 315 |
| **ESV08L** | 8 | 8 | 20 | 56 | 500 | 315 | 500 | 315 |
| **ESV10L** | 10 | 10 | 22 | 58 | 500 | 315 | 500 | 315 |
| **ESV12L** | 12 | 12 | 25 | 58 | 400 | 315 | 400 | 315 |
| **ESV15L** | 15 | 15 | 28 | 70 | 400 | 315 | 400 | 315 |
| **ESV18L** | 18 | 18 | 32 | 69 | 400 | 315 | 400 | 315 |
| **ESV22L** | 22 | 22 | 36 | 73 | 250 | 160 | 250 | 160 |
| **ESV28L** | 28 | 28 | 40 | 73 | 250 | 160 | 250 | 160 |
| **ESV35L** | 35 | 35 | 50 | 71 | 250 | 160 | 250 | 160 |
| **ESV42L** | 42 | 42 | 60 | 70 | 250 | 160 | 250 | 160 |
| **ESV06S** | 6 | 6 | 20 | 60 | 800 | 630 | 800 | 630 |
| **ESV08S** | 8 | 8 | 22 | 60 | 800 | 630 | 800 | 630 |
| **ESV10S** | 10 | 10 | 25 | 59 | 800 | 630 | 800 | 630 |
| **ESV12S** | 12 | 12 | 28 | 59 | 630 | 630 | 630 | 630 |
| **ESV14S** | 14 | 14 | 30 | 72 | 630 | 630 | 630 | 630 |
| **ESV16S** | 16 | 16 | 35 | 71 | 630 | 400 | 630 | 400 |
| **ESV20S** | 20 | 20 | 38 | 71 | 420 | 400 | 420 | 400 |
| **ESV25S** | 25 | 25 | 45 | 72 | 420 | 400 | 420 | 400 |
| **ESV30S** | 30 | 30 | 50 | 73 | 420 | 400 | 420 | 400 |
| **ESV38S** | 38 | 38 | 60 | 72 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: ESV06ZL71**
**Note:** Weld fitting. Omit "CF" in the part number for steel material.

Dimensions and pressures for reference only, subject to change.



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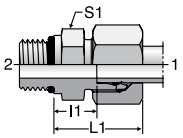
# GE-UNF/UN

Male Connector
24° Flareless / SAE-ORB

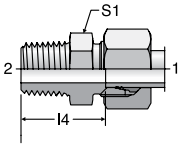



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 UN/UNF-2A | l 1 (mm) | L1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **GE08L7/16UNF** | 8 | 7/16-20 | 10.0 | 25 | 17 | 315 | 315 | 315 | 315 |
| **GE10L7/16UNF** | 10 | 7/16-20 | 11.0 | 26 | 17 | 315 | 315 | 315 | 315 |
| **GE12L9/16UNF** | 12 | 9/16-18 | 11.0 | 26 | 19 | 315 | 315 | 315 | 315 |
| **GE12L3/4UNF** | 12 | 3/4-16 | 13.0 | 28 | 24 | 315 | 315 | 315 | 315 |
| **GE12L7/8UNF** | 12 | 7/8-14 | 14.3 | 29 | 27 | 315 | 315 | 315 | 315 |
| **GE15L3/4UNF** | 15 | 3/4-16 | 14.0 | 29 | 24 | 315 | 315 | 315 | 315 |
| **GE18L3/4UNF** | 18 | 3/4-16 | 14.5 | 31 | 27 | 315 | 315 | 315 | 315 |
| **GE18L7/8UNF** | 18 | 7/8-14 | 14.8 | 31 | 27 | 315 | 315 | 315 | 315 |
| **GE22L7/8UNF** | 22 | 7/8-14 | 16.8 | 33 | 32 | 160 | 160 | 160 | 160 |
| **GE22L11/16UN** | 22 | 1 1/16-12 | 16.5 | 33 | 32 | 160 | 160 | 160 | 160 |
| **GE22L15/16UN** | 22 | 1 5/16-12 | 17.5 | 34 | 41 | 160 | 160 | 160 | 160 |
| **GE28L11/16UN** | 28 | 1 1/16-12 | 17.5 | 34 | 41 | 160 | 160 | 160 | 160 |
| **GE28L15/16UN** | 28 | 1 5/16-12 | 17.5 | 34 | 41 | 160 | 160 | 160 | 160 |
| **GE35L15/16UN** | 35 | 1 5/16-12 | 17.5 | 39 | 46 | 160 | 160 | 160 | 160 |
| **GE35L15/8UN** | 35 | 1 5/8-12 | 17.5 | 39 | 50 | 160 | 160 | 160 | 160 |
| **GE42L15/8UN** | 42 | 1 5/8-12 | 19.0 | 42 | 55 | 160 | 160 | 160 | 160 |
| **GE08S7/16UNF** | 8 | 7/16-20 | 13.0 | 30 | 17 | 630 | 630 | 630 | 630 |
| **GE10S9/16UNF** | 10 | 9/16-18 | 12.5 | 31 | 19 | 630 | 630 | 630 | 630 |
| **GE12S9/16UNF** | 12 | 9/16-18 | 12.5 | 31 | 22 | 630 | 630 | 630 | 630 |
| **GE12S3/4UNF** | 12 | 3/4-16 | 14.5 | 34 | 24 | 630 | 630 | 630 | 630 |
| **GE16S3/4UNF** | 16 | 3/4-16 | 12.5 | 34 | 24 | 400 | 400 | 400 | 400 |
| **GE16S7/8UNF** | 16 | 7/8-14 | 15.5 | 37 | 27 | 400 | 400 | 400 | 400 |
| **GE20S3/4UNF** | 20 | 3/4-16 | 17.5 | 42 | 32 | 400 | 400 | 400 | 400 |
| **GE20S7/8UNF** | 20 | 7/8-14 | 17.5 | 42 | 32 | 400 | 400 | 400 | 400 |
| **GE20S11/16UN** | 20 | 1 1/16-12 | 17.0 | 42 | 32 | 400 | 400 | 400 | 400 |
| **GE25S11/16UN** | 25 | 1 1/16-12 | 19.5 | 47 | 36 | 400 | 400 | 400 | 400 |
| **GE25S15/16UN** | 25 | 1 5/16-12 | 19.5 | 47 | 41 | 400 | 400 | 400 | 400 |
| **GE30S15/16UN** | 30 | 1 5/16-12 | 20.0 | 50 | 46 | 400 | 400 | 400 | 400 |
| **GE30S15/8UN** | 30 | 1 5/8-12 | 20.0 | 50 | 50 | 400 | 400 | 400 | 400 |
| **GE38S15/8UN** | 38 | 1 5/8-12 | 22.5 | 57 | 55 | 315 | 315 | 315 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: GE08ZL7/16UNFCF**

# GE-NPT

Male Connector
24° Flareless / NPTF




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 NPT | l 4 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS |
|---|---|---|---|---|---|---|---|
| **GE04LL1/8NPT** | 4 | 1/8-27 | 18.0 | 11 | 100 | 100 | 63 |
| **GE06LL1/8NPT** | 6 | 1/8-27 | 16.5 | 11 | 100 | 100 | 63 |
| **GE08LL1/8NPT** | 8 | 1/8-27 | 18.5 | 12 | 100 | 100 | 63 |
| **GE06L1/8NPT** | 6 | 1/8-27 | 17.0 | 12 | 315 | 315 | 200 |
| **GE06L1/4NPT** | 6 | 1/4-18 | 23.0 | 17 | 315 | 315 | 200 |
| **GE08L1/4NPT** | 8 | 1/4-18 | 23.0 | 17 | 315 | 315 | 200 |
| **GE10L1/4NPT** | 10 | 1/4-18 | 24.0 | 17 | 315 | 315 | 200 |
| **GE10L3/8NPT** | 10 | 3/8-18 | 25.0 | 19 | 315 | 315 | 200 |
| **GE12L1/4NPT** | 12 | 1/4-18 | 25.0 | 19 | 315 | 315 | 200 |
| **GE12L3/8NPT** | 12 | 3/8-18 | 25.0 | 19 | 315 | 315 | 200 |
| **GE12L1/2NPT** | 12 | 1/2-14 | 30.0 | 22 | 315 | 315 | 200 |
| **GE15L1/2NPT** | 15 | 1/2-14 | 31.0 | 24 | 315 | 315 | 200 |
| **GE18L1/2NPT** | 18 | 1/2-14 | 31.5 | 27 | 315 | 315 | 200 |
| **GE22L3/4NPT** | 22 | 3/4-14 | 33.5 | 32 | 160 | 160 | 100 |
| **GE28L1NPT** | 28 | 1-11 1/2 | 39.5 | 41 | 160 | 160 | 100 |
| **GE35L11/4NPT** | 35 | 1 1/4-11 1/2 | 40.5 | 46 | 160 | 160 | 100 |
| **GE42L11/2NPT** | 42 | 1 1/2-11 1/2 | 42.0 | 55 | 160 | 160 | 100 |
| **GE06S1/4NPT** | 6 | 1/4-18 | 28.0 | 17 | 630 | 630 | 400 |
| **GE08S1/4NPT** | 8 | 1/4-18 | 28.0 | 17 | 630 | 630 | 400 |
| **GE10S1/4NPT** | 10 | 1/4-18 | 27.5 | 19 | 630 | 630 | 400 |
| **GE10S3/8NPT** | 10 | 3/8-18 | 27.5 | 19 | 630 | 630 | 400 |
| **GE12S1/4NPT** | 12 | 1/4-18 | 29.5 | 22 | 630 | 630 | 400 |
| **GE12S3/8NPT** | 12 | 3/8-18 | 29.5 | 22 | 630 | 630 | 400 |
| **GE12S1/2NPT** | 12 | 1/2-14 | 34.5 | 22 | 630 | 630 | 400 |
| **GE14S1/2NPT** | 14 | 1/2-14 | 36.0 | 24 | 630 | 630 | 400 |
| **GE16S1/2NPT** | 16 | 1/2-14 | 39.5 | 32 | 400 | 400 | 250 |
| **GE20S3/4NPT** | 20 | 3/4-14 | 37.5 | 32 | 400 | 400 | 250 |
| **GE25S1NPT** | 25 | 1-11 1/2 | 45.0 | 41 | 400 | 400 | 100 |
| **GE30S11/4NPT** | 30 | 1 1/4-11 1/2 | 46.5 | 46 | 400 | 400 | 100 |
| **GE38S11/2NPT** | 38 | 1 1/2-11 1/2 | 49.0 | 55 | 315 | 315 | 100 |

**Note: Not sold with EO-2 Functional Nut.**

Dimensions and pressures for reference only, subject to change.



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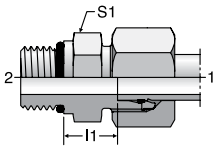
# GEO

Male Connector
24° Flareless / ISO 6149

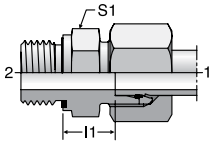



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric Thread | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|
| **GEO04LLM** | 4 | M8 x 1 | 9.5 | 11 | 100 | — | 100 | — |
| **GEO04LLM10x1** | 4 | M10 x 1 | 9.5 | 13 | 100 | — | 100 | — |
| **GEO06LLM** | 6 | M10 x 1 | 8.0 | 13 | 100 | — | 100 | — |
| **GEO06LM** | 6 | M10 x 1 | 8.5 | 14 | 500 | 315 | 500 | 315 |
| **GEO08LM** | 8 | M12 x 1.5 | 10.0 | 17 | 500 | 315 | 500 | 315 |
| **GEO10LM** | 10 | M14 x 1.5 | 11.0 | 19 | 500 | 315 | 500 | 315 |
| **GEO12LM** | 12 | M16 x 1.5 | 12.5 | 22 | 400 | 315 | 400 | 315 |
| **GEO15LM** | 15 | M18 x 1.5 | 13.5 | 24 | 400 | 315 | 400 | 315 |
| **GEO18LM** | 18 | M22 x 1.5 | 14.5 | 27 | 400 | 315 | 400 | 315 |
| **GEO22LM27x2** | 22 | M27 x 2 | 16.5 | 32 | 250 | 160 | 250 | 160 |
| **GEO28LM** | 28 | M33 x 2 | 17.5 | 41 | 250 | 160 | 250 | 160 |
| **GEO35LM** | 35 | M42 x 2 | 17.5 | 50 | 250 | 160 | 250 | 160 |
| **GEO42LM** | 42 | M48 x 2 | 19.0 | 55 | 250 | 160 | 250 | 160 |
| **GEO06SM** | 6 | M12 x 1.5 | 13.0 | 17 | 800 | 630 | 800 | 630 |
| **GEO08SM** | 8 | M14 x 1.5 | 15.0 | 19 | 800 | 630 | 800 | 630 |
| **GEO10SM** | 10 | M16 x 1.5 | 15.0 | 22 | 800 | 630 | 800 | 630 |
| **GEO12SM** | 12 | M18 x 1.5 | 17.0 | 24 | 630 | 630 | 630 | 630 |
| **GEO16SM** | 16 | M22 x 1.5 | 18.5 | 27 | 630 | 400 | 630 | 400 |
| **GEO20SM** | 20 | M27 x 2 | 20.5 | 32 | 420 | 400 | 420 | 400 |
| **GEO25SM** | 25 | M33 x 2 | 23.0 | 41 | 420 | 400 | 420 | 400 |
| **GEO30SM** | 30 | M42 x 2 | 23.5 | 50 | 420 | 400 | 420 | 400 |
| **GEO38SM** | 38 | M48 x 2 | 26.0 | 55 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: GEO06ZLMCF**

# GE-R-ED

Male Connector
24° Flareless / BSPP




DIN 3852-2 Form E

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **GE04LLRED** | 4 | G 1/8 A | 9.5 | 14 | 100 | 100 | 63 | 100 | 100 |
| **GE06LLRED** | 6 | G 1/8 A | 8.0 | 14 | 100 | 100 | 63 | 100 | 100 |
| **GE06LRED** | 6 | G 1/8 A | 8.5 | 14 | 500 | 315 | 200 | 500 | 315 |
| **GE06LR1/4ED** | 6 | G 1/4A | 10.0 | 19 | 500 | 315 | 200 | 500 | 315 |
| **GE08LR1/8ED** | 8 | G 1/8 A | 9.5 | 14 | 500 | 315 | 200 | 500 | 315 |
| **GE08LRED** | 8 | G 1/4A | 10.0 | 19 | 500 | 315 | 200 | 500 | 315 |
| **GE08LR3/8ED** | 8 | G 3/8 A | 11.5 | 22 | 420 | 315 | 200 | 420 | 315 |
| **GE10LRED** | 10 | G 1/4A | 11.0 | 19 | 500 | 315 | 200 | 500 | 315 |
| **GE10LR3/8ED** | 10 | G 3/8 A | 12.5 | 22 | 420 | 315 | 200 | 420 | 315 |
| **GE10LR1/2ED** | 10 | G 1/2 A | 13.0 | 27 | 400 | 315 | 200 | 400 | 315 |
| **GE12LR1/4ED** | 12 | G 1/4A | 12.0 | 19 | 400 | 315 | 200 | 400 | 315 |
| **GE12LRED** | 12 | G 3/8 A | 12.5 | 22 | 420 | 315 | 200 | 420 | 315 |
| **GE12LR1/2ED** | 12 | G 1/2 A | 13.0 | 27 | 400 | 315 | 200 | 400 | 315 |
| **GE15LR3/8ED** | 15 | G 3/8 A | 13.5 | 24 | 400 | 315 | 200 | 400 | 315 |
| **GE15LRED** | 15 | G 1/2 A | 14.0 | 27 | 400 | 315 | 200 | 400 | 315 |
| **GE18LRED** | 18 | G 1/2 A | 14.5 | 27 | 400 | 315 | 200 | 400 | 315 |
| **GE18LR3/4ED** | 18 | G 3/4 A | 14.5 | 32 | 250 | 160 | 100 | 250 | 160 |
| **GE22LRED** | 22 | G 3/4 A | 16.5 | 32 | 250 | 160 | 100 | 250 | 160 |
| **GE28LRED** | 28 | G1 A | 17.5 | 41 | 250 | 160 | 100 | 250 | 160 |
| **GE35LRED** | 35 | G1 1/4A | 17.5 | 50 | 250 | 160 | 100 | 250 | 160 |
| **GE42LRED** | 42 | G1 1/2 A | 19.0 | 55 | 250 | 160 | 100 | 250 | 160 |
| **GE06SRED** | 6 | G 1/4A | 13.0 | 19 | 800 | 630 | 400 | 800 | 630 |
| **GE08SRED** | 8 | G 1/4A | 15.0 | 19 | 800 | 630 | 400 | 800 | 630 |
| **GE08SR3/8ED** | 8 | G 3/8 A | 15.5 | 22 | 800 | 630 | 400 | 800 | 630 |
| **GE10SR1/4ED** | 10 | G 1/4A | 14.5 | 19 | 800 | 630 | 400 | 800 | 630 |
| **GE10SRED** | 10 | G 3/8 A | 15.0 | 22 | 800 | 630 | 400 | 800 | 630 |
| **GE10SR1/2ED** | 10 | G 1/2 A | 17.5 | 27 | 630 | 630 | 400 | 630 | 630 |
| **GE12SR1/4ED** | 12 | G 1/4A | 16.5 | 22 | 630 | 630 | 400 | 630 | 630 |
| **GE12SRED** | 12 | G 3/8 A | 17.0 | 22 | 630 | 630 | 400 | 630 | 630 |
| **GE12SR1/2ED** | 12 | G 1/2 A | 17.5 | 27 | 630 | 630 | 400 | 630 | 630 |
| **GE14SRED** | 14 | G 1/2 A | 19.0 | 27 | 630 | 630 | 400 | 630 | 630 |
| **GE16SR3/8ED** | 16 | G 3/8 A | 18.0 | 27 | 630 | 400 | 250 | 630 | 400 |
| **GE16SRED** | 16 | G 1/2 A | 18.5 | 27 | 630 | 400 | 250 | 630 | 400 |
| **GE16SR3/4ED** | 16 | G 3/4 A | 20.5 | 32 | 420 | 400 | 250 | 420 | 400 |
| **GE20SRED** | 20 | G 3/4 A | 20.5 | 32 | 420 | 400 | 250 | 420 | 400 |
| **GE25SR1/2ED** | 25 | G 1/2 A | 23.0 | 41 | 420 | 400 | 250 | 420 | 400 |
| **GE25SRED** | 25 | G1 A | 23.0 | 41 | 420 | 400 | 250 | 420 | 400 |
| **GE30SRED** | 30 | G1 1/4A | 23.5 | 50 | 420 | 400 | 250 | 420 | 400 |
| **GE38SRED** | 38 | G1 1/2 A | 26.0 | 55 | 420 | 315 | 200 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: GE06ZLREDCF**

Dimensions and pressures for reference only, subject to change.



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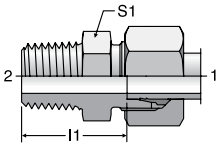
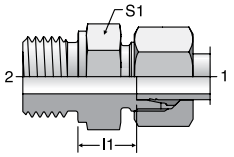
# GE-R

Male Connector
24° Flareless / BSPT or BSPP




R (BSPT) thread




Cutting face DIN 3852, form B, G (BSPP) thread

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPT / BSPP | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS |
|---|---|---|---|---|---|---|---|
| **GE04LLR** | 4 | R 1/8 keg. | 16.0 | 11* | 100 | 100 | 63 |
| **GE06LLR** | 6 | R 1/8 keg. | 14.5 | 11* | 100 | 100 | 63 |
| **GE08LLR** | 8 | R 1/8 keg. | 16.5 | 12 | 100 | 100 | 63 |
| **GE08LLR1/4** | 8 | R 1/4 keg. | 20.5 | 14 | 100 | 100 | 63 |
| **GE10LLR** | 10 | R 1/4 keg. | 20.5 | 14 | 100 | 100 | 63 |
| **GE12LLR** | 12 | R 1/4 keg. | 20.0 | 17 | 100 | 100 | 63 |
| **GE12LLR3/8** | 12 | R 3/8 keg. | 20.0 | 17 | 100 | 100 | 63 |
| **GE06LR** | 6 | G 1/8 A | 8.5 | 14 | 315 | 315 | 200 |
| **GE06LR1/8KEG** | 6 | R 1/8 keg. | 15.0 | 12 | 315 | 315 | 200 |
| **GE06LR1/4** | 6 | G 1/4 A | 10.0 | 19 | 315 | 315 | 200 |
| **GE06LR3/8** | 6 | G 3/8 A | 11.5 | 22 | 315 | 315 | 200 |
| **GE06LR1/2** | 6 | G 1/2 A | 12.0 | 27 | 315 | 315 | 200 |
| **GE08LR** | 8 | G 1/4 A | 10.0 | 19 | 315 | 315 | 200 |
| **GE08LR1/8** | 8 | G 1/8 A | 8.5 | 14 | 315 | 315 | 200 |
| **GE08LR1/4KEG** | 8 | R 1/4 keg. | 20.0 | 17 | 315 | 315 | 200 |
| **GE08LR3/8** | 8 | G 3/8 A | 11.5 | 22 | 315 | 315 | 200 |
| **GE08LR1/2** | 8 | G 1/2 A | 12.0 | 27 | 315 | 315 | 200 |
| **GE10LR** | 10 | G 1/4 A | 11.0 | 19 | 315 | 315 | 200 |
| **GE10LR1/4KEG** | 10 | R 1/4 keg. | 21.0 | 17 | 315 | 315 | 200 |
| **GE10LR3/8** | 10 | G 3/8 A | 12.5 | 22 | 315 | 315 | 200 |
| **GE10LR1/2** | 10 | G 1/2 A | 13.0 | 27 | 315 | 315 | 200 |
| **GE12LR** | 12 | G 3/8 A | 12.5 | 22 | 315 | 315 | 200 |
| **GE12LR1/4** | 12 | G 1/4 A | 12.0 | 19 | 315 | 315 | 200 |
| **GE12LR1/4KEG** | 12 | R 1/4 keg. | 22.0 | 19 | 315 | 315 | 200 |
| **GE12LR3/8KEG** | 12 | R 3/8 keg. | 22.0 | 19 | 315 | 315 | 200 |
| **GE12LR1/2** | 12 | G 1/2 A | 13.0 | 27 | 315 | 315 | 200 |
| **GE12LR1/2KEG** | 12 | R 1/2 keg. | 24.0 | 24 | 315 | 315 | 200 |
| **GE12LR3/4** | 12 | G 3/4 A | 14.0 | 32 | 315 | 315 | 200 |
| **GE15LR** | 15 | G 1/2A | 14.0 | 27 | 250 | 250 | 160 |
| **GE15LR3/8** | 15 | G 3/8 A | 13.5 | 24 | 250 | 250 | 160 |
| **GE15LR3/8KEG** | 15 | R 3/8 keg. | 23.0 | 24 | 315 | 315 | 160 |
| **GE15LR1/2KEG** | 15 | R 1/2 keg. | 25.0 | 24 | 315 | 315 | 160 |
| **GE15LR3/4** | 15 | G 3/4 A | 15.0 | 32 | 250 | 250 | 160 |
| **GE18LR** | 18 | G 1/2 A | 14.5 | 27 | 250 | 250 | 160 |
| **GE18LR3/8** | 18 | G 3/8 A | 14.0 | 27 | 250 | 250 | 160 |
| **GE18LR1/2KEG** | 18 | R 1/2 keg. | 25.5 | 27 | 315 | 315 | 160 |
| **GE18LR3/4** | 18 | G 3/4 A | 14.5 | 32 | 250 | 250 | 160 |
| **GE22LR** | 22 | G 3/4 A | 16.5 | 32 | 160 | 160 | 100 |
| **GE22LR1/2** | 22 | G 1/2 A | 16.5 | 32 | 160 | 160 | 100 |
| **GE22LR3/4KEG** | 22 | R 3/4 keg. | 29.5 | 32 | 160 | 160 | 100 |
| **GE28LR** | 28 | G 1 A | 17.5 | 41 | 160 | 160 | 100 |
| **GE28LR3/4** | 28 | G 3/4 A | 17.5 | 41 | 160 | 160 | 100 |
| **GE35LR** | 35 | G 1 1/4 A | 17.5 | 50 | 160 | 160 | 100 |
| **GE35LR1** | 35 | G 1 A | 17.5 | 46 | 160 | 160 | 100 |
| **GE42LR** | 42 | G 1 1/2 A | 19.0 | 55 | 160 | 160 | 100 |

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS |
|---|---|---|---|---|---|---|---|
| **GE06SR** | 6 | G 1/4 A | 13.0 | 19 | 400 | 400 | 250 |
| **GE06SR1/2** | 6 | G 1/2 A | 18.0 | 27 | 400 | 400 | 250 |
| **GE08SR** | 8 | G 1/4 A | 15.0 | 19 | 400 | 400 | 250 |
| **GE08SR3/8** | 8 | G 3/8 A | 15.5 | 22 | 400 | 400 | 250 |
| **GE10SR** | 10 | G 3/8 A | 15.0 | 22 | 400 | 400 | 250 |
| **GE10SR1/4** | 10 | G 1/4 A | 14.5 | 19 | 400 | 400 | 250 |
| **GE10SR1/2** | 10 | G 1/2 A | 17.5 | 27 | 400 | 400 | 250 |
| **GE12SR** | 12 | G 3/8 A | 17.0 | 22 | 400 | 400 | 250 |
| **GE12SR1/4** | 12 | G 1/4 A | 16.5 | 22 | 400 | 400 | 250 |
| **GE12SR1/2** | 12 | G 1/2 A | 17.5 | 27 | 400 | 400 | 250 |
| **GE14SR** | 14 | G 1/2 A | 19.0 | 27 | 400 | 400 | 250 |
| **GE14SR3/8** | 14 | G 3/8 A | 18.5 | 24 | 400 | 400 | 250 |
| **GE16SR** | 16 | G 1/2 A | 18.5 | 27 | 400 | 400 | 250 |
| **GE16SR3/8** | 16 | G 3/8 A | 18.0 | 27 | 400 | 400 | 250 |
| **GE16SR3/4** | 16 | G 3/4 A | 20.5 | 32 | 400 | 400 | 250 |
| **GE20SR** | 20 | G 3/4 A | 20.5 | 32 | 400 | 400 | 250 |
| **GE20SR1/2** | 20 | G 1/2 A | 20.5 | 32 | 400 | 400 | 250 |
| **GE25SR** | 25 | G 1 A | 23.0 | 41 | 250 | 250 | 160 |
| **GE25SR3/4** | 25 | G 3/4 A | 23.0 | 41 | 250 | 250 | 160 |
| **GE30SR** | 30 | G 1 1/4 A | 23.5 | 50 | 160 | 160 | 100 |
| **GE30SR1** | 30 | G 1 A | 23.5 | 46 | 160 | 160 | 100 |
| **GE38SR** | 38 | G 1 1/2 A | 26.0 | 55 | 160 | 160 | 100 |
| **GE38SR11/4** | 38 | G 1 1/4 A | 26.0 | 55 | 160 | 160 | 100 |

**Note:** "keg." refers to tapered threads.
Not sold with EO-2 Functional Nut.
*S1 = l2 for stainless steel (71).

Dimensions and pressures for reference only, subject to change.



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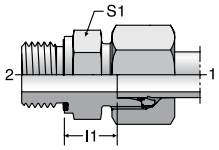
E

# GE-M-ED

Male Connector
24° Flareless / Metric with
EOlastic Seal




DIN 3852-1, form E

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|
| **GE06LMED** | 6 | M10 x 1 | 8.5 | 14 | 500 | 315 | 500 | 315 |
| **GE08LMED** | 8 | M12 x 1.5 | 10.0 | 17 | 500 | 315 | 500 | 315 |
| **GE10LMED** | 10 | M14 x 1.5 | 11.0 | 19 | 500 | 315 | 500 | 315 |
| **GE12LMED** | 12 | M16 x 1.5 | 12.5 | 22 | 400 | 315 | 400 | 315 |
| **GE12LM18X1.5ED** | 12 | M18 x 1.5 | 12.5 | 24 | 400 | 315 | 400 | 315 |
| **GE12LM22X1.5ED** | 12 | M22 x 1.5 | 14.0 | 27 | 400 | 315 | 400 | 315 |
| **GE15LMED** | 15 | M18 x 1.5 | 13.5 | 24 | 400 | 315 | 400 | 315 |
| **GE15LM22X1.5ED** | 15 | M22 x 1.5 | 15.0 | 27 | 400 | 315 | 400 | 315 |
| **GE18LMED** | 18 | M22 x 1.5 | 14.5 | 27 | 400 | 315 | 400 | 315 |
| **GE22LMED** | 22 | M26 x 1.5 | 16.5 | 32 | 250 | 160 | 250 | 160 |
| **GE28LMED** | 28 | M33 x 2 | 17.5 | 41 | 250 | 160 | 250 | 160 |
| **GE35LMED** | 35 | M42 x 2 | 17.5 | 50 | 250 | 160 | 250 | 160 |
| **GE42LMED** | 42 | M48 x 2 | 19.0 | 55 | 250 | 160 | 250 | 160 |
| **GE06SMED** | 6 | M12 x 1.5 | 13.0 | 17 | 800 | 630 | 800 | 630 |
| **GE08SMED** | 8 | M14 x 1.5 | 15.0 | 19 | 800 | 630 | 800 | 630 |
| **GE10SMED** | 10 | M16 x 1.5 | 15.0 | 22 | 800 | 630 | 800 | 630 |
| **GE12SMED** | 12 | M18 x 1.5 | 17.0 | 24 | 630 | 630 | 630 | 630 |
| **GE14SMED** | 14 | M20 x 1.5 | 19.0 | 27 | 630 | 630 | 630 | 630 |
| **GE16SMED** | 16 | M22 x 1.5 | 18.5 | 27 | 630 | 400 | 630 | 400 |
| **GE20SMED** | 20 | M27 x 2 | 20.5 | 32 | 420 | 400 | 420 | 400 |
| **GE25SMED** | 25 | M33 x 2 | 23.0 | 41 | 420 | 400 | 420 | 400 |
| **GE30SMED** | 30 | M42 x 2 | 23.5 | 50 | 420 | 400 | 420 | 400 |
| **GE38SMED** | 38 | M48 x 2 | 26.0 | 55 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: GE06ZLMEDCF**

Dimensions and pressures for reference only, subject to change.



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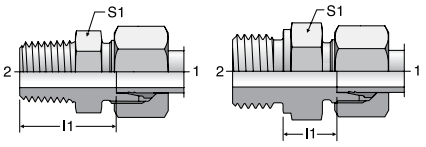
# GE-M

Male Connector
24° Flareless / Metric




Metric taper thread

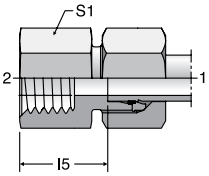
Cutting face DIN 3852, form B, Metric thread

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS |
|---|---|---|---|---|---|---|---|
| **GE04LLM6X1KEG** | 4 | M6 x 1 keg. | 16.0 | 9 | 100 | 100 | 63 |
| **GE04LLM** | 4 | M8 x 1 keg. | 16.0 | 10 | 100 | 100 | 63 |
| **GE06LLM** | 6 | M10 x 1 keg. | 14.5 | 11 | 100 | 100 | 63 |
| **GE08LLM** | 8 | M10 x 1 keg. | 16.5 | 12 | 100 | 100 | 63 |
| **GE06LM** | 6 | M10 x 1 | 8.5 | 14 | 315 | 315 | 200 |
| **GE08LM** | 8 | M12 x 1.5 | 10.0 | 17 | 315 | 315 | 200 |
| **GE10LM** | 10 | M14 x 1.5 | 11.0 | 19 | 315 | 315 | 200 |
| **GE10LM16X1.5** | 10 | M16 x 1.5 | 12.0 | 22 | 315 | 315 | 200 |
| **GE10LM18X1.5** | 10 | M18 x 1.5 | 12.5 | 24 | 315 | 315 | 200 |
| **GE10LM22X1.5** | 10 | M22 x 1.5 | 14.0 | 27 | 315 | 315 | 200 |
| **GE12LM14X1.5** | 12 | M14 x 1.5 | 11.0 | 19 | 315 | 315 | 200 |
| **GE12LM** | 12 | M16 x 1.5 | 12.5 | 22 | 315 | 315 | 200 |
| **GE12LM18X1.5** | 12 | M18 x 1.5 | 12.5 | 24 | 315 | 315 | 200 |
| **GE12LM22X1.5** | 12 | M22 x 1.5 | 14.0 | 27 | 315 | 315 | 200 |
| **GE15LM16X1.5** | 15 | M16 x 1.5 | 13.0 | 24 | 250 | 250 | 160 |
| **GE15LM** | 15 | M18 x 1.5 | 13.5 | 24 | 250 | 250 | 160 |
| **GE15LM22X1.5** | 15 | M22 x 1.5 | 15.0 | 27 | 250 | 250 | 160 |
| **GE18LM18X1.5** | 18 | M18 x 1.5 | 14.0 | 27 | 250 | 250 | 160 |
| **GE18LM** | 18 | M22 x 1.5 | 14.5 | 27 | 250 | 250 | 160 |
| **GE22LM22X1.5** | 22 | M22 x 1.5 | 16.5 | 32 | 160 | 160 | 100 |
| **GE22LM** | 22 | M26 x 1.5 | 16.5 | 32 | 160 | 160 | 100 |
| **GE28LM** | 28 | M33 x 2 | 17.5 | 41 | 160 | 160 | 100 |
| **GE35LM** | 35 | M42 x 2 | 17.5 | 50 | 160 | 160 | 100 |
| **GE42LM** | 42 | M48 x 2 | 19.0 | 55 | 160 | 160 | 100 |
| **GE06SM** | 6 | M12 x 1.5 | 13.0 | 17 | 400 | 400 | 250 |
| **GE08SM** | 8 | M14 x 1.5 | 15.0 | 19 | 400 | 400 | 250 |
| **GE10SM** | 10 | M16 x 1.5 | 15.0 | 22 | 400 | 400 | 250 |
| **GE12SM** | 12 | M18 x 1.5 | 17.0 | 24 | 400 | 400 | 250 |
| **GE12SM22X1.5** | 12 | M22 x 1.5 | 17.5 | 27 | 400 | 400 | 250 |
| **GE14SM** | 14 | M20 x 1.5 | 19.0 | 27 | 400 | 400 | 250 |
| **GE16SM18X1.5** | 16 | M18 x 1.5 | 18.0 | 27 | 400 | 400 | 250 |
| **GE16SM** | 16 | M22 x 1.5 | 18.5 | 27 | 400 | 400 | 250 |
| **GE20SM** | 20 | M27 x 2 | 20.5 | 32 | 400 | 400 | 250 |
| **GE25SM** | 25 | M33 x 2 | 23.0 | 41 | 250 | 250 | 160 |
| **GE30SM** | 30 | M42 x 2 | 23.5 | 50 | 160 | 160 | 100 |
| **GE38SM** | 38 | M48 x 2 | 26.0 | 55 | 160 | 160 | 100 |

**Note:** "keg." refers to taper threads.
Not sold with EO-2 Functional Nut.

# GAI-R

Female Connector
24° Flareless / BSPP




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | l 5 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **GAI06LR** | 6 | G 1/8 | 19.0 | 14 | 315 | 315 | 200 | 315 | 315 |
| **GAI08LR** | 8 | G 1/4 | 24.0 | 19 | 315 | 315 | 200 | 315 | 315 |
| **GAI08LR3/8** | 8 | G 3/8 | 25.0 | 24 | 315 | 315 | 200 | 315 | 315 |
| **GAI08LR1/2** | 8 | G 1/2 | 29.0 | 27 | 315 | 315 | 200 | 315 | 315 |
| **GAI10LR** | 10 | G 1/4 | 25.0 | 19 | 315 | 315 | 200 | 315 | 315 |
| **GAI10LR3/8** | 10 | G 3/8 | 26.0 | 24 | 315 | 315 | 200 | 315 | 315 |
| **GAI10LR1/2** | 10 | G 1/2 | 30.0 | 27 | 315 | 315 | 200 | 315 | 315 |
| **GAI12LR** | 12 | G 3/8 | 26.0 | 24 | 315 | 315 | 200 | 315 | 315 |
| **GAI12LR1/2** | 12 | G 1/2 | 30.0 | 27 | 315 | 315 | 200 | 315 | 315 |
| **GAI15LR** | 15 | G 1/2 | 31.0 | 27 | 315 | 315 | 200 | 315 | 315 |
| **GAI18LR** | 18 | G 1/2 | 30.5 | 27 | 315 | 315 | 200 | 315 | 315 |
| **GAI22LR** | 22 | G 3/4 | 35.5 | 36 | 160 | 160 | 100 | 160 | 160 |
| **GAI28LR** | 28 | G 1 | 38.0 | 41 | 160 | 160 | 100 | 160 | 160 |
| **GAI35LR** | 35 | G 1 1/4 | 41.0 | 55 | 160 | 160 | 100 | 160 | 160 |
| **GAI42LR** | 42 | G 1 1/2 | 42.5 | 60 | 160 | 160 | 100 | 160 | 160 |
| **GAI06SR** | 6 | G 1/4 | 26.0 | 19 | 400 | 400 | 250 | 400 | 400 |
| **GAI08SR** | 8 | G 1/4 | 26.0 | 19 | 400 | 400 | 250 | 400 | 400 |
| **GAI10SR** | 10 | G 3/8 | 26.5 | 24 | 400 | 400 | 250 | 400 | 400 |
| **GAI12SR** | 12 | G 3/8 | 26.5 | 24 | 400 | 400 | 250 | 400 | 400 |
| **GAI14SR** | 14 | G 1/2 | 32.0 | 30 | 400 | 400 | 250 | 400 | 400 |
| **GAI16SR** | 16 | G 1/2 | 31.5 | 30 | 400 | 400 | 250 | 400 | 400 |
| **GAI20SR** | 20 | G 3/4 | 34.5 | 36 | 315 | 315 | 200 | 315 | 315 |
| **GAI25SR** | 25 | G 1 | 37.5 | 41 | 315 | 315 | 200 | 315 | 315 |
| **GAI30SR** | 30 | G 1 1/4 | 42.0 | 55 | 315 | 315 | 200 | 315 | 315 |
| **GAI38SR** | 38 | G 1 1/2 | 43.5 | 60 | 250 | 250 | 160 | 250 | 250 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: GAI06ZLRCF**

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Dimensions and pressures for reference only, subject to change.



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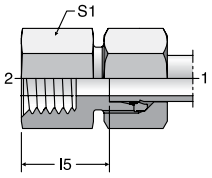
# GAI-M

Female Connector
24° Flareless / Metric

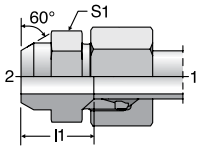



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 5 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|
| **GAI06LM** | 6 | M10 x 1 | 19.5 | 14 | 315 | 315 | 315 | 315 |
| **GAI08LM** | 8 | M12 x 1.5 | 24.0 | 17 | 315 | 315 | 315 | 315 |
| **GAI10LM** | 10 | M14 x 1.5 | 25.0 | 19 | 315 | 315 | 315 | 315 |
| **GAI12LM** | 12 | M16 x 1.5 | 26.0 | 22 | 315 | 315 | 315 | 315 |
| **GAI15LM** | 15 | M18 x 1.5 | 28.0 | 24 | 315 | 315 | 315 | 315 |
| **GAI18LM** | 18 | M22 x 1.5 | 29.5 | 30 | 315 | 315 | 315 | 315 |
| **GAI22LM** | 22 | M26 x 1.5 | 34.5 | 32 | 160 | 160 | 160 | 160 |
| **GAI28LM** | 28 | M33 x 2 | 37.5 | 41 | 160 | 160 | 160 | 160 |
| **GAI35LM** | 35 | M42 x 2 | 40.5 | 55 | 160 | 160 | 160 | 160 |
| **GAI42LM** | 42 | M48 x 2 | 42.0 | 60 | 160 | 160 | 160 | 160 |
| **GAI06SM** | 6 | M12 x 1.5 | 26.0 | 17 | 400 | 400 | 400 | 400 |
| **GAI08SM** | 8 | M14 x 1.5 | 26.0 | 17 | 400 | 400 | 400 | 400 |
| **GAI10SM** | 10 | M16 x 1.5 | 26.5 | 22 | 400 | 400 | 400 | 400 |
| **GAI12SM** | 12 | M18 x 1.5 | 27.5 | 24 | 400 | 400 | 400 | 400 |
| **GAI14SM** | 14 | M20 x 1.5 | 31.0 | 27 | 400 | 400 | 400 | 400 |
| **GAI16SM** | 16 | M22 x 1.5 | 30.5 | 30 | 400 | 400 | 400 | 400 |
| **GAI20SM** | 20 | M27 x 2 | 34.5 | 36 | 315 | 315 | 315 | 315 |
| **GAI25SM** | 25 | M33 x 2 | 37.0 | 41 | 315 | 315 | 315 | 315 |
| **GAI30SM** | 30 | M42 x 2 | 41.5 | 55 | 315 | 315 | 315 | 315 |
| **GAI38SM** | 38 | M48 x 2 | 43.0 | 60 | 250 | 250 | 250 | 250 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: GAI06ZLMCF**

# AS

Weld Connector
24° Flareless / Butt Weld




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 (mm) | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|
| **AS06L** | 6 | 10 | 14.0 | 12 | 315 | 315 | 315 | 315 |
| **AS08L** | 8 | 12 | 16.0 | 14 | 315 | 315 | 315 | 315 |
| **AS10L** | 10 | 14 | 18.0 | 17 | 315 | 315 | 315 | 315 |
| **AS12L** | 12 | 16 | 18.0 | 19 | 315 | 315 | 315 | 315 |
| **AS15L** | 15 | 19 | 22.0 | 22 | 315 | 315 | 315 | 315 |
| **AS18L** | 18 | 22 | 23.5 | 27 | 315 | 315 | 315 | 315 |
| **AS22L** | 22 | 27 | 28.5 | 32 | 160 | 160 | 160 | 160 |
| **AS28L** | 28 | 32 | 30.5 | 41 | 160 | 160 | 160 | 160 |
| **AS35L** | 35 | 40 | 32.5 | 46 | 160 | 160 | 160 | 160 |
| **AS42L** | 42 | 46 | 35.0 | 55 | 160 | 160 | 160 | 160 |
| **AS06S** | 6 | 11 | 19.0 | 14 | 630 | 630 | 630 | 630 |
| **AS08S** | 8 | 13 | 21.0 | 17 | 630 | 630 | 630 | 630 |
| **AS10S** | 10 | 15 | 22.5 | 19 | 630 | 630 | 630 | 630 |
| **AS12S** | 12 | 17 | 24.5 | 22 | 630 | 630 | 630 | 630 |
| **AS14S** | 14 | 19 | 27.0 | 24 | 630 | 630 | 630 | 630 |
| **AS16S** | 16 | 21 | 26.5 | 27 | 400 | 400 | 400 | 400 |
| **AS20S** | 20 | 26 | 29.5 | 32 | 400 | 400 | 400 | 400 |
| **AS25S** | 25 | 31 | 32.0 | 41 | 400 | 400 | 400 | 400 |
| **AS30S** | 30 | 36 | 35.5 | 46 | 400 | 400 | 400 | 400 |
| **AS38S** | 38 | 44 | 38.0 | 55 | 315 | 315 | 315 | 315 |

**Note:** Weld fitting. Omit "CF" in the part number for steel material.
**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: AS06ZL**

Dimensions and pressures for reference only, subject to change.



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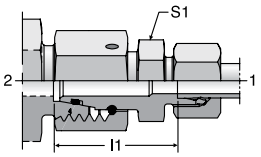
# RED

Tube End Reducer
Flareless Swivel / 24° Flareless

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## L-Series

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|
| **RED06L/04LL** | 4 | M12 x 1.5 | 24.5 | 9 | 100 | 100 | 100 | 100 |
| **RED08/06L** | 6 | M14 x 1.5 | 23.5 | 12 | 500 | 315 | 500 | 315 |
| **RED10/06L** | 6 | M16 x 1.5 | 25 | 14 | 500 | 315 | 500 | 315 |
| **RED10/08L** | 8 | | 25 | 14 | 500 | 315 | 500 | 315 |
| **RED12/06L** | 6 | M18 x 1.5 | 25 | 17 | 400 | 315 | 400 | 315 |
| **RED12/08L** | 8 | | 25 | 17 | 400 | 315 | 400 | 315 |
| **RED12/10L** | 10 | | 26 | 17 | 400 | 315 | 400 | 315 |
| **RED15/06L** | 6 | M22 x 1.5 | 28.5 | 19 | 400 | 315 | 400 | 315 |
| **RED15/08L** | 8 | | 28.5 | 19 | 400 | 315 | 400 | 315 |
| **RED15/10L** | 10 | | 29.5 | 19 | 400 | 315 | 400 | 315 |
| **RED15/12L** | 12 | | 29.5 | 19 | 400 | 315 | 400 | 315 |
| **RED18/06L** | 6 | M26 x 1.5 | 28 | 24 | 400 | 315 | 400 | 315 |
| **RED18/08L** | 8 | | 28 | 24 | 400 | 315 | 400 | 315 |
| **RED18/10L** | 10 | | 29 | 24 | 400 | 315 | 400 | 315 |
| **RED18/12L** | 12 | | 29 | 24 | 400 | 315 | 400 | 315 |
| **RED18/15L** | 15 | | 30 | 24 | 400 | 315 | 400 | 315 |
| **RED22/06L** | 6 | M30 x 2 | 32 | 27 | 250 | 160 | 250 | 160 |
| **RED22/08L** | 8 | | 32 | 27 | 250 | 160 | 250 | 160 |
| **RED22/10L** | 10 | | 33 | 27 | 250 | 160 | 250 | 160 |
| **RED22/12L** | 12 | | 33 | 27 | 250 | 160 | 250 | 160 |
| **RED22/15L** | 15 | | 34 | 27 | 250 | 160 | 250 | 160 |
| **RED22/18L** | 18 | | 33.5 | 27 | 250 | 160 | 250 | 160 |
| **RED28/06L** | 6 | M36 x 2 | 34 | 32 | 250 | 160 | 250 | 160 |
| **RED28/08L** | 8 | | 34 | 32 | 250 | 160 | 250 | 160 |
| **RED28/10L** | 10 | | 35 | 32 | 250 | 160 | 250 | 160 |
| **RED28/12L** | 12 | | 35 | 32 | 250 | 160 | 250 | 160 |
| **RED28/15L** | 15 | | 36 | 32 | 250 | 160 | 250 | 160 |
| **RED28/18L** | 18 | | 35.5 | 32 | 250 | 160 | 250 | 160 |
| **RED28/22L** | 22 | | 37.5 | 32 | 250 | 160 | 250 | 160 |
| **RED35/12L** | 12 | M45 x 2 | 38 | 41 | 250 | 160 | 250 | 160 |
| **RED35/15L** | 15 | | 39 | 41 | 250 | 160 | 250 | 160 |
| **RED35/18L** | 18 | | 38.5 | 41 | 250 | 160 | 250 | 160 |
| **RED35/22L** | 22 | | 40.5 | 41 | 250 | 160 | 250 | 160 |
| **RED35/28L** | 28 | | 40.5 | 41 | 250 | 160 | 250 | 160 |
| **RED42/18L** | 18 | M52 x 2 | 42 | 50 | 250 | 160 | 250 | 160 |
| **RED42/22L** | 22 | | 44 | 50 | 250 | 160 | 250 | 160 |
| **RED42/28L** | 28 | | 44 | 50 | 250 | 160 | 250 | 160 |
| **RED42/35L** | 35 | | 43 | 50 | 250 | 160 | 250 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: RED08/06ZLCF**

## S-Series

| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|
| **RED08/06S** | 6 | M16 x 1.5 | 27.0 | 14 | 800 | 630 | 800 | 630 |
| **RED10/06S** | 6 | M18 x 1.5 | 27.5 | 17 | 800 | 630 | 800 | 630 |
| **RED10/08S** | 8 | | 27.5 | 17 | 800 | 630 | 800 | 630 |
| **RED12/06S** | 6 | M20 x 1.5 | 29.0 | 17 | 630 | 630 | 630 | 630 |
| **RED12/08S** | 8 | | 29.0 | 17 | 630 | 630 | 630 | 630 |
| **RED12/10S** | 10 | | 29.5 | 19 | 630 | 630 | 630 | 630 |
| **RED14/06S** | 6 | M22 x 1.5 | 31.5 | 19 | 630 | 630 | 630 | 630 |
| **RED14/08S** | 8 | | 31.5 | 19 | 630 | 630 | 630 | 630 |
| **RED14/10S** | 10 | | 31.0 | 19 | 630 | 630 | 630 | 630 |
| **RED14/12S** | 12 | | 31.0 | 22 | 630 | 630 | 630 | 630 |
| **RED16/06S** | 6 | M24 x 1.5 | 32.0 | 22 | 630 | 400 | 630 | 400 |
| **RED16/08S** | 8 | | 32.0 | 22 | 630 | 400 | 630 | 400 |
| **RED16/10S** | 10 | | 31.5 | 22 | 630 | 400 | 630 | 400 |
| **RED16/12S** | 12 | | 31.5 | 22 | 630 | 400 | 630 | 400 |
| **RED16/14S** | 14 | | 33.0 | 24 | 630 | 400 | 630 | 400 |
| **RED20/06S** | 6 | M30 x 2 | 36.0 | 27 | 420 | 400 | 420 | 400 |
| **RED20/08S** | 8 | | 36.0 | 27 | 420 | 400 | 420 | 400 |
| **RED20/10S** | 10 | | 35.5 | 27 | 420 | 400 | 420 | 400 |
| **RED20/12S** | 12 | | 35.5 | 27 | 420 | 400 | 420 | 400 |
| **RED20/14S** | 14 | | 37.0 | 27 | 420 | 400 | 420 | 400 |
| **RED20/16S** | 16 | | 36.5 | 27 | 420 | 400 | 420 | 400 |
| **RED25/06S** | 6 | M36 x 2 | 38.5 | 32 | 420 | 400 | 420 | 400 |
| **RED25/08S** | 8 | | 38.5 | 32 | 420 | 400 | 420 | 400 |
| **RED25/10S** | 10 | | 38.0 | 32 | 420 | 400 | 420 | 400 |
| **RED25/12S** | 12 | | 38.0 | 32 | 420 | 400 | 420 | 400 |
| **RED25/14S** | 14 | | 39.5 | 32 | 420 | 400 | 420 | 400 |
| **RED25/16S** | 16 | | 39.0 | 32 | 420 | 400 | 420 | 400 |
| **RED25/20S** | 20 | | 39.0 | 32 | 420 | 400 | 420 | 400 |
| **RED30/08S** | 8 | M42 x 2 | 44.0 | 41 | 420 | 400 | 420 | 400 |
| **RED30/10S** | 10 | | 43.5 | 41 | 420 | 400 | 420 | 400 |
| **RED30/12S** | 12 | | 43.5 | 41 | 420 | 400 | 420 | 400 |
| **RED30/14S** | 14 | | 45.0 | 41 | 420 | 400 | 420 | 400 |
| **RED30/16S** | 16 | | 44.5 | 41 | 420 | 400 | 420 | 400 |
| **RED30/20S** | 20 | | 44.5 | 41 | 420 | 400 | 420 | 400 |
| **RED30/25S** | 25 | | 45.0 | 41 | 420 | 400 | 420 | 400 |
| **RED38/12S** | 12 | M52 x 2 | 47.0 | 50 | 420 | 315 | 420 | 315 |
| **RED38/16S** | 16 | | 48.0 | 50 | 420 | 315 | 420 | 315 |
| **RED38/20S** | 20 | | 48.0 | 50 | 420 | 315 | 420 | 315 |
| **RED38/25S** | 25 | | 48.5 | 50 | 420 | 315 | 420 | 315 |
| **RED38/30S** | 30 | | 49.0 | 50 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: RED08/06ZSCF**

Dimensions and pressures for reference only, subject to change.



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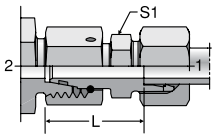
E

# DA

Distance Piece Adapter
Flareless Swivel / 24° Flareless

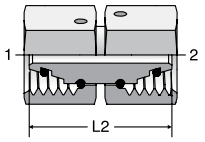



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | L (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| DA06L | 6 | M12 x 1.5 | 36 | 12 | 500 | 315 | 200 | 500 | 315 |
| DA08L | 8 | M14 x 1.5 | 36 | 14 | 500 | 315 | 200 | 500 | 315 |
| DA10L | 10 | M16 x 1.5 | 36 | 17 | 500 | 315 | 200 | 500 | 315 |
| DA12L | 12 | M18 x 1.5 | 36 | 19 | 400 | 315 | 200 | 400 | 315 |
| DA15L | 15 | M22 x 1.5 | 36 | 24 | 400 | 315 | 200 | 400 | 315 |
| DA18L | 18 | M26 x 1.5 | 36 | 27 | 400 | 315 | 200 | 400 | 315 |
| DA22L | 22 | M30 x 2 | 40 | 32 | 250 | 160 | 100 | 250 | 160 |
| DA28L | 28 | M36 x 2 | 40 | 41 | 250 | 160 | 100 | 250 | 160 |
| DA35L | 35 | M45 x 2 | 50 | 46 | 250 | 160 | 100 | 250 | 160 |
| DA42L | 42 | M52 x 2 | 60 | 55 | 250 | 160 | 100 | 250 | 160 |
| DA06S | 6 | M14 x 1.5 | 36 | 14 | 800 | 630 | 400 | 800 | 630 |
| DA08S | 8 | M16 x 1.5 | 36 | 17 | 800 | 630 | 400 | 800 | 630 |
| DA10S | 10 | M18 x 1.5 | 36 | 19 | 800 | 630 | 400 | 800 | 630 |
| DA12S | 12 | M20 x 1.5 | 36 | 22 | 630 | 630 | 400 | 630 | 630 |
| DA14S | 14 | M22 x 1.5 | 40 | 24 | 630 | 630 | 400 | 630 | 630 |
| DA16S | 16 | M24 x 1.5 | 40 | 27 | 630 | 400 | 250 | 630 | 400 |
| DA20S | 20 | M30 x 2 | 46 | 32 | 420 | 400 | 250 | 420 | 400 |
| DA25S | 25 | M36 x 2 | 50 | 41 | 420 | 400 | 250 | 420 | 400 |
| DA30S | 30 | M42 x 2 | 56 | 46 | 420 | 400 | 250 | 420 | 400 |
| DA38S | 38 | M52 x 2 | 60 | 55 | 420 | 315 | 200 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: DA06ZLCF**

# GZ

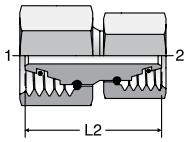
Swivel Union
Flareless Swivel /
Flareless Swivel




| TUBE FITTING PART # | END SIZE 1 & 2 Metric | L2 (mm) | Pressure Rating (bar) EO CF | EO 71 |
|---|---|---|---|---|
| GZ06L | M12 x 1.5 | 32 | 500 | 315 |
| GZ08L | M14 x 1.5 | 32 | 500 | 315 |
| GZ10L | M16 x 1.5 | 33 | 500 | 315 |
| GZ12L | M18 x 1.5 | 33 | 400 | 315 |
| GZ15L | M22 x 1.5 | 38 | 400 | 315 |
| GZ18L | M26 x 1.5 | 38 | 400 | 315 |
| GZ22L | M30 x 2 | 44 | 250 | 160 |
| GZ28L | M36 x 2 | 48 | 250 | 160 |
| GZ35L | M45 x 2 | 52 | 250 | 160 |
| GZ42L | M52 x 2 | 57 | 250 | 160 |
| GZ06S | M14 x 1.5 | 33 | 800 | 630 |
| GZ08S | M16 x 1.5 | 34 | 800 | 630 |
| GZ10S | M18 x 1.5 | 35 | 800 | 630 |
| GZ12S | M20 x 1.5 | 38 | 630 | 630 |
| GZ14S | M22 x 1.5 | 41 | 630 | 630 |
| GZ16S | M24 x 1.5 | 42 | 630 | 400 |
| GZ20S | M30 x 2 | 48 | 420 | 400 |
| GZ25S | M36 x 2 | 53 | 420 | 400 |
| GZ30S | M42 x 2 | 62 | 420 | 400 |
| GZ38S | M52 x 2 | 67 | 420 | 315 |

# GZR

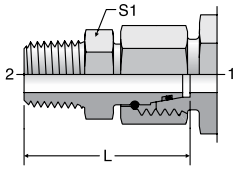
Swivel Union Reducer
Flareless Swivel / Flareless Swivel




| TUBE FITTING PART # | END SIZE 1 Metric | END SIZE 2 Metric | L2 (mm) | Pressure Rating (bar) EO CF |
|---|---|---|---|---|
| GZR06L/06S | M14 x 1.5 | M12 x 1.5 | 32.0 | 500 |
| GZR08L/08S | M16 x 1.5 | M14 x 1.5 | 33.0 | 500 |
| GZR10L/10S | M18 x 1.5 | M16 x 1.5 | 33.5 | 500 |
| GZR12L/12S | M20 x 1.5 | M18 x 1.5 | 36.0 | 400 |
| GZR12/08L | M18 x 1.5 | M14 x 1.5 | 34.0 | 400 |
| GZR15/08L | M22 x 1.5 | M14 x 1.5 | 38.0 | 400 |
| GZR15/12L | M22 x 1.5 | M18 x 1.5 | 38.0 | 400 |
| GZR18L/16S | M26 x 1.5 | M24 x 1.5 | 41.5 | 400 |
| GZR22L/20S | M30 x 2 | M30 x 2 | 47.0 | 250 |
| GZR28L/25S | M36 x 2 | M36 x 2 | 50.5 | 250 |
| GZR28/22L | M36 x 2 | M30 x 2 | 46.0 | 250 |
| GZR35L/30S | M45 x 2 | M42 x 2 | 59.0 | 250 |
| GZR42L/38S | M52 x 2 | M52 x 2 | 62.0 | 250 |
| GZR16S/15L | M24 x 1.5 | M22 x 1.5 | 41.0 | 400 |
| GZR20S/18L | M30 x 2 | M26 x 1.5 | 37.5 | 400 |
| GZR25S/22L | M36 x 2 | M30 x 2 | 46 | 250 |
| GZR30S/28L | M42 x 2 | M36 x 2 | 52 | 250 |
| GZR38S/35L | M52 x 2 | M45 x 2 | 52 | 250 |

# EGE-NPT

Swivel Connector
Flareless Swivel / NPT




| TUBE FITTING PART # | END SIZE 1 Metric | END SIZE 2 NPT | L (mm) | S1 (mm) | Pressure Rating (bar) EO CF |
|---|---|---|---|---|---|
| EGE06L1/8NPT | M12 x 1.5 | 1/8-27 | 31.5 | 11 | 315 |
| EGE08L1/4NPT | M14 x 1.5 | 1/4-18 | 37.5 | 14 | 315 |
| EGE10L1/4NPT | M16 x 1.5 | 1/4-18 | 38.0 | 14 | 315 |
| EGE12L3/8NPT | M18 x 1.5 | 3/8-18 | 40.0 | 19 | 315 |
| EGE15L1/2NPT | M22 x 1.5 | 1/2-14 | 49.5 | 22 | 315 |
| EGE18L1/2NPT | M26 x 1.5 | 1/2-14 | 49.0 | 24 | 315 |
| EGE22L3/4NPT | M30 x 2 | 3/4-14 | 52.0 | 27 | 160 |
| EGE28L1NPT | M36 x 2 | 1-11 1/2 | 61.0 | 36 | 160 |
| EGE35L11/4NPT | M45 x 2 | 1 1/4-11 1/2 | 65.5 | 46 | 160 |
| EGE42L11/2NPT | M52 x 2 | 1 1/2-11 1/2 | 68.5 | 50 | 160 |
| EGE06S1/4NPT | M14 x 1.5 | 1/4-18 | 37.5 | 14 | 630 |
| EGE08S1/4NPT | M16 x 1.5 | 1/4-18 | 38.0 | 14 | 630 |
| EGE10S3/8NPT | M18 x 1.5 | 3/8-18 | 40.5 | 19 | 630 |
| EGE12S3/8NPT | M20 x 1.5 | 3/8-18 | 42.0 | 19 | 630 |
| EGE14S1/2NPT | M22 x 1.5 | 1/2-14 | 50.5 | 22 | 630 |
| EGE16S1/2NPT | M24 x 1.5 | 1/2-14 | 51.0 | 22 | 400 |
| EGE20S3/4NPT | M30 x 2 | 3/4-14 | 54.0 | 27 | 400 |
| EGE25S1NPT | M36 x 2 | 1-11 1/2 | 63.5 | 36 | 400 |
| EGE30S11/4NPT | M42 x 2 | 1 1/4-11 1/2 | 70.5 | 46 | 400 |
| EGE38S11/2NPT | M52 x 2 | 1 1/2-11 1/2 | 73.5 | 50 | 315 |

Dimensions and pressures for reference only, subject to change.



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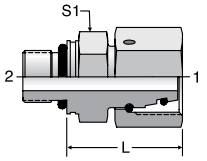
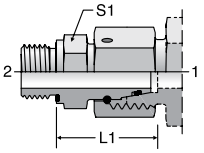
Swivel Connector
Metric ISO 6149 / Flareless Swivel




| TUBE FITTING PART # | END SIZE 1 Metric | END SIZE 2 Metric | L (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 |
|---|---|---|---|---|---|---|
| EGEO06LM | M12 x 1.5 | M10 x 1 | 24.5 | 14 | 500 | 315 |
| EGEO08LM | M14 x 1.5 | M12 x 1.5 | 26.5 | 17 | 500 | 315 |
| EGEO10LM | M16 x 1.5 | M14 x 1.5 | 27.5 | 19 | 500 | 315 |
| EGEO12LM | M18 x 1.5 | M16 x 1.5 | 30.5 | 22 | 400 | 315 |
| EGEO15LM | M22 x 1.5 | M18 x 1.5 | 31.5 | 24 | 400 | 315 |
| EGEO18LM | M26 x 1.5 | M22 x 1.5 | 31.5 | 27 | 400 | 315 |
| EGEO22LM27X2 | M30 x 2 | M27 x 2 | 32.5 | 32 | 250 | 160 |
| EGEO28LM | M36 x 2 | M33 x 2 | 35.0 | 41 | 250 | 160 |
| EGEO35LM | M45 x 2 | M42 x 2 | 42.5 | 50 | 250 | 160 |
| EGEO08SM | M16 x 1.5 | M14 x 1.5 | 29.5 | 19 | 800 | 630 |
| EGEO10SM | M18 x 1.5 | M16 x 1.5 | 32.0 | 22 | 800 | 630 |
| EGEO12SM | M20 x 1.5 | M18 x 1.5 | 34.0 | 24 | 630 | 630 |
| EGEO16SM | M24 x 1.5 | M22 x 1.5 | 37.0 | 27 | 630 | 400 |
| EGEO20SM | M30 x 2 | M27 x 2 | 43.0 | 32 | 420 | 400 |
| EGEO25SM | M36 x 2 | M33 x 2 | 48.0 | 41 | 420 | 400 |
| EGEO30SM | M42 x 2 | M42 x 2 | 51.0 | 50 | 420 | 400 |

# EGE-R-ED

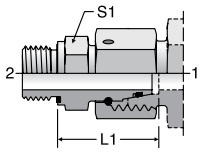
Swivel Connector
Flareless Swivel / BSPP with
EOlastic Seal




| TUBE FITTING PART # | END SIZE 1 Metric | END SIZE 2 BSPP | L1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 |
|---|---|---|---|---|---|---|
| EGE06LRED | M12 x 1.5 | G 1/8A | 24.5 | 14 | 500 | 315 |
| EGE08LRED | M14 x 1.5 | G 1/4A | 29.5 | 19 | 500 | 315 |
| EGE10LRED | M16 x 1.5 | G 1/4A | 27.5 | 19 | 500 | 315 |
| EGE12LRED | M18 x 1.5 | G 3/8A | 34.0 | 22 | 400 | 315 |
| EGE15LRED | M22 x 1.5 | G 1/2A | 32.0 | 27 | 400 | 315 |
| EGE18LRED | M26 x 1.5 | G 1/2A | 31.5 | 27 | 400 | 315 |
| EGE22LRED | M30 x 2 | G 3/4A | 32.5 | 32 | 250 | 160 |
| EGE28LRED | M36 x 2 | G 1A | 35.0 | 41 | 250 | 160 |
| EGE35LRED | M45 x 2 | G 1 1/4A | 42.5 | 50 | 250 | 160 |
| EGE42LRED | M52 x 2 | G 1 1/2A | 46.5 | 55 | 250 | 160 |
| EGE06SRED | M14 x 1.5 | G 1/4A | 27.0 | 19 | 800 | 630 |
| EGE08SRED | M16 x 1.5 | G 1/4A | 29.5 | 19 | 800 | 630 |
| EGE10SRED | M18 x 1.5 | G 3/8A | 32.0 | 22 | 800 | 630 |
| EGE12SRED | M20 x 1.5 | G 3/8A | 34.0 | 22 | 630 | 630 |
| EGE14SRED | M22 x 1.5 | G 1/2A | 36.5 | 27 | 630 | 630 |
| EGE16SRED | M24 x 1.5 | G 1/2A | 37.0 | 27 | 630 | 400 |
| EGE20SRED | M30 x 2 | G 3/4A | 43.0 | 32 | 420 | 400 |
| EGE25SRED | M36 x 2 | G 1A | 48.0 | 41 | 420 | 400 |
| EGE30SRED | M42 x 2 | G 1 1/4A | 51.0 | 50 | 420 | 400 |
| EGE38SRED | M52 x 2 | G 1 1/2A | 60.0 | 55 | 420 | 315 |

# EGE-M-ED

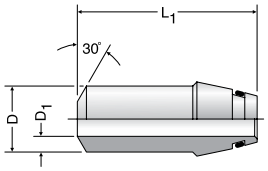
Swivel Connector
Flareless Swivel / Metric with
EOlastic Seal




| TUBE FITTING PART # | END SIZE 1 Metric | END SIZE 2 Metric | L1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 |
|---|---|---|---|---|---|---|
| EGE06LMED | M12 x 1.5 | M10 x 1 | 24.5 | 14 | 500 | 315 |
| EGE08LMED | M14 x 1.5 | M12 x 1.5 | 26.5 | 17 | 500 | 315 |
| EGE10LMED | M16 x 1.5 | M14 x 1.5 | 27.5 | 19 | 500 | 315 |
| EGE12LMED | M18 x 1.5 | M16 x 1.5 | 30.5 | 22 | 400 | 315 |
| EGE15LMED | M22 x 1.5 | M18 x 1.5 | 31.5 | 24 | 400 | 315 |
| EGE18LMED | M26 x 1.5 | M22 x 1.5 | 31.5 | 27 | 400 | 315 |
| EGE22LMED | M30 x 2 | M26 x 1.5 | 32.5 | 32 | 250 | 160 |
| EGE28LMED | M36 x 2 | M33 x 2 | 35.0 | 41 | 250 | 160 |
| EGE35LMED | M45 x 2 | M42 x 2 | 42.5 | 50 | 250 | 160 |
| EGE42LMED | M52 x 2 | M48 x 2 | 46.5 | 55 | 250 | 160 |
| EGE06SMED | M14 x 1.5 | M12 x 1.5 | 27.0 | 17 | 800 | 630 |
| EGE08SMED | M16 x 1.5 | M14 x 1.5 | 29.5 | 19 | 800 | 630 |
| EGE10SMED | M18 x 1.5 | M16 x 1.5 | 32.0 | 22 | 800 | 630 |
| EGE12SMED | M20 x 1.5 | M18 x 1.5 | 34.0 | 24 | 630 | 630 |
| EGE14SMED | M22 x 1.5 | M20 x 1.5 | 36.5 | 27 | 630 | 630 |
| EGE16SMED | M24 x 1.5 | M22 x 1.5 | 37.0 | 27 | 630 | 400 |
| EGE20SMED | M30 x 2 | M27 x 2 | 43.0 | 32 | 420 | 400 |
| EGE25SMED | M36 x 2 | M33 x 2 | 48.0 | 41 | 420 | 400 |
| EGE30SMED | M42 x 2 | M42 x 2 | 51.0 | 50 | 420 | 400 |
| EGE38SMED | M52 x 2 | M48 x 2 | 60.0 | 55 | 420 | 315 |

# SKA

Weld Nipple
24° Flareless /
ISO 8434-4 Butt Weld




| TUBE FITTING PART # | D (mm) | D1 (mm) | L1 (mm) | Pressure Rating (bar) EO CF | EO 71 |
|---|---|---|---|---|---|
| SKA10X1 | 10 | 8 | 32.5 | 249 | 240 |
| SKA10X1.5 | 10 | 7 | 32.5 | 358 | 350 |
| SKA10X2 | 10 | 6 | 32.5 | 460 | 445 |
| SKA12X1.5 | 12 | 9 | 32.5 | 305 | 300 |
| SKA12X2 | 12 | 8 | 32.5 | 393 | 380 |
| SKA12X2.5 | 12 | 7 | 32.5 | 476 | 460 |
| SKA16X1.5 | 16 | 13 | 39.0 | 234 | 225 |
| SKA16X2 | 16 | 12 | 39.0 | 305 | 295 |
| SKA16X2.5 | 16 | 11 | 39.0 | 372 | 360 |
| SKA16X3 | 16 | 10 | 39.0 | 400 | 390 |
| SKA20X2 | 20 | 16 | 45.0 | 249 | 240 |
| SKA20X2.5 | 20 | 15 | 45.0 | 305 | 300 |
| SKA20X3 | 20 | 14 | 45.0 | 358 | 350 |
| SKA20X4 | 20 | 12 | 45.0 | 400 | 390 |
| SKA25X3 | 25 | 19 | 49.5 | 294 | 285 |
| SKA25X4 | 25 | 17 | 49.5 | 379 | 365 |
| SKA25X5 | 25 | 15 | 49.5 | 400 | 390 |
| SKA30X3 | 30 | 24 | 52.0 | 249 | 240 |
| SKA30X4 | 30 | 22 | 52.0 | 323 | 314 |
| SKA30X5 | 30 | 20 | 52.0 | 393 | 380 |
| SKA30X6 | 30 | 18 | 52.0 | 400 | 390 |
| SKA38X4 | 38 | 30 | 56.5 | 261 | 254 |
| SKA38X5 | 38 | 28 | 56.5 | 315 | 315 |
| SKA38X6 | 38 | 26 | 56.5 | 315 | 315 |
| SKA38X7 | 38 | 24 | 56.5 | 315 | 315 |

**Note:** Weld fitting. Omit "CF" in the part number for steel material. Part does not include the tube nut. Size 10 and 12 SKA will work for Series L & S

Dimensions and pressures for reference only, subject to change.



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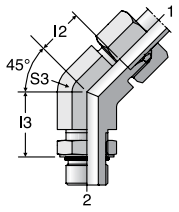
# VEE-UNF

Adjustable Locknut 45° Elbow
24° Flareless / SAE-ORB

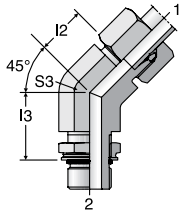



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 UN/UNF-2A | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| VEE06L7/16UNF | 6 | 7/16-20 | 9 | 19 | 14 | 315 | 315 | 315 | 315 |
| VEE08L7/16UNF | 8 | 7/16-20 | 12 | 19 | 14 | 315 | 315 | 315 | 315 |
| VEE10L7/16UNF | 10 | 9/16-18 | 12 | 24 | 19 | 315 | 315 | 315 | 315 |
| VEE12L9/16UNF | 12 | 9/16-18 | 14 | 24 | 19 | 315 | 315 | 315 | 315 |
| VEE12L3/4UNF | 12 | 3/4-16 | 14 | 24 | 19 | 315 | 315 | 315 | 315 |
| VEE15L3/4UNF | 15 | 3/4-16 | 17 | 24 | 22 | 315 | 315 | 315 | 315 |
| VEE15L7/8UNF | 15 | 7/8-14 | 17 | 24 | 22 | 315 | 315 | 315 | 315 |
| VEE18L7/8UNF | 18 | 7/8-14 | 17 | 30 | 27 | 315 | 315 | 315 | 315 |
| VEE18L11/16UN | 18 | 1 1/16-12 | 17 | 30 | 30 | 315 | 315 | 315 | 315 |
| VEE22L11/16UN | 22 | 1 1/16-12 | 19 | 33 | 30 | 160 | 160 | 160 | 160 |
| VEE28L15/16UN | 28 | 1 5/16-12 | 23 | 35 | 36 | 160 | 160 | 160 | 160 |
| VEE35L15/8UN | 35 | 1 5/8-12 | 27 | 37 | 50 | 160 | 160 | 160 | 160 |
| VEE42L17/8UN | 42 | 1 7/8-12 | 26 | 37 | 50 | 160 | 160 | 160 | 160 |
| VEE06S7/16UNF | 6 | 7/16-20 | 9 | 18 | 14 | 400 | 400 | 400 | 400 |
| VEE08S9/16UNF | 8 | 9/16-18 | 12 | 21 | 19 | 400 | 400 | 400 | 400 |
| VEE10S9/16UNF | 10 | 9/16-18 | 13 | 21 | 19 | 400 | 400 | 400 | 400 |
| VEE12S3/4UNF | 12 | 3/4-16 | 17 | 22 | 22 | 400 | 400 | 400 | 400 |
| VEE16S7/8UNF | 16 | 7/8-14 | 16 | 29 | 27 | 400 | 400 | 400 | 400 |
| VEE20S11/16UN | 20 | 1 1/16-12 | 16 | 31 | 30 | 400 | 400 | 400 | 400 |
| VEE25S11/16UN | 25 | 11/16-12 | 30 | 33 | 36 | 400 | 400 | 400 | 400 |
| VEE30S15/8UN | 30 | 1 5/8-12 | 24 | 35 | 50 | 250 | 250 | 250 | 250 |
| VEE38S17/8UN | 38 | 1 7/8-12 | 21 | 35 | 50 | 250 | 250 | 250 | 250 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: VEE06ZL7/16UNFCF**

# VEE-OR

Adjustable Locknut 45° Elbow
24° Flareless / Metric ISO 6149




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| VEE06LMOR | 6 | M10 x 1 | 9 | 20 | 14 | 315 | 315 | 315 | 315 |
| VEE08LMOR | 8 | M12 x 1.5 | 12 | 18 | 14 | 315 | 315 | 315 | 315 |
| VEE10LMOR | 10 | M14 x 1.5 | 12 | 22 | 19 | 315 | 315 | 315 | 315 |
| VEE12LMOR | 12 | M16 x 1.5 | 14 | 23 | 19 | 315 | 315 | 315 | 315 |
| VEE15LMOR | 15 | M18 x 1.5 | 17 | 23 | 22 | 315 | 315 | 315 | 315 |
| VEE18LMOR | 18 | M22 x 1.5 | 17 | 30 | 27 | 315 | 315 | 315 | 315 |
| VEE22LM27X2OR | 22 | M27 x 2 | 19 | 30 | 30 | 160 | 160 | 160 | 160 |
| VEE28LMOR | 28 | M33 x 2 | 23 | 34 | 36 | 160 | 160 | 160 | 160 |
| VEE35LMOR | 35 | M42 x 2 | 27 | 36 | 50 | 160 | 160 | 160 | 160 |
| VEE42LMOR | 42 | M48 x 2 | 26 | 36 | 50 | 160 | 160 | 160 | 160 |
| VEE06SMOR | 6 | M12 x 1.5 | 9 | 18 | 14 | 400 | 400 | 400 | 400 |
| VEE08SMOR | 8 | M14 x 1.5 | 12 | 18 | 19 | 400 | 400 | 400 | 400 |
| VEE10SMOR | 10 | M16 x 1.5 | 13 | 22 | 19 | 400 | 400 | 400 | 400 |
| VEE12SMOR | 12 | M18 x 1.5 | 17 | 23 | 22 | 400 | 400 | 400 | 400 |
| VEE16SMOR | 16 | M22 x 1.5 | 16 | 20 | 27 | 400 | 400 | 400 | 400 |
| VEE20SMOR | 20 | M27 x 2 | 16 | 33 | 30 | 400 | 400 | 400 | 400 |
| VEE25SMOR | 25 | M33 x 2 | 19 | 35 | 36 | 315 | 315 | 315 | 315 |
| VEE30SMOR | 30 | M42 x 2 | 24 | 36 | 50 | 250 | 250 | 250 | 250 |
| VEE38SMOR | 38 | M48 x 2 | 21 | 36 | 50 | 200 | 200 | 200 | 200 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: VEE06ZLMORCF**

Dimensions and pressures for reference only, subject to change.



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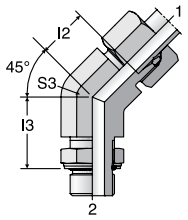
# VEE-R

Adjustable Locknut 45° Elbow
24° Flareless / BSPP ORR

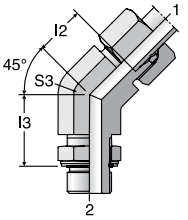



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **VEE06LR** | 6 | G 1/8A | 9 | 21 | 14 | 315 | 315 | 315 | 315 |
| **VEE08LR** | 8 | G 1/4A | 12 | 20 | 14 | 315 | 315 | 315 | 315 |
| **VEE10LR** | 10 | G 1/4A | 12 | 25 | 19 | 315 | 315 | 315 | 315 |
| **VEE12LR** | 12 | G 3/8A | 14 | 28 | 19 | 250 | 250 | 250 | 250 |
| **VEE15LR** | 15 | G 1/2A | 17 | 26 | 22 | 250 | 250 | 250 | 250 |
| **VEE18LR** | 18 | G 1/2A | 17 | 32 | 27 | 250 | 250 | 250 | 250 |
| **VEE22LR** | 22 | G 3/4A | 19 | 37 | 30 | 160 | 160 | 160 | 160 |
| **VEE28LR** | 28 | G 1A | 23 | 37 | 36 | 160 | 160 | 160 | 160 |
| **VEE35LR** | 35 | G 1 1/4A | 27 | 39 | 50 | 160 | 160 | 160 | 160 |
| **VEE42LR** | 42 | G 1 1/2A | 26 | 39 | 50 | 160 | 160 | 160 | 160 |
| **VEE06SR** | 6 | G 1/4A | 9 | 19 | 14 | 315 | 315 | 315 | 315 |
| **VEE08SR** | 8 | G 1/4A | 12 | 23 | 19 | 315 | 315 | 315 | 315 |
| **VEE10SR** | 10 | G 3/8A | 13 | 25 | 19 | 250 | 250 | 250 | 250 |
| **VEE12SR** | 12 | G 3/8A | 17 | 25 | 22 | 250 | 250 | 250 | 250 |
| **VEE16SR** | 16 | G 1/2A | 16 | 31 | 27 | 250 | 250 | 250 | 250 |
| **VEE20SR** | 20 | G 3/4A | 16 | 34 | 30 | 250 | 250 | 250 | 250 |
| **VEE25SR** | 25 | G 1A | 19 | 37 | 36 | 250 | 250 | 250 | 250 |
| **VEE30SR** | 30 | G 1 1/4A | 24 | 38 | 50 | 160 | 160 | 160 | 160 |
| **VEE38SR** | 38 | G 1 1/2A | 21 | 38 | 50 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: VEE06ZLRCF**

# VEE-M

Adjustable Locknut 45° Elbow
24° Flareless / Metric ORR




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **VEE06LM** | 6 | M10 x 1 | 9 | 21 | 14 | 315 | 315 | 315 | 315 |
| **VEE08LM** | 8 | M12 x 1.5 | 12 | 19 | 14 | 315 | 315 | 315 | 315 |
| **VEE10LM** | 10 | M14 x 1.5 | 12 | 24 | 19 | 315 | 315 | 315 | 315 |
| **VEE12LM** | 12 | M16 x 1.5 | 14 | 25 | 19 | 315 | 315 | 315 | 315 |
| **VEE15LM** | 15 | M18 x 1.5 | 17 | 24 | 22 | 315 | 315 | 315 | 315 |
| **VEE18LM** | 18 | M22 x 1.5 | 17 | 31 | 27 | 250 | 250 | 250 | 250 |
| **VEE22LM27X2** | 22 | M27 x 2 | 19 | 31 | 30 | 160 | 160 | 160 | 160 |
| **VEE28LM** | 28 | M33 x 2 | 23 | 35 | 36 | 160 | 160 | 160 | 160 |
| **VEE35LM** | 35 | M42 x 2 | 27 | 37 | 50 | 160 | 160 | 160 | 160 |
| **VEE42LM** | 42 | M48 x 2 | 26 | 37 | 50 | 160 | 160 | 160 | 160 |
| **VEE06SM** | 6 | M12 x 1.5 | 9 | 19 | 14 | 315 | 315 | 315 | 315 |
| **VEE08SM** | 8 | M14 x 1.5 | 12 | 19 | 19 | 315 | 315 | 315 | 315 |
| **VEE10SM** | 10 | M16 x 1.5 | 13 | 23 | 19 | 315 | 315 | 315 | 315 |
| **VEE12SM** | 12 | M18 x 1.5 | 17 | 25 | 22 | 315 | 315 | 315 | 315 |
| **VEE16SM** | 16 | M22 x 1.5 | 16 | 30 | 27 | 250 | 250 | 250 | 250 |
| **VEE20SM** | 20 | M27 x 2 | 16 | 35 | 30 | 250 | 250 | 250 | 250 |
| **VEE25SM** | 25 | M33 x 2 | 19 | 37 | 36 | 160 | 160 | 160 | 160 |
| **VEE30SM** | 30 | M42 x 2 | 24 | 37 | 50 | 160 | 160 | 160 | 160 |
| **VEE38SM** | 38 | M48 x 2 | 21 | 38 | 50 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: VEE06ZLMCF**

Dimensions and pressures for reference only, subject to change.



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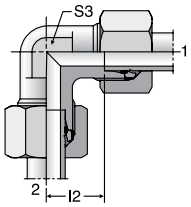
# W

## Elbow Union
## 24° Flareless / 24° Flareless




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | l 2 (mm) | S3 (mm) | S3 (Stainless Steel) (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| * W04LL | 4 | 11 | 9 | 9 | 100 | 100 | 63 | 100 | 100 |
| * W06LL | 6 | 9.5 | 11 | 9 | 100 | 100 | 63 | 100 | 100 |
| * W08LL | 8 | 11.5 | 12 | 12 | 100 | 100 | 63 | 100 | 100 |
| * W10LL | 10 | 12.5 | 14 | 12 | 100 | 100 | 63 | 100 | 100 |
| * W12LL | 12 | 13 | 17 | 14 | 100 | 100 | 63 | 100 | 100 |
| * W06L | 6 | 12 | 12 | 12 | 500 | 315 | 200 | 500 | 315 |
| * W08L | 8 | 14 | 14 | 12 | 500 | 315 | 200 | 500 | 315 |
| * W10L | 10 | 15 | 17 | 14 | 500 | 315 | 200 | 500 | 315 |
| * W12L | 12 | 17 | 19 | 19 | 400 | 315 | 200 | 400 | 315 |
| W15L | 15 | 21 | 19 | 19 | 400 | 315 | 200 | 400 | 315 |
| W18L | 18 | 23.5 | 24 | 24 | 400 | 315 | 200 | 400 | 315 |
| W22L | 22 | 27.5 | 27 | 27 | 250 | 160 | 100 | 250 | 160 |
| W28L | 28 | 30.5 | 36 | 36 | 250 | 160 | 100 | 250 | 160 |
| W35L | 35 | 34.5 | 41 | 41 | 250 | 160 | 100 | 250 | 160 |
| W42L | 42 | 40 | 50 | 50 | 250 | 160 | 100 | 250 | 160 |
| * W06S | 6 | 16 | 14 | 12 | 800 | 630 | 400 | 800 | 630 |
| * W08S | 8 | 17 | 17 | 14 | 800 | 630 | 400 | 800 | 630 |
| * W10S | 10 | 17.5 | 19 | 17 | 500 | 630 | 400 | 500 | 630 |
| * W12S | 12 | 21.5 | 22 | 17 | 630 | 630 | 400 | 630 | 630 |
| W14S | 14 | 22 | 19 | 19 | 630 | 630 | 400 | 630 | 630 |
| W16S | 16 | 24.5 | 24 | 24 | 630 | 400 | 250 | 630 | 400 |
| W20S | 20 | 26.5 | 27 | 27 | 420 | 400 | 250 | 420 | 400 |
| W25S | 25 | 30 | 36 | 36 | 420 | 400 | 250 | 420 | 400 |
| W30S | 30 | 35.5 | 41 | 41 | 420 | 400 | 250 | 420 | 400 |
| W38S | 38 | 41 | 50 | 50 | 420 | 315 | 200 | 420 | 315 |

* Extruded body for steel and brass .
**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: W04ZLLCF**

Dimensions and pressures for reference only, subject to change.



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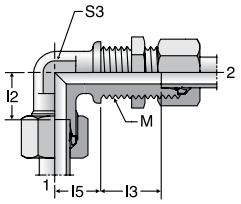
# WSV

Bulkhead Union Elbow
24° Flareless / 24° Flareless

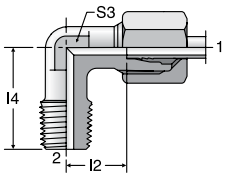



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | M Metric | l 2 (mm) | l 3 (mm) | l 5 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **WSV06L** | 6 | M12 x 1.5 | 12.0 | 27.0 | 14 | 12 | 315 | 315 | 200 | 315 | 315 |
| **WSV08L** | 8 | M14 x 1.5 | 14.0 | 27.0 | 17 | 12 | 315 | 315 | 200 | 315 | 315 |
| **WSV10L** | 10 | M16 x 1.5 | 15.0 | 28.0 | 18 | 14 | 315 | 315 | 200 | 315 | 315 |
| **WSV12L** | 12 | M18 x 1.5 | 17.0 | 29.0 | 20 | 17 | 315 | 315 | 200 | 315 | 315 |
| **WSV15L** | 15 | M22 x 1.5 | 21.0 | 31.0 | 23 | 19 | 315 | 315 | 200 | 315 | 315 |
| **WSV18L** | 18 | M26 x 1.5 | 23.5 | 32.5 | 24 | 24 | 315 | 315 | 200 | 315 | 315 |
| **WSV22L** | 22 | M30 x 2 | 27.5 | 34.5 | 30 | 27 | 160 | 160 | 100 | 160 | 160 |
| **WSV28L** | 28 | M36 x 2 | 30.5 | 35.5 | 34 | 36 | 160 | 160 | 100 | 160 | 160 |
| **WSV35L** | 35 | M45 x 2 | 34.5 | 36.5 | 39 | 41 | 160 | 160 | 100 | 160 | 160 |
| **WSV42L** | 42 | M52 x 2 | 40.0 | 36.0 | 43 | 50 | 160 | 160 | 100 | 160 | 160 |
| **WSV06S** | 6 | M14 x 1.5 | 16.0 | 29.0 | 17 | 12 | 630 | 630 | 400 | 630 | 630 |
| **WSV08S** | 8 | M16 x 1.5 | 17.0 | 29.0 | 18 | 14 | 630 | 630 | 400 | 630 | 630 |
| **WSV10S** | 10 | M18 x 1.5 | 17.5 | 29.5 | 20 | 17 | 630 | 630 | 400 | 630 | 630 |
| **WSV12S** | 12 | M20 x 1.5 | 21.5 | 30.5 | 21 | 17 | 630 | 630 | 400 | 630 | 630 |
| **WSV14S** | 14 | M22 x 1.5 | 22.0 | 32.0 | 23 | 19 | 630 | 630 | 400 | 630 | 630 |
| **WSV16S** | 16 | M24 x 1.5 | 24.5 | 31.5 | 24 | 24 | 400 | 400 | 250 | 400 | 400 |
| **WSV20S** | 20 | M30 x 2 | 26.5 | 33.5 | 30 | 27 | 400 | 400 | 250 | 400 | 400 |
| **WSV25S** | 25 | M36 x 2 | 30.0 | 35.0 | 34 | 36 | 400 | 400 | 250 | 400 | 400 |
| **WSV30S** | 30 | M42 x 2 | 35.5 | 37.5 | 39 | 41 | 400 | 400 | 250 | 400 | 400 |
| **WSV38S** | 38 | M52 x 2 | 41.0 | 37.0 | 43 | 50 | 315 | 315 | 200 | 315 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: WSV06ZLCF**

# WE-NPT

Male Elbow
24° Flareless / NPT




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 NPT | l 2 (mm) | l 4 (mm) | S3 (mm) | S3 Stainless Steel (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS |
|---|---|---|---|---|---|---|---|---|---|
| *** WE04LL1/8NPT** | 4 | 1/8-27 | 11.0 | 17 | 11 | 9 | 100 | 100 | 65 |
| *** WE06LL1/8NPT** | 6 | 1/8-27 | 9.5 | 17 | 11 | 9 | 100 | 100 | 65 |
| *** WE08LL1/8NPT** | 8 | 1/8-27 | 11.5 | 20 | 12 | 12 | 100 | 100 | 65 |
| *** WE06L1/8NPT** | 6 | 1/8-27 | 12.0 | 20 | 12 | 12 | 315 | 315 | 200 |
| *** WE06L1/4NPT** | 6 | 1/4-18 | 14.0 | 26 | 14 | 12 | 315 | 315 | 200 |
| *** WE08L1/4NPT** | 8 | 1/4-18 | 14.0 | 26 | 14 | 12 | 315 | 315 | 200 |
| *** WE10L1/4NPT** | 10 | 1/4-18 | 15.0 | 27 | 17 | 14 | 315 | 315 | 200 |
| *** WE12L3/8NPT** | 12 | 3/8-18 | 17.0 | 28 | 19 | 17 | 315 | 315 | 200 |
| *** WE12L1/4NPT** | 12 | 1/4-18 | 17.0 | 28 | 19 | 17 | 315 | 315 | 200 |
| **WE12L1/2NPT** | 12 | 1/2-14 | 21.0 | 34 | 19 | 19 | 315 | 315 | 200 |
| **WE15L1/2NPT** | 15 | 1/2-14 | 21.0 | 34 | 19 | 19 | 315 | 315 | 200 |
| **WE18L1/2NPT** | 18 | 1/2-14 | 23.5 | 36 | 24 | 24 | 315 | 315 | 200 |
| **WE22L3/4NPT** | 22 | 3/4-14 | 27.5 | 42 | 27 | 27 | 160 | 160 | 100 |
| **WE28L1NPT** | 28 | 1-11 1/2 | 30.5 | 48 | 36 | 36 | 160 | 160 | 100 |
| **WE35L11/4NPT** | 35 | 1 1/4-11 1/2 | 34.5 | 54 | 41 | 41 | 160 | 160 | 100 |
| **WE42L11/2NPT** | 42 | 1 1/2-11 1/2 | 40.0 | 61 | 50 | 50 | 160 | 160 | 100 |
| *** WE06S1/4NPT** | 6 | 1/4-18 | 16.0 | 26 | 14 | 12 | 630 | 630 | 400 |
| *** WE08S1/4NPT** | 8 | 1/4-18 | 17.0 | 27 | 17 | 14 | 630 | 630 | 400 |
| *** WE10S3/8NPT** | 10 | 3/8-18 | 17.5 | 28 | 19 | 17 | 630 | 630 | 400 |
| *** WE12S3/8NPT** | 12 | 3/8-18 | 22.5 | 28 | 22 | 17 | 630 | 630 | 400 |
| **WE14S1/2NPT** | 14 | 1/2-14 | 22.0 | 34 | 19 | 19 | 630 | 630 | 400 |
| **WE16S1/2NPT** | 16 | 1/2-14 | 24.5 | 36 | 24 | 24 | 400 | 400 | 250 |
| **WE20S3/4NPT** | 20 | 3/4-14 | 26.5 | 42 | 27 | 27 | 400 | 400 | 250 |
| **WE25S1NPT** | 25 | 1-11 1/2 | 30.0 | 48 | 36 | 36 | 400 | 400 | 250 |
| **WE30S11/4NPT** | 30 | 1 1/4-11 1/2 | 35.5 | 54 | 41 | 41 | 400 | 400 | 250 |
| **WE38S11/2NPT** | 38 | 1 1/2-11 1/2 | 41.0 | 61 | 50 | 50 | 315 | 315 | 200 |

***** Extruded body for steel and brass.

Dimensions and pressures for reference only, subject to change.



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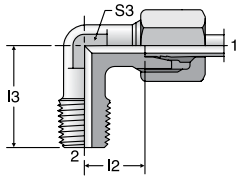
# WE-R keg

Male Elbow
24° Flareless / BSPT

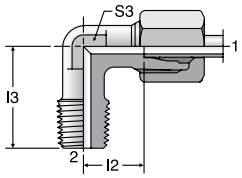



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPT | l 2 (mm) | l 3 (mm) | S3 (mm) | S3 Stainless Steel (mm | Pressure Rating (bar) EO CF | EO 71 | EO MS |
|---|---|---|---|---|---|---|---|---|---|
| * WE04LLR | 4 | R1/8 keg. | 11.0 | 17 | 11 | 9 | 100 | 100 | 63 |
| * WE06LLR | 6 | R1/8 keg. | 9.5 | 17 | 11 | 9 | 100 | 100 | 63 |
| * WE08LLR | 8 | R1/8 keg. | 11.5 | 20 | 12 | 12 | 100 | 100 | 63 |
| * WE10LLR | 10 | R1/4 keg. | 12.5 | 23 | 14 | 12 | 100 | 100 | 63 |
| * WE12LLR | 12 | R1/4 keg. | 13.0 | 23 | 17 | 14 | 100 | 100 | 63 |
| * WE06LR | 6 | R1/8 keg. | 12.0 | 20 | 12 | 12 | 315 | 315 | 200 |
| * WE08LR | 8 | R1/4 keg. | 14.0 | 26 | 14 | 12 | 315 | 315 | 200 |
| * WE10LR | 10 | R1/4 keg. | 15.0 | 27 | 17 | 14 | 315 | 315 | 200 |
| * WE12LR | 12 | R3/8 keg. | 17.0 | 28 | 19 | 17 | 315 | 315 | 200 |
| * WE12LR1/4 | 12 | R1/4 keg. | 17.0 | 27 | 19 | 17 | 315 | 315 | 200 |
| WE15LR | 15 | R1/2 keg. | 21.0 | 34 | 19 | 19 | 315 | 315 | 200 |
| WE18LR | 18 | R1/2 keg. | 23.5 | 36 | 24 | 24 | 315 | 315 | 200 |
| WE22LR3/4KEG | 22 | R3/4 keg. | 27.5 | 42 | 27 | 27 | 160 | 160 | 100 |
| * WE06SR | 6 | R1/4 keg. | 16.0 | 26 | 14 | 12 | 400 | 400 | 250 |
| * WE08SR | 8 | R1/4 keg. | 17.0 | 27 | 17 | 14 | 400 | 400 | 250 |
| * WE10SR | 10 | R3/8 keg. | 17.5 | 28 | 19 | 17 | 400 | 400 | 250 |
| * WE12SR | 12 | R3/8 keg. | 21.5 | 28 | 22 | 17 | 400 | 400 | 250 |
| WE14SR | 14 | R1/2 keg. | 22.0 | 32 | 19 | 19 | 400 | 400 | 250 |
| WE16SR | 16 | R1/2 keg. | 24.5 | 32 | 24 | 24 | 400 | 400 | 250 |

* Extruded body for steel and brass.
**Note:** keg. refers to taper threads.

# WE-M keg

Male Elbow
24° Flareless / Metric Taper Thread




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 2 (mm) | l 3 (mm) | S3 (mm) | S3 Stainless Steel (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS |
|---|---|---|---|---|---|---|---|---|---|
| * WE06LLM | 6 | M10 x 1 keg. | 9.5 | 17 | 11 | 9 | 100 | 100 | 63 |
| * WE08LLM | 8 | M10 x 1 keg. | 11.5 | 20 | 12 | 12 | 100 | 100 | 63 |
| * WE06LM | 6 | M10 x 1 keg. | 12.0 | 20 | 12 | 12 | 315 | 315 | 200 |
| * WE08LM | 8 | M12 x 1.5 keg. | 14.0 | 26 | 14 | 12 | 315 | 315 | 200 |
| * WE10LM | 10 | M14 x 1.5 keg. | 15.0 | 27 | 17 | 14 | 315 | 315 | 200 |
| * WE12LM | 12 | M16 x 1.5 keg. | 17.0 | 28 | 19 | 17 | 315 | 315 | 200 |
| WE15LM | 15 | M18 x 1.5 keg. | 21.0 | 32 | 19 | 19 | 315 | 315 | 200 |
| WE18LM | 18 | M22 x 1.5 keg. | 23.0 | 36 | 24 | 24 | 315 | 315 | 200 |
| * WE06SM | 6 | M12 x 1.5 keg. | 16.0 | 26 | 14 | 12 | 400 | 400 | 250 |
| * WE08SM | 8 | M14 x 1.5 keg. | 17.0 | 27 | 17 | 14 | 400 | 400 | 250 |
| * WE10SM | 10 | M16 x 1.5 keg. | 17.5 | 28 | 19 | 17 | 400 | 400 | 250 |
| * WE12SM | 12 | M18 x 1.5 keg. | 21.5 | 28 | 22 | 17 | 400 | 400 | 250 |
| WE14SM | 14 | M20 x 1.5 keg. | 22.0 | 32 | 19 | 19 | 400 | 400 | 250 |
| WE16SM | 16 | M22 x 1.5 keg. | 24.5 | 32 | 24 | 24 | 400 | 400 | 250 |

* Extruded body for steel and brass.
**Note:** keg. refers to taper threads.

Dimensions and pressures for reference only, subject to change.



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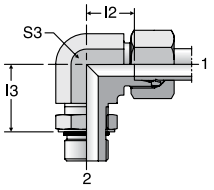
Adjustable Locknut Elbow
24° Flareless / SAE-ORB

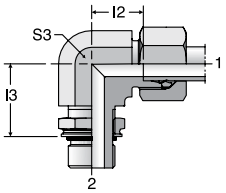



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 UN / UNF | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **WEE06L7/16UNF** | 6 | 7/16-20 | 14 | 19 | 14 | 315 | 315 | 315 | 315 |
| **WEE08L7/16UNF** | 8 | 7/16-20 | 16 | 19 | 14 | 315 | 315 | 315 | 315 |
| **WEE10L9/16UNF** | 10 | 9/16-18 | 17 | 24 | 19 | 315 | 315 | 315 | 315 |
| **WEE12L9/16UNF** | 12 | 9/16-18 | 19 | 25 | 19 | 315 | 315 | 315 | 315 |
| **WEE12L3/4UNF** | 12 | 3/4-16 | 19 | 25 | 19 | 315 | 315 | 315 | 315 |
| **WEE15L3/4UNF** | 15 | 3/4-16 | 21 | 28 | 22 | 315 | 315 | 315 | 315 |
| **WEE15L7/8UNF** | 15 | 7/8-14 | 21 | 28 | 22 | 315 | 315 | 315 | 315 |
| **WEE18L7/8UNF** | 18 | 7/8-14 | 24 | 32 | 27 | 315 | 315 | 315 | 315 |
| **WEE18L11/16UN** | 18 | 1 1/16-12 | 24 | 32 | 30 | 315 | 315 | 315 | 315 |
| **WEE22L11/16UN** | 22 | 1 1/16-12 | 28 | 35 | 30 | 160 | 160 | 160 | 160 |
| **WEE28L15/16UN** | 28 | 1 5/16-12 | 31 | 42 | 36 | 160 | 160 | 160 | 160 |
| **WEE35L15/8UN** | 35 | 1 5/8-12 | 38 | 46 | 50 | 160 | 160 | 160 | 160 |
| **WEE42L17/8UN** | 42 | 1 7/8-12 | 38 | 47 | 50 | 160 | 160 | 160 | 160 |
| **WEE06S7/16UNF** | 6 | 7/16-20 | 15 | 20 | 14 | 400 | 400 | 400 | 400 |
| **WEE08S9/16UNF** | 8 | 9/16-18 | 17 | 25 | 19 | 400 | 400 | 400 | 400 |
| **WEE10S9/16UNF** | 10 | 9/16-18 | 18 | 26 | 19 | 400 | 400 | 400 | 400 |
| **WEE12S3/4UNF** | 12 | 3/4-16 | 22 | 30 | 22 | 400 | 400 | 400 | 400 |
| **WEE16S7/8UNF** | 16 | 7/8-14 | 25 | 34 | 27 | 400 | 400 | 400 | 400 |
| **WEE20S11/16UN** | 20 | 1 1/16-12 | 28 | 37 | 30 | 400 | 400 | 400 | 400 |
| **WEE25S11/16UN** | 25 | 1 1/16-12 | 30 | 50 | 36 | 400 | 400 | 400 | 400 |
| **WEE30S15/8UN** | 30 | 1 5/8-12 | 36 | 50 | 50 | 250 | 250 | 250 | 250 |
| **WEE38S17/8UN** | 38 | 1 7/8-12 | 34 | 51 | 50 | 250 | 250 | 250 | 250 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: WEE06ZL7/16UNFCF**

# WEE-OR

Adjustable Locknut Elbow
24° Flareless / Metric ISO 6149




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l2 (mm) | l3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **WEE04LLMOR** | 4 | M8 x 1 | 11.3 | 19.8 | 12 | 100 | 100 | 100 | 100 |
| **WEE04LLM10X1OR** | 4 | M10 x 1 | 11.3 | 19.8 | 11 | 100 | 100 | 100 | 100 |
| **WEE06LLMOR** | 6 | M10 x 1 | 9.8 | 19.8 | 14 | 100 | 100 | 100 | 100 |
| **WEE06LLM12X1.5OR** | 6 | M12 x 1.5 | 12.8 | 23.2 | 14 | 100 | 100 | 100 | 100 |
| **WEE06LMOR** | 6 | M10 x 1 | 14.0 | 20.0 | 14 | 315 | 315 | 315 | 315 |
| **WEE08LMOR** | 8 | M12 x 1.5 | 16.0 | 22.0 | 14 | 315 | 315 | 315 | 315 |
| **WEE10LMOR** | 10 | M14 x 1.5 | 17.0 | 25.0 | 19 | 315 | 315 | 315 | 315 |
| **WEE12LMOR** | 12 | M16 x 1.5 | 19.0 | 26.0 | 19 | 315 | 315 | 315 | 315 |
| **WEE15LMOR** | 15 | M18 x 1.5 | 21.0 | 30.0 | 22 | 315 | 315 | 315 | 315 |
| **WEE18LMOR** | 18 | M22 x 1.5 | 24.0 | 33.0 | 27 | 315 | 315 | 315 | 315 |
| **WEE22LM27X2OR** | 22 | M27 x 2 | 28.0 | 35.0 | 30 | 160 | 160 | 160 | 160 |
| **WEE28LMOR** | 28 | M33 x 2 | 31.0 | 38.0 | 36 | 160 | 160 | 160 | 160 |
| **WEE35LMOR** | 35 | M42 x 2 | 38.0 | 48.0 | 50 | 160 | 160 | 160 | 160 |
| **WEE42LMOR** | 42 | M48 x 2 | 38.0 | 49.0 | 50 | 160 | 160 | 160 | 160 |
| **WEE06SMOR** | 6 | M12 x 1.5 | 15.0 | 22.0 | 14 | 400 | 400 | 400 | 400 |
| **WEE08SMOR** | 8 | M14 x 1.5 | 17.0 | 26.0 | 19 | 400 | 400 | 400 | 400 |
| **WEE10SMOR** | 10 | M16 x 1.5 | 18.0 | 27.0 | 19 | 400 | 400 | 400 | 400 |
| **WEE12SMOR** | 12 | M18 x 1.5 | 22.0 | 31.0 | 22 | 400 | 400 | 400 | 400 |
| **WEE16SMOR** | 16 | M22 x 1.5 | 25.0 | 35.0 | 27 | 400 | 400 | 400 | 400 |
| **WEE20SMOR** | 20 | M27 x 2 | 28.0 | 39.0 | 30 | 400 | 400 | 400 | 400 |
| **WEE25SMOR** | 25 | M33 x 2 | 30.0 | 44.0 | 36 | 315 | 315 | 315 | 315 |
| **WEE30SMOR** | 30 | M42 x 2 | 36.0 | 51.0 | 50 | 250 | 250 | 250 | 250 |
| **WEE38SMOR** | 38 | M48 x 2 | 34.0 | 54.0 | 50 | 200 | 200 | 200 | 200 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: WEE04ZLLMORCF**

Dimensions and pressures for reference only, subject to change.



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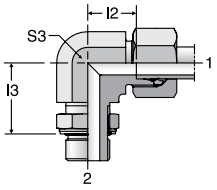
# WEE-R

Adjustable Locknut Elbow
24° Flareless / BSPP ORR

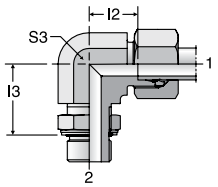



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **WEE04LLR** | 4 | G 1/8A | 11 | 20 | 11 | 250 | 250 | 250 | 250 |
| **WEE06LLR** | 6 | G 1/8A | 11 | 20 | 11 | 250 | 250 | 250 | 250 |
| **WEE06LR** | 6 | G 1/8A | 14 | 19 | 14 | 315 | 315 | 315 | 315 |
| **WEE08LR** | 8 | G 1/4A | 16 | 23 | 14 | 315 | 315 | 315 | 315 |
| **WEE10LR** | 10 | G 1/4A | 17 | 25 | 19 | 315 | 315 | 315 | 315 |
| **WEE12LR** | 12 | G 3/8A | 19 | 28 | 19 | 250 | 250 | 250 | 250 |
| **WEE15LR** | 15 | G 1/2A | 21 | 30 | 22 | 250 | 250 | 250 | 250 |
| **WEE18LR** | 18 | G 1/2A | 24 | 36 | 27 | 250 | 250 | 250 | 250 |
| **WEE22LR** | 22 | G 3/4A | 28 | 36 | 30 | 160 | 160 | 160 | 160 |
| **WEE28LR** | 28 | G 1A | 31 | 44 | 36 | 160 | 160 | 160 | 160 |
| **WEE35LR** | 35 | G 1 1/4A | 38 | 50 | 50 | 160 | 160 | 160 | 160 |
| **WEE42LR** | 42 | G 1 1/2A | 38 | 52 | 50 | 160 | 160 | 160 | 160 |
| **WEE06SR** | 6 | G 1/4A | 15 | 23 | 14 | 315 | 315 | 315 | 315 |
| **WEE08SR** | 8 | G 1/4A | 17 | 27 | 19 | 315 | 315 | 315 | 315 |
| **WEE10SR** | 10 | G 3/8A | 18 | 29 | 19 | 250 | 250 | 250 | 250 |
| **WEE12SR** | 12 | G 3/8A | 22 | 29 | 22 | 250 | 250 | 250 | 250 |
| **WEE16SR** | 16 | G 1/2A | 25 | 36 | 27 | 250 | 250 | 250 | 250 |
| **WEE20SR** | 20 | G 3/4A | 28 | 39 | 30 | 250 | 250 | 250 | 250 |
| **WEE25SR** | 25 | G 1A | 30 | 44 | 36 | 250 | 250 | 250 | 250 |
| **WEE30SR** | 30 | G 1 1/4A | 36 | 49 | 50 | 160 | 160 | 160 | 160 |
| **WEE38SR** | 38 | G 1 1/2A | 34 | 55 | 50 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: WEE04ZLLRCF**

# WEE-M

Adjustable Locknut Elbow
24° Flareless / Metric ORR




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **WEE06LM** | 6 | M10 x 1 | 14 | 20 | 14 | 315 | 315 | 315 | 315 |
| **WEE08LM** | 8 | M12 x 1.5 | 16 | 22 | 14 | 315 | 315 | 315 | 315 |
| **WEE10LM** | 10 | M14 x 1.5 | 17 | 24 | 19 | 315 | 315 | 315 | 315 |
| **WEE12LM** | 12 | M16 x 1.5 | 19 | 25 | 19 | 315 | 315 | 315 | 315 |
| **WEE15LM** | 15 | M18 x 1.5 | 21 | 31 | 22 | 315 | 315 | 315 | 315 |
| **WEE18LM** | 18 | M22 x 1.5 | 24 | 33 | 27 | 250 | 250 | 250 | 250 |
| **WEE22LM27X2** | 22 | M27 x 2 | 28 | 36 | 30 | 160 | 160 | 160 | 160 |
| **WEE28LM** | 28 | M33 x 2 | 31 | 39 | 36 | 160 | 160 | 160 | 160 |
| **WEE35LM** | 35 | M42 x 2 | 38 | 49 | 50 | 160 | 160 | 160 | 160 |
| **WEE42LM** | 42 | M48 x 2 | 38 | 50 | 50 | 160 | 160 | 160 | 160 |
| **WEE06SM** | 6 | M12 x 1.5 | 15 | 22 | 14 | 315 | 315 | 315 | 315 |
| **WEE08SM** | 8 | M14 x 1.5 | 17 | 26 | 19 | 315 | 315 | 315 | 315 |
| **WEE10SM** | 10 | M16 x 1.5 | 18 | 27 | 19 | 315 | 315 | 315 | 315 |
| **WEE12SM** | 12 | M18 x 1.5 | 22 | 31 | 22 | 315 | 315 | 315 | 315 |
| **WEE16SM** | 16 | M22 x 1.5 | 25 | 36 | 27 | 250 | 250 | 250 | 250 |
| **WEE20SM** | 20 | M27 x 2 | 28 | 39 | 30 | 250 | 250 | 250 | 250 |
| **WEE25SM** | 25 | M33 x 2 | 30 | 44 | 36 | 160 | 160 | 160 | 160 |
| **WEE30SM** | 30 | M42 x 2 | 36 | 51 | 50 | 160 | 160 | 160 | 160 |
| **WEE38SM** | 38 | M48 x 2 | 34 | 54 | 50 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: WEE06ZLMCF**

Dimensions and pressures for reference only, subject to change.



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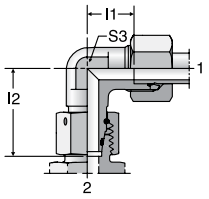
Swivel Nut Elbow
24° Flareless / Flareless Swivel




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 1 (mm) | l 2 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **EW06L** | 6 | M12 x 1.5 | 12.0 | 26.0 | 12 | 500 | 315 | 500 | 315 |
| **EW08L** | 8 | M14 x 1.5 | 14.0 | 27.5 | 12 | 500 | 315 | 500 | 315 |
| **EW10L** | 10 | M16 x 1.5 | 15.0 | 29.0 | 14 | 500 | 315 | 500 | 315 |
| **EW12L** | 12 | M18 x 1.5 | 17.0 | 29.5 | 17 | 400 | 315 | 400 | 315 |
| **EW15L** | 15 | M22 x 1.5 | 21.0 | 32.5 | 19 | 400 | 315 | 400 | 315 |
| **EW18L** | 18 | M26 x 1.5 | 23.5 | 35.5 | 24 | 400 | 315 | 400 | 315 |
| **EW22L** | 22 | M30 x 2 | 27.5 | 38.5 | 27 | 250 | 160 | 250 | 160 |
| **EW28L** | 28 | M36 x 2 | 30.5 | 41.5 | 36 | 250 | 160 | 250 | 160 |
| **EW35L** | 35 | M45 x 2 | 34.5 | 51.0 | 41 | 250 | 160 | 250 | 160 |
| **EW42L** | 42 | M52 x 2 | 40.0 | 56.0 | 50 | 250 | 160 | 250 | 160 |
| **EW06S** | 6 | M14 x 1.5 | 16.0 | 27.0 | 12 | 800 | 630 | 800 | 630 |
| **EW08S** | 8 | M16 x 1.5 | 17.0 | 27.5 | 14 | 800 | 630 | 800 | 630 |
| **EW10S** | 10 | M18 x 1.5 | 17.5 | 30.0 | 17 | 800 | 630 | 800 | 630 |
| **EW12S** | 12 | M20 x 1.5 | 21.5 | 31.0 | 17 | 630 | 630 | 630 | 630 |
| **EW14S** | 14 | M22 x 1.5 | 22.0 | 35.0 | 19 | 630 | 630 | 630 | 630 |
| **EW16S** | 16 | M24 x 1.5 | 24.5 | 36.5 | 24 | 630 | 400 | 630 | 400 |
| **EW20S** | 20 | M30 x 2 | 26.5 | 44.5 | 27 | 420 | 400 | 420 | 400 |
| **EW25S** | 25 | M36 x 2 | 30.0 | 50.0 | 36 | 420 | 400 | 420 | 400 |
| **EW30S** | 30 | M42 x 2 | 35.5 | 55.0 | 41 | 420 | 400 | 420 | 400 |
| **EW38S** | 38 | M52 x 2 | 41.0 | 63.0 | 50 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: EW06ZLCF**

Dimensions and pressures for reference only, subject to change.



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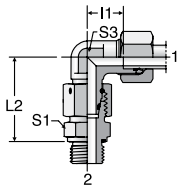
# EW-R-ED

Assembled Adjustable Swivel Elbow
24° Flareless / BSPP with EOlastic Seal

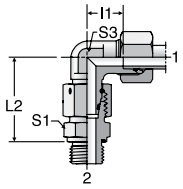



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | l 1 (mm) | L2 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| **EW06LRED** | 6 | G 1/8 A | 12.0 | 34.5 | 14 | 12 | 500 | 315 | 500 | 315 |
| **EW08LRED** | 8 | G 1/4 A | 14.0 | 37.5 | 19 | 12 | 500 | 315 | 500 | 315 |
| **EW10LRED** | 10 | G 1/4 A | 15.0 | 40.0 | 19 | 14 | 500 | 315 | 500 | 315 |
| **EW12LRED** | 12 | G 3/8 A | 17.0 | 42.0 | 22 | 17 | 400 | 315 | 400 | 315 |
| **EW15LRED** | 15 | G 1/2 A | 21.0 | 46.5 | 27 | 19 | 400 | 315 | 400 | 315 |
| **EW18LRED** | 18 | G 1/2 A | 23.5 | 50.0 | 27 | 24 | 400 | 315 | 400 | 315 |
| **EW22LRED** | 22 | G 3/4 A | 27.5 | 55.0 | 32 | 27 | 250 | 160 | 250 | 160 |
| **EW28LRED** | 28 | G 1A | 30.5 | 59.0 | 41 | 36 | 250 | 160 | 250 | 160 |
| **EW35LRED** | 35 | G 1 1/4 A | 34.5 | 68.5 | 50 | 41 | 250 | 160 | 250 | 160 |
| **EW42LRED** | 42 | G 1 1/2 A | 40.0 | 75.0 | 55 | 50 | 250 | 160 | 250 | 160 |
| **EW06SRED** | 6 | G 1/4 A | 16.0 | 40.0 | 19 | 12 | 800 | 630 | 800 | 630 |
| **EW08SRED** | 8 | G 1/4 A | 17.0 | 42.5 | 19 | 14 | 800 | 630 | 800 | 630 |
| **EW10SRED** | 10 | G 3/8 A | 17.5 | 45.0 | 22 | 17 | 800 | 630 | 800 | 630 |
| **EW12SRED** | 12 | G 3/8 A | 21.5 | 48.0 | 22 | 17 | 630 | 630 | 630 | 630 |
| **EW14SRED** | 14 | G 1/2 A | 22.0 | 54.0 | 27 | 19 | 630 | 630 | 630 | 630 |
| **EW16SRED** | 16 | G 1/2 A | 24.5 | 55.0 | 27 | 24 | 630 | 400 | 630 | 400 |
| **EW20SRED** | 20 | G 3/4 A | 26.5 | 65.0 | 32 | 27 | 420 | 400 | 420 | 400 |
| **EW25SRED** | 25 | G 1A | 30.0 | 73.0 | 41 | 36 | 420 | 400 | 420 | 400 |
| **EW30SRED** | 30 | G 1 1/4 A | 35.5 | 78.5 | 50 | 41 | 420 | 400 | 420 | 400 |
| **EW38SRED** | 38 | G 1 1/2 A | 41.0 | 89.0 | 55 | 50 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: EW06ZLREDCF**

# EW-M-ED

Assembled Adjustable Swivel Elbow
24° Flareless / Metric Parallel with EOlastic Seal




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 1 (mm) | L2 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| **EW06LMED** | 6 | M10 x 1 | 12 | 34.5 | 14 | 12 | 500 | 315 | 500 | 315 |
| **EW08LMED** | 8 | M12 x 1.5 | 14 | 37.5 | 17 | 12 | 500 | 315 | 500 | 315 |
| **EW10LMED** | 10 | M14 x 1.5 | 15 | 40.0 | 19 | 14 | 500 | 315 | 500 | 315 |
| **EW12LMED** | 12 | M16 x 1.5 | 17 | 42.0 | 22 | 17 | 400 | 315 | 400 | 315 |
| **EW15LMED** | 15 | M18 x 1.5 | 21 | 46.0 | 24 | 19 | 400 | 315 | 400 | 315 |
| **EW18LMED** | 18 | M22 x 1.5 | 23.5 | 50.0 | 27 | 24 | 400 | 315 | 400 | 315 |
| **EW22LMED** | 22 | M26 x 1.5 | 27.5 | 55.0 | 32 | 27 | 250 | 160 | 250 | 160 |
| **EW28LMED** | 28 | M33 x 2 | 30.5 | 59.0 | 41 | 36 | 250 | 160 | 250 | 160 |
| **EW35LMED** | 35 | M42 x 2 | 34.5 | 68.5 | 50 | 41 | 250 | 160 | 250 | 160 |
| **EW42LMED** | 42 | M48 x 2 | 40 | 75.0 | 55 | 50 | 250 | 160 | 250 | 160 |
| **EW06SMED** | 6 | M12 x 1.5 | 16 | 40.0 | 17 | 12 | 800 | 630 | 800 | 630 |
| **EW08SMED** | 8 | M14 x 1.5 | 17 | 42.5 | 19 | 14 | 800 | 630 | 800 | 630 |
| **EW10SMED** | 10 | M16 x 1.5 | 17.5 | 45.0 | 22 | 17 | 800 | 630 | 800 | 630 |
| **EW12SMED** | 12 | M18 x 1.5 | 21.5 | 48.0 | 24 | 17 | 630 | 630 | 630 | 630 |
| **EW14SMED** | 14 | M20 x 1.5 | 22 | 54.0 | 27 | 19 | 630 | 630 | 630 | 630 |
| **EW16SMED** | 16 | M22 x 1.5 | 24.5 | 55.0 | 27 | 24 | 630 | 400 | 630 | 400 |
| **EW20SMED** | 20 | M27 x 2 | 26.5 | 65.0 | 32 | 27 | 420 | 400 | 420 | 400 |
| **EW25SMED** | 25 | M33 x 2 | 30 | 73.0 | 41 | 36 | 420 | 400 | 420 | 400 |
| **EW30SMED** | 30 | M42 x 2 | 35.5 | 78.5 | 50 | 41 | 420 | 400 | 420 | 400 |
| **EW38SMED** | 38 | M48 x 2 | 41 | 89.0 | 55 | 50 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: EW06ZLMEDCF**

Dimensions and pressures for reference only, subject to change.



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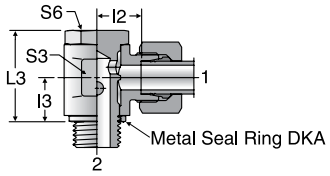
# SWVE-R

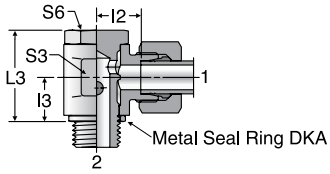
Banjo Elbow
24° Flareless / BSPP




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | l 2 (mm) | l 3 (mm) | L3 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO / CF |
|---|---|---|---|---|---|---|---|---|
| SWVE04LLR | 4 | G 1/8 A | 11.5 | 10.0 | 21.0 | 14 | 14 | 63 |
| SWVE06LLR | 6 | G 1/8 A | 10.0 | 10.0 | 21.5 | 14 | 14 | 63 |
| SWVE08LLR | 8 | G 1/8 A | 11.0 | 10.0 | 21.0 | 14 | 14 | 63 |
| SWVE06LR | 6 | G 1/8 A | 10.5 | 10.0 | 21.0 | 14 | 14 | 160 |
| SWVE08LR | 8 | G 1/4 A | 13.0 | 13.0 | 27.0 | 19 | 19 | 160 |
| SWVE10LR | 10 | G 1/4 A | 14.0 | 13.0 | 27.0 | 19 | 19 | 160 |
| SWVE12LR | 12 | G 3/8 A | 15.5 | 15.0 | 32.0 | 22 | 22 | 100 |
| SWVE15LR | 15 | G 1/2 A | 19.0 | 18.0 | 37.5 | 27 | 27 | 100 |
| SWVE18LR | 18 | G 1/2 A | 20.5 | 21.5 | 44.5 | 30 | 27 | 100 |
| SWVE22LR | 22 | G 3/4 A | 25.5 | 24.0 | 49.0 | 36 | 32 | 100 |
| SWVE06SR | 6 | G 1/4 A | 15.0 | 13.0 | 27.0 | 19 | 19 | 160 |
| SWVE08SR | 8 | G 1/4 A | 15.0 | 13.0 | 27.0 | 19 | 19 | 160 |
| SWVE10SR | 10 | G 3/8 A | 16.0 | 15.0 | 32.0 | 22 | 22 | 100 |
| SWVE12SR | 12 | G 3/8 A | 17.0 | 18.0 | 37.0 | 24 | 24 | 100 |
| SWVE14SR | 14 | G 1/2 A | 20.0 | 18.0 | 37.5 | 27 | 27 | 100 |
| SWVE16SR | 16 | G 1/2 A | 21.5 | 21.5 | 44.5 | 30 | 27 | 100 |
| SWVE20SR | 20 | G 3/4 A | 24.5 | 24.0 | 49.0 | 36 | 32 | 100 |

# SWVE-M

Banjo Elbow
24° Flareless / Metric Parallel




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 2 (mm) | l 3 (mm) | L3 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO / CF |
|---|---|---|---|---|---|---|---|---|
| SWVE04LLM | 4 | M8 x 1 | 10.5 | 8.0 | 17.0 | 12 | 12 | 63 |
| SWVE06LLM | 6 | M10 x 1 | 10.0 | 10.0 | 21.0 | 14 | 14 | 63 |
| SWVE08LLM | 8 | M10 x 1 | 11.0 | 10.0 | 21.0 | 14 | 14 | 63 |
| SWVE06LM | 6 | M10 x 1 | 10.5 | 10.0 | 21.5 | 14 | 14 | 160 |
| SWVE08LM | 8 | M12 x 1.5 | 12.0 | 12.0 | 25.0 | 17 | 17 | 160 |
| SWVE10LM | 10 | M14 x 1.5 | 14.0 | 13.0 | 27.0 | 19 | 19 | 160 |
| SWVE12LM | 12 | M16 x 1.5 | 15.5 | 15.0 | 32.0 | 22 | 21 | 100 |
| SWVE15LM | 15 | M18 x 1.5 | 17.5 | 18.0 | 37.5 | 24 | 24 | 100 |
| SWVE18LM | 18 | M22 x 1.5 | 20.5 | 21.5 | 44.5 | 30 | 27 | 100 |
| SWVE22LM | 22 | M26 x 1.5 | 25.5 | 24.0 | 49.0 | 36 | 32 | 100 |
| SWVE06SM | 6 | M12 x 1.5 | 14.0 | 12.0 | 25.0 | 17 | 17 | 160 |
| SWVE08SM | 8 | M14 x 1.5 | 15.0 | 13.0 | 27.0 | 19 | 19 | 160 |
| SWVE10SM | 10 | M16 x 1.5 | 16.0 | 15.0 | 32.0 | 22 | 22 | 100 |
| SWVE12SM | 12 | M18 x 1.5 | 17.0 | 18.0 | 37.0 | 24 | 24 | 100 |
| SWVE14SM | 14 | M20 x 1.5 | 20.0 | 18.0 | 37.0 | 27 | 27 | 100 |
| SWVE16SM | 16 | M22 x 1.5 | 21.5 | 21.5 | 44.5 | 30 | 27 | 100 |
| SWVE20SM | 20 | M27 x 2 | 24.5 | 24.0 | 49.0 | 36 | 32 | 100 |

Dimensions and pressures for reference only, subject to change.



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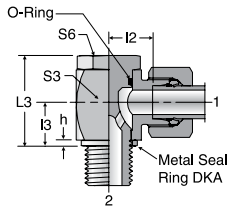
# WH-R

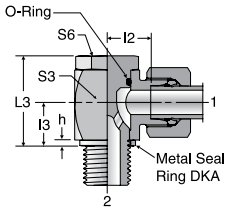
High Pressure Banjo Elbow
24° Flareless / BSPP




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | h (mm) | l 2 (mm) | l 3 (mm) | L3 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WH06LR** | 6 | G 1/8 A | 2.5 | 12.0 | 10.5 | 24 | 17 | 17 | 250 | 250 | 160 | 250 | 250 |
| **WH08LR** | 8 | G 1/4 A | 3.0 | 14.5 | 14.0 | 30 | 22 | 19 | 250 | 250 | 160 | 250 | 250 |
| **WH10LR** | 10 | G 1/4 A | 3.0 | 15.5 | 14.0 | 30 | 22 | 19 | 250 | 250 | 160 | 250 | 250 |
| **WH12LR** | 12 | G 3/8 A | 3.0 | 18.0 | 16.5 | 36 | 27 | 24 | 250 | 250 | 160 | 250 | 250 |
| **WH15LR** | 15 | G 1/2 A | 4.5 | 21.5 | 21.5 | 45 | 32 | 30 | 250 | 250 | 160 | 250 | 250 |
| **WH18LR** | 18 | G 1/2 A | 4.5 | 21.0 | 21.5 | 45 | 32 | 30 | 250 | 250 | 160 | 250 | 250 |
| **WH22LR** | 22 | G 3/4 A | 3.5 | 27.5 | 24.0 | 53 | 41 | 36 | 160 | 160 | 100 | 160 | 160 |
| **WH28LR** | 28 | G 1A | 3.5 | 32.0 | 30.5 | 66 | 50 | 46 | 160 | 160 | 100 | 160 | 160 |
| **WH35LR** | 35 | G 1 1/4 A | 3.5 | 36.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 100 | 160 | 160 |
| **WH42LR** | 42 | G 1 1/2 A | 3.5 | 40.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 100 | 160 | 160 |
| **WH06SR** | 6 | G 1/4 A | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 200 | 315 | 315 |
| **WH08SR** | 8 | G 1/4 A | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 200 | 315 | 315 |
| **WH10SR** | 10 | G 3/8 A | 3.0 | 18.5 | 16.5 | 36 | 27 | 24 | 315 | 315 | 200 | 315 | 315 |
| **WH12SR** | 12 | G 3/8 A | 3.0 | 18.5 | 16.5 | 36 | 27 | 24 | 315 | 315 | 200 | 315 | 315 |
| **WH14SR** | 14 | G 1/2 A | 4.5 | 22.5 | 21.5 | 45 | 32 | 30 | 315 | 315 | 200 | 315 | 315 |
| **WH16SR** | 16 | G 1/2 A | 4.5 | 22.0 | 21.5 | 45 | 32 | 30 | 315 | 315 | 200 | 315 | 315 |
| **WH20SR** | 20 | G 3/4 A | 3.5 | 26.5 | 24.0 | 53 | 41 | 36 | 160 | 160 | 100 | 160 | 160 |
| **WH25SR** | 25 | G 1A | 3.5 | 31.5 | 30.5 | 66 | 50 | 46 | 160 | 160 | 100 | 160 | 160 |
| **WH30SR** | 30 | G 1 1/4 A | 3.5 | 37.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 100 | 160 | 160 |
| **WH38SR** | 38 | G 1 1/2 A | 3.5 | 41.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 100 | 160 | 160 |

# WH-M

High Pressure Banjo Elbow
24° Flareless / Metric Parallel




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | h (mm) | l 2 (mm) | l 3 (mm) | L3 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WH06LM** | 6 | M10 x 1 | 2.5 | 12.0 | 10.5 | 24 | 17 | 17 | 250 | 250 | 250 | 250 |
| **WH08LM** | 8 | M12 x 1.5 | 3.0 | 14.5 | 14.0 | 30 | 22 | 19 | 250 | 250 | 250 | 250 |
| **WH10LM** | 10 | M14 x 1.5 | 3.0 | 15.5 | 14.0 | 30 | 22 | 19 | 250 | 250 | 250 | 250 |
| **WH12LM** | 12 | M16 x 1.5 | 3.0 | 18.0 | 16.5 | 36 | 27 | 24 | 250 | 250 | 250 | 250 |
| **WH15LM** | 15 | M18 x 1.5 | 3.0 | 21.5 | 18.5 | 39.5 | 30 | 27 | 250 | 250 | 250 | 250 |
| **WH18LM** | 18 | M22 x 1.5 | 4.5 | 21.0 | 21.5 | 45 | 32 | 30 | 250 | 250 | 250 | 250 |
| **WH22LM** | 22 | M26 x 1.5 | 3.5 | 27.5 | 24.0 | 53 | 41 | 36 | 160 | 160 | 160 | 160 |
| **WH28LM** | 28 | M33 x 2 | 3.5 | 32.0 | 30.5 | 66 | 50 | 46 | 160 | 160 | 160 | 160 |
| **WH35LM** | 35 | M42 x 2 | 3.5 | 36.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 160 | 160 |
| **WH42LM** | 42 | M48 x 2 | 3.5 | 40.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 160 | 160 |
| **WH06SM** | 6 | M12 x 1.5 | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 315 | 315 |
| **WH08SM** | 8 | M14 x 1.5 | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 315 | 315 |
| **WH10SM** | 10 | M16 x 1.5 | 3.0 | 18.5 | 16.5 | 36 | 27 | 24 | 315 | 315 | 315 | 315 |
| **WH12SM** | 12 | M18 x 1.5 | 3.0 | 20.0 | 18.5 | 39.5 | 27 | 27 | 315 | 315 | 315 | 315 |
| **WH14SM** | 14 | M20 x 1.5 | 3.0 | 22.5 | 20.0 | 43.5 | 32 | 30 | 315 | 315 | 315 | 315 |
| **WH16SM** | 16 | M22 x 1.5 | 4.5 | 22.0 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **WH20SM** | 20 | M27 x 2 | 3.5 | 26.5 | 24.0 | 53 | 41 | 36 | 160 | 160 | 160 | 160 |
| **WH25SM** | 25 | M33 x 2 | 3.5 | 31.5 | 30.5 | 66 | 50 | 46 | 160 | 160 | 160 | 160 |
| **WH30SM** | 30 | M42 x 2 | 3.5 | 37.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 160 | 160 |
| **WH38SM** | 38 | M48 x 2 | 3.5 | 41.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 160 | 160 |

Dimensions and pressures for reference only, subject to change.



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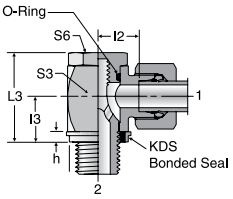
# WH-R-KDS

High Pressure Banjo Elbow
24° Flareless / BSPP

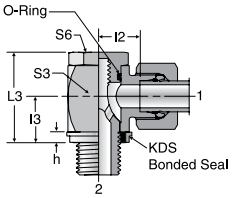



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | h (mm) | l 2 (mm) | l 3 (mm) | L3 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WH06LRKDS** | 6 | G 1/8 A | 2.5 | 12.0 | 10.5 | 24 | 17 | 17 | 315 | 315 | 315 | 315 |
| **WH08LRKDS** | 8 | G 1/4 A | 3.0 | 14.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 315 | 315 |
| **WH10LRKDS** | 10 | G 1/4 A | 3.0 | 15.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 315 | 315 |
| **WH12LRKDS** | 12 | G 3/8 A | 3.0 | 18.0 | 16.5 | 36 | 27 | 24 | 315 | 315 | 315 | 315 |
| **WH15LRKDS** | 15 | G 1/2 A | 4.5 | 21.5 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **WH18LRKDS** | 18 | G 1/2 A | 4.5 | 21.0 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **WH22LRKDS** | 22 | G 3/4 A | 3.5 | 27.5 | 24.0 | 53 | 41 | 36 | 160 | 160 | 160 | 160 |
| **WH28LRKDS** | 28 | G 1A | 3.5 | 32.0 | 30.5 | 66 | 50 | 46 | 160 | 160 | 160 | 160 |
| **WH35LRKDS** | 35 | G 1 1/4 A | 3.5 | 36.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 160 | 160 |
| **WH42LRKDS** | 42 | G 1 1/2 A | 3.5 | 40.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 160 | 160 |
| **WH06SRKDS** | 6 | G 1/4 A | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 400 | 400 | 400 | 400 |
| **WH08SRKDS** | 8 | G 1/4 A | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 400 | 400 | 400 | 400 |
| **WH10SRKDS** | 10 | G 3/8 A | 3.0 | 18.5 | 16.5 | 36 | 27 | 24 | 400 | 400 | 400 | 400 |
| **WH12SRKDS** | 12 | G 3/8 A | 3.0 | 18.5 | 16.5 | 36 | 27 | 24 | 400 | 400 | 400 | 400 |
| **WH14SRKDS** | 14 | G 1/2 A | 4.5 | 22.5 | 21.5 | 45 | 32 | 30 | 400 | 400 | 400 | 400 |
| **WH16SRKDS** | 16 | G 1/2 A | 4.5 | 22.0 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **WH20SRKDS** | 20 | G 3/4 A | 3.5 | 26.5 | 24.0 | 53 | 41 | 36 | 315 | 315 | 315 | 315 |
| **WH25SRKDS** | 25 | G 1A | 3.5 | 31.5 | 30.5 | 66 | 50 | 46 | 250 | 250 | 250 | 250 |
| **WH30SRKDS** | 30 | G 1 1/4 A | 3.5 | 37.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 160 | 160 |
| **WH38SRKDS** | 38 | G 1 1/2 A | 3.5 | 41.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example WH06ZLRKDSCF**
***Stainless Steel (71) part numbers have KD instead of KDS.**
**Example: WHO6SRKD71**

# WH-M-KDS

High Pressure Banjo Elbow
Banjo Metric / Flareless




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | h (mm) | l 2 (mm) | l 3 (mm) | L3 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WH06LMKDS** | 6 | M10 x 1 | 2.5 | 12.0 | 10.5 | 24.0 | 17 | 17 | 315 | 315 | 315 | 315 |
| **WH08LMKDS** | 8 | M12 x 1.5 | 3.0 | 14.5 | 14.0 | 30.0 | 22 | 19 | 315 | 315 | 315 | 315 |
| **WH10LMKDS** | 10 | M14 x 1.5 | 3.0 | 15.5 | 14.0 | 30.0 | 22 | 19 | 315 | 315 | 315 | 315 |
| **WH12LMKDS** | 12 | M16 x 1.5 | 3.0 | 18.0 | 16.5 | 36.0 | 27 | 24 | 315 | 315 | 315 | 315 |
| **WH15LMKDS** | 15 | M18 x 1.5 | 3.0 | 21.5 | 18.5 | 39.5 | 30 | 30 | 315 | 315 | 315 | 315 |
| **WH18LMKDS** | 18 | M22 x 1.5 | 4.5 | 21.0 | 21.5 | 45.0 | 32 | 30 | 315 | 315 | 315 | 315 |
| **WH22LMKDS** | 22 | M26 x 1.5 | 3.5 | 27.5 | 24.0 | 53.0 | 41 | 36 | 160 | 160 | 160 | 160 |
| **WH28LMKDS** | 28 | M33 x 2 | 3.5 | 32.0 | 30.5 | 66.0 | 50 | 46 | 160 | 160 | 160 | 160 |
| **WH35LMKDS** | 35 | M42 x 2 | 3.5 | 36.0 | 35.5 | 76.0 | 60 | 55 | 160 | 160 | 160 | 160 |
| **WH42LMKDS** | 42 | M48 x 2 | 3.5 | 40.5 | 40.5 | 87.0 | 70 | 60 | 160 | 160 | 160 | 160 |
| **WH06SMKDS** | 6 | M12 x 1.5 | 3.0 | 16.5 | 14.0 | 30.0 | 22 | 19 | 400 | 400 | 400 | 400 |
| **WH08SMKDS** | 8 | M14 x 1.5 | 3.0 | 16.5 | 14.0 | 30.0 | 22 | 19 | 400 | 400 | 400 | 400 |
| **WH10SMKDS** | 10 | M16 x 1.5 | 3.0 | 18.5 | 16.5 | 36.0 | 27 | 24 | 400 | 400 | 400 | 400 |
| **WH12SMKDS** | 12 | M18 x 1.5 | 3.0 | 20.0 | 18.5 | 39.5 | 27 | 27 | 400 | 400 | 400 | 400 |
| **WH14SMKDS** | 14 | M20 x 1.5 | 3.0 | 22.5 | 20.0 | 43.5 | 32 | 30 | 400 | 400 | 400 | 400 |
| **WH16SMKDS** | 16 | M22 x 1.5 | 4.5 | 22.0 | 21.5 | 45.0 | 32 | 30 | 315 | 315 | 315 | 315 |
| **WH20SMKDS** | 20 | M27 x 2 | 3.5 | 26.5 | 24.0 | 53.0 | 41 | 36 | 315 | 315 | 315 | 315 |
| **WH25SMKDS** | 25 | M33 x 2 | 3.5 | 31.5 | 30.5 | 66.0 | 50 | 46 | 250 | 250 | 250 | 250 |
| **WH30SMKDS** | 30 | M42 x 2 | 3.5 | 37.0 | 35.5 | 76.0 | 60 | 55 | 160 | 160 | 160 | 160 |
| **WH38SMKDS** | 38 | M48 x 2 | 3.5 | 41.5 | 40.5 | 87.0 | 70 | 60 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: WH06ZLMKDSCF**
***Stainless Steel (71) part numbers have KD instead of KDS.**
**Example: WH06SMKD71**

Dimensions and pressures for reference only, subject to change.



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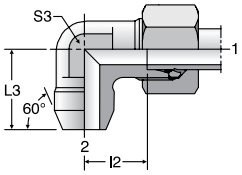
# WAS

Weld Elbow
24° Flareless / Butt Weld

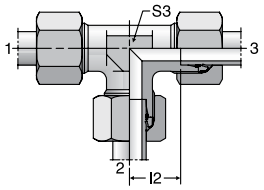



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 (mm) | l 2 (mm) | L3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **WAS06L** | 6 | 10 | 12.0 | 19 | 12 | 315 | 315 | 315 | 315 |
| **WAS08L** | 8 | 12 | 14.0 | 23 | 12 | 315 | 315 | 315 | 315 |
| **WAS10L** | 10 | 14 | 15.0 | 24 | 14 | 315 | 315 | 315 | 315 |
| **WAS12L** | 12 | 16 | 17.0 | 25 | 17 | 315 | 315 | 315 | 315 |
| **WAS15L** | 15 | 19 | 21.0 | 30 | 19 | 315 | 315 | 315 | 315 |
| **WAS18L** | 18 | 22 | 23.5 | 33 | 24 | 315 | 315 | 315 | 315 |
| **WAS22L** | 22 | 27 | 27.5 | 37 | 27 | 160 | 160 | 160 | 160 |
| **WAS28L** | 28 | 32 | 30.5 | 42 | 36 | 160 | 160 | 160 | 160 |
| **WAS35L** | 35 | 40 | 34.5 | 49 | 41 | 160 | 160 | 160 | 160 |
| **WAS42L** | 42 | 46 | 40.0 | 57 | 50 | 160 | 160 | 160 | 160 |
| **WAS06S** | 6 | 11 | 16.0 | 23 | 12 | 630 | 630 | 630 | 630 |
| **WAS08S** | 8 | 13 | 17.0 | 24 | 14 | 630 | 630 | 630 | 630 |
| **WAS10S** | 10 | 15 | 17.5 | 25 | 17 | 630 | 630 | 630 | 630 |
| **WAS12S** | 12 | 17 | 21.5 | 29 | 17 | 630 | 630 | 630 | 630 |
| **WAS14S** | 14 | 19 | 22.0 | 30 | 19 | 630 | 630 | 630 | 630 |
| **WAS16S** | 16 | 21 | 24.5 | 33 | 24 | 400 | 400 | 400 | 400 |
| **WAS20S** | 20 | 26 | 26.5 | 37 | 27 | 400 | 400 | 400 | 400 |
| **WAS25S** | 25 | 31 | 30.0 | 42 | 36 | 400 | 400 | 400 | 400 |
| **WAS30S** | 30 | 36 | 35.5 | 49 | 41 | 400 | 400 | 400 | 400 |
| **WAS38S** | 38 | 44 | 41.0 | 57 | 50 | 315 | 315 | 315 | 315 |

**Note:** Weld fitting. Omit "CF" in the part number for steel material.
**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: WAS06ZL**

# T

Union Tee
24° Flareless




| TUBE FITTING PART # | END SIZE 1 - 3 (mm) | l 2 (mm) | S3 (mm) | S3 (Only Stainless Steel) (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| ***T04LL** | 4 | 11.0 | 9 | 9 | 100 | 100 | 63 | 100 | 100 |
| ***T06LL** | 6 | 9.5 | 11 | 9 | 100 | 100 | 63 | 100 | 100 |
| ***T08LL** | 8 | 11.5 | 12 | 12 | 100 | 100 | 63 | 100 | 100 |
| ***T10LL** | 10 | 12.5 | 14 | 12 | 100 | 100 | 63 | 100 | 100 |
| **T12LL** | 12 | 15.0 | 14 | 14 | 100 | 100 | 63 | 100 | 100 |
| ***T06L** | 6 | 12.0 | 12 | 12 | 500 | 315 | 200 | 500 | 315 |
| ***T08L** | 8 | 14.0 | 14 | 12 | 500 | 315 | 200 | 500 | 315 |
| **T10L** | 10 | 15.0 | 14 | 14 | 500 | 315 | 200 | 500 | 315 |
| **T12L** | 12 | 17.0 | 17 | 17 | 400 | 315 | 200 | 400 | 315 |
| **T15L** | 15 | 21.0 | 19 | 19 | 400 | 315 | 200 | 400 | 315 |
| **T18L** | 18 | 23.5 | 24 | 24 | 400 | 315 | 200 | 400 | 315 |
| **T22L** | 22 | 27.5 | 27 | 27 | 250 | 160 | 100 | 250 | 160 |
| **T28L** | 28 | 30.5 | 36 | 36 | 250 | 160 | 100 | 250 | 160 |
| **T35L** | 35 | 34.5 | 41 | 41 | 250 | 160 | 100 | 250 | 160 |
| **T42L** | 42 | 40.0 | 50 | 50 | 250 | 160 | 100 | 250 | 160 |
| ***T06S** | 6 | 16.0 | 14 | 12 | 800 | 630 | 400 | 800 | 630 |
| **T08S** | 8 | 17.0 | 14 | 14 | 800 | 630 | 400 | 800 | 630 |
| **T10S** | 10 | 17.5 | 17 | 17 | 800 | 630 | 400 | 800 | 630 |
| **T12S** | 12 | 21.5 | 17 | 17 | 630 | 630 | 400 | 630 | 630 |
| **T14S** | 14 | 22.0 | 19 | 19 | 630 | 630 | 400 | 630 | 630 |
| **T16S** | 16 | 24.5 | 24 | 24 | 630 | 400 | 250 | 630 | 400 |
| **T20S** | 20 | 26.5 | 27 | 27 | 420 | 400 | 250 | 420 | 400 |
| **T25S** | 25 | 30.0 | 36 | 36 | 420 | 400 | 250 | 420 | 400 |
| **T30S** | 30 | 35.5 | 41 | 41 | 420 | 400 | 250 | 420 | 400 |
| **T38S** | 38 | 41.0 | 50 | 50 | 420 | 315 | 200 | 420 | 315 |

* Extruded body for steel and brass.
**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: T04ZLLCF**

Dimensions and pressures for reference only, subject to change.



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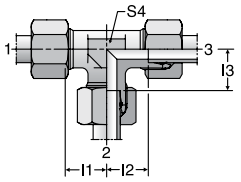
Tee-Reducer
24° Flareless




| TUBE FITTING PART # | END SIZE 1 (mm) | 2 (mm) | 3 (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | S4 (mm) | S4 (Stainless Steel) (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *TR04/08/04LL | 4 | 8 | 4 | 13.0 | 13.0 | 11.5 | 12 | 12 | 100 | 100 | 63 | 100 | 100 |
| *TR06/04/06LL | 6 | 4 | 6 | 9.5 | 9.5 | 11.0 | 11 | 9 | 100 | 100 | 63 | 100 | 100 |
| *TR06/08/06L | 6 | 8 | 6 | 14.0 | 14.0 | 14.0 | 14 | 12 | 500 | 315 | 200 | 500 | 315 |
| *TR08/06/08L | 8 | 6 | 8 | 14.0 | 14.0 | 14.0 | 14 | 12 | 500 | 315 | 200 | 500 | 315 |
| TR06/10/06L | 6 | 10 | 6 | 15.0 | 15.0 | 15.0 | 14 | 14 | 500 | 315 | 200 | 500 | 315 |
| TR08/10/08L | 8 | 10 | 8 | 15.0 | 15.0 | 15.0 | 14 | 14 | 500 | 315 | 200 | 500 | 315 |
| TR10/06/10L | 10 | 6 | 10 | 15.0 | 15.0 | 15.0 | 14 | 14 | 500 | 315 | 200 | 500 | 315 |
| TR10/08/10L | 10 | 8 | 10 | 15.0 | 15.0 | 15.0 | 14 | 14 | 500 | 315 | 200 | 500 | 315 |
| TR10/10/06L | 10 | 10 | 6 | 15.0 | 15.0 | 15.0 | 14 | 14 | 500 | 315 | 200 | 500 | 315 |
| TR08/12/08L | 8 | 12 | 8 | 17.0 | 17.0 | 17.0 | 17 | 17 | 400 | 315 | 200 | 400 | 315 |
| TR12/06/12L | 12 | 6 | 12 | 17.0 | 17.0 | 17.0 | 17 | 17 | 400 | 315 | 200 | 400 | 315 |
| TR12/08/08L | 12 | 8 | 8 | 17.0 | 17.0 | 17.0 | 17 | 17 | 400 | 315 | 200 | 400 | 315 |
| TR12/08/12L | 12 | 8 | 12 | 17.0 | 17.0 | 17.0 | 17 | 17 | 400 | 315 | 200 | 400 | 315 |
| TR12/10/10L | 12 | 10 | 10 | 17.0 | 17.0 | 17.0 | 17 | 17 | 400 | 315 | 200 | 400 | 315 |
| TR12/10/12L | 12 | 10 | 12 | 17.0 | 17.0 | 17.0 | 17 | 17 | 400 | 315 | 200 | 400 | 315 |
| TR12/12/10L | 12 | 12 | 10 | 17.0 | 17.0 | 17.0 | 17 | 17 | 400 | 315 | 200 | 400 | 315 |
| TR10/15/10L | 10 | 15 | 10 | 21.0 | 21.0 | 21.0 | 19 | 19 | 400 | 315 | 200 | 400 | 315 |
| TR12/15/12L | 12 | 15 | 12 | 21.0 | 21.0 | 21.0 | 19 | 19 | 400 | 315 | 200 | 400 | 315 |
| TR15/06/15L | 15 | 6 | 15 | 21.0 | 21.0 | 21.0 | 19 | 19 | 400 | 315 | 200 | 400 | 315 |
| TR15/10/15L | 15 | 10 | 15 | 21.0 | 21.0 | 21.0 | 19 | 19 | 400 | 315 | 200 | 400 | 315 |
| TR15/12/12L | 15 | 12 | 12 | 21.0 | 21.0 | 21.0 | 19 | 19 | 400 | 315 | 200 | 400 | 315 |
| TR15/12/15L | 15 | 12 | 15 | 21.0 | 21.0 | 21.0 | 19 | 19 | 400 | 315 | 200 | 400 | 315 |
| TR15/15/12L | 15 | 15 | 12 | 21.0 | 21.0 | 21.0 | 19 | 19 | 400 | 315 | 200 | 400 | 315 |
| TR12/18/12L | 12 | 18 | 12 | 24.0 | 24.0 | 23.5 | 24 | 24 | 400 | 315 | 200 | 400 | 315 |
| TR18/10/10L | 18 | 10 | 10 | 23.5 | 24.0 | 24.0 | 24 | 24 | 400 | 315 | 200 | 400 | 315 |
| TR18/10/18L | 18 | 10 | 18 | 23.5 | 23.5 | 24.0 | 24 | 24 | 400 | 315 | 200 | 400 | 315 |
| TR18/12/18L | 18 | 12 | 18 | 23.5 | 23.5 | 24.0 | 24 | 24 | 400 | 315 | 200 | 400 | 315 |
| TR18/15/18L | 18 | 15 | 18 | 23.5 | 23.5 | 24.0 | 24 | 24 | 400 | 315 | 200 | 400 | 315 |
| TR18/18/10L | 18 | 18 | 10 | 23.5 | 24.0 | 23.5 | 24 | 24 | 400 | 315 | 200 | 400 | 315 |
| TR22/10/22L | 22 | 10 | 22 | 27.5 | 27.5 | 28.0 | 27 | 27 | 250 | 160 | 100 | 250 | 160 |
| TR22/12/22L | 22 | 12 | 22 | 27.5 | 27.5 | 28.0 | 27 | 27 | 250 | 160 | 100 | 250 | 160 |
| TR22/15/15L | 22 | 15 | 15 | 27.5 | 28.0 | 28.0 | 27 | 27 | 250 | 160 | 100 | 250 | 160 |
| TR22/15/22L | 22 | 15 | 22 | 27.5 | 27.5 | 28.0 | 27 | 27 | 250 | 160 | 100 | 250 | 160 |
| TR22/18/18L | 22 | 18 | 18 | 27.5 | 27.5 | 27.5 | 27 | 27 | 250 | 160 | 100 | 250 | 160 |
| TR22/18/22L | 22 | 18 | 22 | 27.5 | 27.5 | 27.5 | 27 | 27 | 250 | 160 | 100 | 250 | 160 |
| TR22/22/18L | 22 | 22 | 18 | 27.5 | 27.5 | 27.5 | 27 | 27 | 250 | 160 | 100 | 250 | 160 |
| TR28/10/28L | 28 | 10 | 28 | 30.5 | 30.5 | 31.0 | 36 | 36 | 250 | 160 | 100 | 250 | 160 |
| TR28/12/28L | 28 | 12 | 28 | 30.5 | 30.5 | 31.0 | 36 | 36 | 250 | 160 | 100 | 250 | 160 |
| TR28/15/28L | 28 | 15 | 28 | 30.5 | 30.5 | 31.0 | 36 | 36 | 250 | 160 | 100 | 250 | 160 |
| TR28/18/28L | 28 | 18 | 28 | 30.5 | 30.5 | 30.5 | 36 | 36 | 250 | 160 | 100 | 250 | 160 |
| TR28/22/22L | 28 | 22 | 22 | 30.5 | 30.5 | 30.5 | 36 | 36 | 250 | 160 | 100 | 250 | 160 |
| TR28/22/28L | 28 | 22 | 28 | 30.5 | 30.5 | 30.5 | 36 | 36 | 250 | 160 | 100 | 250 | 160 |

***Extruded body for steel and brass.**

**Series S is continued on the next page.**

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: TR06/08/06ZLLCF**

Dimensions and pressures for reference only, subject to change.



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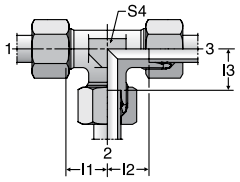
# TR

Tee-Reducer
24° Flareless



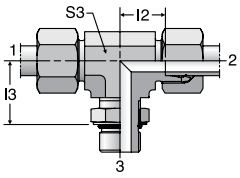

| TUBE FITTING PART # | END SIZE 1 (mm) | 2 (mm) | 3 (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | S4 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TR10/06/10S** | 10 | 6 | 10 | 17.5 | 17.5 | 18.0 | 17 | 800 | 630 | 400 | 800 | 630 |
| **TR12/08/08S** | 12 | 8 | 8 | 21.5 | 22.0 | 22.0 | 17 | 630 | 630 | 400 | 630 | 630 |
| **TR12/08/12S** | 12 | 8 | 12 | 21.5 | 21.5 | 22.0 | 17 | 630 | 630 | 400 | 630 | 630 |
| **TR12/10/12S** | 12 | 10 | 12 | 21.5 | 21.5 | 21.5 | 17 | 630 | 630 | 400 | 630 | 630 |
| **TR12/16/12S** | 12 | 16 | 12 | 25.5 | 25.5 | 24.5 | 24 | 630 | 400 | 250 | 630 | 400 |
| **TR16/06/16S** | 16 | 6 | 16 | 24.5 | 24.5 | 26.0 | 24 | 630 | 400 | 250 | 630 | 400 |
| **TR16/08/16S** | 16 | 8 | 16 | 24.5 | 24.5 | 26.0 | 24 | 630 | 400 | 250 | 630 | 400 |
| **TR16/10/16S** | 16 | 10 | 16 | 24.5 | 24.5 | 25.5 | 24 | 630 | 400 | 250 | 630 | 400 |
| **TR16/12/16S** | 16 | 12 | 16 | 24.5 | 24.5 | 25.5 | 24 | 630 | 400 | 250 | 630 | 400 |
| **TR16/20/16S** | 16 | 20 | 16 | 28.5 | 28.5 | 26.5 | 27 | 420 | 400 | 250 | 420 | 400 |
| **TR20/10/20S** | 20 | 10 | 20 | 26.5 | 26.5 | 29.5 | 27 | 420 | 400 | 250 | 420 | 400 |
| **TR20/12/20S** | 20 | 12 | 20 | 26.5 | 26.5 | 29.5 | 27 | 420 | 400 | 250 | 420 | 400 |
| **TR20/16/20S** | 20 | 16 | 20 | 26.5 | 26.5 | 28.5 | 27 | 420 | 400 | 250 | 420 | 400 |
| **TR20/25/20S** | 20 | 25 | 20 | 31.5 | 31.5 | 30.0 | 36 | 420 | 400 | 250 | 420 | 400 |
| **TR25/16/25S** | 25 | 16 | 25 | 30.0 | 30.0 | 33.5 | 36 | 420 | 400 | 250 | 420 | 400 |
| **TR25/20/25S** | 25 | 20 | 25 | 30.0 | 30.0 | 31.5 | 36 | 420 | 400 | 250 | 420 | 400 |
| **TR25/30/25S** | 25 | 30 | 25 | 37.0 | 37.0 | 35.5 | 41 | 420 | 400 | 250 | 420 | 400 |

**Series L is on the previous page.**

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: TR10/06/10ZSCF**

# TEE-UNF

Adjustable Locknut Branch Tee
24° Flareless / SAE-ORB




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | 3 UN/UNF-2A | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **TEE06L7/16UNF** | 6 | 7/16-20 | 14 | 19 | 14 | 315 | 315 | 315 | 315 |
| **TEE08L7/16UNF** | 8 | 7/16-20 | 16 | 19 | 14 | 315 | 315 | 315 | 315 |
| **TEE10L9/16UNF** | 10 | 9/16-18 | 17 | 24 | 19 | 315 | 315 | 315 | 315 |
| **TEE12L9/16UNF** | 12 | 9/16-18 | 19 | 25 | 19 | 315 | 315 | 315 | 315 |
| **TEE12L3/4UNF** | 12 | 3/4-16 | 19 | 25 | 19 | 315 | 315 | 315 | 315 |
| **TEE15L3/4UNF** | 15 | 3/4-16 | 21 | 28 | 22 | 315 | 315 | 315 | 315 |
| **TEE15L7/8UNF** | 15 | 7/8-14 | 21 | 28 | 22 | 315 | 315 | 315 | 315 |
| **TEE18L7/8UNF** | 18 | 7/8-14 | 24 | 32 | 27 | 315 | 315 | 315 | 315 |
| **TEE18L11/16UN** | 18 | 1 1/16-12 | 24 | 32 | 30 | 315 | 315 | 315 | 315 |
| **TEE22L11/16UN** | 22 | 1 1/16-12 | 28 | 35 | 30 | 160 | 160 | 160 | 160 |
| **TEE28L15/16UN** | 28 | 1 5/16-12 | 31 | 42 | 36 | 160 | 160 | 160 | 160 |
| **TEE35L15/8UN** | 35 | 1 5/8-12 | 38 | 46 | 50 | 160 | 160 | 160 | 160 |
| **TEE42L17/8UN** | 42 | 1 7/8-12 | 38 | 47 | 50 | 160 | 160 | 160 | 160 |
| **TEE06S7/16UNF** | 6 | 7/16-20 | 15 | 20 | 14 | 400 | 400 | 400 | 400 |
| **TEE08S9/16UNF** | 8 | 9/16-18 | 17 | 25 | 19 | 400 | 400 | 400 | 400 |
| **TEE10S9/16UNF** | 10 | 9/16-18 | 18 | 26 | 19 | 400 | 400 | 400 | 400 |
| **TEE12S3/4UNF** | 12 | 3/4-16 | 22 | 30 | 22 | 400 | 400 | 400 | 400 |
| **TEE16S7/8UNF** | 16 | 7/8-14 | 25 | 34 | 27 | 400 | 400 | 400 | 400 |
| **TEE20S11/16UN** | 20 | 1 1/16-12 | 28 | 37 | 30 | 400 | 400 | 400 | 400 |
| **TEE25S11/16UN** | 25 | 1 1/16-12 | 30 | 50 | 36 | 400 | 400 | 400 | 400 |
| **TEE30S15/8UN** | 30 | 1 5/8-12 | 36 | 50 | 50 | 250 | 250 | 250 | 250 |
| **TEE38S17/8UN** | 38 | 1 7/8-12 | 34 | 51 | 50 | 250 | 250 | 250 | 250 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: TEE06ZL7/16UNFCF**

Dimensions and pressures for reference only, subject to change.



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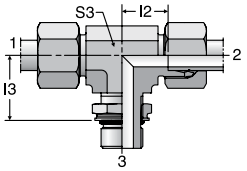
# TEE-OR

Adjustable Locknut Branch Tee
24° Flareless / Metric ISO 6149

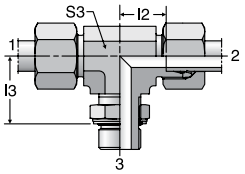



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 Metric | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **TEE06LMOR** | 6 | M10x1 | 14 | 20 | 14 | 315 | 315 | 315 | 315 |
| **TEE08LMOR** | 8 | M12x1.5 | 16 | 22 | 14 | 315 | 315 | 315 | 315 |
| **TEE10LMOR** | 10 | M14x1.5 | 17 | 25 | 19 | 315 | 315 | 315 | 315 |
| **TEE12LMOR** | 12 | M16x1.5 | 19 | 26 | 19 | 315 | 315 | 315 | 315 |
| **TEE15LMOR** | 15 | M18x1.5 | 21 | 30 | 22 | 315 | 315 | 315 | 315 |
| **TEE18LMOR** | 18 | M22x1.5 | 24 | 33 | 27 | 315 | 315 | 315 | 315 |
| **TEE22LM27X2OR** | 22 | M27x2 | 28 | 35 | 30 | 160 | 160 | 160 | 160 |
| **TEE28LMOR** | 28 | M33x2 | 31 | 38 | 36 | 160 | 160 | 160 | 160 |
| **TEE35LMOR** | 35 | M42x2 | 38 | 48 | 50 | 160 | 160 | 160 | 160 |
| **TEE42LMOR** | 42 | M48x2 | 38 | 49 | 50 | 160 | 160 | 160 | 160 |
| **TEE06SMOR** | 6 | M12x1.5 | 15 | 22 | 14 | 400 | 400 | 400 | 400 |
| **TEE08SMOR** | 8 | M14x1.5 | 17 | 26 | 19 | 400 | 400 | 400 | 400 |
| **TEE10SMOR** | 10 | M16x1.5 | 18 | 27 | 19 | 400 | 400 | 400 | 400 |
| **TEE12SMOR** | 12 | M18x1.5 | 22 | 31 | 22 | 400 | 400 | 400 | 400 |
| **TEE16SMOR** | 16 | M22x1.5 | 25 | 35 | 27 | 400 | 400 | 400 | 400 |
| **TEE20SMOR** | 20 | M27x2 | 28 | 39 | 30 | 400 | 400 | 400 | 400 |
| **TEE25SMOR** | 25 | M33x2 | 30 | 44 | 36 | 315 | 315 | 315 | 315 |
| **TEE30SMOR** | 30 | M42x2 | 36 | 51 | 50 | 250 | 250 | 250 | 250 |
| **TEE38SMOR** | 38 | M48x2 | 34 | 54 | 50 | 200 | 200 | 200 | 200 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: TR06ZLMORCF**

# TEE-R

Adjustable Locknut Branch Tee
24° Flareless / BSPP ORR




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 BSPP | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **TEE06LR** | 6 | G 1/8A | 14 | 19 | 14 | 315 | 315 | 315 | 315 |
| **TEE08LR** | 8 | G 1/4A | 16 | 23 | 14 | 315 | 315 | 315 | 315 |
| **TEE10LR** | 10 | G 1/4A | 17 | 25 | 19 | 315 | 315 | 315 | 315 |
| **TEE12LR** | 12 | G 3/8A | 19 | 28 | 19 | 250 | 250 | 250 | 250 |
| **TEE15LR** | 15 | G 1/2A | 21 | 30 | 22 | 250 | 250 | 250 | 250 |
| **TEE18LR** | 18 | G 1/2A | 24 | 36 | 27 | 250 | 250 | 250 | 250 |
| **TEE22LR** | 22 | G 3/4A | 28 | 36 | 30 | 160 | 160 | 160 | 160 |
| **TEE28LR** | 28 | G 1A | 31 | 44 | 36 | 160 | 160 | 160 | 160 |
| **TEE35LR** | 35 | G 1 1/4A | 38 | 50 | 50 | 160 | 160 | 160 | 160 |
| **TEE42LR** | 42 | G 1 1/2A | 38 | 52 | 50 | 160 | 160 | 160 | 160 |
| **TEE06SR** | 6 | G 1/4A | 15 | 23 | 14 | 315 | 315 | 315 | 315 |
| **TEE08SR** | 8 | G 1/4A | 17 | 27 | 19 | 315 | 315 | 315 | 315 |
| **TEE10SR** | 10 | G 3/8A | 18 | 29 | 19 | 250 | 250 | 250 | 250 |
| **TEE12SR** | 12 | G 3/8A | 22 | 29 | 22 | 250 | 250 | 250 | 250 |
| **TEE16SR** | 16 | G 1/2A | 25 | 36 | 27 | 250 | 250 | 250 | 250 |
| **TEE20SR** | 20 | G 3/4A | 28 | 39 | 30 | 250 | 250 | 250 | 250 |
| **TEE25SR** | 25 | G 1A | 30 | 44 | 36 | 250 | 250 | 250 | 250 |
| **TEE30SR** | 30 | G 1 1/4A | 36 | 49 | 50 | 160 | 160 | 160 | 160 |
| **TEE38SR** | 38 | G 1 1/2A | 34 | 55 | 50 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: TEE06ZLRCF**

Dimensions and pressures for reference only, subject to change.



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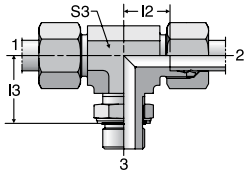
# TEE-M

Adjustable Locknut Branch Tee
24° Flareless / Metric ORR

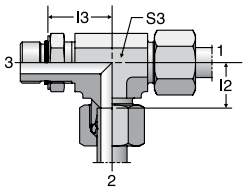



| TUBE FITTING PART # | END SIZE 1&2 (mm) | END SIZE 3 Metric | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **TEE06LM** | 6 | M10x1 | 14 | 20 | 14 | 315 | 315 | 315 | 315 |
| **TEE08LM** | 8 | M12x1.5 | 16 | 22 | 14 | 315 | 315 | 315 | 315 |
| **TEE10LM** | 10 | M14x1.5 | 17 | 25 | 19 | 315 | 315 | 315 | 315 |
| **TEE12LM** | 12 | M16x1.5 | 19 | 26 | 19 | 315 | 315 | 315 | 315 |
| **TEE15LM** | 15 | M18x1.5 | 21 | 30 | 22 | 315 | 315 | 315 | 315 |
| **TEE18LM** | 18 | M22x1.5 | 24 | 33 | 27 | 250 | 250 | 250 | 250 |
| **TEE22LM27X2** | 22 | M27x2 | 28 | 35 | 30 | 160 | 160 | 160 | 160 |
| **TEE28LM** | 28 | M33x2 | 31 | 38 | 36 | 160 | 160 | 160 | 160 |
| **TEE35LM** | 35 | M42x2 | 38 | 48 | 50 | 160 | 160 | 160 | 160 |
| **TEE42LM** | 42 | M48x2 | 38 | 49 | 50 | 160 | 160 | 160 | 160 |
| **TEE06SM** | 6 | M12x1.5 | 15 | 22 | 14 | 315 | 315 | 315 | 315 |
| **TEE08SM** | 8 | M14x1.5 | 17 | 26 | 19 | 315 | 315 | 315 | 315 |
| **TEE10SM** | 10 | M16x1.5 | 18 | 27 | 19 | 315 | 315 | 315 | 315 |
| **TEE12SM** | 12 | M18x1.5 | 22 | 31 | 22 | 315 | 315 | 315 | 315 |
| **TEE16SM** | 16 | M22x1.5 | 25 | 35 | 27 | 250 | 250 | 250 | 250 |
| **TEE20SM** | 20 | M27x2 | 28 | 39 | 30 | 250 | 250 | 250 | 250 |
| **TEE25SM** | 25 | M33x2 | 30 | 44 | 36 | 160 | 160 | 160 | 160 |
| **TEE30SM** | 30 | M42x2 | 36 | 51 | 50 | 160 | 160 | 160 | 160 |
| **TEE38SM** | 38 | M48x2 | 34 | 54 | 50 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: TEE06ZLMCF**

# LEE-UNF

Adjustable Locknut Run Tee
24° Flareless / SAE-ORB




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 UN/UNF-2A | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **LEE06L7/16UNF** | 6 | 7/16-20 | 14 | 19 | 14 | 315 | 315 | 315 | 315 |
| **LEE08L7/16UNF** | 8 | 7/16-20 | 16 | 19 | 14 | 315 | 315 | 315 | 315 |
| **LEE10L9/16UNF** | 10 | 9/16-18 | 17 | 24 | 19 | 315 | 315 | 315 | 315 |
| **LEE12L9/16UNF** | 12 | 9/16-18 | 19 | 25 | 19 | 315 | 315 | 315 | 315 |
| **LEE12L3/4UNF** | 12 | 3/4-16 | 19 | 25 | 19 | 315 | 315 | 315 | 315 |
| **LEE15L3/4UNF** | 15 | 3/4-16 | 21 | 28 | 22 | 315 | 315 | 315 | 315 |
| **LEE15L7/8UNF** | 15 | 7/8-14 | 21 | 28 | 22 | 315 | 315 | 315 | 315 |
| **LEE18L7/8UNF** | 18 | 7/8-14 | 24 | 32 | 27 | 315 | 315 | 315 | 315 |
| **LEE18L11/16UN** | 18 | 1 1/16-12 | 24 | 32 | 30 | 315 | 315 | 315 | 315 |
| **LEE22L11/16UN** | 22 | 1 1/16-12 | 28 | 35 | 30 | 160 | 160 | 160 | 160 |
| **LEE28L15/16UN** | 28 | 1 5/16-12 | 31 | 42 | 36 | 160 | 160 | 160 | 160 |
| **LEE35L15/8UN** | 35 | 1 5/8-12 | 38 | 46 | 50 | 160 | 160 | 160 | 160 |
| **LEE42L17/8UN** | 42 | 1 7/8-12 | 38 | 47 | 50 | 160 | 160 | 160 | 160 |
| **LEE06S7/16UNF** | 6 | 7/16-20 | 15 | 20 | 14 | 400 | 400 | 400 | 400 |
| **LEE08S9/16UNF** | 8 | 9/16-18 | 17 | 25 | 19 | 400 | 400 | 400 | 400 |
| **LEE10S9/16UNF** | 10 | 9/16-18 | 18 | 26 | 19 | 400 | 400 | 400 | 400 |
| **LEE12S3/4UNF** | 12 | 3/4-16 | 22 | 30 | 22 | 400 | 400 | 400 | 400 |
| **LEE16S7/8UNF** | 16 | 7/8-14 | 25 | 34 | 27 | 400 | 400 | 400 | 400 |
| **LEE20S11/16UN** | 20 | 1 1/16-12 | 28 | 37 | 30 | 400 | 400 | 400 | 400 |
| **LEE25S11/16UN** | 25 | 1 1/16-12 | 30 | 50 | 36 | 400 | 400 | 400 | 400 |
| **LEE30S15/8UN** | 30 | 1 5/8-12 | 36 | 50 | 50 | 250 | 250 | 250 | 250 |
| **LEE38S17/8UN** | 38 | 1 7/8-12 | 34 | 51 | 50 | 250 | 250 | 250 | 250 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: LEE06ZL7/16UNFCF**

Dimensions and pressures for reference only, subject to change.



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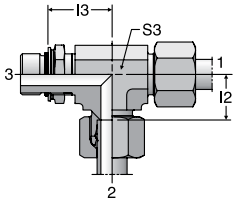
# LEE-OR

Adjustable Locknut Run Tee
24° Flareless / Metric ISO 6149

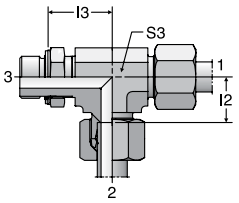



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 Metric | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| LEE06LMOR | 6 | M10 x 1 | 14 | 20 | 14 | 315 | 315 | 315 | 315 |
| LEE08LMOR | 8 | M12 x 1.5 | 16 | 22 | 14 | 315 | 315 | 315 | 315 |
| LEE10LMOR | 10 | M14 x 1.5 | 17 | 25 | 19 | 315 | 315 | 315 | 315 |
| LEE12LMOR | 12 | M16 x 1.5 | 19 | 26 | 19 | 315 | 315 | 315 | 315 |
| LEE15LMOR | 15 | M18 x 1.5 | 21 | 30 | 22 | 315 | 315 | 315 | 315 |
| LEE18LMOR | 18 | M22 x 1.5 | 24 | 33 | 27 | 315 | 315 | 315 | 315 |
| LEE22LM27x2OR | 22 | M27 x 2 | 28 | 35 | 30 | 160 | 160 | 160 | 160 |
| LEE28LMOR | 28 | M33 x 2 | 31 | 38 | 36 | 160 | 160 | 160 | 160 |
| LEE35LMOR | 35 | M42 x 2 | 38 | 48 | 50 | 160 | 160 | 160 | 160 |
| LEE42LMOR | 42 | M48 x 2 | 38 | 49 | 50 | 160 | 160 | 160 | 160 |
| LEE06SMOR | 6 | M12 x 1.5 | 15 | 22 | 14 | 400 | 400 | 400 | 400 |
| LEE08SMOR | 8 | M14 x 1.5 | 17 | 26 | 19 | 400 | 400 | 400 | 400 |
| LEE10SMOR | 10 | M16 x 1.5 | 18 | 27 | 19 | 400 | 400 | 400 | 400 |
| LEE12SMOR | 12 | M18 x 1.5 | 22 | 31 | 22 | 400 | 400 | 400 | 400 |
| LEE16SMOR | 16 | M22 x 1.5 | 25 | 35 | 27 | 400 | 400 | 400 | 400 |
| LEE20SMOR | 20 | M27 x 2 | 28 | 35 | 30 | 400 | 400 | 400 | 400 |
| LEE25SMOR | 25 | M33 x 2 | 30 | 44 | 36 | 315 | 315 | 315 | 315 |
| LEE30SMOR | 30 | M42 x 2 | 36 | 51 | 50 | 250 | 250 | 250 | 250 |
| LEE38SMOR | 38 | M48 x 2 | 34 | 54 | 50 | 200 | 200 | 200 | 200 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: LEE06ZLMORCF**

# LEE-R

Adjustable Locknut Run Tee
24° Flareless / BSPP ORR

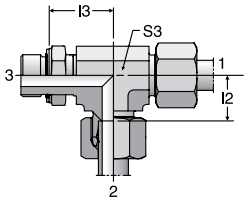



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 BSPP | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| LEE06LR | 6 | G 1/8A | 14 | 19 | 14 | 315 | 315 | 315 | 315 |
| LEE08LR | 8 | G 1/4A | 16 | 23 | 14 | 315 | 315 | 315 | 315 |
| LEE10LR | 10 | G 1/4A | 17 | 25 | 19 | 315 | 315 | 315 | 315 |
| LEE12LR | 12 | G 3/8A | 19 | 28 | 19 | 250 | 250 | 250 | 250 |
| LEE15LR | 15 | G 1/2A | 21 | 30 | 22 | 250 | 250 | 250 | 250 |
| LEE18LR | 18 | G 1/2A | 24 | 36 | 27 | 250 | 250 | 250 | 250 |
| LEE22LR | 22 | G 3/4A | 28 | 36 | 30 | 160 | 160 | 160 | 160 |
| LEE28LR | 28 | G 1A | 31 | 44 | 36 | 160 | 160 | 160 | 160 |
| LEE35LR | 35 | G 1 1/4A | 38 | 50 | 50 | 160 | 160 | 160 | 160 |
| LEE42LR | 42 | G 1 1/2A | 38 | 52 | 50 | 160 | 160 | 160 | 160 |
| LEE06SR | 6 | G 1/4A | 15 | 23 | 14 | 315 | 315 | 315 | 315 |
| LEE08SR | 8 | G 1/4A | 17 | 27 | 19 | 315 | 315 | 315 | 315 |
| LEE10SR | 10 | G 3/8A | 18 | 29 | 19 | 250 | 250 | 250 | 250 |
| LEE12SR | 12 | G 3/8A | 22 | 29 | 22 | 250 | 250 | 250 | 250 |
| LEE16SR | 16 | G 1/2A | 25 | 36 | 27 | 250 | 250 | 250 | 250 |
| LEE20SR | 20 | G 3/4A | 28 | 39 | 30 | 250 | 250 | 250 | 250 |
| LEE25SR | 25 | G 1A | 30 | 44 | 36 | 250 | 250 | 250 | 250 |
| LEE30SR | 30 | G 1 1/4A | 36 | 49 | 50 | 160 | 160 | 160 | 160 |
| LEE38SR | 38 | G 1 1/2A | 34 | 55 | 50 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: LEE06ZLRCF**

# LEE-M

Adjustable Locknut Run Tee
24° Flareless / Metric ORR




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 Metric | l 2 (mm) | l 3 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| LEE06LM | 6 | M10 x 1 | 14 | 20 | 14 | 315 | 315 | 315 | 315 |
| LEE08LM | 8 | M12 x 1.5 | 16 | 22 | 14 | 315 | 315 | 315 | 315 |
| LEE10LM | 10 | M14 x 1.5 | 17 | 25 | 19 | 315 | 315 | 315 | 315 |
| LEE12LM | 12 | M16 x 1.5 | 19 | 26 | 19 | 315 | 315 | 315 | 315 |
| LEE15LM | 15 | M18 x 1.5 | 21 | 30 | 22 | 315 | 315 | 315 | 315 |
| LEE18LM | 18 | M22 x 1.5 | 24 | 33 | 27 | 250 | 250 | 250 | 250 |
| LEE22LM27X2 | 22 | M27 x 2 | 28 | 35 | 30 | 160 | 160 | 160 | 160 |
| LEE28LM | 28 | M33 x 2 | 31 | 38 | 36 | 160 | 160 | 160 | 160 |
| LEE35LM | 35 | M42 x 2 | 38 | 48 | 50 | 160 | 160 | 160 | 160 |
| LEE42LM | 42 | M48 x 2 | 38 | 49 | 50 | 160 | 160 | 160 | 160 |
| LEE06SM | 6 | M12 x 1.5 | 15 | 22 | 14 | 315 | 315 | 315 | 315 |
| LEE08SM | 8 | M14 x 1.5 | 17 | 26 | 19 | 315 | 315 | 315 | 315 |
| LEE10SM | 10 | M16 x 1.5 | 18 | 27 | 19 | 315 | 315 | 315 | 315 |
| LEE12SM | 12 | M18 x 1.5 | 22 | 31 | 22 | 315 | 315 | 315 | 315 |
| LEE16SM | 16 | M22 x 1.5 | 25 | 35 | 27 | 250 | 250 | 250 | 250 |
| LEE20SM | 20 | M27 x 2 | 28 | 39 | 30 | 250 | 250 | 250 | 250 |
| LEE25SM | 25 | M33 x 2 | 30 | 44 | 36 | 160 | 160 | 160 | 160 |
| LEE30SM | 30 | M42 x 2 | 36 | 51 | 50 | 160 | 160 | 160 | 160 |
| LEE38SM | 38 | M48 x 2 | 34 | 54 | 50 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: LEE06ZLMCF**

Dimensions and pressures for reference only, subject to change.



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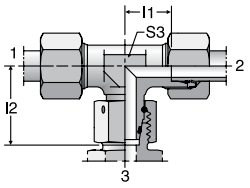
# ET

Swivel Nut Branch Tee
24° Flareless / 24° Flareless /
Flareless Swivel

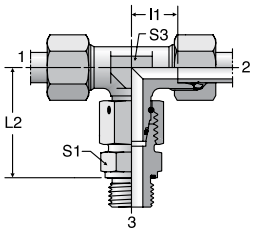



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 Metric | l 1 (mm) | l 2 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **ET06L** | 6 | M12 x 1.5 | 12.0 | 26.0 | 12 | 500 | 315 | 500 | 315 |
| **ET08L** | 8 | M14 x 1.5 | 14.0 | 27.5 | 12 | 500 | 315 | 500 | 315 |
| **ET10L** | 10 | M16 x 1.5 | 15.0 | 29.0 | 14 | 500 | 315 | 500 | 315 |
| **ET12L** | 12 | M18 x 1.5 | 17.0 | 29.5 | 17 | 400 | 315 | 400 | 315 |
| **ET15L** | 15 | M22 x 1.5 | 21.0 | 32.5 | 19 | 400 | 315 | 400 | 315 |
| **ET18L** | 18 | M26 x 1.5 | 23.5 | 35.5 | 24 | 400 | 315 | 400 | 315 |
| **ET22L** | 22 | M30 x 2 | 27.5 | 38.5 | 27 | 250 | 160 | 250 | 160 |
| **ET28L** | 28 | M36 x 2 | 30.5 | 41.5 | 36 | 250 | 160 | 250 | 160 |
| **ET35L** | 35 | M45 x 2 | 34.5 | 51.0 | 41 | 250 | 160 | 250 | 160 |
| **ET42L** | 42 | M52 x 2 | 40.0 | 56.0 | 50 | 250 | 160 | 250 | 160 |
| **ET06S** | 6 | M14 x 1.5 | 16.0 | 27.0 | 12 | 800 | 630 | 800 | 630 |
| **ET08S** | 8 | M16 x 1.5 | 17.0 | 27.5 | 14 | 800 | 630 | 800 | 630 |
| **ET10S** | 10 | M18 x 1.5 | 17.5 | 30.0 | 17 | 800 | 630 | 800 | 630 |
| **ET12S** | 12 | M20 x 1.5 | 21.5 | 31.0 | 17 | 630 | 630 | 630 | 630 |
| **ET14S** | 14 | M22 x 1.5 | 22.0 | 35.0 | 19 | 630 | 630 | 630 | 630 |
| **ET16S** | 16 | M24 x 1.5 | 24.5 | 36.5 | 24 | 630 | 400 | 630 | 400 |
| **ET20S** | 20 | M30 x 2 | 26.5 | 44.5 | 27 | 420 | 400 | 420 | 400 |
| **ET25S** | 25 | M36 x 2 | 30.0 | 50.0 | 36 | 420 | 400 | 420 | 400 |
| **ET30S** | 30 | M42 x 2 | 35.5 | 55.0 | 41 | 420 | 400 | 420 | 400 |
| **ET38S** | 38 | M52 x 2 | 41.0 | 63.0 | 50 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: ET06ZLCF**

# ET-R-ED

Assembled Adjustable Swivel Branch Tee
24° Flareless / 24° Flareless /
BSPP with EOlastic Seal




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 BSPP | l 1 (mm) | L2 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| **ET06LRED** | 6 | G 1/8 A | 12.0 | 34.5 | 14 | 12 | 500 | 315 | 500 | 315 |
| **ET08LRED** | 8 | G 1/4 A | 14.0 | 37.5 | 19 | 12 | 500 | 315 | 500 | 315 |
| **ET10LRED** | 10 | G 1/4 A | 15.0 | 40.0 | 19 | 14 | 500 | 315 | 500 | 315 |
| **ET12LRED** | 12 | G 3/8 A | 17.0 | 42.0 | 22 | 17 | 400 | 315 | 400 | 315 |
| **ET15LRED** | 15 | G 1/2 A | 21.0 | 46.5 | 27 | 19 | 400 | 315 | 400 | 315 |
| **ET18LRED** | 18 | G 1/2 A | 23.5 | 50.0 | 27 | 24 | 400 | 315 | 400 | 315 |
| **ET22LRED** | 22 | G 3/4 A | 27.5 | 55.0 | 32 | 27 | 250 | 160 | 250 | 160 |
| **ET28LRED** | 28 | G 1A | 30.5 | 59.0 | 41 | 36 | 250 | 160 | 250 | 160 |
| **ET35LRED** | 35 | G 1 1/4 A | 34.5 | 68.5 | 50 | 41 | 250 | 160 | 250 | 160 |
| **ET42LRED** | 42 | G 1 1/2 A | 40.0 | 75.0 | 55 | 50 | 250 | 160 | 250 | 160 |
| **ET06SRED** | 6 | G 1/4 A | 16.0 | 40.0 | 19 | 12 | 800 | 630 | 800 | 630 |
| **ET08SRED** | 8 | G 1/4 A | 17.0 | 42.5 | 19 | 14 | 800 | 630 | 800 | 630 |
| **ET10SRED** | 10 | G 3/8 A | 17.5 | 45.0 | 22 | 17 | 800 | 630 | 800 | 630 |
| **ET12SRED** | 12 | G 3/8 A | 21.5 | 48.0 | 22 | 17 | 630 | 630 | 630 | 630 |
| **ET14SRED** | 14 | G 1/2 A | 22.0 | 54.0 | 27 | 19 | 630 | 630 | 630 | 630 |
| **ET16SRED** | 16 | G 1/2 A | 24.5 | 55.0 | 27 | 24 | 630 | 400 | 630 | 400 |
| **ET20SRED** | 20 | G 3/4 A | 26.5 | 65.0 | 32 | 27 | 420 | 400 | 420 | 400 |
| **ET25SRED** | 25 | G 1A | 30.0 | 73.0 | 41 | 36 | 420 | 400 | 420 | 400 |
| **ET30SRED** | 30 | G 1 1/4 A | 35.5 | 78.5 | 50 | 41 | 420 | 400 | 420 | 400 |
| **ET38SRED** | 38 | G 1 1/2 A | 41.0 | 89.0 | 55 | 50 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: ET06ZLREDCF**

Dimensions and pressures for reference only, subject to change.



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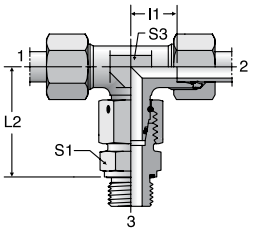
# ET-M-ED

Assembled Adjustable Swivel Branch Tee
24° Flareless / 24° Flareless /
Metric Parallel with EOlastic Seal

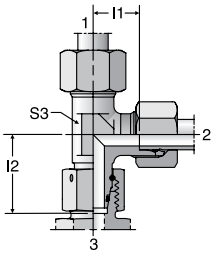



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 Metric | I 1 (mm) | L2 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| **ET06LMED** | 6 | M10 x 1 | 12.0 | 34.5 | 14 | 12 | 500 | 315 | 500 | 315 |
| **ET08LMED** | 8 | M12 x 1.5 | 14.0 | 37.5 | 17 | 12 | 500 | 315 | 500 | 315 |
| **ET10LMED** | 10 | M14 x 1.5 | 15.0 | 40.0 | 19 | 14 | 500 | 315 | 500 | 315 |
| **ET12LMED** | 12 | M16 x 1.5 | 17.0 | 42.0 | 22 | 17 | 400 | 315 | 400 | 315 |
| **ET15LMED** | 15 | M18 x 1.5 | 21.0 | 46.0 | 24 | 19 | 400 | 315 | 400 | 315 |
| **ET18LMED** | 18 | M22 x 1.5 | 23.5 | 50.0 | 27 | 24 | 400 | 315 | 400 | 315 |
| **ET22LMED** | 22 | M26 x 1.5 | 27.5 | 55.0 | 32 | 27 | 250 | 160 | 250 | 160 |
| **ET28LMED** | 28 | M33 x 2 | 30.5 | 59.0 | 41 | 36 | 250 | 160 | 250 | 160 |
| **ET35LMED** | 35 | M42 x 2 | 34.5 | 68.5 | 50 | 41 | 250 | 160 | 250 | 160 |
| **ET42LMED** | 42 | M48 x 2 | 40.0 | 75.0 | 55 | 50 | 250 | 160 | 250 | 160 |
| **ET06SMED** | 6 | M12 x 1.5 | 16.0 | 40.0 | 17 | 12 | 800 | 630 | 800 | 630 |
| **ET08SMED** | 8 | M14 x 1.5 | 17.0 | 42.5 | 19 | 14 | 800 | 630 | 800 | 630 |
| **ET10SMED** | 10 | M16 x 1.5 | 17.5 | 45.0 | 22 | 17 | 800 | 630 | 800 | 630 |
| **ET12SMED** | 12 | M18 x 1.5 | 21.5 | 48.0 | 24 | 17 | 630 | 630 | 630 | 630 |
| **ET14SMED** | 14 | M20 x 1.5 | 22.0 | 54.0 | 27 | 19 | 630 | 630 | 630 | 630 |
| **ET16SMED** | 16 | M22 x 1.5 | 24.5 | 55.0 | 27 | 24 | 630 | 400 | 630 | 400 |
| **ET20SMED** | 20 | M27 x 2 | 26.5 | 65.0 | 32 | 27 | 420 | 400 | 420 | 400 |
| **ET25SMED** | 25 | M33 x 2 | 30.0 | 73.0 | 41 | 36 | 420 | 400 | 420 | 400 |
| **ET30SMED** | 30 | M42 x 2 | 35.5 | 78.5 | 50 | 41 | 420 | 400 | 420 | 400 |
| **ET38SMED** | 38 | M48 x 2 | 41.0 | 89.0 | 55 | 50 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: ET06ZLMEDCF**

# EL

Swivel Nut Run Tee
24° Flareless / Flareless Swivel




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 Metric | I 1 (mm) | I 2 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|
| **EL06L** | 6 | M12 x 1.5 | 12.0 | 26.0 | 12 | 500 | 315 | 500 | 315 |
| **EL08L** | 8 | M14 x 1.5 | 14.0 | 27.5 | 12 | 500 | 315 | 500 | 315 |
| **EL10L** | 10 | M16 x 1.5 | 15.0 | 29.0 | 14 | 500 | 315 | 500 | 315 |
| **EL12L** | 12 | M18 x 1.5 | 17.0 | 29.5 | 17 | 400 | 315 | 400 | 315 |
| **EL15L** | 15 | M22 x 1.5 | 21.0 | 32.5 | 19 | 400 | 315 | 400 | 315 |
| **EL18L** | 18 | M26 x 1.5 | 23.5 | 35.5 | 24 | 400 | 315 | 400 | 315 |
| **EL22L** | 22 | M30 x 2 | 27.5 | 38.5 | 27 | 250 | 160 | 250 | 160 |
| **EL28L** | 28 | M36 x 2 | 30.5 | 41.5 | 36 | 250 | 160 | 250 | 160 |
| **EL35L** | 35 | M45 x 2 | 34.5 | 51.0 | 41 | 250 | 160 | 250 | 160 |
| **EL42L** | 42 | M52 x 2 | 40.0 | 56.0 | 50 | 250 | 160 | 250 | 160 |
| **EL06S** | 6 | M14 x 1.5 | 16.0 | 27.0 | 12 | 800 | 630 | 800 | 630 |
| **EL08S** | 8 | M16 x 1.5 | 17.0 | 27.5 | 14 | 800 | 630 | 800 | 630 |
| **EL10S** | 10 | M18 x 1.5 | 17.5 | 30.0 | 17 | 800 | 630 | 800 | 630 |
| **EL12S** | 12 | M20 x 1.5 | 21.5 | 31.0 | 17 | 630 | 630 | 630 | 630 |
| **EL14S** | 14 | M22 x 1.5 | 22.0 | 35.0 | 19 | 630 | 630 | 630 | 630 |
| **EL16S** | 16 | M24 x 1.5 | 24.5 | 36.5 | 24 | 630 | 400 | 630 | 400 |
| **EL20S** | 20 | M30 x 2 | 26.5 | 44.5 | 27 | 420 | 400 | 420 | 400 |
| **EL25S** | 25 | M36 x 2 | 30.0 | 50.0 | 36 | 420 | 400 | 420 | 400 |
| **EL30S** | 30 | M42 x 2 | 35.5 | 55.0 | 41 | 420 | 400 | 420 | 400 |
| **EL38S** | 38 | M52 x 2 | 41.0 | 63.0 | 50 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: EL06ZLCF**

Dimensions and pressures for reference only, subject to change.



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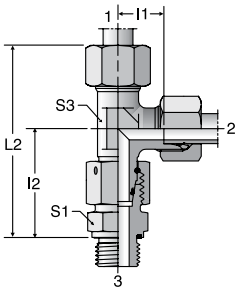
# EL-R-ED

Adjustable Assembled Swivel Run Tee
24° Flareless / BSPP with EOlastic Seal

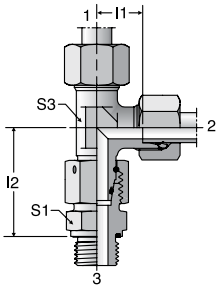



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 BSPP | l 1 (mm) | l 2 (mm) | L2 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **EL06LRED** | 6 | G 1/8 A | 12.0 | 34.5 | 61 | 14 | 12 | 500 | 315 | 500 | 315 |
| **EL08LRED** | 8 | G 1/4 A | 14.0 | 37.5 | 66 | 19 | 12 | 500 | 315 | 500 | 315 |
| **EL10LRED** | 10 | G 1/4 A | 15.0 | 40.0 | 70 | 19 | 14 | 500 | 315 | 500 | 315 |
| **EL12LRED** | 12 | G 3/8 A | 17.0 | 42.0 | 74 | 22 | 17 | 400 | 315 | 400 | 315 |
| **EL15LRED** | 15 | G 1/2 A | 21.0 | 46.5 | 83 | 27 | 19 | 400 | 315 | 400 | 315 |
| **EL18LRED** | 18 | G 1/2 A | 23.5 | 50.0 | 90 | 27 | 24 | 400 | 315 | 400 | 315 |
| **EL22LRED** | 22 | G 3/4 A | 27.5 | 55.0 | 99 | 32 | 27 | 250 | 160 | 250 | 160 |
| **EL28LRED** | 28 | G 1 A | 30.5 | 59.0 | 106 | 41 | 36 | 250 | 160 | 250 | 160 |
| **EL35LRED** | 35 | G 1 1/4 A | 34.5 | 68.5 | 125 | 50 | 41 | 250 | 160 | 250 | 160 |
| **EL42LRED** | 42 | G 1 1/2 A | 40.0 | 75.0 | 138 | 55 | 50 | 250 | 160 | 250 | 160 |
| **EL06SRED** | 6 | G 1/4 A | 16.0 | 40.0 | 71 | 19 | 12 | 800 | 630 | 800 | 630 |
| **EL08SRED** | 8 | G 1/4 A | 17.0 | 42.5 | 74 | 19 | 14 | 800 | 630 | 800 | 630 |
| **EL10SRED** | 10 | G 3/8 A | 17.5 | 45.0 | 79 | 22 | 17 | 800 | 630 | 800 | 630 |
| **EL12SRED** | 12 | G 3/8 A | 21.5 | 48.0 | 86 | 22 | 17 | 630 | 630 | 630 | 630 |
| **EL14SRED** | 14 | G 1/2 A | 22.0 | 54.0 | 94 | 27 | 19 | 630 | 630 | 630 | 630 |
| **EL16SRED** | 16 | G 1/2 A | 24.5 | 55.0 | 98 | 27 | 24 | 630 | 400 | 630 | 400 |
| **EL20SRED** | 20 | G 3/4 A | 26.5 | 65.0 | 113 | 32 | 27 | 420 | 400 | 420 | 400 |
| **EL25SRED** | 25 | G 1 A | 30.0 | 73.0 | 127 | 41 | 36 | 420 | 400 | 420 | 400 |
| **EL30SRED** | 30 | G 1 1/4 A | 35.5 | 78.5 | 141 | 50 | 41 | 420 | 400 | 420 | 400 |
| **EL38SRED** | 38 | G 1 1/2 A | 41.0 | 89.0 | 161 | 55 | 50 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: EL06ZLREDCF**

# EL-M-ED

Adjustable Assembled Swivel Run Tee
24° Flareless / Metric Parallel with EOlastic Seal




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 Metric | l 1 (mm) | l 2 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| **EL06LMED** | 6 | M10 x 1 | 12.0 | 34.5 | 14 | 12 | 500 | 315 | 500 | 315 |
| **EL08LMED** | 8 | M12 x 1.5 | 14.0 | 37.5 | 17 | 12 | 500 | 315 | 500 | 315 |
| **EL10LMED** | 10 | M14 x 1.5 | 15.0 | 40.0 | 19 | 14 | 500 | 315 | 500 | 315 |
| **EL12LMED** | 12 | M16 x 1.5 | 17.0 | 42.0 | 22 | 17 | 400 | 315 | 400 | 315 |
| **EL15LMED** | 15 | M18 x 1.5 | 21.0 | 46.0 | 24 | 19 | 400 | 315 | 400 | 315 |
| **EL18LMED** | 18 | M22 x 1.5 | 23.5 | 50.0 | 27 | 24 | 400 | 315 | 400 | 315 |
| **EL22LMED** | 22 | M26 x 1.5 | 27.5 | 55.0 | 32 | 27 | 250 | 160 | 250 | 160 |
| **EL28LMED** | 28 | M33 x 2 | 30.5 | 59.0 | 41 | 36 | 250 | 160 | 250 | 160 |
| **EL35LMED** | 35 | M42 x 2 | 34.5 | 68.5 | 50 | 41 | 250 | 160 | 250 | 160 |
| **EL42LMED** | 42 | M48 x 2 | 40.0 | 75.0 | 55 | 50 | 250 | 160 | 250 | 160 |
| **EL06SMED** | 6 | M12 x 1.5 | 16.0 | 40.0 | 17 | 12 | 800 | 630 | 800 | 630 |
| **EL08SMED** | 8 | M14 x 1.5 | 17.0 | 42.5 | 19 | 14 | 800 | 630 | 800 | 630 |
| **EL10SMED** | 10 | M16 x 1.5 | 17.5 | 45.0 | 22 | 17 | 800 | 630 | 800 | 630 |
| **EL12SMED** | 12 | M18 x 1.5 | 21.5 | 48.0 | 24 | 17 | 630 | 630 | 630 | 630 |
| **EL14SMED** | 14 | M20 x 1.5 | 22.0 | 54.0 | 27 | 19 | 630 | 630 | 630 | 630 |
| **EL16SMED** | 16 | M22 x 1.5 | 24.5 | 55.0 | 27 | 24 | 630 | 400 | 630 | 400 |
| **EL20SMED** | 20 | M27 x 2 | 26.5 | 65.0 | 32 | 27 | 420 | 400 | 420 | 400 |
| **EL25SMED** | 25 | M33 x 2 | 30.0 | 73.0 | 41 | 36 | 420 | 400 | 420 | 400 |
| **EL30SMED** | 30 | M42 x 2 | 35.5 | 78.5 | 50 | 41 | 420 | 400 | 420 | 400 |
| **EL38SMED** | 38 | M48 x 2 | 41.0 | 89.0 | 55 | 50 | 420 | 315 | 420 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: EL06ZLMEDCF**

Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
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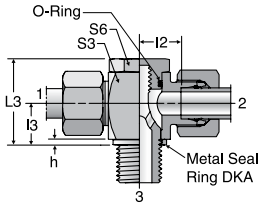
# TH-R

High Pressure Banjo Tee
24° Flareless / 24° Flareless / BSPP

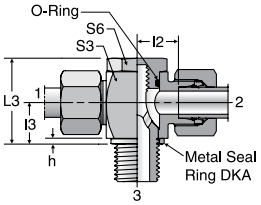



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 BSPP | h (mm) | l 2 (mm) | l 3 (mm) | L3 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TH06LR** | 6 | G 1/8 A | 2.5 | 12.0 | 10.5 | 24 | 17 | 17 | 250 | 250 | 250 | 250 |
| **TH08LR** | 8 | G 1/4 A | 3.0 | 14.5 | 14.0 | 30 | 22 | 19 | 250 | 250 | 250 | 250 |
| **TH10LR** | 10 | G 1/4 A | 3.0 | 15.5 | 14.0 | 30 | 22 | 19 | 250 | 250 | 250 | 250 |
| **TH12LR** | 12 | G 3/8 A | 3.0 | 18.0 | 16.5 | 36 | 27 | 24 | 250 | 250 | 250 | 250 |
| **TH15LR** | 15 | G 1/2 A | 4.5 | 21.5 | 21.5 | 45 | 32 | 30 | 250 | 250 | 250 | 250 |
| **TH18LR** | 18 | G 1/2 A | 4.5 | 21.0 | 21.5 | 45 | 32 | 30 | 250 | 250 | 250 | 250 |
| **TH22LR** | 22 | G 3/4 A | 3.5 | 27.5 | 24.0 | 53 | 41 | 36 | 160 | 160 | 160 | 160 |
| **TH28LR** | 28 | G 1 A | 3.5 | 32.0 | 30.5 | 66 | 50 | 46 | 160 | 160 | 160 | 160 |
| **TH35LR** | 35 | G 1 1/4 A | 3.5 | 36.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 160 | 160 |
| **TH42LR** | 42 | G 1 1/2 A | 3.5 | 40.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 160 | 160 |
| **TH06SR** | 6 | G 1/4 A | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 315 | 315 |
| **TH08SR** | 8 | G 1/4 A | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 315 | 315 |
| **TH10SR** | 10 | G 3/8 A | 3.0 | 18.5 | 16.5 | 36 | 27 | 24 | 315 | 315 | 315 | 315 |
| **TH12SR** | 12 | G 3/8 A | 3.0 | 18.5 | 16.5 | 36 | 27 | 24 | 315 | 315 | 315 | 315 |
| **TH14SR** | 14 | G 1/2 A | 4.5 | 22.5 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **TH16SR** | 16 | G 1/2 A | 4.5 | 22.0 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **TH20SR** | 20 | G 3/4 A | 3.5 | 26.5 | 24.0 | 53 | 41 | 36 | 160 | 160 | 160 | 160 |
| **TH25SR** | 25 | G 1 A | 3.5 | 31.5 | 30.5 | 66 | 50 | 46 | 160 | 160 | 160 | 160 |
| **TH30SR** | 30 | G 1 1/4 A | 3.5 | 37.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 160 | 160 |
| **TH38SR** | 38 | G 1 1/2 A | 3.5 | 41.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: TH06ZLRCF**

# TH-M

High Pressure Banjo Tee
24° Flareless / 24° Flareless / Metric Parallel




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 Metric | h (mm) | l 2 (mm) | l 3 (mm) | L3 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TH06LM** | 6 | M10 x 1 | 2.5 | 12.0 | 10.5 | 24.0 | 17 | 17 | 250 | 250 | 250 | 250 |
| **TH08LM** | 8 | M12 x 1.5 | 3.0 | 14.5 | 14.0 | 30.0 | 22 | 19 | 250 | 250 | 250 | 250 |
| **TH10LM** | 10 | M14 x 1.5 | 3.0 | 15.5 | 14.0 | 30.0 | 22 | 19 | 250 | 250 | 250 | 250 |
| **TH12LM** | 12 | M16 x 1.5 | 3.0 | 18.0 | 16.5 | 36.0 | 27 | 24 | 250 | 250 | 250 | 250 |
| **TH15LM** | 15 | M18 x 1.5 | 3.0 | 21.5 | 18.5 | 39.5 | 30 | 27 | 250 | 250 | 250 | 250 |
| **TH18LM** | 18 | M22 x 1.5 | 4.5 | 21.0 | 21.5 | 45.0 | 32 | 30 | 250 | 250 | 250 | 250 |
| **TH22LM** | 22 | M26 x 1.5 | 3.5 | 27.5 | 24.0 | 53.0 | 41 | 36 | 160 | 160 | 160 | 160 |
| **TH28LM** | 28 | M33 x 2 | 3.5 | 32.0 | 30.5 | 66.0 | 50 | 46 | 160 | 160 | 160 | 160 |
| **TH35LM** | 35 | M42 x 2 | 3.5 | 36.0 | 35.5 | 76.0 | 60 | 55 | 160 | 160 | 160 | 160 |
| **TH42LM** | 42 | M48 x 2 | 3.5 | 40.5 | 40.5 | 87.0 | 70 | 60 | 160 | 160 | 160 | 160 |
| **TH06SM** | 6 | M12 x 1.5 | 3.0 | 16.5 | 14.0 | 30.0 | 22 | 19 | 315 | 315 | 315 | 315 |
| **TH08SM** | 8 | M14 x 1.5 | 3.0 | 16.5 | 14.0 | 30.0 | 22 | 19 | 315 | 315 | 315 | 315 |
| **TH10SM** | 10 | M16 x 1.5 | 3.0 | 18.5 | 16.5 | 36.0 | 27 | 24 | 315 | 315 | 315 | 315 |
| **TH12SM** | 12 | M18 x 1.5 | 3.0 | 20.0 | 18.5 | 39.5 | 27 | 27 | 315 | 315 | 315 | 315 |
| **TH14SM** | 14 | M20 x 1.5 | 3.0 | 22.5 | 20.0 | 43.5 | 32 | 30 | 315 | 315 | 315 | 315 |
| **TH16SM** | 16 | M22 x 1.5 | 4.5 | 22.0 | 21.5 | 45.0 | 32 | 30 | 315 | 315 | 315 | 315 |
| **TH20SM** | 20 | M27 x 2 | 3.5 | 26.5 | 24.0 | 53.0 | 41 | 36 | 160 | 160 | 160 | 160 |
| **TH25SM** | 25 | M33 x 2 | 3.5 | 31.5 | 30.5 | 66.0 | 50 | 46 | 160 | 160 | 160 | 160 |
| **TH30SM** | 30 | M42 x 2 | 3.5 | 37.0 | 35.5 | 76.0 | 60 | 55 | 160 | 160 | 160 | 160 |
| **TH38SM** | 38 | M48 x 2 | 3.5 | 41.5 | 40.5 | 87.0 | 70 | 60 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: TH06ZLMCF**

Dimensions and pressures for reference only, subject to change.



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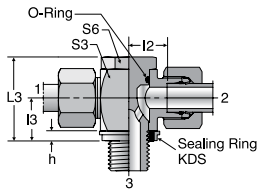
# TH-R-KDS

High Pressure Banjo Tee
24° Flareless / 24° Flareless / BSPP

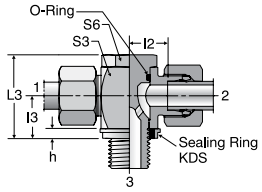



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 BSPP | h (mm) | l 2 (mm) | l 3 (mm) | L3 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TH06LRKDS** | 6 | G 1/8 A | 2.5 | 12.0 | 10.5 | 24 | 17 | 17 | 315 | 315 | 315 | 315 |
| **TH08LRKDS** | 8 | G 1/4 A | 3.0 | 14.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 315 | 315 |
| **TH10LRKDS** | 10 | G 1/4 A | 3.0 | 15.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 315 | 315 |
| **TH12LRKDS** | 12 | G 3/8 A | 3.0 | 18.0 | 16.5 | 36 | 27 | 24 | 315 | 315 | 315 | 315 |
| **TH15LRKDS** | 15 | G 1/2 A | 4.5 | 21.5 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **TH18LRKDS** | 18 | G 1/2 A | 4.5 | 21.0 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **TH22LRKDS** | 22 | G 3/4 A | 3.5 | 27.5 | 24.0 | 53 | 41 | 36 | 160 | 160 | 160 | 160 |
| **TH28LRKDS** | 28 | G 1 A | 3.5 | 32.0 | 30.5 | 66 | 50 | 46 | 160 | 160 | 160 | 160 |
| **TH35LRKDS** | 35 | G 1 1/4 A | 3.5 | 36.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 160 | 160 |
| **TH42LRKDS** | 42 | G 1 1/2 A | 3.5 | 40.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 160 | 160 |
| **TH06SRKDS** | 6 | G 1/4 A | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 400 | 400 | 400 | 400 |
| **TH08SRKDS** | 8 | G 1/4 A | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 400 | 400 | 400 | 400 |
| **TH10SRKDS** | 10 | G 3/8 A | 3.0 | 18.5 | 16.5 | 36 | 27 | 24 | 400 | 400 | 400 | 400 |
| **TH12SRKDS** | 12 | G 3/8 A | 3.0 | 18.5 | 16.5 | 36 | 27 | 24 | 400 | 400 | 400 | 400 |
| **TH14SRKDS** | 14 | G 1/2 A | 4.5 | 22.5 | 21.5 | 45 | 32 | 30 | 400 | 400 | 400 | 400 |
| **TH16SRKDS** | 16 | G 1/2 A | 4.5 | 22.0 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **TH20SRKDS** | 20 | G 3/4 A | 3.5 | 26.5 | 24.0 | 53 | 41 | 36 | 315 | 315 | 315 | 315 |
| **TH25SRKDS** | 25 | G 1 A | 3.5 | 31.5 | 30.5 | 66 | 50 | 46 | 250 | 250 | 250 | 250 |
| **TH30SRKDS** | 30 | G 1 1/4 A | 3.5 | 37.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 160 | 160 |
| **TH38SRKDS** | 38 | G 1 1/2 A | 3.5 | 41.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: TH06ZLRKDSCF**

# TH-M-KDS

High Pressure Banjo Tee
24° Flareless / 24° Flareless / Metric Parallel




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | END SIZE 3 Metric | h (mm) | l 2 (mm) | l 3 (mm) | L3 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TH06LMKDS** | 6 | M10 x 1 | 2.5 | 12.0 | 10.5 | 24 | 17 | 17 | 315 | 315 | 315 | 315 |
| **TH08LMKDS** | 8 | M12 x 1.5 | 3.0 | 14.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 315 | 315 |
| **TH10LMKDS** | 10 | M14 x 1.5 | 3.0 | 15.5 | 14.0 | 30 | 22 | 19 | 315 | 315 | 315 | 315 |
| **TH12LMKDS** | 12 | M16 x 1.5 | 3.0 | 18.0 | 16.5 | 36 | 27 | 24 | 315 | 315 | 315 | 315 |
| **TH15LMKDS** | 15 | M18 x 1.5 | 3.0 | 21.5 | 18.5 | 39.5 | 30 | 27 | 315 | 315 | 315 | 315 |
| **TH18LMKDS** | 18 | M22 x 1.5 | 4.5 | 21.0 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **TH22LMKDS** | 22 | M26 x 1.5 | 3.5 | 27.5 | 24.0 | 53 | 41 | 36 | 160 | 160 | 160 | 160 |
| **TH28LMKDS** | 28 | M33 x 2 | 3.5 | 32.0 | 30.5 | 66 | 50 | 46 | 160 | 160 | 160 | 160 |
| **TH35LMKDS** | 35 | M42 x 2 | 3.5 | 36.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 160 | 160 |
| **TH42LMKDS** | 42 | M48 x 2 | 3.5 | 40.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 160 | 160 |
| **TH06SMKDS** | 6 | M12 x 1.5 | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 400 | 400 | 400 | 400 |
| **TH08SMKDS** | 8 | M14 x 1.5 | 3.0 | 16.5 | 14.0 | 30 | 22 | 19 | 400 | 400 | 400 | 400 |
| **TH10SMKDS** | 10 | M16 x 1.5 | 3.0 | 18.5 | 16.5 | 36 | 27 | 24 | 400 | 400 | 400 | 400 |
| **TH12SMKDS** | 12 | M18 x 1.5 | 3.0 | 20.0 | 18.5 | 39.5 | 27 | 27 | 400 | 400 | 400 | 400 |
| **TH14SMKDS** | 14 | M20 x 1.5 | 3.0 | 22.5 | 20.0 | 43.5 | 32 | 30 | 400 | 400 | 400 | 400 |
| **TH16SMKDS** | 16 | M22 x 1.5 | 4.5 | 22.0 | 21.5 | 45 | 32 | 30 | 315 | 315 | 315 | 315 |
| **TH20SMKDS** | 20 | M27 x 2 | 3.5 | 26.5 | 24.0 | 53 | 41 | 36 | 315 | 315 | 315 | 315 |
| **TH25SMKDS** | 25 | M33 x 2 | 3.5 | 31.5 | 30.5 | 66 | 50 | 46 | 250 | 250 | 250 | 250 |
| **TH30SMKDS** | 30 | M42 x 2 | 3.5 | 37.0 | 35.5 | 76 | 60 | 55 | 160 | 160 | 160 | 160 |
| **TH38SMKDS** | 38 | M48 x 2 | 3.5 | 41.5 | 40.5 | 87 | 70 | 60 | 160 | 160 | 160 | 160 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: TH06ZLMKDSCF**

Dimensions and pressures for reference only, subject to change.



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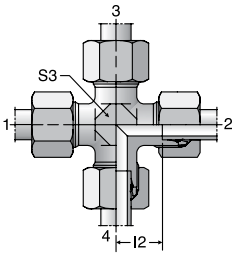
Union Cross
24° Flareless

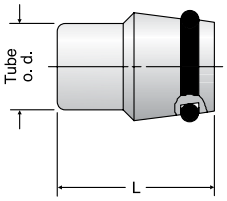



| TUBE FITTING PART # | END SIZE 1 - 4 (mm) | l 2 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|
| K04LL | 4 | 11.0 | 9 | 100 | 100 | 63 | 100 | 100 |
| K06LL | 6 | 9.5 | 9 | 100 | 100 | 63 | 100 | 100 |
| K08LL | 8 | 11.5 | 12 | 100 | 100 | 63 | 100 | 100 |
| K06L | 6 | 12.0 | 12 | 315 | 315 | 200 | 315 | 315 |
| K08L | 8 | 14.0 | 12 | 315 | 315 | 200 | 315 | 315 |
| K10L | 10 | 15.0 | 14 | 315 | 315 | 200 | 315 | 315 |
| K12L | 12 | 17.0 | 17 | 315 | 315 | 200 | 315 | 315 |
| K15L | 15 | 21.0 | 19 | 315 | 315 | 200 | 315 | 315 |
| K18L | 18 | 23.5 | 24 | 315 | 315 | 200 | 315 | 315 |
| K22L | 22 | 27.5 | 27 | 160 | 160 | 100 | 160 | 160 |
| K28L | 28 | 30.5 | 36 | 160 | 160 | 100 | 160 | 160 |
| K35L | 35 | 34.5 | 41 | 160 | 160 | 100 | 160 | 160 |
| K42L | 42 | 40.0 | 50 | 160 | 160 | 100 | 160 | 160 |
| K06S | 6 | 16.0 | 12 | 630 | 630 | 400 | 630 | 630 |
| K08S | 8 | 17.0 | 14 | 630 | 630 | 400 | 630 | 630 |
| K10S | 10 | 17.5 | 17 | 630 | 630 | 400 | 630 | 630 |
| K12S | 12 | 21.5 | 17 | 630 | 630 | 400 | 630 | 630 |
| K14S | 14 | 22.0 | 19 | 400 | 400 | 250 | 400 | 400 |
| K16S | 16 | 24.5 | 24 | 400 | 400 | 250 | 400 | 400 |
| K20S | 20 | 26.5 | 27 | 315 | 315 | 200 | 315 | 315 |
| K25S | 25 | 30.0 | 36 | 315 | 315 | 200 | 315 | 315 |
| K30S | 30 | 35.5 | 41 | 315 | 315 | 200 | 315 | 315 |
| K38S | 38 | 41.0 | 50 | 315 | 315 | 200 | 315 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: K06ZLCF**

# VKA

Cap

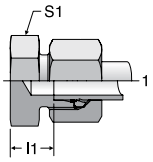



| TUBE FITTING PART # | TUBE O.D. 1 (mm) | L (mm) | Pressure Rating (bar) EO CF | EO 71 | EO MS |
|---|---|---|---|---|---|
| VKA06 | 6 | 18.5 | 500 | 315 | 200 |
| VKA08 | 8 | 18.5 | 500 | 315 | 200 |
| VKA10 | 10 | 20.0 | 500 | 315 | 200 |
| VKA12 | 12 | 20.5 | 400 | 315 | 200 |
| VKA15 | 15 | 20.5 | 400 | 315 | 200 |
| VKA18 | 18 | 22.5 | 400 | 315 | 200 |
| VKA22 | 22 | 25.0 | 250 | 160 | 100 |
| VKA28 | 28 | 25.5 | 250 | 160 | 100 |
| VKA35 | 35 | 30.0 | 250 | 160 | 100 |
| VKA42 | 42 | 30.0 | 250 | 160 | 100 |
| VKA06 | 6 | 18.5 | 800 | 630 | 400 |
| VKA08 | 8 | 18.5 | 800 | 630 | 400 |
| VKA10 | 10 | 20.0 | 800 | 630 | 400 |
| VKA12 | 12 | 20.5 | 630 | 630 | 400 |
| VKA14 | 14 | 22.5 | 630 | 630 | 400 |
| VKA16 | 16 | 23.5 | 630 | 400 | 250 |
| VKA20 | 20 | 28.5 | 420 | 400 | 250 |
| VKA25 | 25 | 29.0 | 420 | 400 | 250 |
| VKA30 | 30 | 30.5 | 420 | 400 | 250 |
| VKA38 | 38 | 33.0 | 420 | 315 | 200 |

**Note: Part does not include tube nut.**
**Sizes 6,8,10 & 12 work with L and S Series.**

# ROV

Plug
24° Flareless




| TUBE FITTING PART # | END SIZE 1 (mm) | l 1 (mm) | S1 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|
| ROV06L | 6 | 7 | 12 | 315 | 315 | 315 | 315 |
| ROV08L | 8 | 8 | 14 | 315 | 315 | 315 | 315 |
| ROV10L | 10 | 9 | 17 | 315 | 315 | 315 | 315 |
| ROV12L | 12 | 10.0 | 19 | 315 | 315 | 315 | 315 |
| ROV15L | 15 | 11.0 | 24 | 315 | 315 | 315 | 315 |
| ROV18L | 18 | 11.5 | 27 | 315 | 315 | 315 | 315 |
| ROV22L | 22 | 13.5 | 32 | 160 | 160 | 160 | 160 |
| ROV28L | 28 | 14.5 | 41 | 160 | 160 | 160 | 160 |
| ROV35L | 35 | 14.5 | 46 | 160 | 160 | 160 | 160 |
| ROV42L | 42 | 16.0 | 55 | 160 | 160 | 160 | 160 |
| ROV06S | 6 | 11.0 | 14 | 630 | 630 | 630 | 630 |
| ROV08S | 8 | 13.0 | 17 | 630 | 630 | 630 | 630 |
| ROV10S | 10 | 12.5 | 19 | 630 | 630 | 630 | 630 |
| ROV12S | 12 | 14.5 | 22 | 630 | 630 | 630 | 630 |
| ROV14S | 14 | 16.0 | 24 | 630 | 630 | 630 | 630 |
| ROV16S | 16 | 15.5 | 27 | 400 | 400 | 400 | 400 |
| ROV20S | 20 | 17.5 | 32 | 400 | 400 | 400 | 400 |
| ROV25S | 25 | 20.0 | 41 | 400 | 400 | 400 | 400 |
| ROV30S | 30 | 20.5 | 46 | 400 | 400 | 400 | 400 |
| ROV38S | 38 | 23.0 | 55 | 315 | 315 | 315 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: ROV06ZLCF**

Dimensions and pressures for reference only, subject to change.



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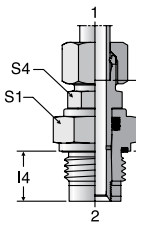
# DVGE-R

Plain Bearing Rotary Straight
24° Flareless / BSPP with EOlastic Seal*

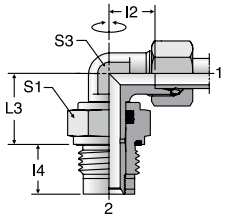



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | l 1 (mm) | l 4 (mm) | S1 (mm) | S4 (mm) | Pressure Rating (bar) EO / CF |
|---|---|---|---|---|---|---|---|
| **DVGE06LR** | 6 | G 1/4 A | 21.0 | 18.0 | 19 | 12 | 40 |
| **DVGE08LR** | 8 | G 1/4 A | 21.0 | 18.0 | 19 | 14 | 40 |
| **DVGE10LR** | 10 | G 3/8 A | 25.0 | 18.0 | 24 | 17 | 40 |
| **DVGE12LR** | 12 | G 1/2 A | 27.0 | 21.0 | 27 | 19 | 40 |
| **DVGE15LR** | 15 | G 3/4 A | 32.0 | 24.0 | 32 | 24 | 40 |
| **DVGE18LR** | 18 | G 1A | 35.0 | 27.5 | 41 | 27 | 40 |
| **DVGE22LR** | 22 | G 1A | 39.0 | 27.5 | 41 | 32 | 40 |
| **DVGE28LR** | 28 | G 1 1/4 A | 40.5 | 31.0 | 50 | 41 | 40 |
| **DVGE35LR** | 35 | G 1 1/2 A | 44.5 | 35.0 | 55 | 46 | 40 |
| **DVGE06SR** | 6 | G 1/4 A | 23.0 | 18.0 | 19 | 14 | 100 |
| **DVGE08SR** | 8 | G 1/4 A | 24.0 | 18.0 | 19 | 17 | 100 |
| **DVGE10SR** | 10 | G 3/8 A | 26.5 | 18.0 | 24 | 19 | 100 |
| **DVGE12SR** | 12 | G 1/2 A | 28.5 | 21.0 | 27 | 22 | 100 |
| **DVGE16SR** | 16 | G 3/4 A | 33.5 | 24.0 | 32 | 27 | 100 |
| **DVGE20SR** | 20 | G 1A | 38.0 | 27.5 | 41 | 32 | 100 |
| **DVGE25SR** | 25 | G 1A | 40.5 | 27.5 | 41 | 41 | 100 |
| **DVGE30SR** | 30 | G 1 1/4 A | 41.5 | 31.0 | 50 | 46 | 100 |
| **DVGE38SR** | 38 | G 1 1/2 A | 47.0 | 35.0 | 55 | 55 | 100 |

***Note:** Port depth must be deeper than standard DIN 3852-2.

# DVWE-R

Plain Bearing Rotary Elbow
24° Flareless / BSPP with EOlastic Seal*




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | l 2 (mm) | l 4 (mm) | L 3 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO / CF |
|---|---|---|---|---|---|---|---|---|
| **DVWE06LR** | 6 | G 1/4 A | 12.0 | 18.0 | 20.0 | 19 | 12 | 40 |
| **DVWE08LR** | 8 | G 1/4 A | 14.0 | 18.0 | 21.0 | 19 | 12 | 40 |
| **DVWE10LR** | 10 | G 3/8 A | 15.0 | 18.0 | 26.0 | 24 | 14 | 40 |
| **DVWE12LR** | 12 | G 1/2 A | 17.0 | 21.0 | 27.0 | 27 | 17 | 40 |
| **DVWE15LR** | 15 | G 3/4 A | 21.0 | 24.0 | 33.0 | 32 | 19 | 40 |
| **DVWE18LR** | 18 | G 1A | 23.5 | 27.5 | 37.5 | 41 | 27 | 40 |
| **DVWE22LR** | 22 | G 1A | 27.5 | 27.5 | 39.5 | 41 | 27 | 40 |
| **DVWE28LR** | 28 | G 1 1/4 A | 30.5 | 31.0 | 44.0 | 50 | 36 | 40 |
| **DVWE35LR** | 35 | G 1 1/2 A | 34.5 | 35.0 | 54.0 | 55 | 41 | 40 |
| **DVWE06SR** | 6 | G 1/4 A | 16.0 | 18.0 | 21.0 | 19 | 12 | 100 |
| **DVWE08SR** | 8 | G 1/4 A | 17.0 | 18.0 | 22.0 | 19 | 14 | 100 |
| **DVWE10SR** | 10 | G 3/8 A | 17.5 | 18.0 | 27.0 | 24 | 17 | 100 |
| **DVWE12SR** | 12 | G 1/2 A | 21.5 | 21.0 | 28.0 | 27 | 17 | 100 |
| **DVWE16SR** | 16 | G 3/4 A | 24.5 | 24.0 | 34.0 | 32 | 24 | 100 |
| **DVWE20SR** | 20 | G 1A | 26.5 | 27.5 | 39.5 | 41 | 27 | 100 |
| **DVWE25SR** | 25 | G 1A | 30.0 | 27.5 | 42.5 | 41 | 36 | 100 |
| **DVWE30SR** | 30 | G 1 1/4 A | 35.5 | 31.0 | 48.0 | 50 | 41 | 100 |
| **DVWE38SR** | 38 | G 1 1/2 A | 41.0 | 35.0 | 55.0 | 55 | 50 | 100 |

***Note:** Port depth must be deeper than standard DIN 3852-2.

Dimensions and pressures for reference only, subject to change.



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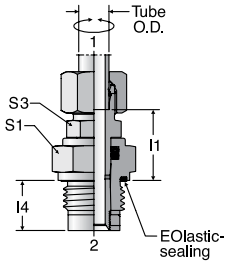
# DVGE-M

Plain Bearing Rotary Straight
24° Flareless / Metric Parallel with EOlastic Seal*

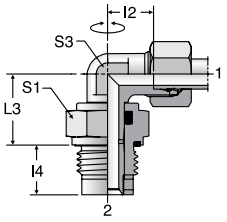



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 1 (mm) | l 4 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO / CF |
|---|---|---|---|---|---|---|---|
| **DVGE06LM** | 6 | M 14 x 1.5 | 20.0 | 18.0 | 19 | 12 | 40 |
| **DVGE08LM** | 8 | M 14 x 1.5 | 21.0 | 18.0 | 19 | 12 | 40 |
| **DVGE10LM** | 10 | M 18 x 1.5 | 26.0 | 18.0 | 24 | 14 | 40 |
| **DVGE12LM** | 12 | M 22 x 1.5 | 27.0 | 21.0 | 27 | 17 | 40 |
| **DVGE15LM** | 15 | M 27 x 2 | 33.0 | 24.0 | 32 | 19 | 40 |
| **DVGE18LM** | 18 | M 33 x 2 | 37.5 | 27.5 | 41 | 27 | 40 |
| **DVGE22LM** | 22 | M 33 x 2 | 39.5 | 27.5 | 41 | 27 | 40 |
| **DVGE28LM** | 28 | M 42 x 2 | 44.0 | 31.0 | 50 | 36 | 40 |
| **DVGE35LM** | 35 | M 48 x 2 | 54.0 | 35.0 | 55 | 41 | 40 |
| **DVGE06SM** | 6 | M 14 x 1.5 | 21.0 | 18.0 | 19 | 12 | 100 |
| **DVGE08SM** | 8 | M 14 x 1.5 | 22.0 | 18.0 | 19 | 14 | 100 |
| **DVGE10SM** | 10 | M 18 x 1.5 | 27.0 | 18.0 | 24 | 17 | 100 |
| **DVGE12SM** | 12 | M 22 x 1.5 | 28.0 | 21.0 | 27 | 17 | 100 |
| **DVGE16SM** | 16 | M 27 x 2 | 34.0 | 24.0 | 32 | 24 | 100 |
| **DVGE20SM** | 20 | M 33 x 2 | 39.5 | 27.5 | 41 | 27 | 100 |
| **DVGE25SM** | 25 | M 33 x 2 | 42.5 | 27.5 | 41 | 36 | 100 |
| **DVGE30SM** | 30 | M 42 x 2 | 48.0 | 31.0 | 50 | 41 | 100 |
| **DVGE38SM** | 38 | M 48 x 2 | 55.0 | 35.0 | 55 | 50 | 100 |

***Note:** Port depth must be deeper than standard DIN 3852-1.

# DVWE-M

Plain Bearing Rotary Elbow
24° Flareless / Metric Parallel with EOlastic Seal*




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 2 (mm) | l 4 (mm) | L3 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO / CF |
|---|---|---|---|---|---|---|---|---|
| **DVWE06LM** | 6 | M 14 x 1.5 | 12.0 | 18.0 | 20.0 | 19 | 12 | 40 |
| **DVWE08LM** | 8 | M 14 x 1.5 | 14.0 | 18.0 | 21.0 | 19 | 12 | 40 |
| **DVWE10LM** | 10 | M 18 x 1.5 | 15.0 | 18.0 | 26.0 | 24 | 14 | 40 |
| **DVWE12LM** | 12 | M 22 x 1.5 | 17.0 | 21.0 | 27.0 | 27 | 17 | 40 |
| **DVWE15LM** | 15 | M 27 x 2 | 21.0 | 24.0 | 33.0 | 32 | 19 | 40 |
| **DVWE18LM** | 18 | M 33 x 2 | 23.5 | 27.5 | 37.5 | 41 | 27 | 40 |
| **DVWE22LM** | 22 | M 33 x 2 | 27.5 | 27.5 | 39.5 | 41 | 27 | 40 |
| **DVWE28LM** | 28 | M 42 x 2 | 30.5 | 31.0 | 44.0 | 50 | 36 | 40 |
| **DVWE35LM** | 35 | M 48 x 2 | 34.5 | 35.0 | 54.0 | 55 | 41 | 40 |
| **DVWE06SM** | 6 | M 14 x 1.5 | 16.0 | 18.0 | 21.0 | 19 | 12 | 100 |
| **DVWE08SM** | 8 | M 14 x 1.5 | 17.0 | 18.0 | 22.0 | 19 | 14 | 100 |
| **DVWE10SM** | 10 | M 18 x 1.5 | 17.5 | 18.0 | 27.0 | 24 | 17 | 100 |
| **DVWE12SM** | 12 | M 22 x 1.5 | 21.5 | 21.0 | 28.0 | 27 | 17 | 100 |
| **DVWE16SM** | 16 | M 27 x 2 | 24.5 | 24.0 | 34.0 | 32 | 24 | 100 |
| **DVWE20SM** | 20 | M 33 x 2 | 26.5 | 27.5 | 39.5 | 41 | 27 | 100 |
| **DVWE25SM** | 25 | M 33 x 2 | 30.0 | 27.5 | 42.5 | 41 | 36 | 100 |
| **DVWE30SM** | 30 | M 42 x 2 | 35.5 | 31.0 | 48.0 | 50 | 41 | 100 |
| **DVWE38SM** | 38 | M 48 x 2 | 41.0 | 35.0 | 55.0 | 55 | 50 | 100 |

***Note:** Port depth must be deeper than standard DIN 3852-1.

Dimensions and pressures for reference only, subject to change.



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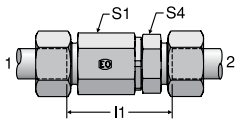
# DG101

Ball Bearing Rotary Union
24° Flareless / 24° Flareless

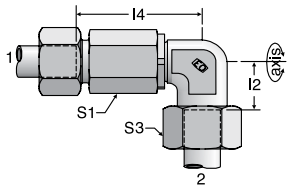



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | l 1 (mm) | S1 (mm) | S4 (mm) | Pressure Rating (bar) EO | CF |
|---|---|---|---|---|---|---|
| DG101/06S | 6 | 47 | 22 | 17 | | |
| DG101/08S | 8 | 47 | 22 | 17 | • | |
| DG101/12S | 12 | 57 | 30 | 24 | • | |
| DG101/16S | 16 | 57 | 30 | 27 | • | |
| DG101/20S | 20 | 71 | 41 | 36 | • | |
| DG101/25S | 25 | 72 | 41 | 41 | • | |
| DG101/30S | 30 | 82 | 60 | 46 | | |
| DG101/38S | 38 | 82 | 60 | 55 | | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

# DG103

Ball Bearing Rotary Elbow
24° Flareless / 24° Flareless

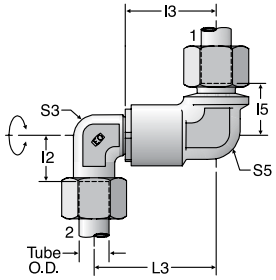



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | l 2 (mm) | l 4 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO | CF |
|---|---|---|---|---|---|---|---|
| DG103/06S | 6 | 16.0 | 44.5 | 22 | 17 | | |
| DG103/08S | 8 | 17.0 | 44.5 | 22 | 19 | • | |
| DG103/12S | 12 | 21.5 | 55.5 | 30 | 24 | • | |
| DG103/16S | 16 | 24.5 | 54.5 | 30 | 30 | • | |
| DG103/20S | 20 | 26.5 | 72.5 | 41 | 36 | • | |
| DG103/25S | 25 | 30.0 | 71.0 | 41 | 46 | | |
| DG103/30S | 30 | 35.5 | 89.0 | 60 | 50 | • | |
| DG103/38S | 38 | 41.0 | 86.5 | 60 | 60 | | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

# DG105

Ball Bearing Rotary Union
24° Flareless / 24° Flareless

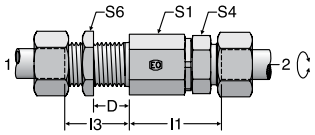



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | l 2 (mm) | l 3 (mm) | l 5 (mm) | L3 (mm) | S3 (mm) | S5 (mm) | Pressure Rating (bar) EO | CF |
|---|---|---|---|---|---|---|---|---|---|
| DG105/12S | 12 | 21.5 | 39.5 | 26.5 | 53.0 | 22 | 24 | | |
| DG105/16S | 16 | 24.5 | 39.5 | 25.5 | 53.0 | 22 | 24 | • | |
| DG105/20S | 20 | 26.5 | 56.5 | 39.5 | 76.0 | 36 | 32 | | |
| DG105/25S | 25 | 30.0 | 56.5 | 38.0 | 76.0 | 36 | 32 | • | |
| DG105/30S | 30 | 35.5 | 65.0 | 44.5 | 92.5 | 50 | 50 | | |
| DG105/38S | 38 | 41.0 | 65.0 | 42.0 | 92.5 | 50 | 50 | • | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

# DG107

Ball Bearing Rotary Bulkhead Union
24° Flareless / 24° Flareless




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | D (mm) | l 1 (mm) | l 3 (mm) | S1 (mm) | S4 (mm) | S6 (mm) | Pressure Rating (bar) EO | CF |
|---|---|---|---|---|---|---|---|---|---|
| DG107/06S | 6 | 5 | 42.0 | 16.0 | 22 | 17 | 19 | • | |
| DG107/08S | 8 | 5 | 42.0 | 16.0 | 22 | 17 | 22 | • | |
| DG107/12S | 12 | 5 | 52.5 | 15.5 | 30 | 24 | 27 | • | |
| DG107/16S | 16 | 5 | 51.5 | 17.5 | 30 | 27 | 32 | • | |
| DG107/20S | 20 | 15 | 65.5 | 28.5 | 41 | 36 | 41 | • | |
| DG107/25S | 25 | 15 | 66.0 | 30.0 | 41 | 41 | 46 | • | |
| DG107/30S | 30 | 15 | 75.5 | 30.5 | 60 | 46 | 50 | • | |
| DG107/38S | 38 | 15 | 76.0 | 31.0 | 60 | 55 | 65 | • | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

Dimensions and pressures for reference only, subject to change.



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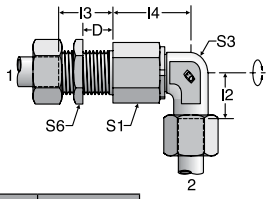
# DG108

Ball Bearing Rotary Bulkhead Elbow
24° Flareless / 24° Flareless

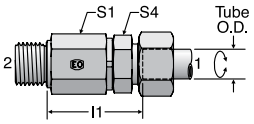



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | D (mm) | l 2 (mm) | l 3 (mm) | l 4 (mm) | S1 (mm) | S3 (mm) | S6 (mm) | Pressure Rating (bar) EO | CF |
|---|---|---|---|---|---|---|---|---|---|---|
| DG108/06S | 6 | 5 | 16.0 | 16.0 | 39.5 | 22 | 17 | 19 | | |
| DG108/08S | 8 | 5 | 17.0 | 16.0 | 39.5 | 22 | 17 | 22 | • | |
| DG108/12S | 12 | 5 | 21.5 | 15.5 | 51.0 | 30 | 22 | 27 | • | |
| DG108/16S | 16 | 5 | 24.5 | 17.5 | 49.0 | 30 | 22 | 32 | • | |
| DG108/20S | 20 | 15 | 26.5 | 28.5 | 67.0 | 41 | 36 | 41 | | |
| DG108/25S | 25 | 15 | 30.0 | 30.0 | 65.0 | 41 | 36 | 46 | | |
| DG108/30S | 30 | 15 | 35.5 | 30.5 | 82.5 | 60 | 50 | 50 | | |
| DG108/38S | 38 | 15 | 41.0 | 31.0 | 80.5 | 60 | 50 | 65 | | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

# DG102-R

Ball Bearing Rotary Straight
24° Flareless / BSPP

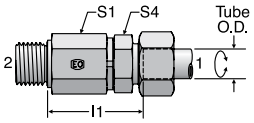



| TUBE FITTING PART # | END SIZE 1 (mm) | 2 BSPP | l 1 (mm) | S1 (mm) | S4 (mm) | Pressure Rating (bar) EO | CF |
|---|---|---|---|---|---|---|---|
| DG102/06SR | 6 | G 1/4 A | 42.0 | 22 | 17 | • | |
| DG102/08SR | 8 | G 1/4 A | 42.0 | 22 | 17 | • | |
| DG102/12SR | 12 | G 3/8 A | 52.5 | 30 | 24 | • | |
| DG102/16SR | 16 | G 1/2 A | 51.5 | 30 | 27 | • | |
| DG102/20SR | 20 | G 3/4 A | 65.5 | 41 | 36 | | |
| DG102/25SR | 25 | G 1 A | 66.0 | 41 | 41 | | |
| DG102/30SR | 30 | G 1 1/4 A | 75.5 | 60 | 46 | • | |
| DG102/38SR | 38 | G 1 1/2 A | 76.0 | 60 | 55 | • | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

# DG102-M

Ball Bearing Rotary Straight
24° Flareless / Metric Parallel

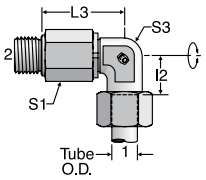



| TUBE FITTING PART # | END SIZE 1 (mm) | 2 Metric | l 1 (mm) | S1 (mm) | S4 (mm) | Pressure Rating (bar) EO | CF |
|---|---|---|---|---|---|---|---|
| DG102/06SM | 6 | M14 x 1.5 | 42.0 | 22 | 17 | • | |
| DG102/08SM | 8 | M14 x 1.5 | 42.0 | 22 | 17 | | |
| DG102/12SM | 12 | M18 x 1.5 | 52.5 | 30 | 24 | • | |
| DG102/16SM | 16 | M22 x 1.5 | 51.5 | 30 | 27 | • | |
| DG102/20SM | 20 | M27 x 2 | 65.5 | 41 | 36 | | |
| DG102/25SM | 25 | M33 x 2 | 66.0 | 41 | 41 | | |
| DG102/30SM | 30 | M42 x 2 | 75.5 | 60 | 46 | | |
| DG102/38SM | 38 | M48 x 2 | 76.0 | 60 | 55 | | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

# DG104-R

Ball Bearing Rotary Elbow
24° Flareless / BSPP with
EOlastic Seal




| TUBE FITTING PART # | END SIZE 1 (mm) | 2 BSPP | i2 (mm | L3 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO | CF |
|---|---|---|---|---|---|---|---|---|
| DG104/06SR | 6 | G 1/4 A | 16.0 | 39.5 | 22 | 17 | • | |
| DG104/08SR | 8 | G 1/4 A | 17.0 | 39.5 | 22 | 17 | • | |
| DG104/12SR | 12 | G 3/8 A | 21.5 | 51.0 | 30 | 22 | • | |
| DG104/16SR | 16 | G 1/2 A | 24.5 | 49.0 | 30 | 22 | • | |
| DG104/20SR | 20 | G 3/4 A | 26.5 | 67.0 | 41 | 36 | • | |
| DG104/25SR | 25 | G 1 A | 30.0 | 65.0 | 41 | 36 | • | |
| DG104/30SR | 30 | G 1 1/4 A | 35.5 | 82.5 | 60 | 50 | • | |
| DG104/38SR | 38 | G 1 1/2 A | 41.0 | 80.5 | 60 | 50 | | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

Dimensions and pressures for reference only, subject to change.



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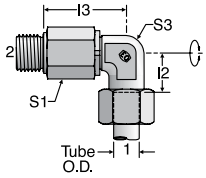
# DG104-M

Ball Bearing Rotary Elbow
24° Flareless / Metric Parallel

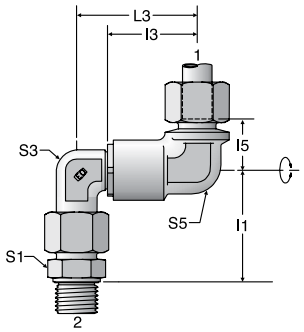



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 2 (mm) | l 3 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO | Pressure Rating (bar) CF |
|---|---|---|---|---|---|---|---|---|
| DG104/06SM | 6 | M14 x 1.5 | 16.0 | 39.5 | 22 | 17 | | |
| DG104/08SM | 8 | M14 x 1.5 | 17.0 | 39.5 | 22 | 17 | • | |
| DG104/12SM | 12 | M18 x 1.5 | 21.5 | 51.0 | 30 | 22 | • | |
| DG104/16SM | 16 | M22 x 1.5 | 24.5 | 49.0 | 30 | 22 | • | |
| DG104/20SM | 20 | M27 x 2 | 26.5 | 67.0 | 41 | 36 | | |
| DG104/25SM | 25 | M33 x 2 | 30.0 | 65.0 | 41 | 36 | • | |
| DG104/30SM | 30 | M42 x 2 | 35.5 | 82.5 | 60 | 50 | | |
| DG104/38SM | 38 | M48 x 2 | 41.0 | 80.5 | 60 | 50 | | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

# DG106-R

Ball Bearing Rotary Double Elbow
24° Flareless / BSPP with EOlastic Seal

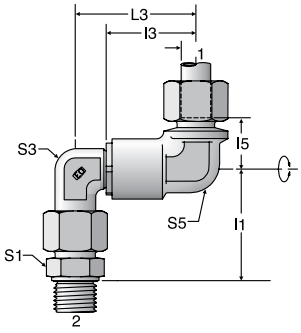



| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | l 1 (mm) | l 3 (mm) | l 5 (mm) | L3 (mm) | S1 (mm) | S3 (mm) | S5 (mm) | Pressure Rating (bar) EO | Pressure Rating (bar) CF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DG106/12SR | 12 | G 3/8 A | 55.5 | 39.5 | 26.5 | 53.0 | 22 | 24 | 22 | | |
| DG106/16SR | 16 | G 1/2 A | 61.5 | 39.5 | 25.5 | 53.0 | 27 | 24 | 24 | • | |
| DG106/20SR | 20 | G 3/4 A | 69.5 | 56.5 | 39.5 | 76.0 | 32 | 36 | 32 | | |
| DG106/25SR | 25 | G 1 A | 78 | 56.5 | 38.0 | 76.0 | 41 | 36 | 32 | | |
| DG106/30SR | 30 | G 1 1/4 A | 86.5 | 65.0 | 44.5 | 92.5 | 50 | 50 | 50 | | |
| DG106/38SR | 38 | G 1 1/2 A | 101.0 | 65.0 | 42.0 | 92.5 | 55 | 50 | 50 | | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

# DG106-M

Ball Bearing Rotary Double Elbow
24° Flareless / Metric Parallel




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | l 1 (mm) | l 3 (mm) | l 5 (mm) | L3 (mm) | S1 (mm) | S3 (mm) | S5 (mm) | Pressure Rating (bar) EO | Pressure Rating (bar) CF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DG106/12SM | 12 | M18 x 1.5 | 55.5 | 39.5 | 26.5 | 53 | 24 | 24 | 22 | | |
| DG106/16SM | 16 | M22 x 1.5 | 61.5 | 39.5 | 25.5 | 53 | 27 | 24 | 24 | | |
| DG106/20SM | 20 | M27 x 2 | 69.5 | 56.5 | 39.5 | 76 | 32 | 36 | 32 | • | |
| DG106/25SM | 25 | M33 x 2 | 78.0 | 56.5 | 38.0 | 76 | 41 | 36 | 32 | | |
| DG106/30SM | 30 | M42 x 2 | 86.5 | 65.0 | 44.5 | 92.5 | 50 | 50 | 50 | | |
| DG106/38SM | 38 | M48 x 2 | 101.0 | 65.0 | 42.0 | 92.5 | 55 | 50 | 50 | | |

**Note:** See Table E1 on page E7 for RPM/working pressure data.

Dimensions and pressures for reference only, subject to change.



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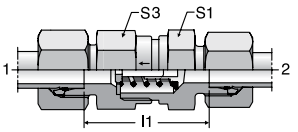
# RHD

Non-Return Valve
24° Flareless / 24° Flareless



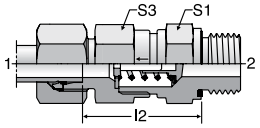

| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | DN SIZE (mm) | l 1 (mm) | S1 (mm) | S3 Steel (mm | S3 (Stainless Steel) (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| **RHD06L** | 6 | 4 | 29.0 | 17 | 17 | 17 | 400 | 250 | 400 | 250 |
| **RHD08L** | 8 | 6 | 30.0 | 19 | 19 | 19 | 400 | 250 | 400 | 250 |
| **RHD10L** | 10 | 8 | 40.5 | 22 | 24 | 24 | 400 | 250 | 400 | 250 |
| **RHD12L** | 12 | 10 | 43.5 | 27 | 30 | 30 | 400 | 250 | 400 | 250 |
| **RHD15L** | 15 | 12 | 47.5 | 27 | 32 | 32 | 400 | 250 | 400 | 250 |
| **RHD18L** | 18 | 16 | 51.5 | 36 | 41 | 36 | 400 | 160 | 400 | 160 |
| **RHD22L** | 22 | 20 | 61.5 | 41 | 46 | 46 | 250 | 160 | 250 | 160 |
| **RHD28L** | 28 | 25 | 69.5 | 50 | 55 | 55 | 250 | 100 | 250 | 100 |
| **RHD35L** | 35 | 32 | 74.5 | 60 | 65 | 60 | 250 | 100 | 250 | 100 |
| **RHD42L** | 42 | 32 | 74.0 | 65 | 70 | 70 | 250 | 100 | 250 | 100 |
| **RHD06S** | 6 | 3 | 34.5 | 19 | 19 | 19 | 420 | 400 | 420 | 400 |
| **RHD08S** | 8 | 4 | 34.5 | 19 | 19 | 19 | 420 | 400 | 420 | 400 |
| **RHD10S** | 10 | 6 | 40.5 | 22 | 24 | 24 | 420 | 400 | 420 | 400 |
| **RHD12S** | 12 | 8 | 42.5 | 24 | 27 | 27 | 420 | 400 | 420 | 400 |
| **RHD14S** | 14 | 10 | 47.5 | 27 | 32 | 32 | 420 | 315 | 420 | 315 |
| **RHD16S** | 16 | 12 | 50.5 | 32 | 36 | 36 | 420 | 315 | 420 | 315 |
| **RHD20S** | 20 | 16 | 54.5 | 41 | 50 | 46 | 420 | 250 | 420 | 250 |
| **RHD25S** | 25 | 20 | 58.5 | 46 | 55 | 50 | 420 | 250 | 420 | 250 |
| **RHD30S** | 30 | 25 | 69.5 | 60 | 60 | 60 | 250 | 250 | 250 | 250 |
| **RHD38S** | 38 | 32 | 75.5 | 65 | 70 | 70 | 250 | 250 | 250 | 250 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: RHD06ZLCF**
**For Optional Opening Pressures see page E8.**

**Note:** These valves are not compatible with steam, oxygen and explosive gases.

# RHV-R-ED

Non-Return Valve
24° Flareless / BSPP
with EOlastic Seal




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | DN SIZE (mm) | l 2 (mm) | S1 (mm) | S3 (Steel) (mm) | S3 (Stainless Steel) (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **RHV06LRED** | 6 | G 1/8 A | 3.5 | 28.0 | 17 | 17 | 17 | 400 | 250 | 400 | 250 |
| **RHV08LRED** | 8 | G 1/4 A | 5.5 | 30.0 | 19 | 19 | 19 | 400 | 250 | 400 | 250 |
| **RHV10LRED** | 10 | G 1/4 A | 7.5 | 38.5 | 22 | 24 | 24 | 400 | 250 | 400 | 250 |
| **RHV12LRED** | 12 | G 3/8 A | 9.5 | 42.5 | 27 | 30 | 30 | 400 | 250 | 400 | 250 |
| **RHV15LRED** | 15 | G 1/2 A | 11.0[1] | 45.5 | 27 | 32 | 32 | 400 | 250 | 400 | 250 |
| **RHV18LRED** | 18 | G 1/2 A | 14.0 | 50.0 | 36 | 41 | 36 | 400 | 160 | 400 | 160 |
| **RHV22LRED** | 22 | G 3/4 A | 18.0 | 55.0 | 41 | 46 | 46 | 250 | 160 | 250 | 160 |
| **RHV28LRED** | 28 | G 1 A | 23.0 | 63.0 | 50 | 55 | 55 | 250 | 100 | 250 | 100 |
| **RHV35LRED** | 35 | G 1 1/4 A | 29.0 | 69.0 | 60 | 65 | 60 | 250 | 100 | 250 | 100 |
| **RHV42LRED** | 42 | G 1 1/2 A | 29.0 | 68.5 | 65 | 70 | 70 | 250 | 100 | 250 | 100 |
| **RHV06SRED** | 6 | G 1/4 A | 3.5 | 31.5 | 19 | 19 | 19 | 420 | 400 | 420 | 400 |
| **RHV08SRED** | 8 | G 1/4 A | 3.5 | 31.5 | 19 | 19 | 19 | 420 | 400 | 420 | 400 |
| **RHV10SRED** | 10 | G 3/8 A | 5.5 | 38.0 | 22 | 24 | 24 | 420 | 400 | 420 | 400 |
| **RHV12SRED** | 12 | G 3/8 A | 7.5 | 41.0 | 24 | 27 | 27 | 420 | 400 | 420 | 400 |
| **RHV14SRED** | 14 | G 1/2 A | 9.5 | 44.5 | 27 | 32 | 32 | 420 | 315 | 420 | 315 |
| **RHV16SRED** | 16 | G 1/2 A | 11.0[1] | 48.0 | 32 | 36 | 36 | 420 | 315 | 420 | 315 |
| **RHV20SRED** | 20 | G 3/4 A | 15.0 | 52.0 | 41 | 50 | 46 | 420 | 250 | 420 | 250 |
| **RHV25SRED** | 25 | G 1 A | 19.0 | 54.5 | 46 | 55 | 50 | 420 | 250 | 420 | 250 |
| **RHV30SRED** | 30 | G 1 1/4 A | 24.0 | 64.0 | 60 | 60 | 60 | 250 | 250 | 250 | 250 |
| **RHV38SRED** | 38 | G 1 1/2 A | 29.0 | 69.5 | 65 | 70 | 70 | 250 | 250 | 250 | 250 |

**[1]Stainless steel is 11.5**

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: RHV06ZLREDCF**

**For Optional Opening Pressures see page E8.**

**Note:** These valves are not compatible with steam, oxygen and explosive gases.

Dimensions and pressures for reference only, subject to change.



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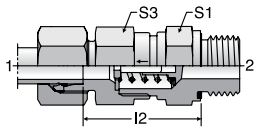
# RHV-M-ED

Non-Return Valve
24° Flareless / Metric Parallel
with EOlastic Seal




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | DN SIZE (mm) | l 2 (mm) | S1 (mm) | S3 (Steel) (mm) | S3 (Stainless Steel) (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **RHV06LMED** | 6 | M10 x 1 | 3.5 | 28.0 | 17 | 17 | 17 | 400 | 250 | 400 | 250 |
| **RHV08LMED** | 8 | M12 x 1.5 | 5.5 | 29.0 | 19 | 19 | 19 | 400 | 250 | 400 | 250 |
| **RHV10LMED** | 10 | M14 x 1.5 | 7.5 | 38.5 | 22 | 24 | 24 | 400 | 250 | 400 | 250 |
| **RHV12LMED** | 12 | M16 x 1.5 | 9.5 | 42.5 | 27 | 30 | 30 | 400 | 250 | 400 | 250 |
| **RHV15LMED** | 15 | M18 x 1.5 | 11.0[1] | 45.5 | 27 | 32 | 32 | 400 | 250 | 400 | 250 |
| **RHV18LMED** | 18 | M22 x 1.5 | 14.0 | 50.0 | 36 | 41 | 36 | 400 | 160 | 400 | 160 |
| **RHV22LMED** | 22 | M26 x 1.5 | 18.0 | 55.0 | 41 | 46 | 46 | 250 | 160 | 250 | 160 |
| **RHV28LMED** | 28 | M33 x 2 | 23.0 | 63.0 | 50 | 55 | 55 | 250 | 100 | 250 | 100 |
| **RHV35LMED** | 35 | M42 x 2 | 29.0 | 69.0 | 60 | 65 | 60 | 250 | 100 | 250 | 100 |
| **RHV42LMED** | 42 | M48 x 2 | 29.0 | 68.5 | 65 | 70 | 70 | 250 | 100 | 250 | 100 |
| **RHV06SMED** | 6 | M12 x 1.5 | 3.5 | 31.5 | 19 | 19 | 19 | 420 | 400 | 420 | 400 |
| **RHV08SMED** | 8 | M14 x 1.5 | 3.5 | 31.5 | 19 | 19 | 19 | 420 | 400 | 420 | 400 |
| **RHV10SMED** | 10 | M16 x 1.5 | 5.5 | 38.0 | 22 | 24 | 24 | 420 | 400 | 420 | 400 |
| **RHV12SMED** | 12 | M18 x 1.5 | 7.5 | 41.0 | 24 | 27 | 27 | 420 | 400 | 420 | 400 |
| **RHV14SMED** | 14 | M20 x 1.5 | 9.5 | 44.5 | 27 | 32 | 32 | 420 | 315 | 420 | 315 |
| **RHV16SMED** | 16 | M22 x 1.5 | 11.0[1] | 48.0 | 32 | 36 | 36 | 420 | 315 | 420 | 315 |
| **RHV20SMED** | 20 | M27 x 2 | 15.0 | 52.0 | 41 | 50 | 46 | 420 | 250 | 420 | 250 |
| **RHV25SMED** | 25 | M33 x 2 | 19.0 | 54.5 | 46 | 55 | 50 | 420 | 250 | 420 | 250 |
| **RHV30SMED** | 30 | M42 x 2 | 24.0 | 64.0 | 60 | 60 | 60 | 250 | 250 | 250 | 250 |
| **RHV38SMED** | 38 | M48 x 2 | 29.0 | 69.5 | 65 | 70 | 70 | 250 | 250 | 250 | 250 |

**[1]Stainless steel is 11.5**

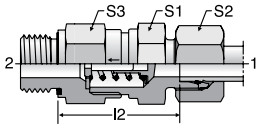
**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: RHV06ZLMEDCF**

**For Optional Opening Pressures see page E8.**

**Note:** These valves are not compatible with steam, oxygen and explosive gases.

# RHZ-R-ED

Non-Return Valve
24° Flareless / BSPP




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 BSPP | DN SIZE (mm) | l 2 (mm) | S1 (mm) | S3 (Steel) (mm) | S3 (Stainless Steel) (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **RHZ06LRED** | 6 | G 1/8 A | 3.5 | 26.5 | 17 | 17 | 17 | 400 | 250 | 400 | 250 |
| **RHZ08LRED** | 8 | G 1/4 A | 5.5 | 28.5 | 19 | 19 | 19 | 400 | 250 | 400 | 250 |
| **RHZ10LRED** | 10 | G 1/4 A | 7.5 | 38.5 | 22 | 24 | 24 | 400 | 250 | 400 | 250 |
| **RHZ12LRED** | 12 | G 3/8 A | 9.5 | 40.5 | 27 | 30 | 30 | 400 | 250 | 400 | 250 |
| **RHZ15LRED** | 15 | G 1/2 A | 11.0[1] | 42.5 | 27 | 32 | 32 | 400 | 250 | 400 | 250 |
| **RHZ18LRED** | 18 | G 1/2 A | 14.0 | 48.0 | 36 | 41 | 36 | 400 | 160 | 400 | 160 |
| **RHZ22LRED** | 22 | G 3/4 A | 18.0 | 56.0 | 41 | 46 | 46 | 250 | 160 | 250 | 160 |
| **RHZ28LRED** | 28 | G 1 A | 23.0 | 64.0 | 50 | 55 | 55 | 250 | 100 | 250 | 100 |
| **RHZ35LRED** | 35 | G 1 1/4 A | 29.0 | 70.0 | 60 | 65 | 60 | 250 | 100 | 250 | 100 |
| **RHZ42LRED** | 42 | G 1 1/2 A | 29.0 | 70.5 | 65 | 70 | 70 | 250 | 100 | 250 | 100 |
| **RHZ06SRED** | 6 | G 1/4 A | 3.5 | 31.5 | 19 | 19 | 19 | 420 | 400 | 420 | 400 |
| **RHZ08SRED** | 8 | G 1/4 A | 3.5 | 31.5 | 19 | 19 | 19 | 420 | 400 | 420 | 400 |
| **RHZ10SRED** | 10 | G 3/8 A | 5.5 | 38.0 | 22 | 24 | 24 | 420 | 400 | 420 | 400 |
| **RHZ12SRED** | 12 | G 3/8 A | 7.5 | 41.0 | 24 | 27 | 27 | 420 | 400 | 420 | 400 |
| **RHZ14SRED** | 14 | G 1/2 A | 9.5 | 43.5 | 27 | 32 | 32 | 420 | 315 | 420 | 315 |
| **RHZ16SRED** | 16 | G 1/2 A | 11.0[1] | 46.0 | 32 | 36 | 36 | 420 | 315 | 420 | 315 |
| **RHZ20SRED** | 20 | G 3/4 A | 15.0 | 50.0 | 41 | 50 | 46 | 420 | 250 | 420 | 250 |
| **RHZ25SRED** | 25 | G 1 A | 19.0 | 54.5 | 46 | 55 | 50 | 420 | 250 | 420 | 250 |
| **RHZ30SRED** | 30 | G 1 1/4 A | 24.0 | 64.0 | 60 | 60 | 60 | 250 | 250 | 250 | 250 |
| **RHZ38SRED** | 38 | G1 1/2 A | 29.0 | 71.5 | 65 | 70 | 70 | 250 | 250 | 250 | 250 |

**[1]Stainless steel is 11.5**

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: RHZ06ZLREDCF**

**For Optional Opening Pressures see page E8.**

**Note:** These valves are not compatible with steam, oxygen and explosive gases.

Dimensions and pressures for reference only, subject to change.



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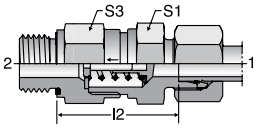
Non-Return Valve
24° Flareless / Metric Parallel with EOlastic Seal




| TUBE FITTING PART # | END SIZE 1 (mm) | END SIZE 2 Metric | DN SIZE (mm) | l 2 (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 | EO-2 CF | EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| **RHZ06LMED** | 6 | M10 x 1 | 3.5 | 26.5 | 17 | 17 | 400 | 250 | 400 | 250 |
| **RHZ08LMED** | 8 | M12 x 1.5 | 5.5 | 28.5 | 19 | 19 | 400 | 250 | 400 | 250 |
| **RHZ10LMED** | 10 | M14 x 1.5 | 7.5 | 38.5 | 22 | 24 | 400 | 250 | 400 | 250 |
| **RHZ12LMED** | 12 | M16 x 1.5 | 9.5 | 40.5 | 27 | 30 | 400 | 250 | 400 | 250 |
| **RHZ15LMED** | 15 | M18 x 1.5 | 11.5 | 42.5 | 27 | 32 | 400 | 250 | 400 | 250 |
| **RHZ18LMED** | 18 | M22 x 1.5 | 14.0 | 48.0 | 36 | 41 | 400 | 160 | 400 | 160 |
| **RHZ22LMED** | 22 | M26 x 1.5 | 18.0 | 56.0 | 41 | 46 | 250 | 160 | 250 | 160 |
| **RHZ28LMED** | 28 | M33 x 2 | 23.0 | 64.0 | 50 | 55 | 250 | 100 | 250 | 100 |
| **RHZ35LMED** | 35 | M42 x 2 | 29.0 | 70.0 | 60 | 65 | 250 | 100 | 250 | 100 |
| **RHZ42LMED** | 42 | M48 x 2 | 29.0 | 70.5 | 65 | 70 | 250 | 100 | 250 | 100 |
| **RHZ06SMED** | 6 | M12 x 1.5 | 3.5 | 31.5 | 19 | 19 | 420 | 400 | 420 | 400 |
| **RHZ08SMED** | 8 | M14 x 1.5 | 3.5 | 31.5 | 19 | 19 | 420 | 400 | 420 | 400 |
| **RHZ10SMED** | 10 | M16 x 1.5 | 5.5 | 38.0 | 22 | 24 | 420 | 400 | 420 | 400 |
| **RHZ12SMED** | 12 | M18 x 1.5 | 7.5 | 41.0 | 24 | 27 | 420 | 400 | 420 | 400 |
| **RHZ14SMED** | 14 | M20 x 1.5 | 9.5 | 43.5 | 27 | 32 | 420 | 315 | 420 | 315 |
| **RHZ16SMED** | 16 | M22 x 1.5 | 11.5 | 46.0 | 32 | 36 | 420 | 315 | 420 | 315 |
| **RHZ20SMED** | 20 | M27 x 2 | 15.0 | 50.0 | 41 | 50 | 420 | 250 | 420 | 250 |
| **RHZ25SMED** | 25 | M33 x 2 | 19.0 | 54.5 | 46 | 55 | 420 | 250 | 420 | 250 |
| **RHZ30SMED** | 30 | M42 x 2 | 24.0 | 64.0 | 60 | 60 | 250 | 250 | 250 | 250 |
| **RHZ38SMED** | 38 | M48 x 2 | 29.0 | 71.5 | 65 | 70 | 250 | 250 | 250 | 250 |

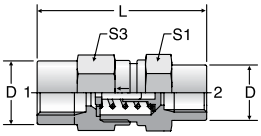
**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: RHZ06ZLMEDCF**

**For Optional Opening Pressures see page E8.**

**Note:** These valves are not compatible with steam, oxygen and explosive gases.

# RHDI

Non-Return Valve
BSPP Female / BSPP Female




| TUBE FITTING PART # | END SIZE 1 & 2 BSPP | DN SIZE (mm) | D (mm) | L (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO CF | EO 71 |
|---|---|---|---|---|---|---|---|---|
| **RHDI1/8** | G 1/8 | 3.5 | 19 | 42.5 | 19 | 19 | 400 | 400 |
| **RHDI1/4** | G 1/4 | 3.5 | 19 | 51 | 19 | 19 | 400 | 400 |
| **RHDI3/8** | G 3/8 | 7.5 | 24 | 60 | 24 | 27 | 400 | 400 |
| **RHDI1/2** | G 1/2 | 11.5 | 32 | 72 | 32 | 36 | 315 | 315 |
| **RHDI3/4** | G 3/4 | 15.0 | 41 | 84 | 41 | 46 | 250 | 250 |
| **RHDI1** | G 1 | 19.0 | 46 | 95 | 46 | 50 | 250 | 250 |
| **RHDI11/4** | G 1 1/4 | 24.0 | 60 | 110 | 60 | 60 | 250 | 250 |
| **RHDI11/2** | G 1 1/2 | 29.0 | 65 | 114 | 65 | 70 | 250 | 250 |

**For Optional Opening Pressures see page E8.**

**Note:** These valves are not compatible with steam, oxygen and explosive gases.



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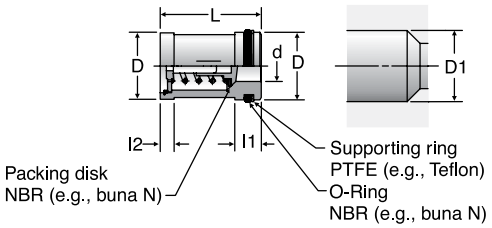
# RVP

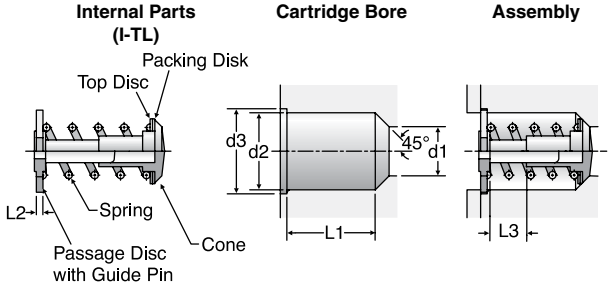
Non-Return Valve
Cartridge




| TUBE FITTING PART # | d (mm) | D (mm) | D1 (mm) | l 1 (mm) | l 2 (mm) | L (mm) | Pressure Rating (bar) EO CF | EO 71 |
|---|---|---|---|---|---|---|---|---|
| **RVP13** | 3.5 | 13 | 13 | 9.5 | 6.0 | 23.0 | 420 | 400 |
| **RVP16** | 5.5 | 16 | 16 | 9.5 | 6.5 | 26.5 | 420 | 400 |
| **RVP20** | 7.5 | 20 | 20 | 9.5 | 6.5 | 30.0 | 420 | 400 |
| **RVP24** | 9.5 | 24 | 24 | 12.0 | 7.5 | 35.0 | 420 | 315 |
| **RVP27** | 11.5 | 27 | 27 | 12.0 | 7.5 | 38.0 | 420 | 315 |
| **RVP35** | 15.0 | 35 | 35 | 12.0 | 9.5 | 44.5 | 420 | 250 |
| **RVP40** | 19.0 | 40 | 40 | 12.0 | 11.0 | 50.5 | 420 | 250 |
| **RVP47** | 24.0 | 47 | 47 | 13.0 | 13.0 | 60.0 | 250 | 250 |
| **RVP55** | 29.0 | 55 | 55 | 16.0 | 13.0 | 70.0 | 250 | 250 |

# I-TL

Non-Return Valve
Internal Parts




| TUBE FITTING PART # | For Use With | d1 (mm) | d2 (mm) | d3 (mm) | L1 (mm) | L2 (mm) | L3 (mm) | STANDARD FROM STOCK S | SS | B |
|---|---|---|---|---|---|---|---|---|---|---|
| **ITL06L/06 + 08S** | 6L, 6S, 8S | 3.5 | 7.5 | 8.6 | 8.2 | 2.0 | 1.0 | • | | |
| **ITL08L/10S** | 8L, 10S | 5.5 | 10.2 | 11.6 | 11.0 | 2.0 | 1.7 | • | | |
| **ITL10L/12S** | 10L, 12S | 7.5 | 13.0 | 14.1 | 14.0 | 2.0 | 2.3 | • | | |
| **ITL12L/14S** | 12L, 14S | 9.5 | 16.7 | 18.1 | 16.5 | 2.5 | 2.9 | • | | |
| **ITL15L/16S** | 15L, 16S | 11.5 | 19.5 | 20.6 | 19.0 | 2.5 | 3.5 | • | | |
| **ITL18L/20S** | 18L, 20S | 15 | 25.2 | 27.1 | 22.5 | 3.0 | 4.4 | | | |
| **ITL22L/25S** | 22L, 25S | 19 | 30.8 | 32.6 | 27.0 | 3.0 | 5.5 | • | | |
| **ITL28L/30S** | 28L, 30S | 24 | 38.6 | 40.6 | 32.5 | 3.5 | 7.3 | | | |
| **ITL35L + 42L/38S** | 35L, 42L, 38S | 29 | 45.7 | 48.1 | 37.5 | 3.5 | 8.9 | | | |

**Note:** Omit “CF” in the part number for steel material.

**Standard:** Material steel zinc plated (CF), springs phophated and oiled. Packing disc of NBR (e.g., buna N), opening pressure 1 bar.

**On request:**
- Packing disc of FKM (e.g., fluorocarbon)
- Stainless steel 1.4571, packing disc of NBR (e.g., buna N) or FKM (e.g., fluorocarbon) (on request).

Temperature rating, without pressure reductions of steel non-return valves with NBR seals (e.g., buna N-standard) is -35°C to +100°C and with FKM seals (e.g., fluorocarbon) (on request) is -25°C to +120°C.

Dimensions and pressures for reference only, subject to change.



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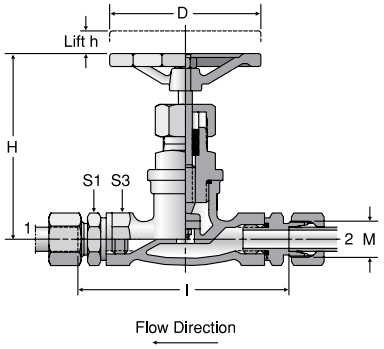
# DV

Shut-Off Valve, PN 10
24° Flareless / 24° Flareless

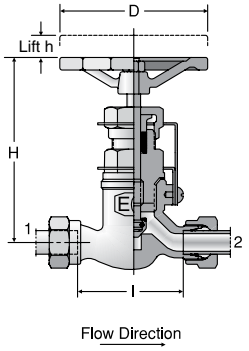



| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | M Metric | DN SIZE (mm) | D (mm) | h Lift (mm) | H (mm) | l (mm) | S1 (mm) | S3 (mm) | Pressure Rating (bar) EO MS |
|---|---|---|---|---|---|---|---|---|---|---|
| **DV06L** | 6 | 12 x 1.5 | 5 | 50 | 7 | 63 | 88 | 22 | 21 | 10 |
| **DV08L** | 8 | 14 x 1.5 | 6 | 50 | 7 | 63 | 88 | 22 | 21 | 10 |
| **DV10L** | 10 | 16 x 1.5 | 8 | 50 | 7 | 63 | 90 | 22 | 21 | 10 |
| **DV12L** | 12 | 18 x 1.5 | 10 | 50 | 7 | 63 | 90 | 22 | 21 | 10 |
| **DV15L** | 15 | 22 x 1.5 | 12 | 50 | 8 | 65 | 93 | 27 | 25 | 10 |
| **DV18L** | 18 | 26 x 1.5 | 16 | 50 | 8 | 67 | 94 | 27 | 25 | 10 |
| **DV22L** | 22 | 30 x 2 | 20 | 60 | 8 | 67 | 108 | 32 | 32 | 10 |
| **DV28L** | 28 | 36 x 2 | 25 | 60 | 10 | 95 | 125 | 41 | 38 | 10 |
| **DV35L** | 35 | 45 x 2 | 32 | 70 | 10 | 102 | 145 | 50 | 47 | 10 |

**Note:** The pressure specification PN for hand operated shut-off valves applies to the design factor 1.5 (according to DIN 3230 T5 and ISO 5208). Omit "MS" in the part number for brass material.

# LD

Shut-Off Valve, PN 40
24° Flareless / 24° Flareless




| TUBE FITTING PART # | END SIZE 1 & 2 (mm) | DN SIZE (mm) | D (mm) | h LIFT (mm) | H (mm) | l (mm) | Pressure Rating (bar) EO MS |
|---|---|---|---|---|---|---|---|
| **LD10S** | 10 | 6 | 63 | 7 | 98 | 45 | 40 |
| **LD12S** | 12 | 8 | 63 | 7 | 98 | 49 | 40 |
| **LD14S** | 14 | 10 | 63 | 7 | 98 | 54 | 40 |
| **LD16S** | 16 | 12 | 80 | 9 | 110 | 67 | 40 |
| **LD20S** | 20 | 16 | 80 | 9 | 110 | 69 | 40 |
| **LD25S** | 25 | 20 | 100 | 12 | 129 | 86 | 40 |
| **LD30S** | 30 | 25 | 100 | 12 | 129 | 93 | 40 |
| **LD38S** | 38 | 32 | 100 | 12 | 158 | 108 | 40 |

**Note:** The pressure specification PN for hand operated shut-off valves applies to the design factor 1.5 (according to DIN 3230 T5 and ISO 5208).
Omit "MS" in the part number for brass material.

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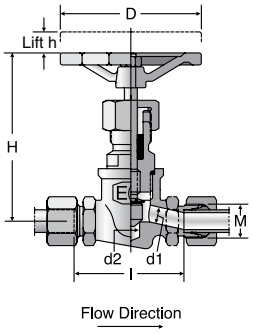
# VDHA

High Pressure Valve
24° Flareless / 24° Flareless

| TUBE FITTING PART # | END SIZE (mm) | DN SIZE (mm) | d1 (mm) | d2 (mm) | D (mm) | h Lift (mm) | H (mm) | l (mm) | Pressure Rating (bar) EO CF | Pressure Rating (bar) EO-2 CF |
|---|---|---|---|---|---|---|---|---|---|---|
| **VDHA06S** | 6 | 3 | 4 | 9.5 | 100 | 6 | 120 | 66 | 630 | 630 |
| **VDHA08S** | 8 | 4 | 5 | 9.5 | 100 | 6 | 120 | 66 | 630 | 630 |
| **VDHA10S** | 10 | 6 | 7 | 9.5 | 100 | 6 | 120 | 65 | 630 | 630 |
| **VDHA12S** | 12 | 8 | 8 | 9.5 | 100 | 6 | 120 | 65 | 630 | 630 |
| **VDHA14S** | 14 | 10 | 10 | 9.5 | 100 | 6 | 120 | 84 | 630 | 630 |
| **VDHA16S** | 16 | 12 | 11 | 9.5 | 100 | 6 | 120 | 83 | 400 | 400 |
| **VDHA20S** | 20 | 16 | 13 | 11.0 | 100 | 6 | 120 | 79 | 400 | 400 |
| **VDHA25S** | 25 | 20 | 17 | 12.0 | 125 | 9 | 143 | 106 | 400 | 400 |
| **VDHA30S** | 30 | 25 | 19 | 22.5 | 125 | 12 | 164 | 103 | 250 | 250 |
| **VDHA38S** | 38 | 32 | 25 | 26.5 | 180 | 12 | 198 | 118 | 250 | 250 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: VDHA06ZS**

**Note:** The pressure specification PN for hand operated shut-off valves applies to the design factor 1.5 (according to DIN 3230 T5 and ISO 5208).




Internal threaded spindle and body of low grade forged stainless steel

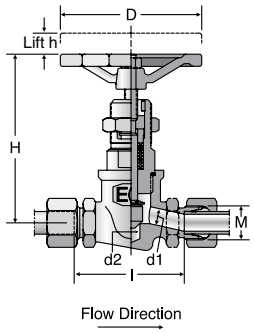
# VDHB

High Pressure Valve – Panel Mount
24° Flareless / 24° Flareless

| TUBE FITTING PART # | END SIZE (mm) | DN SIZE (mm) | M Metric | d1 (mm) | d2 (mm) | D (mm) | h Lift (mm) | H (mm) | l (mm) | Pressure Rating (bar) EO 71 | Pressure Rating (bar) EO-2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VDHB06S** | 6 | 4 | 14 x 1.5 | 4 | 9.5 | 100 | 6 | 124 | 66 | 400 | 400 |
| **VDHB08S** | 8 | 4 | 16 x 1.5 | 5 | 9.5 | 100 | 6 | 124 | 66 | 400 | 400 |
| **VDHB10S** | 10 | 6 | 18 x 1.5 | 7 | 9.5 | 100 | 6 | 124 | 65 | 400 | 400 |
| **VDHB12S** | 12 | 8 | 20 x 1.5 | 8 | 9.5 | 100 | 6 | 124 | 65 | 400 | 400 |
| **VDHB14S** | 14 | 10 | 22 x 1.5 | 10 | 9.5 | 100 | 6 | 124 | 84 | 400 | 400 |
| **VDHB16S** | 16 | 12 | 24 x 1.5 | 11 | 9.5 | 100 | 6 | 124 | 83 | 400 | 400 |
| **VDHB20S** | 20 | 16 | 30 x 2 | 13 | 11.0 | 100 | 6 | 124 | 79 | 400 | 400 |
| **VDHB25S** | 25 | 20 | 36 x 2 | 17 | 12.0 | 125 | 9 | 153 | 106 | 400 | 400 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: VDHB06ZS**

**Note:** The pressure specification PN for hand operated shut-off valves applies to the design factor 1.5 (according to DIN 3230 T5 and ISO 5208).




External threaded spindle and body of low grade forged stainless steel

Dimensions and pressures for reference only, subject to change.



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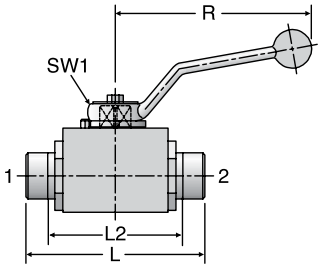
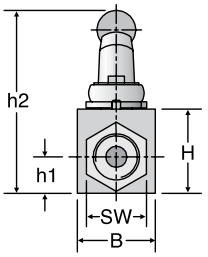
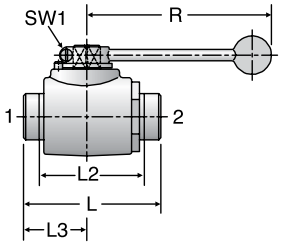
# KH

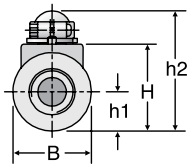
Two-Way Ball Valve
24° Flareless / 24° Flareless




**DN4 - DN25**




**DN32 - DN40**

| TUBE FITTING PART # | END SIZE (mm) | DN SIZE (mm) | L2 (mm) | L (mm) | h1 (mm) | h2 (mm) | H (mm | R (mm) | B (mm) | SW (mm) | SW1 (mm) | Pressure Rating (bar) EO CF | Pressure Rating (bar) EO2 CF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **KH06L** | 6 | 4 | 53 | 67 | 10.0 | 55.0 | 25 | 76 | 20 | 19 | 7 | 500 | 500 |
| **KH08L** | 8 | 6 | 53 | 67 | 10.0 | 55.0 | 25 | 76 | 20 | 19 | 7 | 500 | 500 |
| **KH10L** | 10 | 8 | 61 | 75 | 14.5 | 68.0 | 35 | 100 | 30 | 24 | 8 | 500 | 500 |
| **KH12L** | 12 | 10 | 61 | 75 | 14.5 | 68.0 | 35 | 100 | 30 | 24 | 8 | 500 | 500 |
| **KH15L** | 15 | 12 | 69 | 83 | 17.0 | 92.0 | 40 | 112 | 35 | 30 | 10 | 500 | 500 |
| **KH18L** | 18 | 16 | 67 | 82 | 20.0 | 105.0 | 45 | 166 | 45 | 36 | 11 | 400 | 400 |
| **KH22L** | 22 | 20 | 84 | 99 | 24.0 | 113.0 | 55 | 187 | 45 | 41 | 14 | 400 | 400 |
| **KH28L** | 28 | 25 | 93 | 108 | 26.0 | 118.0 | 60 | 187 | 55 | 50 | 14 | 400 | 400 |
| **KH35L** | 35 | 32 | 100 | 121 | 36.5 | 180.5 | 80 | 320 | 73 | 60 | 17 | 315 | 315 |
| **KH42L** | 42 | 40 | 96 | 118 | 42.5 | 190.5 | 90 | 320 | 85 | 70 | 17 | 315 | 315 |
| **KH08S** | 8 | 4 | 59 | 73 | 10.0 | 55.0 | 25 | 76 | 20 | 19 | 7 | 500 | 500 |
| **KH10S** | 10 | 6 | 58 | 73 | 10.0 | 55.0 | 25 | 76 | 20 | 19 | 7 | 500 | 500 |
| **KH12S** | 12 | 8 | 62 | 77 | 14.5 | 68.0 | 35 | 100 | 30 | 24 | 8 | 500 | 500 |
| **KH14S** | 14 | 10 | 65 | 81 | 14.5 | 68.0 | 35 | 100 | 30 | 24 | 8 | 500 | 500 |
| **KH16S** | 16 | 12 | 70 | 87 | 17.0 | 92.0 | 40 | 112 | 35 | 30 | 10 | 500 | 500 |
| **KH20S** | 20 | 16 | 69 | 90 | 20.0 | 105.0 | 45 | 166 | 45 | 36 | 11 | 400 | 400 |
| **KH25S** | 25 | 20 | 83 | 107 | 24.0 | 113.0 | 55 | 187 | 45 | 41 | 14 | 400 | 400 |
| **KH30S** | 30 | 25 | 93 | 120 | 26.0 | 118.0 | 60 | 187 | 55 | 50 | 14 | 400 | 400 |
| **KH38S** | 38 | 32 | 95 | 127 | 36.5 | 180.5 | 80 | 320 | 73 | 60 | 17 | 315 | 315 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: KH08ZSCF.**

Dimensions and pressures for reference only, subject to change.



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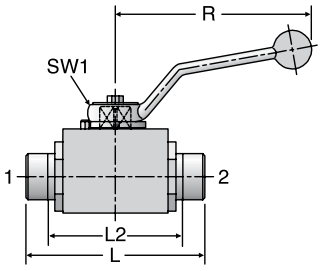
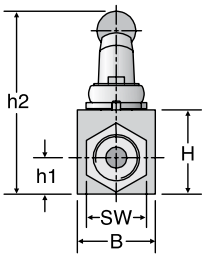
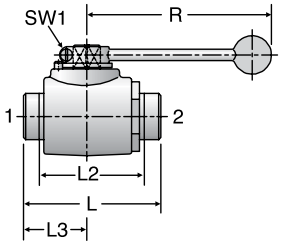
# KH

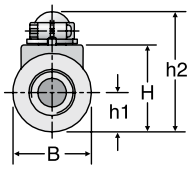
Two-Way Ball Valve
24° Flareless / 24° Flareless
Stainless Steel




**DN4 - DN25**




**DN32 - DN40**

| TUBE FITTING PART # | END SIZE (mm) | DN SIZE (mm) | L2 (mm) | L (mm) | h1 (mm) | h2 (mm) | H (mm) | R (mm) | B (mm) | SW (mm) | SW1 (mm) | Pressure Rating (bar) EO 71 | Pressure Rating (bar) EO2 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **KH06L71X** | 6 | 4 | 59 | 73 | 13.7 | 56.5 | 30.0 | 76 | 30 | 22 | 7 | 500 | 500 |
| **KH08L71X** | 8 | 6 | 59 | 73 | 13.7 | 56.5 | 30.0 | 76 | 30 | 22 | 7 | 500 | 500 |
| **KH10L71X** | 10 | 8 | 73 | 87 | 18.0 | 84.5 | 40.0 | 130 | 40 | 30 | 8 | 500 | 500 |
| **KH12L71X** | 12 | 10 | 73 | 87 | 18.0 | 84.5 | 40.0 | 130 | 40 | 30 | 8 | 500 | 500 |
| **KH15L71X** | 15 | 12 | 77 | 91 | 21.0 | 90.0 | 45.0 | 130 | 45 | 32 | 10 | 500 | 500 |
| **KH18L71X** | 18 | 16/12 | 76 | 91 | 21.0 | 90.0 | 45.0 | 130 | 45 | 32 | 10 | 500 | 500 |
| **KH22L71X** | 22 | 20 | 87 | 105 | 31.0 | 115.0 | 65.0 | 185 | 65 | 46 | 14 | 420 | 420 |
| **KH28L71X** | 28 | 25 | 92 | 112 | 38.0 | 125.0 | 75.0 | 185 | 75 | 58 | 14 | 420 | 420 |
| **KH35L71X** | 35 | 32 | 105 | 145 | 45.0 | 175.0 | 93.2 | 320 | 100 | 70 | 19 | 420 | 420 |
| **KH42L71X** | 42 | 40 | 114 | 150 | 52.5 | 186.0 | 104.4 | 320 | 110 | 80 | 19 | 420 | 420 |
| **KH08S71X** | 8 | 4 | 62 | 76 | 13.7 | 56.5 | 30.0 | 76 | 30 | 22 | 7 | 500 | 500 |
| **KH10S71X** | 10 | 6 | 61 | 76 | 13.7 | 56.5 | 30.0 | 76 | 30 | 22 | 7 | 500 | 500 |
| **KH12S71X** | 12 | 8 | 74 | 89 | 18.0 | 84.5 | 40.0 | 130 | 40 | 30 | 8 | 500 | 500 |
| **KH14S71X** | 14 | 10 | 77 | 93 | 18.0 | 84.5 | 40.0 | 130 | 40 | 30 | 8 | 500 | 500 |
| **KH16S71X** | 16 | 12 | 79 | 96 | 21.0 | 90.0 | 45.0 | 130 | 45 | 32 | 10 | 500 | 500 |
| **KH20S71X** | 20 | 16/12 | 78 | 99 | 21.0 | 90.0 | 45.0 | 130 | 45 | 32 | 10 | 500 | 500 |
| **KH25S71X** | 25 | 20 | 86 | 113 | 31.0 | 115.0 | 65.0 | 185 | 65 | 46 | 14 | 420 | 420 |
| **KH30S71X** | 30 | 25 | 93 | 124 | 38.0 | 125.0 | 75.0 | 185 | 75 | 50 | 14 | 420 | 420 |
| **KH38S71X** | 38 | 32 | 100 | 145 | 45.0 | 175.0 | 93.2 | 320 | 100 | 70 | 19 | 420 | 420 |

**For EO-2 part number, insert "Z" between size and pressure series.**
**Example: KH08ZSCF.**

Dimensions and pressures for reference only, subject to change.



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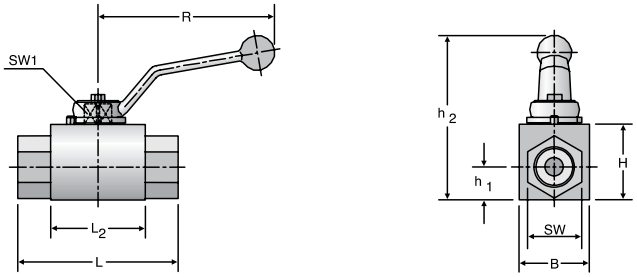
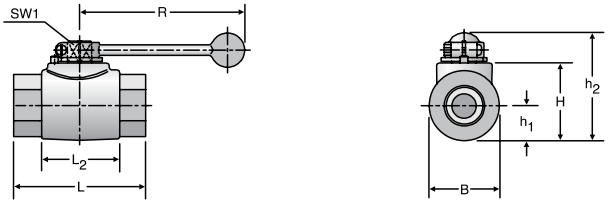
Two-Way Ball Valve
Female BSPP / Female BSPP
Female NPT / Female NPT




DN4-DN25




DN32-DN40

| TUBE FITTING PART # | END SIZE 1 & 2 NPT / BSPP | DN SIZE (mm) | B (mm) | h1 (mm) | h2 (mm) | H (mm) | L (mm) | L2 (mm) | R (mm) | SW (mm) | SW1 (mm) | Pressure Rating (bar) EO | Pressure Rating (bar) CF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **KH1/8X** | G 1/8-28 | 4 | 20 | 10.0 | 55.0 | 25.0 | 69 | 36 | 76 | 19 | 7 | 500 | 500 |
| **KH1/4X** | G 1/4-19 | 6 | 20 | 10.0 | 55.0 | 25.0 | 69 | 36 | 76 | 19 | 7 | 500 | 500 |
| **KH3/8X** | G 3/8-19 | 10 | 30 | 14.5 | 68.0 | 35.0 | 73 | 45 | 100 | 24 | 8 | 500 | 500 |
| **KH1/2X** | G 1/2-14 | 12 | 35 | 17.0 | 92.0 | 40.0 | 82 | 51 | 112 | 30 | 10 | 500 | 500 |
| **KH5/8X** | G 5/8-14 | 16 | 40 | 20.0 | 105.0 | 45.0 | 88 | 50 | 166 | 36 | 11 | 400 | 400 |
| **KH3/4X** | G 3/4-14 | 20 | 45 | 24.0 | 113.0 | 55.0 | 93 | 60 | 187 | 41 | 14 | 400 | 400 |
| **KH1X** | G 1-11 | 25 | 55 | 26.0 | 118.0 | 60.0 | 113 | 70 | 187 | 50 | 14 | 400 | 400 |
| **KH11/4X** | G 1 1/4-11 | 32 | 73 | 36.5 | 180.5 | 80.0 | 110 | 70 | 320 | 60 | 17 | 315 | 315 |
| **KH11/2X** | G 1 1/2-11 | 40 | 85 | 42.5 | 190.5 | 90.0 | 114 | 75 | 320 | 70 | 17 | 315 | 315 |
| **KH1/871X** | G 1/8-28 | 4 | 30 | 13.7 | 56.5 | 30.0 | 69 | 41 | 76 | 22 | 7 | 500 | 500 |
| **KH1/471X** | G 1/4-19 | 6 | 30 | 13.7 | 56.5 | 30.0 | 75 | 41 | 76 | 22 | 7 | 500 | 500 |
| **KH3/871X** | G 3/8-19 | 10 | 40 | 18.0 | 84.5 | 40.0 | 86 | 53 | 130 | 30 | 8 | 500 | 500 |
| **KH1/271X** | G 1/2-14 | 12 | 45 | 21.0 | 90.0 | 45.0 | 92 | 55 | 130 | 32 | 10 | 500 | 500 |
| **KH3/471X** | G 3/4-14 | 20 | 65 | 31.0 | 115.0 | 65.0 | 111 | 65 | 185 | 46 | 14 | 420 | 420 |
| **KH171X** | G 1-11 | 25 | 75 | 38.0 | 125.0 | 75.0 | 122 | 71 | 185 | 50 | 14 | 420 | 420 |
| **KH11/471X** | G 1 1/4-11 | 32 | 100 | 45.0 | 175.0 | 93.2 | 110 | 86 | 320 | 70 | 19 | 420 | 420 |
| **KH11/271X** | G 1 1/2-11 | 40 | 110 | 52.2 | 186.0 | 104.4 | 120 | 92 | 320 | 80 | 19 | 420 | 420 |
| **KH1/8NPTX** | 1/8-27 | 4 | 20 | 10.0 | 55.0 | 25.0 | 69 | 36 | 76 | 19 | 7 | 500 | 500 |
| **KH1/4NPTX** | 1/4-18 | 6 | 20 | 10.0 | 55.0 | 25.0 | 69 | 36 | 76 | 19 | 7 | 500 | 500 |
| **KH3/8NPTX** | 3/8-18 | 10 | 30 | 14.5 | 68.0 | 35.0 | 73 | 45 | 100 | 24 | 8 | 500 | 500 |
| **KH1/2NPTX** | 1/2-14 | 12 | 35 | 17.0 | 92.0 | 40.0 | 82 | 51 | 112 | 30 | 10 | 500 | 500 |
| **KH3/4NPTX** | 3/4-14 | 20 | 45 | 24.0 | 113.0 | 55.0 | 93 | 60 | 187 | 41 | 14 | 400 | 400 |
| **KH1NPTX** | 1-11 1/2 | 25 | 55 | 26.0 | 118.0 | 60.0 | 113 | 70 | 187 | 50 | 14 | 400 | 400 |
| **KH11/4NPTX** | 1 1/4-11 1/2 | 32 | 73 | 36.5 | 108.5 | 80.0 | 110 | 70 | 320 | 60 | 17 | 315 | 315 |
| **KH11/2NPTX** | 1 1/2-11 1/2 | 40 | 85 | 42.5 | 190.5 | 90.0 | 114 | 75 | 320 | 70 | 17 | 315 | 315 |
| **KH1/8NPT71X** | 1/8-27 | 4 | 30 | 13.7 | 56.5 | 30.0 | 82 | 41 | 76 | 22 | 7 | 500 | 500 |
| **KH1/4NPT71X** | 1/4-18 | 6 | 30 | 13.7 | 56.5 | 30.0 | 82 | 41 | 76 | 22 | 7 | 500 | 500 |
| **KH3/8NPT71X** | 3/8-18 | 10 | 40 | 18.0 | 84.5 | 40.0 | 95 | 53 | 130 | 30 | 8 | 500 | 500 |
| **KH1/2NPT71X** | 1/2-14 | 12 | 45 | 21.0 | 90.0 | 45.0 | 108 | 55 | 130 | 32 | 10 | 500 | 500 |
| **KH3/4NPT71X** | 3/4-14 | 20 | 65 | 31.0 | 115.0 | 65.0 | 111 | 65 | 185 | 46 | 14 | 420 | 420 |
| **KH1NPT71X** | 1-11 1/2 | 25 | 75 | 38.0 | 125.0 | 75.0 | 122 | 71 | 185 | 50 | 14 | 420 | 420 |
| **KH11/4NPT71X** | 1 1/4-11 1/2 | 32 | 100 | 45.0 | 175.0 | 93.2 | 110 | 86 | 320 | 70 | 19 | 420 | 420 |
| **KH11/2NPT71X** | 1 1/2-11 1/2 | 40 | 110 | 52.2 | 186.0 | 104.4 | 120 | 92 | 320 | 80 | 19 | 420 | 420 |

**Note:** Omit “CF” in the part number for steel material.

Dimensions and pressures for reference only, subject to change.



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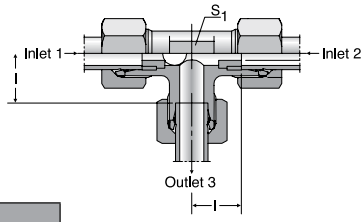
# WV

Alternating Valve
24° Flareless




| TUBE FITTING PART # | END SIZE 1 - 3 (mm) | I (mm) | S1 (mm) | Pressure Rating (bar) EO CF |
|---|---|---|---|---|
| **WV08L** | 8 | 14 | 14 | 160 |
| **WV10L** | 10 | 15 | 17 | 160 |
| **WV12L** | 12 | 17 | 19 | 160 |
| **WV15L** | 15 | 21 | 19 | 160 |

Dimensions and pressures for reference only, subject to change.



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# Pipe Fittings and Port Adapters

F

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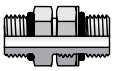
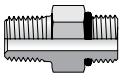
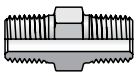
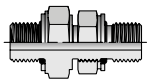
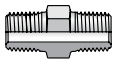
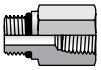
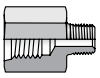
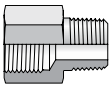
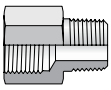
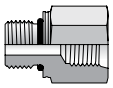
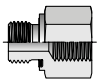
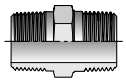
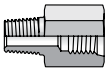
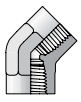
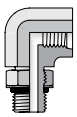
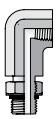
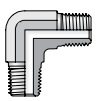
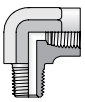
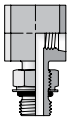
|---|---|---|---|---|---|
| **Nipples** | **F5OHAO**<br>SAE-ORB / SAE-ORB<br>  <br>F11 | **F5OF**<br>SAE-ORB / NPTF<br>  <br>F11 | **FF**<br>NPTF / NPTF<br>  <br>F11 | **FFF**<br>NPTF / NPTF Long<br> <br>F11 | **F8OHA8O**<br>Metric-ORR / Metric-ORR<br>  <br>F12 |
| **FF33M**<br>BSPT / BSPT<br>  <br>F12 | **Couplings** | **G5HG5**<br>SAE-ORB / SAE-ORB<br> <br>F12 | **GG**<br>NPTF / NPTF<br> <br>F12 | **G8HG8**<br>Metric-ORR / Metric-ORR<br> <br>F13 | **GG44M**<br>BSPP / BSPP<br> <br>F13 |
| **Reducers, Expanders, Conversions** | **F5OG5**<br>SAE-ORB / SAE-ORB<br> <br>F13 | **F5OG**<br>SAE-ORB / NPTF<br>  <br>F13 | **F5OHG8**<br>SAE-ORB / Metric<br> <br>F14 | **F5OHF42**<br>SAE-ORB / BSPP-ED<br> <br>F14 | **F5OHG4**<br>SAE-ORB / BSPP<br> <br>F14 |
| **FHG5**<br>NPTF / SAE-ORB<br>  <br>F14 | **FG**<br>NPTF / NPTF<br> <br>F15 | **PTR**<br>Pipe Thread Reducer<br> <br>F15 | **FHG8**<br>NPTF / Metric<br>  <br>F15 | **FHG4**<br>NPTF / BSPP<br>  <br>F15 | **F87OHG87M**<br>ISO 6149 / ISO 6149<br>  <br>F16 |
| **F8OHG5**<br>Metric-ORR / SAE-ORB<br> <br>F16 | **F8OHG**<br>Metric-ORR / NPTF<br> <br>F16 | **F82HG8**<br>Metric-ED / Metric-ORR<br>  <br>F17 | **F4OHG5**<br>BSPP-ORR / SAE-ORB<br> <br>F17 | **F4OHG**<br>BSPP-ORR / NPTF<br> <br>F17 | **GHG4**<br>BSPP / NPTF<br> <br>F17 |
| **PTR34M**<br>BSPT / BSPP<br> <br>F17 | **RI-ED**<br>BSPP-ED / BSPP<br> <br>F18 | **RI**<br>BSPP-CF / BSPP<br> <br>F19 | **FHF3**<br>BSPT / NPTF<br>  <br>F20 | **F3HG**<br>BSPT/ NPTF<br> <br>F20 | **F3HG5**<br>BSPT / SAE-ORB<br>  <br>F20 |
| **45° Elbows** | **CD45**<br>NPTF / NPTF<br> <br>F20 | **DD45**<br>NPTF / NPTF<br>  <br>F21 | **90° Elbows** | **AOEG5**<br>SAE-ORB / SAE-ORB<br>  <br>F21 | **AOEG**<br>SAE-ORB / NPTF<br> <br>F21 |
| **AOE4G**<br>SAE-ORB / NPTF Long<br>  <br>F21 | **CR**<br>NPTF / NPTF<br>  <br>F22 | **CD**<br>NPTF / NPTF<br>  <br>F22 | **DD**<br>NPTF / NPTF<br> <br>F22 | **A87LPOEG87LPM**<br>ISO 6149 / ISO 6149<br>  <br>F23 | **Tees** |



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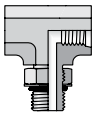
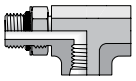
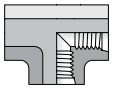
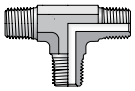
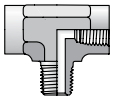
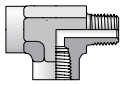
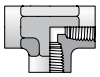
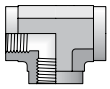
| **G5G5JAO**<br>SAE-ORB Branch Tee<br>  <br>F23 | **AOG5JG5**<br>SAE-ORB Run Tee<br>  <br>F24 | **G5G5JG5**<br>SAE-ORB Tee<br>  <br>F24 | **RRS**<br>NPTF Tee<br>  <br>F24 | **MMS**<br>NPTF Branch Tee<br>  <br>F24 | **MRO**<br>NPTF Run Tee<br>  <br>F24 |
| **MMO**<br>NPTF Tee<br>  <br>F25 | **MMO444M**<br>BSPP Tee<br>  <br>F25 | **Cross** | **KMMOO**<br>NPTF Cross<br> <br>F25 | **Plugs, Bleed Adapters** | **P5ON**<br>SAE-ORB Hex Head<br> <br>F25 |
| **HP5ON**<br>SAE-ORB Hollow Hex<br> <br>F26 | **HP**<br>NPTF Hex Head<br> <br>F26 | **SHP**<br>NPTF Square Head<br> <br>F26 | **HHP**<br>NPTF Hollow Hex Head<br> <br>F26 | **HPC**<br>NPTF Pipe Cap<br> <br>F27 | **P87OMN**<br>ISO 6149 Hex Head<br> <br>F27 |
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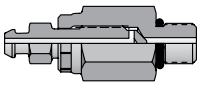
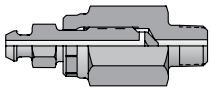
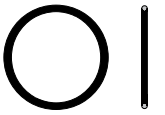
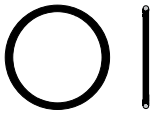
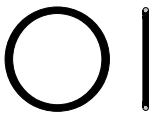
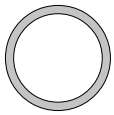
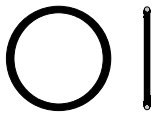
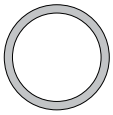
## Diagnostic, Orifice and Bleed Adapters (Shown in Section M)

| | | |
|---|---|---|
| **Bleed Adapters** | **P5ONBA**<br>Bleed Screw / Bleed Adapter<br>  <br>M10 | **HPBA**<br>Bleed Screw / NPT<br>  <br>M10 |

## O-Rings and Seals (Shown in Section N)

| | | | | | |
|---|---|---|---|---|---|
| **O-Rings and Seals** | **SAE O-Ring**<br>  <br>N4 | **ISO 6149 O-Ring**<br>  <br>N5 | **Metric O-Ring**<br>  <br>N5 | **Metric Retaining Ring**<br>  <br>N5 | **BSPP O-Ring**<br>  <br>N6 |
| **BSPP Retaining Ring**<br>  <br>N6 | **EOlastic Seal Ring**<br> <br>N6 | | | | |



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# Pipe Fittings and Port Adapters

This Section contains adapters with thread types including: NPT, NPTF, BSPT, BSPP, SAE UN/UNF, and Metric. All the threads in this section are made to industry specifications with conformance shown in Table F1.

# Design and Construction

Shaped products (elbows, tees and crosses) are hot forged and machined, while straights are manufactured from cold drawn barstock. Where applicable, these products are made in conformance with the design criteria of the Society of Automotive Engineers Standards, SAE J514, J530.

Parker Fluid Connector products made from steel and brass, for the most part, have NPTF threads. Stainless steel products may have NPT or slightly modified NPT threads to minimize the chance of galling on assembly.

**Standard Material Specifications:** The standard materials used in the manufacture of Industrial Pipe and Adapter fittings are shown in Table U1 on page U2.

**Note:** Upon request, pipe fittings, adapters and plugs could be furnished in materials other than those shown in the material specifications chart.

**Finish** - Zinc plating with silver chromate (zinc chromium 6 free) is used on all standard steel products. Stainless steel fittings are passivated.

# How Port Connections Work

**Tapered ("Pipe") Threads**

There are three types of tapered threads commonly used in industrial applications.

- NPT/NPTF
- BSPT
- Metric Taper

All three thread styles noted above use the same basic metal-to-metal sealing design for achieving a seal. Although very similar, there are differences in the thread dimensions, pitch, and flank angle that do not allow interchangeability.

**NPT / NPTF Threads**

NPT threads, when assembled without a sealant, leave a spiral leak path at the crest-root junction as shown in Fig. F1. To seal pressurized fluid, NPT threads require a suitable sealant. NPTF threads (Dryseal), on the other hand, when assembled, do not leave the spiral leak path. This is because they have controlled truncation at the crest and root, ensuring metal-to-metal crest-root contact prior to, or just as the male-female thread flanks make contact as seen in Fig. F2. Upon further tightening, the thread crests are flattened out until the flanks also make metal-to-metal contact as seen in Fig. F3. Thus, theoretically at least, there is no passage left for the fluid to leak, provided all surfaces are flawless and dimensions exact. **In reality, this is not the case and a sealant/lubricant is necessary to achieve a leak free joint, even with NPTF threads.** The sealant/lubricant fills all imperfections in the surfaces affecting the seal and also provides lubrication to ease assembly and minimize galling.

# Assembly and Installation

Please refer to Section S for the assembly and installation instructions for Pipe Fittings and Port Adapters.

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| Thread | Standard |
|---|---|
| NPT | ANSI B1.20.1, FED-STD-H28/7 |
| NPTF | SAE J476, ANSI B1.20.3, FED-STD-H28/8 |
| BSPT | BS 21, ISO 7/1 |
| BSPP | BS 2779, ISO 228/1 |
| Metric | ISO 261, ANSI B1.13M, FED-STD-H28/21 |
| UN/UNF* | ANSI B1.1, FED-STD-H28/2 |

*Class 2A or 2B

**Table F1 — Thread Conformance Standards**

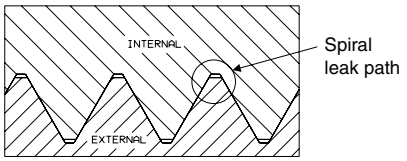


**Fig. F1 — NPT: Wrench Tight, No Crest-Root Contact, Flank Contact Only**

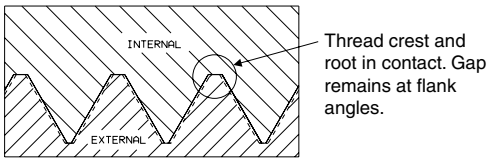


**Fig. F2 — NPTF: Hand Tight, Crest to Root Contact**

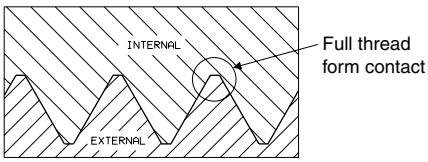


**Fig. F3 — NPTF: Wrench Tight, Crest to Root and Flank Contact**

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### Application Guidelines for Tapered Threads

#### Straight Connectors with NPT/NTPF 3/4-14 and Smaller

Straight connectors with 3/4-14 NPT/NPTF and smaller male pipe threads have very high pressure holding capability and seal reliability when used in applications without “make and break” (such as maintenance) requirements.

They are also well suited for low cycle non-pulsating (static) applications with pressures in excess of 6,000 psi.

#### Straight Connectors with NPT/NPTF above 3/4 -14 and All Shaped Connectors with NPT/NPTF Threads

It is difficult to always tighten shapes with pipe threads to an optimum tightness level because of orientation requirements. Also, all connectors in this category with pipe threads have low reliability for leak free operation in dynamic applications. Therefore, they are not preferred where a leak free joint is required.

#### All NPTF Connectors

While a pipe thread connection can be disassembled and re-assembled in low-pressure systems, it is not intended to be a frequently assembled and disassembled connection. (When connectors are known to be disassembled and re-assembled repeatedly, pipe connections are not preferred for high-pressure systems.)

For the above applications, a port connection with an elastomeric seal, such as SAE straight thread port (SAE J1926/ISO11926), SAE four bolt split flange (SAE J518/ISO 6162), and ISO 6149 is recommended. For applications where elastomeric seals can’t be used, consult the manufacturer.

As noted, BSPT and metric taper are designed and perform similarly. Follow the NPT/NPTF guidelines for their application.

In general, tapered thread connections have the following limitations which should be considered when specifying port connections:

- Poor dynamic sealing characteristics
- Possible expansion, and even cracking, of the port
- Orientation is a concern in shaped connectors
- Larger threads are more prone to leakage because of more potential leak points
- System contamination due to thread sealant
- Prone to galling, especially in stainless steel
- Limited remakeability

### Parallel Thread Adapters

Straight, or parallel, thread ports in various forms are becoming more popular in hydraulic systems because they are more reliable and easier to service.

Three types of threads are used for parallel thread ports:

- UN/UNF (SAE straight thread)
- BSPP (British Standard Pipe, Parallel)
- Metric parallel

Because parallel threads only serve one function (i.e. holding the fitting in place), some other means of sealing is always present, such as an elastomeric O-ring or a metal seal. There are many variations of sealing methods, and in some cases, they are interchangeable among the different thread forms and may appear to be similar.

### UN / UNF Threads

SAE J1926 uses **UN/UNF** threads and is often referred to as SAE Straight Thread. The female port is often referred to as ORB or O-ring boss. This port style, shown in Fig. F4, is widely used in North America.

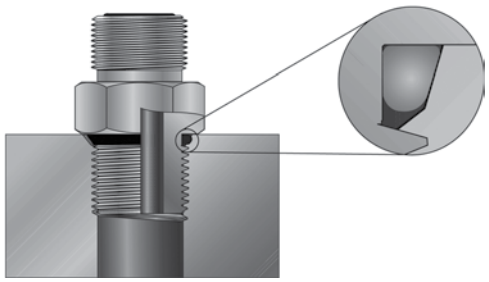

**Fig. F4 — Typical O-Ring Boss Port**

### BSPP

In Europe, Japan and many other former Commonwealth nations, the British Standard Pipe thread form, BSP, is still used extensively to connect pipes and components in hydraulic systems. The BSP thread is offered in a straight (parallel) form known as BSPP and a tapered form known as BSPT. These threads feature a 55° flank angle. Fittings in this section with male BSPP threads use a primary sealing method of an O-ring and retaining ring, as shown in Fig. F5.

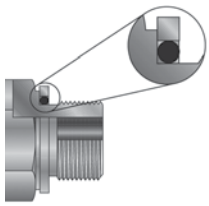

**Fig. F5 — O-Ring with Retaining Ring**

Additional sealing methods such as a cutting face or an EOlastic seal, as shown in Fig. G6, are also available on other fittings within the catalog. These BSPP fittings are all designed to thread into a female BSPP port (ISO 1179), however, the seal is created with one of the aforementioned sealing methods, not with the threads. It is also important to note that with these BSPP threaded connections, the seal occurs on the port surface, or spotface, not in an O-ring gland or chamfer as SAE and ISO-6149 straight thread do. A detail of the BSPP port is shown on page T35.

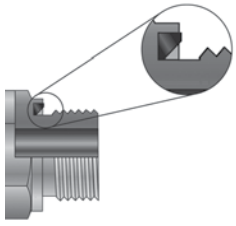

**Fig. F6 — O-Ring in Fitting Groove**



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**Metric Parallel**

In Europe, primarily in Germany, the traditional metric parallel thread form is used extensively to connect components in hydraulic systems. This metric thread is designed to thread into and seal in a female Metric parallel port conforming to ISO-9974-1 (DIN-3852, Part 1). Fittings in this section with male metric threads use a primary sealing method of an O-ring and retaining ring (similar to Fig. F5). Additional sealing methods such as a cutting face or an EOlastic seal (similar to Fig. F6) are also available on other fittings within the catalog. Sealing is accommodated with one of the aforementioned sealing methods, not with the threads. It is also important to note that with these male metric threads, the seal occurs on the top face (spotface) of the port, not in an O-ring gland or chamfer as in SAE and ISO-6149 straight threads. A detail of this metric port is shown on page T32.

To minimize further proliferation of additional port thread styles, the International Standards Organization Technical Committee 131 completed the development of a world standard leak-free port connection. It is recommended that this port, ISO 6149-1, be specified in all new hydraulic fluid power applications. Parker and other fluid connector manufacturers have expanded product offering to incorporate the ISO 6149 male studs as a standard on many tube fitting products. Parker offers the ISO 6149 male stud end, shown in Fig. F7, on several tube fitting products including: Seal-Lok, Triple-Lok, EO, EO-2, Conversion Adapters, Plugs, etc. This port, utilizes metric parallel threads for mechanical holding power and a sealing method similar to the proven SAE Straight Thread O-ring port. A detail of this metric port is shown on page T32.

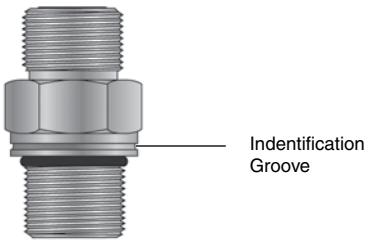


**Fig. F7 — ISO 6149 Male**

| Feature | Advantage | Benefit |
|---|---|---|
| **Tapered Thread Fittings** | | |
| Compact size | Suitable selection for plumbing in limited or tight space in a compact system. | Compact systems are more efficient and reduce the need for excessive routing of costly hose or tube |
| Widespread acceptability | Available worldwide for OEM and MRO applications | Eases efforts to find component parts and replacement fittings, reducing unnecessary downtime |
| High static pressure rating | Allows for use in high pressure applications | Increases versatility of fitting |
| Offered in three standard materials (Steel, Stainless Steel, and Brass) | Allows customer to match media and temperature applications without special fittings and seals. | Reduces component procurement costs and increases fitting availability |
| Adaptable to ORFS, Flareless Bite-type, Metric Bite-type, 37° flare, etc. | Versatility for end customer and for customer standardization efforts | Standardization reduces procurement costs |
| High temperature applications | Is not limited by temperature range of elastomeric seal | Increases versatility of fitting |
| **Straight Thread Fittings** | | |
| Reliable sealing in dynamics applications | Ideal in systems with high pressure and cycling | Provides reliable, long-term sealing |
| Unlimited reusability/ remakeability | Extends the service life of the fitting | Reduces maintenance costs and component replacement costs |
| No thread sealant needed | Eliminates the potential for contaminating and damaging sensitive hydraulic components due to thread sealant | Reduces maintenance costs and component replacement costs |
| Infinite positioning of shaped adapters | Eliminates potential of damaging adapter and/or component by incorrectly assembling to accomplish correct orientation | Improves assembly time and reduces maintenance costs |
| Elastomeric seal | Tolerant of minor surface imperfections to provide leak-free connection | Reduces operational and maintenance costs |

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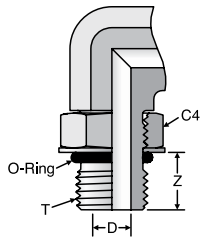
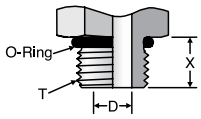
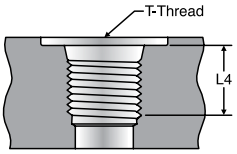
# Port Ends for SAE J1926-1 (ISO 11926-1) Port




**SAE J1926 Adjustable**




**SAE J1926 Nonadjustable**




**SAE J1926-1 Port**[2)]

| | Thread | Locknut Hex | Drill | Minimum Thread | Stud Length | |
|---|---|---|---|---|---|---|
| **SIZE** | **T** UN/UNF | **C4** (inch) | **D Ref.** (inch) | **L4 Min** (inch) | **X** (inch) | **Z Max** (inch) |
| **LIGHT DUTY (TRIPLE-LOK, FERULOK, ADAPTERS)** | | | | | | |
| **2** | 5/16-24 | 7/16 | 0.063 | 0.390 | 0.297 | 0.36 |
| **3** | 3/8-24 | 1/2 | 0.126 | 0.390 | 0.297 | 0.33 |
| **4** | 7/16-20 | 9/16 | 0.177 | 0.454 | 0.360 | 0.39 |
| **5** | 1/2-20 | 5/8 | 0.236 | 0.454 | 0.360 | 0.43 |
| **6** | 9/16-18 | 11/16 | 0.295 | 0.500 | 0.391 | 0.43 |
| **8** | 3/4-16 | 7/8 | 0.394 | 0.562 | 0.438 | 0.49 |
| **10** | 7/8-14 | 1 | 0.492 | 0.656 | 0.500 | 0.56 |
| **12** | 1 1/16-12 | 1 1/4 | 0.610 | 0.750 | 0.594 | 0.65 |
| **14** | 1 3/16-12 | 1 3/8 | 0.709 | 0.750 | 0.594 | 0.65 |
| **16** | 1 5/16-12 | 1 1/2 | 0.846 | 0.750 | 0.594 | 0.65 |
| **20** | 1 5/8-12 | 1 7/8 | 1.083 | 0.750 | 0.594 | 0.65 |
| **24** | 1 7/8-12 | 2 1/8 | 1.319 | 0.750 | 0.594 | 0.65 |
| **32** | 2 1/2-12 | 2 3/4 | 1.772 | 0.750 | 0.594 | 0.59 |
| **HEAVY DUTY (SEAL-LOK)** | | | | | | |
| **2** | 5/16-24 | 1/2 | 0.063 | 0.390 | 0.374 | 0.38 |
| **3** | 3/8-24 | 9/16 | 0.118 | 0.390 | 0.374 | 0.39 |
| **4** | 7/16-20 | 5/8 | 0.177 | 0.454 | 0.433 | 0.43 |
| **5** | 1/2-20 | 11/16 | 0.236 | 0.454 | 0.433 | 0.44 |
| **6** | 9/16-18 | 3/4 | 0.295 | 0.500 | 0.472 | 0.47 |
| **8** | 3/4-16 | 15/16 | 0.378 | 0.562 | 0.551 | 0.54 |
| **10** | 7/8-14 | 1 1/16 | 0.492 | 0.656 | 0.630 | 0.63 |
| **12** | 1 1/16-12 | 1 3/8 | 0.610 | 0.750 | 0.728 | 0.73 |
| **14** | 1 3/16-12 | 1 1/2 | 0.709 | 0.750 | 0.728 | 0.73 |
| **16** | 1 5/16-12 | 1 5/8 | 0.846 | 0.750 | 0.728 | 0.73 |
| **20** | 1 5/8-12 | 1 7/8 | 1.083 | 0.750 | 0.728 | 0.73 |
| **24** | 1 7/8-12 | 2 1/8 | 1.319 | 0.750 | 0.728 | 0.73 |
| **32** | 2 1/2-12 | 2 3/4 | 1.575 | 0.750 | 0.728 | 0.73 |

1) See page N3 for SAE O-rings.
2) See page T33 for port details.

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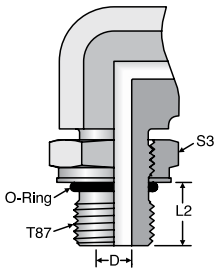


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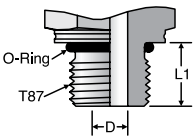
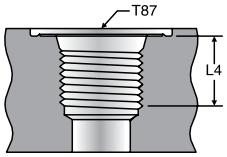



**ISO 6149 Nonadjustable**




**ISO 6149 Port**[2)]

| | Thread | Drill | Minimum Thread | Stud Length | | Lockhead Hex |
|---|---|---|---|---|---|---|
| **SIZE** | **T87** Metric | **D Ref.** (mm) | **L4 Min** (mm) | **L1** (mm) | **L2 Max** (mm) | **S3** (mm) |
| **LIGHT DUTY (TRIPLE-LOK, FERULOK, ADAPTERS)** | | | | | | |
| **M8** | M8X1 | 3 | 10.0 | 8.5 | 8.7 | 12 |
| **M10** | M10X1 | 4.5 | 10.0 | 8.5 | 8.7 | 14 |
| **M12** | M12X1.5 | 6 | 11.5 | 11.0 | 11.1 | 17 |
| **M14** | M14X1.5 | 7.5 | 11.5 | 11.0 | 11.1 | 19 |
| **M16** | M16X1.5 | 9 | 13.0 | 11.5 | 11.6 | 22 |
| **M18** | M18X1.5 | 11 | 14.5 | 12.5 | 12.6 | 24 |
| **M20** | M20X1.5 | — | 14.5 | | | — |
| **M22** | M22X1.5 | 14 | 15.5 | 13.0 | 13.0 | 27 |
| **M27** | M27X2 | 18 | 19.0 | 16.0 | 16.0 | 32 |
| **M30** | M30X2 | — | 19.0 | | | — |
| **M33** | M33X2 | 23 | 19.0 | 16.0 | 16.0 | 41 |
| **M38** | M38X2 | — | 19.0 | | | — |
| **M42** | M42X2 | 30 | 19.5 | 16.0 | 16.0 | 50 |
| **M48** | M48X2 | 36 | 22.0 | 17.5 | 17.3 | 55 |
| **M60** | M60X2 | 44 | 24.5 | 17.5 | 17.3 | 65 |
| **HEAVY DUTY (SEAL-LOK)** | | | | | | |
| **M8** | M8X1 | 2 | 10.0 | 9.5 | 9.7 | 12 |
| **M10** | M10X1 | 3 | 10.0 | 9.5 | 9.7 | 14 |
| **M12** | M12X1.5 | 4 | 11.5 | 11.0 | 11.1 | 17 |
| **M14** | M14X1.5 | 6 | 11.5 | 11.0 | 11.1 | 19 |
| **M16** | M16X1.5 | 7 | 13.0 | 12.5 | 12.6 | 22 |
| **M18** | M18X1.5 | 9 | 14.5 | 14.0 | 14.1 | 24 |
| **M20** | M20X1.5 | 11 | 14.5 | 14.0 | | — |
| **M22** | M22X1.5 | 12 | 15.5 | 15.0 | 15.0 | 27 |
| **M27** | M27X2 | 15 | 19.0 | 18.5 | 18.0 | 32 |
| **M30** | M30X2 | 18 | 19.0 | 18.5 | 18.5 | 36 |
| **M33** | M33X2 | 20 | 19.0 | 18.5 | 18.5 | 41 |
| **M38** | M38X2 | 26 | 19.0 | 18.5 | 19.0 | 46 |
| **M42** | M42X2 | 26 | 19.5 | 19.0 | 19.0 | 50 |
| **M48** | M48X2 | 32 | 22.0 | 21.5 | 21.5 | 55 |
| **M60** | M60X2 | 40 | 24.5 | 24.0 | 24.0 | 65 |

1) See page N5 for ISO 6149 O-rings.

2) See page T32 for port details.

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# NPTF and BSPT Port Ends

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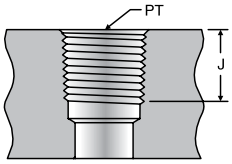
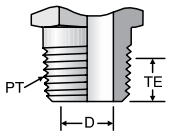



**NPTF and BSPT Port**




**NPTF and BSPT Stud**

| | Thread | Drill | Minimum Thread | Thread Engagement |
|---|---|---|---|---|
| **SIZE** | **PT** | **D Ref.** (inch) | **J** (inch) | **TE** (inch) |
| **NPTF** | | | | |
| **2** | 1/8-27 | 0.188 | 0.31 | 0.24 |
| **4** | 1/4-18 | 0.281 | 0.44 | 0.34 |
| **6** | 3/8-18 | 0.406 | 0.47 | 0.34 |
| **8** | 1/2-14 | 0.531 | 0.59 | 0.46 |
| **12** | 3/4-14 | 0.719 | 0.63 | 0.46 |
| **16** | 1-11 1/2 | 0.938 | 0.75 | 0.59 |
| **20** | 1 1/4-11 1/2 | 1.250 | 0.78 | 0.59 |
| **24** | 1 1/2-11 1/2 | 1.500 | 0.81 | 0.59 |
| **32** | 2-11 1/2 | 1.938 | 0.81 | 0.59 |
| **BSPT** | | | | |
| **2** | 1/8-28 | 0.188 | 0.31 | 0.24 |
| **4** | 1/4-19 | 0.281 | 0.44 | 0.34 |
| **6** | 3/8-19 | 0.406 | 0.47 | 0.34 |
| **8** | 1/2-14 | 0.531 | 0.59 | 0.46 |
| **12** | 3/4-14 | 0.719 | 0.63 | 0.46 |
| **16** | 1-11 | 0.938 | 0.75 | 0.59 |
| **20** | 1 1/4-11 | 1.250 | 0.78 | 0.59 |
| **24** | 1 1/2-11 | 1.438 | 0.81 | 0.59 |
| **32** | 2-11 | 1.938 | 0.81 | 0.59 |

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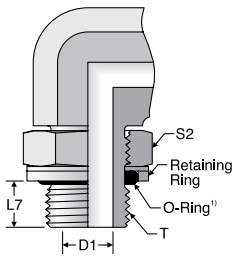
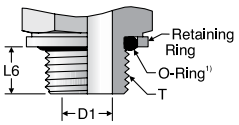
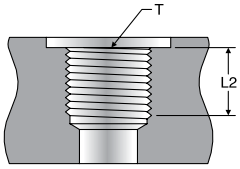


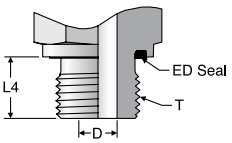

**ISO 9974 and 1179 Adjustable O-Ring with Retaining Ring2)**



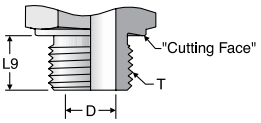

**ISO 9974 and 1179 Non-Adjustable O-Ring with Retaining Ring2)**



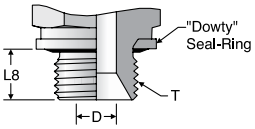

**ISO 9974[3] and 1179[4] Port**




**ISO 9974 and 1179 ED Seal**




**ISO 9974 and 1179 Cutting Face Seal**




**Dowty Seal Stud End for ISO 9974-1 and ISO 1179-1 Ports**

## ISO 9974

| | Thread | O-Ring, RR Stud | Light Duty (L Series) | Heavy Duty (S Series) | Port Min Depth | ED Stud | O-Ring, RR Non-Adj Stud | O-Ring, RR Adj-Stud | O-Ring, RR Adj-Stud, Locknut Hex | Dowty Seal Stud | Cutting Face Stud |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Drill Ref. | | | | | | | | | |
| **SIZE** | **T** Metric | **D1** (mm) | **D** (mm) | | **L2** (mm) | **L4** (mm) | **L6** (mm) | **L7** (mm) | **S2** (mm) | **L8** (mm) | **L9** (mm) |
| **M8** | M8X1 | 2 | — | — | 8 | — | 8.0 | 8.6 | 11 | — | 8 |
| **M10** | M10X1 | 4 | 4 | — | 8 | 8 | 8.0 | 8.7 | 14 | — | 8 |
| **M12** | M12X1.5 | 5 | 6 | 4 | 12 | 12 | 8.7 | 10.0 | 17 | — | 12 |
| **M14** | M14X1.5 | 7 | 7 | 5 | 12 | 12 | 8.7 | 10.0 | 19 | — | 12 |
| **M16** | M16X1.5 | 9 | 9 | 7 | 12 | 12 | 9.0 | 11.3 | 21 | — | 12 |
| **M18** | M18X1.5 | 11 | 11 | 8 | 12 | 12 | 11.0 | 12.2 | 22 | — | 12 |
| **M20** | M20X1.5 | 11 | - | 10 | 14 | 14 | 12.7 | — | — | — | 14 |
| **M22** | M22X1.5 | 13 | 14 | 12 | 14 | 14 | 12.7 | 13.7 | 27 | — | 14 |
| **M26** | M26X1.5 | 13 | 18 | — | 16 | 16 | 14.0 | — | — | — | 16 |
| **M27** | M27X2 | 16 | — | 16 | 16 | 16 | 15.0 | 16.8 | 32 | — | 16 |
| **M33** | M33X2 | 22 | 23 | 20 | 18 | 18 | 15.0 | 16.8 | 38 | — | 18 |
| **M42** | M42X2 | 28 | 30 | 25 | 20 | 20 | 15.5 | 17.3 | 48 | — | 20 |
| **M48** | M48X2 | 36 | 36 | 32 | 22 | 22 | 19.5 | 19.3 | 55 | — | 22 |
| **M60** | M60X2 | 44 | — | — | 24.5 | — | 20.5 | 22.3 | 65 | — | — |

## ISO 1179

| | Thread | O-Ring, RR Stud | Light Duty (L Series) | Heavy Duty (S Series) | Port Min Depth | ED Stud | O-Ring, RR Non-Adj Stud | O-Ring, RR Adj-Stud | O-Ring, RR Adj-Stud, Locknut Hex | Dowty Seal Stud | Cutting Face Stud |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Drill Ref. | | | | | | | | | |
| **SIZE** | **T** BSPP | **D1** (mm) | **D** (mm) | | **L2** (mm) | **L4** (mm) | **L6** (mm) | **L7** (mm) | **S2** (mm) | **L8** (mm) | **L9** (mm) |
| **2** | 1/8-28 | 4.4 | 4 | — | 8 | 8 | 6.3 | 7.2 | 14 | 8 | 8 |
| **4** | 1/4-19 | 7.5 | 7 | 5 | 12 | 12 | 9.4 | 9.4 | 19 | 11 | 12 |
| **6** | 3/8-19 | 9.9 | 9 | 8 | 12 | 12 | 9.4 | 9.3 | 22 | 12 | 12 |
| **8** | 1/2-14 | 12.3 | 14 | 12 | 14 | 14 | 12.6 | 13.1 | 30 | 14 | 14 |
| **12** | 3/4-14 | 15.5 | 18 | 16 | 16 | 16 | 12.6 | 13.1 | 36 | 16 | 16 |
| **16** | 1-11 | 21.5 | 23 | 20 | 18 | 18 | 16.0 | 14.7 | 46 | 16 | 18 |
| **20** | 1-1/4-11 | 27.5 | 30 | 25 | 20 | 20 | 16.0 | 14.7 | 50 | 19 | 20 |
| **24** | 1-1/2-11 | 33.0 | 36 | 32 | 22 | 22 | 16.0 | 14.7 | 55 | 22 | 22 |
| **32** | 2-11 | — | — | — | 26 | — | 16.0 | 14.7 | 75 | 25 | — |

1) See Section N for O-rings and seals.

2) O-ring with retaining ring stud ends are not shown in ISO 9974.

3) See page T36 for ISO 9974-1 port details.

4) See page T35 for ISO 1179-1 port details.

Dimensions and pressures for reference only, subject to change.



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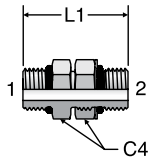
F

# F5OHAO

Straight Thread Union
SAE-ORB / SAE-ORB

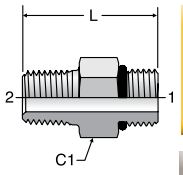
HPD Base # 0505




| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 UN/UNF-2A | C4 HEX (in.) | L1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **4 F5OHAO** | 7/16 - 20 | 7/16 - 20 | 9/16 | 1.27 | 6.0 | 6.0 | 3.3 |
| **6 F5OHAO** | 9/16 - 18 | 9/16 - 18 | 11/16 | 1.41 | 6.0 | 6.0 | 3.3 |
| **8 F5OHAO** | 3/4 - 16 | 3/4 - 16 | 7/8 | 1.64 | 6.0 | 6.0 | 3.3 |
| **10 F5OHAO** | 7/8 - 14 | 7/8 - 14 | 1 | 1.81 | 5.0 | 5.0 | 3.3 |
| **12 F5OHAO** | 1 1/16 - 12 | 1 1/16 - 12 | 1 1/4 | 2.13 | 5.0 | 5.0 | 3.3 |
| **16 F5OHAO** | 1 5/16 - 12 | 1 5/16 - 12 | 1 1/2 | 2.44 | 4.0 | 4.0 | 2.6 |
| **20 F5OHAO** | 1 5/8 - 12 | 1 5/8 - 12 | 1 7/8 | 2.44 | 4.0 | 4.0 | 2.6 |
| **24 F5OHAO** | 1 7/8 - 12 | 1 7/8 - 12 | 2 1/8 | 2.44 | 3.0 | 3.0 | 1.9 |
| **32 F5OHAO** | 2 1/2 - 12 | 2 1/2 - 12 | 2 3/4 | 2.44 | 2.0 | 2.0 | 1.3 |

# F5OF

Male Pipe Adapter
SAE-ORB / NPTF

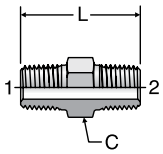



| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 NPTF | C1 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **4-1/8 F5OF** | 7/16 - 20 | 1/8 - 27 | 9/16 | 1.00 | 6.0 | 6.0 | 3.3 |
| **4-1/4 F5OF** | 7/16 - 20 | 1/4 - 18 | 9/16 | 1.20 | 6.0 | 6.0 | 3.3 |
| **5-1/4 F5OF** | 1/2 - 20 | 1/4 - 18 | 5/8 | 1.20 | 6.0 | 6.0 | 3.3 |
| **6-1/4 F5OF** | 9/16 - 18 | 1/4 - 18 | 11/16 | 1.25 | 6.0 | 6.0 | 3.3 |
| **6-3/8 F5OF** | 9/16 - 18 | 3/8 - 18 | 11/16 | 1.34 | 6.0 | 6.0 | 3.3 |
| **8-1/4 F5OF** | 3/4 - 16 | 1/4 - 18 | 7/8 | 1.36 | 6.0 | 6.0 | 3.3 |
| **8-3/8 F5OF** | 3/4 - 16 | 3/8 - 18 | 7/8 | 1.36 | 6.0 | 6.0 | 3.3 |
| **8-1/2 F5OF** | 3/4 - 16 | 1/2 - 14 | 7/8 | 1.53 | 6.0 | 6.0 | 3.3 |
| **10-1/2 F5OF** | 7/8 - 14 | 1/2 - 14 | 1 | 1.59 | 6.0 | 6.0 | 3.3 |
| **12-1/2 F5OF** | 1 1/16 - 12 | 1/2 - 14 | 1 1/4 | 1.80 | 5.0 | 6.0 | 3.3 |
| **12-3/4 F5OF** | 1 1/16 - 12 | 3/4 - 14 | 1 1/4 | 1.80 | 5.0 | 6.0 | 3.3 |
| **16-3/4 F5OF** | 1 5/16 - 12 | 3/4 - 14 | 1 1/2 | 1.78 | 4.5 | 5.4 | 2.9 |
| **16-1 F5OF** | 1 5/16 - 12 | 1 - 11 1/2 | 1 1/2 | 1.98 | 4.5 | 5.4 | 2.9 |
| **20-1 1/4 F5OF** | 1 5/8 - 12 | 1 1/4 - 11 1/2 | 1 7/8 | 2.02 | 3.0 | 3.6 | 1.9 |
| **24-1 1/2 F5OF** | 1 7/8 - 12 | 1 1/2 - 11 1/2 | 2 1/8 | 2.25 | 3.0 | 3.0 | 1.9 |

# FF

Pipe Nipple
NPTF / NPTF

HPD Base # 0101  SAE 140137

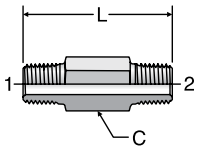



| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPTF | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8 FF** | 1/8 - 27 | 1/8 - 27 | 7/16 | 1.06 | 6.0 | 7.2 | 3.9 |
| **1/4 x 1/8 FF** | 1/4 - 18 | 1/8 - 27 | 5/8 | 1.25 | 6.0 | 7.2 | 3.9 |
| **1/4 FF** | 1/4 - 18 | 1/4 - 18 | 5/8 | 1.45 | 6.0 | 7.2 | 3.9 |
| **3/8 x 1/8 FF** | 3/8 - 18 | 1/8 - 27 | 3/4 | 1.27 | 6.0 | 7.2 | 3.9 |
| **3/8 x 1/4 FF** | 3/8 - 18 | 1/4 - 18 | 3/4 | 1.45 | 6.0 | 7.2 | 3.9 |
| **3/8 FF** | 3/8 - 18 | 3/8 - 18 | 3/4 | 1.45 | 6.0 | 7.2 | 3.9 |
| **1/2 x 1/8 FF** | 1/2 - 14 | 1/8 - 27 | 7/8 | 1.52 | 6.0 | 7.2 | 3.3 |
| **1/2 x 3/8 FF** | 1/2 - 14 | 3/8 - 18 | 7/8 | 1.70 | 6.0 | 7.2 | 3.9 |
| **1/2 x 1/4 FF** | 1/2 - 14 | 1/4 - 18 | 7/8 | 1.70 | 6.0 | 7.2 | 3.9 |
| **1/2 FF** | 1/2 - 14 | 1/2 - 14 | 7/8 | 1.89 | 6.0 | 7.2 | 3.9 |
| **3/4 x 1/4 FF** | 3/4 - 14 | 1/4 - 18 | 1 1/8 | 1.78 | 5.5 | 6.6 | 3.5 |
| **3/4 x 3/8 FF** | 3/4 - 14 | 3/8 - 18 | 1 1/8 | 1.78 | 5.5 | 6.6 | 3.3 |
| **3/4 x 1/2 FF** | 3/4 - 14 | 1/2 - 14 | 1 1/8 | 1.96 | 5.5 | 6.6 | 3.5 |
| **3/4 FF** | 3/4 - 14 | 3/4 - 14 | 1 1/8 | 1.96 | 5.5 | 6.6 | 3.5 |
| **1 x 1/4 FF** | 1 - 11 1/2 | 1/4 - 18 | 1 3/8 | 1.96 | 4.5 | 5.4 | 3.3 |
| **1 x 3/8 FF** | 1 - 11 1/2 | 3/8 - 18 | 1 3/8 | 1.96 | 4.5 | 5.4 | 3.3 |
| **1 x 1/2 FF** | 1 - 11 1/2 | 1/2 - 14 | 1 3/8 | 2.09 | 4.5 | 5.4 | 3.3 |
| **1 x 3/4 FF** | 1 - 11 1/2 | 3/4 - 14 | 1 3/8 | 2.09 | 4.5 | 5.4 | 3.3 |
| **1 FF** | 1 - 11 1/2 | 1 - 11 1/2 | 1 3/8 | 2.34 | 4.5 | 5.4 | 3.0 |
| **1 1/4 x 1 FF** | 1 1/4 - 11 1/2 | 1 - 11 1/2 | 1 3/4 | 2.45 | 3.0 | 3.6 | 2.3 |
| **1 1/4 FF** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 1 3/4 | 2.48 | 3.0 | 3.6 | 2.3 |
| **1 1/2 x 1 FF** | 1 1/2 - 11 1/2 | 1 - 11 1/2 | 2 | 2.55 | 3.0 | 3.6 | 2.3 |
| **1 1/2 FF** | 1 1/2 - 11 1/2 | 1 1/2 - 11 1/2 | 2 | 2.61 | 3.0 | 3.6 | 2.3 |
| **2 x 1 1/2 FF** | 2 - 11 1/2 | 1 1/2 - 11 1/2 | 2 1/2 | 2.79 | 2.0 | 2.4 | 1.5 |
| **2 FF** | 2 - 11 1/2 | 2 - 11 1/2 | 2 1/2 | 2.83 | 2.0 | 2.4 | 1.5 |

**Note:** All steel "FF" fittings have a 30° chamfer for sealing with NPSM swivel type fittings.

# FFF

Long Pipe Nipple
NPTF / NPTF




| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPTF | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8 x 1.5 FFF** | 1/8 - 27 | 1/8 - 27 | 7/16 | 1.5 | 6.0 | 7.2 | 3.9 |
| **1/8 x 2.0 FFF** | 1/8 - 27 | 1/8 - 27 | 7/16 | 2.0 | 6.0 | 7.2 | 3.9 |
| **1/8 x 2.5 FFF** | 1/8 - 27 | 1/8 - 27 | 7/16 | 2.5 | 6.0 | 7.2 | 3.9 |
| **1/8 x 3.0 FFF** | 1/8 - 27 | 1/8 - 27 | 7/16 | 3.0 | 6.0 | 7.2 | 3.9 |
| **1/4 x 1.5 FFF** | 1/4 - 18 | 1/4 - 18 | 5/8 | 1.5 | 6.0 | 7.2 | 3.9 |
| **1/4 x 2.0 FFF** | 1/4 - 18 | 1/4 - 18 | 5/8 | 2.0 | 6.0 | 7.2 | 3.9 |
| **1/4 x 2.5 FFF** | 1/4 - 18 | 1/4 - 18 | 5/8 | 2.5 | 6.0 | 7.2 | 3.9 |
| **1/4 x 3.0 FFF** | 1/4 - 18 | 1/4 - 18 | 5/8 | 3.0 | 6.0 | 7.2 | 3.9 |
| **1/4 x 4.0 FFF** | 1/4 - 18 | 1/4 - 18 | 5/8 | 4.0 | 6.0 | 7.2 | 3.9 |
| **3/8 x 2.0 FFF** | 3/8 - 18 | 3/8 - 18 | 3/4 | 2.0 | 6.0 | 7.2 | 3.3 |
| **3/8 x 3.0 FFF** | 3/8 - 18 | 3/8 - 18 | 3/4 | 3.0 | 6.0 | 7.2 | 3.3 |
| **3/8 x 3.5 FFF** | 3/8 - 18 | 3/8 - 18 | 3/4 | 3.5 | 6.0 | 7.2 | 3.3 |
| **3/8 x 4.0 FFF** | 3/8 - 18 | 3/8 - 18 | 3/4 | 4.0 | 6.0 | 7.2 | 3.3 |
| **1/2 x 2.0 FFF** | 1/2 - 14 | 1/2 - 14 | 7/8 | 2.0 | 6.0 | 7.2 | 3.3 |
| **1/2 x 2.5 FFF** | 1/2 - 14 | 1/2 - 14 | 7/8 | 2.5 | 6.0 | 7.2 | 3.3 |
| **1/2 x 3.0 FFF** | 1/2 - 14 | 1/2 - 14 | 7/8 | 3.0 | 6.0 | 7.2 | 3.9 |
| **1/2 x 4.0 FFF** | 1/2 - 14 | 1/2 - 14 | 7/8 | 4.0 | 6.0 | 7.2 | 3.3 |
| **1/2 x 6.0 FFF** | 1/2 - 14 | 1/2 - 14 | 7/8 | 6.0 | 6.0 | 7.2 | 3.3 |
| **3/4 x 3.0 FFF** | 3/4 - 14 | 3/4 - 14 | 1 1/8 | 3.0 | 5.5 | 6.6 | 3.3 |
| **1 x 3.0 FFF** | 1 - 11 1/2 | 1 - 11 1/2 | 1 3/8 | 3.0 | 4.5 | 5.4 | 3.3 |

Dimensions and pressures for reference only, subject to change.



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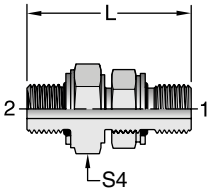
# F8OHA8O

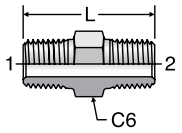
Metric Union
Metric-ORR / Metric-ORR
(for ISO 9974 / DIN 3852-1 Port




| TUBE FITTING PART # | End Size 1 Metric Str | End Size 2 Metric Str | S4 Hex (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **M10F8OHA8O** | M10X1 | M10X1 | 16 | 33.8 | 6.0 |
| **M12F8OHA8O** | M12X1.5 | M12X1.5 | 19 | 36.8 | 6.0 |
| **M14F8OHA8O** | M14X1.5 | M14X1.5 | 22 | 37.3 | 6.0 |
| **M16F8OHA8O** | M16X1.5 | M16X1.5 | 22 | 46.0 | 5.0 |
| **M18F8OHA8O** | M18X1.5 | M18X1.5 | 27 | 48.8 | 5.0 |
| **M20M18F8OHA8O** | M20X1.5 | M18X1.5 | 27 | 49.8 | 4.0 |
| **M22F8OHA8O** | M22X1.5 | M22X1.5 | 27 | 52.6 | 4.0 |
| **M27F8OHA8O** | M27X2 | M27X2 | 32 | 62.0 | 4.0 |
| **M33F8OHA8O** | M33X2 | M33X2 | 41 | 62.0 | 3.0 |

# FF33M

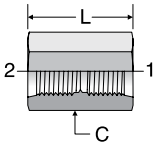
BSPT Pipe Nipple
BSPT / BSPT




| TUBE FITTING PART # | END SIZE 1 BSPT | END SIZE 2 BSPT | C6 HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **1/8FF33M** | 1/8 - 28 | 1/8 - 28 | 11 | 27 | 6.0 | 6.0 | 3.3 |
| **1/4x1/8FF33M** | 1/4 - 19 | 1/8 - 28 | 14 | 32 | 6.0 | 6.0 | 3.3 |
| **1/4FF33M** | 1/4 - 19 | 1/4 - 19 | 14 | 37 | 6.0 | 6.0 | 3.3 |
| **3/8x1/4FF33M** | 3/8 - 19 | 1/4 - 19 | 17 | 37 | 6.0 | 6.0 | 3.3 |
| **3/8FF33M** | 3/8 - 19 | 3/8 - 19 | 17 | 37 | 6.0 | 6.0 | 3.3 |
| **1/2FF33M** | 1/2 - 14 | 1/2 - 14 | 22 | 48 | 6.0 | 6.0 | 3.3 |
| **1/2x3/8FF33M** | 1/2 - 14 | 3/8 - 19 | 22 | 43 | 6.0 | 6.0 | 3.3 |
| **3/4FF33M** | 3/4 - 14 | 3/4 - 14 | 27 | 50 | 5.5 | 5.5 | 3.3 |
| **3/4x1/2FF33M** | 3/4 - 14 | 1/2 - 14 | 27 | 50 | 5.5 | 5.5 | 3.3 |
| **1X3/4FF33M** | 1 - 11 | 3/4 - 14 | 36 | 55 | 4.5 | 4.5 | 2.9 |
| **1FF33M** | 1 - 11 | 1 - 11 | 36 | 59 | 4.5 | 4.5 | 2.9 |

# G5HG5

Straight Thread Coupling
Female SAE / Female SAE

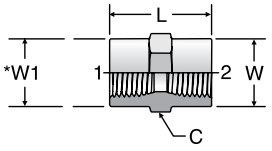



| TUBE FITTING PART # | END SIZE 1 UN/UNF-2B | END SIZE 2 UN/UNF-2B | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **4 G5HG5** | 7/16 - 20 | 7/16 - 20 | 11/16 | 1.13 | 7.0 | 6.0 | 3.3 |
| **6 G5HG5** | 9/16 - 18 | 9/16 - 18 | 13/16 | 1.26 | 6.0 | 6.0 | 3.3 |
| **8 G5HG5** | 3/4 - 16 | 3/4 - 16 | 1 | 1.42 | 5.0 | 5.0 | 3.3 |
| **10 G5HG5** | 7/8 - 14 | 7/8 - 14 | 1 3/16 | 1.60 | 4.5 | 4.5 | 2.9 |
| **12 G5HG5** | 1 1/16 - 12 | 1 1/16 - 12 | 1 3/8 | 1.85 | 4.5 | 4.5 | 2.9 |
| **16 G5HG5** | 1 5/16 - 12 | 1 5/16 - 12 | 1 5/8 | 1.85 | 3.5 | 3.5 | 2.2 |

# GG

Pipe Coupling
NPTF / NPTF

SAE 140138
HPD Base # 0202




| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPTF | C HEX (in.) | L (in.) | W1 (in.) | W (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|
| **1/8 GG** | 1/8 - 27 | 1/8 - 27 | 5/8 | 0.75 | 0.63 | 0.63 | 6.0 | 6.0 | 3.9 |
| **1/4 x 1/8 GG** | 1/4 - 18 | 1/8 - 27 | 3/4 | 0.94 | 0.75 | 0.63 | 6.0 | 6.0 | 3.9 |
| **1/4 GG** | 1/4 - 18 | 1/4 - 18 | 3/4 | 1.13 | 0.75 | 0.75 | 6.0 | 6.0 | 3.9 |
| **3/8 x 1/8 GG** | 3/8 - 18 | 1/8 - 27 | 7/8 | 1.03 | 0.88 | 0.63 | 6.0 | 6.0 | 3.9 |
| **3/8 x 1/4 GG** | 3/8 - 18 | 1/4 - 18 | 7/8 | 1.13 | 0.88 | 0.75 | 6.0 | 6.0 | 3.9 |
| **3/8 GG** | 3/8 - 18 | 3/8 - 18 | 7/8 | 1.13 | 0.88 | 0.88 | 6.0 | 6.0 | 3.9 |
| **1/2 x 1/8 GG** | 1/2 - 14 | 1/8 - 27 | 1 1/8 | 1.06 | 1.13 | 0.63 | 6.0 | 6.0 | 3.2 |
| **1/2 x 1/4 GG** | 1/2 - 14 | 1/4 - 18 | 1 1/8 | 1.38 | 1.13 | 0.75 | 5.0 | 6.0 | 3.2 |
| **1/2 x 3/8 GG** | 1/2 - 14 | 3/8 - 18 | 1 1/8 | 1.50 | 1.13 | 0.88 | 5.0 | 6.0 | 3.2 |
| **1/2 GG** | 1/2 - 14 | 1/2 - 14 | 1 1/8 | 1.50 | 1.13 | 1.13 | 5.0 | 6.0 | 3.2 |
| **3/4 x 1/4 GG** | 3/4 - 14 | 1/4 - 18 | 1 3/8 | 1.55 | 1.36 | 0.75 | 4.0 | 4.8 | 3.1 |
| **3/4 x 1/2 GG** | 3/4 - 14 | 1/2 - 14 | 1 3/8 | 1.88 | 1.36 | 1.13 | 4.0 | 4.8 | 3.1 |
| **3/4 GG** | 3/4 - 14 | 3/4 - 14 | 1 3/8 | 1.53 | 1.38 | 1.38 | 4.0 | 4.8 | 2.6 |
| **1 GG** | 1 - 11 1/2 | 1 - 11 1/2 | 1 5/8 | 1.89 | 1.63 | 1.63 | 3.0 | 3.6 | 1.9 |
| **1 x 1/2 GG** | 1 - 11 1/2 | 1/2 - 14 | 1 5/8 | 1.77 | 1.63 | 1.13 | 3.0 | 3.6 | 1.9 |
| **1 x 3/4 GG** | 1 - 11 1/2 | 3/4 - 14 | 1 5/8 | 1.77 | 1.63 | 1.38 | 3.0 | 3.6 | 1.9 |
| **1 1/4 GG** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 2 | 1.93 | 2.00 | 2.00 | 2.5 | 3.0 | 1.9 |
| **1 1/4 x 1 GG** | 1 1/4 - 11 1/2 | 1 - 11 1/2 | 2 | 1.93 | 2.00 | 1.63 | 2.5 | 3.0 | 1.9 |
| **1 1/2 GG** | 1 1/2 - 11 1/2 | 1 1/2 - 11 1/2 | 2 3/8 | 1.93 | 2.38 | 2.38 | 2.0 | 2.4 | 1.5 |
| **1 1/2 x 1 1/4 GG** | 1 1/2 - 11 1/2 | 1 1/4 - 11 1/2 | 2 3/8 | 1.93 | 2.37 | 2.37 | 2.0 | 2.4 | 1.5 |
| **2 GG** | 2 - 11 1/2 | 2 - 11 1/2 | 2 7/8 | 1.97 | 2.88 | 2.88 | 2.0 | 2.4 | 1.5 |

Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
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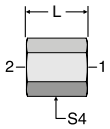
# G8HG8

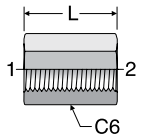
Metric Female Union
Metric-ORR / Metric-ORR
(for ISO 9974 / DIN 3852-1 Port)




| TUBE FITTING PART # | End Size 1 Metric Str | End Size 2 Metric Str | S4 Hex (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **M10G8HG8** | M10X1 | M10X1 | 17 | 19 | 6.0 |
| **M14G8HG8** | M14X1.5 | M14X1.5 | 22 | 28 | 6.0 |
| **M16G8HG8** | M16X1.5 | M16X1.5 | 24 | 29 | 6.0 |
| **M18G8HG8** | M18X1.5 | M18X1.5 | 27 | 29 | 6.0 |
| **M20G8HG8** | M20X1.5 | M20X1.5 | 32 | 32 | 5.0 |
| **M27G8HG8** | M27X2 | M27X2 | 38 | 38 | 5.0 |
| **M33G8HG8** | M33X2 | M33X2 | 46 | 44 | 5.0 |

# GG44M

BSPP Female Union
BSPP / BSPP

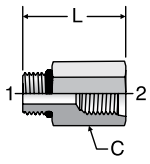



| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | C6 HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **1/8GG44M** | 1/8 - 28 | 1/8 - 28 | 14 | 19.0 | 6.0 | 6.0 | 3.3 |
| **1/4X1/8GG44M** | 1/4 - 19 | 1/8 - 28 | 17 | 24.0 | 6.0 | 6.0 | 3.3 |
| **1/4GG44M** | 1/4 - 19 | 1/4 - 19 | 17 | 28.0 | 6.0 | 6.0 | 3.3 |
| **3/8GG44M** | 3/8 - 19 | 3/8 - 19 | 22 | 28.0 | 6.0 | 6.0 | 3.3 |
| **3/8x1/4GG44M** | 3/8 - 19 | 1/4 - 19 | 22 | 28.0 | 6.0 | 6.0 | 3.3 |
| **1/2x3/8GG44M** | 1/2 - 14 | 3/8 - 19 | 27 | 31.0 | 5.0 | 5.0 | 3.3 |
| **1/2GG44M** | 1/2 - 14 | 1/2 - 14 | 27 | 32.5 | 5.0 | 5.0 | 3.3 |
| **1GG44M** | 1 - 11 | 1 - 11 | 46 | 42.0 | 3.0 | 3.0 | 1.9 |

# F5OG5

Straight Thread Reducer / Expander
SAE-ORB / SAE-ORB

SAE 090136
HPD Base # 0510

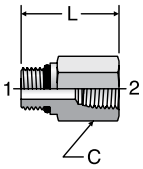



| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 UN/UNF-2B | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **2-4 F5OG5** | 5/16 - 24 | 7/16 - 20 | 11/16 | 1.03 | 7.5 | 7.5 | 3.3 |
| **4-4 F5OG5** | 7/16 - 20 | 7/16 - 20 | 11/16 | 1.08 | 7.5 | 7.5 | 3.3 |
| **4-6 F5OG5** | 7/16 - 20 | 9/16 - 18 | 13/16 | 1.16 | 6.0 | 6.0 | 3.3 |
| **6-4 F5OG5** | 9/16 - 18 | 7/16 - 20 | 11/16 | 1.03 | 6.0 | 6.0 | 3.3 |
| **6-6 F5OG5** | 9/16 - 18 | 9/16 - 18 | 13/16 | 1.16 | 6.0 | 6.0 | 3.3 |
| **6-8 F5OG5** | 9/16 - 18 | 3/4 - 16 | 1 1/16 | 1.38 | 6.0 | 6.0 | 3.3 |
| **8-4 F5OG5** | 3/4 - 16 | 7/16 - 20 | 7/8 | 1.13 | 6.0 | 6.0 | 3.3 |
| **8-6 F5OG5** | 3/4 - 16 | 9/16 - 18 | 7/8 | 1.13 | 6.0 | 6.0 | 3.3 |
| **8-10 F5OG5** | 3/4 - 16 | 7/8 - 14 | 1 1/8 | 1.56 | 4.5 | 4.5 | 2.9 |
| **10-4 F5OG5** | 7/8 - 14 | 7/16 - 20 | 1 | 0.81 | 5.0 | 5.0 | 3.3 |
| **10-6 F5OG5** | 7/8 - 14 | 9/16 - 18 | 1 | 1.26 | 5.0 | 5.0 | 3.3 |
| **10-8 F5OG5** | 7/8 - 14 | 3/4 - 16 | 1 | 1.31 | 5.0 | 5.0 | 3.3 |
| **10-12 F5OG5** | 7/8 - 14 | 1 1/16 - 12 | 1 3/8 | 1.69 | 4.5 | 4.5 | 2.9 |
| **12-4 F5OG5** | 1 1/16 - 12 | 7/16 - 20 | 1 1/4 | 1.00 | 5.0 | 5.0 | 3.3 |
| **12-6 F5OG5** | 1 1/16 - 12 | 9/16 - 18 | 1 1/4 | 1.00 | 5.0 | 5.0 | 3.3 |
| **12-8 F5OG5** | 1 1/16 - 12 | 3/4 - 16 | 1 1/4 | 1.45 | 5.0 | 5.0 | 3.3 |
| **12-10 F5OG5** | 1 1/16 - 12 | 7/8 - 14 | 1 1/4 | 1.53 | 5.0 | 5.0 | 3.3 |
| **12-16 F5OG5** | 1 1/16 - 12 | 1 5/16 - 12 | 1 5/8 | 1.88 | 3.5 | 3.5 | 2.2 |
| **16-6 F5OG5** | 1 5/16 - 12 | 9/16 - 18 | 1 1/2 | 1.00 | 4.5 | 4.5 | 2.9 |
| **16-8 F5OG5** | 1 5/16 - 12 | 3/4 - 16 | 1 1/2 | 1.00 | 4.5 | 4.5 | 2.9 |
| **16-10 F5OG5** | 1 5/16 - 12 | 7/8 - 14 | 1 1/2 | 1.00 | 4.5 | 4.5 | 2.9 |
| **16-12 F5OG5** | 1 5/16 - 12 | 1 1/16 - 12 | 1 1/2 | 1.75 | 4.5 | 4.5 | 2.9 |
| **16-20 F5OG5** | 1 5/16 - 12 | 1 5/8 - 12 | 2 1/8 | 1.97 | 3.0 | 3.0 | 1.9 |
| **20-6 F5OG5** | 1 5/8 - 12 | 9/16 - 18 | 1 7/8 | 1.00 | 4.0 | 4.0 | 2.6 |
| **20-8 F5OG5** | 1 5/8 - 12 | 3/4 - 16 | 1 7/8 | 1.00 | 4.0 | 4.0 | 2.6 |
| **20-10 F5OG5** | 1 5/8 - 12 | 7/8 - 14 | 1 7/8 | 1.00 | 4.0 | 4.0 | 2.6 |
| **20-12 F5OG5** | 1 5/8 - 12 | 1 1/16 - 12 | 1 7/8 | 1.00 | 4.0 | 4.0 | 2.6 |
| **20-16 F5OG5** | 1 5/8 - 12 | 1 5/16 - 12 | 1 7/8 | 1.72 | 4.0 | 4.0 | 2.6 |
| **20-24 F5OG5** | 1 5/8 - 12 | 1 7/8 - 12 | 2 1/2 | 1.88 | 3.0 | 3.0 | 1.9 |
| **24-6 F5OG5** | 1 7/8 - 12 | 9/16 - 18 | 2 1/8 | 1.00 | 3.0 | 3.0 | 1.9 |
| **24-12 F5OG5** | 1 7/8 - 12 | 1 1/16 - 12 | 2 1/8 | 1.00 | 3.0 | 3.0 | 1.9 |
| **24-16 F5OG5** | 1 7/8 - 12 | 1 5/16 - 12 | 2 1/8 | 1.00 | 3.0 | 3.0 | 1.9 |
| **24-20 F5OG5** | 1 7/8 - 12 | 1 5/8 - 12 | 2 1/8 | 1.75 | 3.0 | 3.0 | 1.9 |
| **32-20 F5OG5** | 2 1/2 - 12 | 1 5/8 - 12 | 2 3/4 | 1.00 | 2.0 | 2.0 | 1.3 |
| **32-24 F5OG5** | 2 1/2 - 12 | 1 7/8 - 12 | 2 3/4 | 1.80 | 2.0 | 2.0 | 1.3 |

# F5OG

Female Pipe Adapter
SAE-ORB / NPTF

SAE 090156




| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 NPTF | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **2-1/8 F5OG** | 5/16 - 24 | 1/8 - 27 | 9/16 | 0.91 | 6.0 | 6.0 | 3.3 |
| **4-1/8 F5OG** | 7/16 - 20 | 1/8 - 27 | 9/16 | 1.00 | 6.0 | 6.0 | 3.3 |
| **4-1/4 F5OG** | 7/16 - 20 | 1/4 - 18 | 3/4 | 1.16 | 6.0 | 6.0 | 3.3 |
| **5-1/8 F5OG** | 1/2 - 20 | 1/8 - 27 | 5/8 | 1.06 | 6.0 | 6.0 | 3.3 |
| **5-1/4 F5OG** | 1/2 - 20 | 1/4 - 18 | 3/4 | 1.19 | 6.0 | 6.0 | 3.3 |
| **6-1/8 F5OG** | 9/16 - 18 | 1/8 - 27 | 11/16 | 1.00 | 6.0 | 6.0 | 3.3 |
| **6-1/4 F5OG** | 9/16 - 18 | 1/4 - 18 | 3/4 | 1.16 | 6.0 | 6.0 | 3.3 |
| **6-3/8 F5OG** | 9/16 - 18 | 3/8 - 18 | 7/8 | 1.28 | 6.0 | 6.0 | 3.3 |
| **6-1/2 F5OG** | 9/16 - 18 | 1/2 - 14 | 1 1/8 | 1.53 | 5.0 | 6.0 | 3.3 |
| **8-1/8 F5OG** | 3/4 - 16 | 1/8 - 27 | 7/8 | 0.80 | 6.0 | 6.0 | 3.3 |
| **8-1/4 F5OG** | 3/4 - 16 | 1/4 - 18 | 7/8 | 1.13 | 6.0 | 6.0 | 3.3 |
| **8-3/8 F5OG** | 3/4 - 16 | 3/8 - 18 | 7/8 | 1.28 | 6.0 | 6.0 | 3.3 |
| **8-1/2 F5OG** | 3/4 - 16 | 1/2 - 14 | 1 1/8 | 1.50 | 5.0 | 6.0 | 3.3 |
| **10-1/4 F5OG** | 7/8 - 14 | 1/4 - 18 | 1 | 0.81 | 5.0 | 6.0 | 3.3 |
| **10-3/8 F5OG** | 7/8 - 14 | 3/8 - 18 | 1 | 1.31 | 5.0 | 6.0 | 3.3 |
| **10-1/2 F5OG** | 7/8 - 14 | 1/2 - 14 | 1 1/8 | 1.53 | 5.0 | 6.0 | 3.3 |
| **10-3/4 F5OG** | 7/8 - 14 | 3/4 - 14 | 1 3/8 | 1.63 | 4.0 | 4.0 | 2.6 |
| **12-1/4 F5OG** | 1 1/16 - 12 | 1/4 - 18 | 1 1/4 | 1.00 | 6.0 | 6.0 | 3.3 |
| **12-3/8 F5OG** | 1 1/16 - 12 | 3/8 - 18 | 1 1/4 | 1.34 | 5.0 | 6.0 | 3.3 |
| **12-1/2 F5OG** | 1 1/16 - 12 | 1/2 - 14 | 1 1/4 | 1.41 | 5.0 | 6.0 | 3.3 |
| **12-3/4 F5OG** | 1 1/16 - 12 | 3/4 - 14 | 1 3/8 | 1.72 | 4.0 | 4.8 | 3.1 |
| **14-1/2 F5OG** | 1 3/16 - 12 | 1/2 - 14 | 1 3/8 | 1.06 | 5.0 | 5.0 | 3.3 |
| **14-3/4 F5OG** | 1 3/16 - 12 | 3/4 - 14 | 1 3/8 | 1.69 | 4.0 | 4.0 | 2.6 |
| **16-1/2 F5OG** | 1 5/16 - 12 | 1/2 - 14 | 1 1/2 | 1.00 | 5.0 | 6.0 | 3.3 |
| **16-3/4 F5OG** | 1 5/16 - 12 | 3/4 - 14 | 1 1/2 | 1.50 | 4.0 | 4.8 | 2.6 |
| **16-1 F5OG** | 1 5/16 - 12 | 1 - 11 1/2 | 1 5/8 | 1.88 | 3.0 | 3.6 | 1.9 |
| **20-1 F5OG** | 1 5/8 - 12 | 1 - 11 1/2 | 1 7/8 | 1.00 | 3.0 | 3.6 | 1.9 |
| **20-1 1/2 F5OG** | 1 5/8 - 12 | 1 1/2 - 11 1/2 | 2 1/4 | 2.16 | 2.5 | 3.0 | 1.6 |
| **20-1 1/4 F5OG** | 1 5/8 - 12 | 1 1/4 - 11 1/2 | 2 | 1.97 | 3.0 | 3.0 | 1.9 |
| **24-1 F5OG** | 1 7/8 - 12 | 1 - 11 1/2 | 2 1/8 | 1.00 | 3.0 | 3.6 | 1.9 |
| **24-1 1/4 F5OG** | 1 7/8 - 12 | 1 1/4 - 11 1/2 | 2 1/8 | 1.94 | 2.5 | 2.5 | 1.6 |
| **24-1 1/2 F5OG** | 1 7/8 - 12 | 1 1/2 - 11 1/2 | 2 1/4 | 2.00 | 2.0 | 2.4 | 1.3 |
| **32-2 F5OG** | 2 1/2 - 12 | 2 - 11 1/2 | 2 7/8 | 2.06 | 2.0 | 2.4 | 1.3 |

Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
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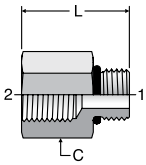
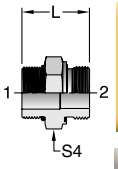



| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 METRIC STR | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **4M10F5OHG8** | 7/16 - 20 | M10X1 | 5/8 | 0.95 | 6.0 | 6.0 | 3.3 |
| **4M12F5OHG8** | 7/16 - 20 | M12X1.5 | 3/4 | 1.14 | 6.0 | 6.0 | 3.3 |
| **6M14F5OHG8** | 9/16 - 18 | M14X1.5 | 13/16 | 1.17 | 6.0 | 6.0 | 3.3 |
| **6M16F5OHG8** | 9/16 - 18 | M16X1.5 | 15/16 | 1.17 | 6.0 | 6.0 | 3.3 |
| **8M16F5OHG8** | 3/4 - 16 | M16X1.5 | 15/16 | 1.30 | 6.0 | 6.0 | 3.3 |
| **8M18F5OHG8** | 3/4 - 16 | M18X1.5 | 1 | 1.30 | 6.0 | 6.0 | 3.3 |
| **10M22F5OHG8** | 7/8 - 14 | M22X1.5 | 1 3/16 | 1.46 | 5.0 | 5.0 | 3.3 |
| **12M27F5OHG8** | 1 1/16 - 12 | M27X2 | 1 1/2 | 1.72 | 5.0 | 5.0 | 3.3 |
| **16M33F5OHG8** | 1 5/16 - 12 | M33X2 | 1 3/4 | 1.81 | 5.0 | 5.0 | 3.3 |

# F5OHF42

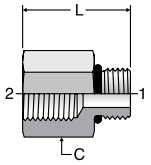
Conversion Adapter
SAE-ORB / BSPP-ED




| TUBE FITTING PART # | End Size 1 UN/UNF-2A | End Size 2 BSPP | S4 Hex (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **4-1/8F5OHF42ED** | 7/16-20 | 1/8-28 | 17 | 27.2 | 9.2 |
| **4-1/4F5OHF42ED** | 7/16-20 | 1/4-19 | 19 | 31.8 | 9.2 |
| **5-1/4F5OHF42ED** | 1/2-20 | 1/4-19 | 19 | 31.4 | 9.2 |
| **6-1/4F5OHF42ED** | 9/16-18 | 1/4-19 | 19 | 32.0 | 9.2 |
| **6-3/8F5OHF42ED** | 9/16-18 | 3/8-19 | 22 | 32.5 | 9.2 |
| **8-1/4F5OHF42ED** | 3/4-16 | 1/4-19 | 22 | 34.9 | 9.2 |
| **8-3/8F5OHF42ED** | 3/4-16 | 3/8-19 | 22 | 36.5 | 9.2 |
| **8-1/2F5OHF42ED** | 3/4-16 | 1/2-14 | 27 | 40.0 | 6.0 |
| **10-1/2F5OHF42ED** | 7/8-14 | 1/2-14 | 27 | 42.0 | 6.0 |
| **12-1/2F5OHF42ED** | 1 1/16-12 | 1/2-14 | 32 | 45.0 | 6.0 |
| **12-3/4F5OHF42ED** | 1 1/16-12 | 3/4-14 | 32 | 47.0 | 6.0 |
| **16-3/4F5OHF42ED** | 1 5/16-12 | 3/4-14 | 38 | 48.0 | 6.0 |
| **16-1F5OHF42ED** | 1 5/16-12 | 1-11 | 41 | 51.0 | 6.0 |
| **20-11/4F5OHF42ED** | 1 5/8-12 | 1 1/4-11 | 50 | 54.0 | 6.0 |
| **24-11/2F5OHF42ED** | 1 7/8-12 | 1 1/2-11 | 55 | 56.0 | 5.0 |

# F5OHG4

Conversion Adapter
SAE-ORB / BSPP

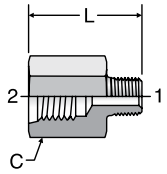



| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 BSPP | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **4-1/8F5OHG4** | 7/16 - 20 | 1/8 - 28 | 5/8 | 0.96 | 6.0 | 6.0 | 3.3 |
| **4-1/4F5OHG4** | 7/16 - 20 | 1/4 - 19 | 3/4 | 1.16 | 6.0 | 6.0 | 3.3 |
| **6-1/4F5OHG4** | 9/16 - 18 | 1/4 - 19 | 3/4 | 1.19 | 6.0 | 6.0 | 3.3 |
| **6-3/8F5OHG4** | 9/16 - 18 | 3/8 - 19 | 7/8 | 1.19 | 6.0 | 6.0 | 3.3 |
| **8-1/4F5OHG4** | 3/4 - 16 | 1/4 - 19 | 7/8 | 1.32 | 6.0 | 6.0 | 3.3 |
| **8-3/8F5OHG4** | 3/4 - 16 | 3/8 - 19 | 15/16 | 1.32 | 6.0 | 6.0 | 3.3 |
| **10-1/2F5OHG4** | 7/8 - 14 | 1/2 - 14 | 1 1/8 | 1.52 | 5.0 | 5.0 | 3.3 |
| **12-3/4F5OHG4** | 1 1/16 - 12 | 3/4 - 14 | 1 7/16 | 1.74 | 4.0 | 4.0 | 2.6 |
| **16-1F5OHG4** | 1 5/16 - 12 | 1 - 11 | 1 7/8 | 1.87 | 3.0 | 3.0 | 1.9 |

# FHG5

Female Straight Thread Adapter
NPTF / SAE-ORB

HPD Base # 0110




| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 UN/UNF-2B | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8-4 FHG5** | 1/8 - 27 | 7/16 - 20 | 11/16 | 1.06 | 6.0 | 6.0 | 3.3 |
| **1/8-5 FHG5** | 1/8 - 27 | 1/2 - 20 | 3/4 | 1.09 | 6.0 | 6.0 | 3.3 |
| **1/4-6 FHG5** | 1/4 - 18 | 9/16 - 18 | 3/4 | 1.36 | 6.0 | 6.0 | 3.3 |
| **3/8-6 FHG5** | 3/8 - 18 | 9/16 - 18 | 3/4 | 1.42 | 6.0 | 6.0 | 3.3 |
| **3/8-8 FHG5** | 3/8 - 18 | 3/4 - 16 | 1 | 1.50 | 5.0 | 5.0 | 3.3 |
| **1/2-6 FHG5** | 1/2 - 14 | 9/16 - 18 | 7/8 | 1.58 | 6.0 | 6.0 | 3.3 |
| **1/2-8 FHG5** | 1/2 - 14 | 3/4 - 16 | 1 | 1.66 | 5.0 | 5.0 | 3.3 |
| **1/2-10 FHG5** | 1/2 - 14 | 7/8 - 14 | 1 1/4 | 1.75 | 4.5 | 4.5 | 2.9 |
| **3/4-8 FHG5** | 3/4 - 14 | 3/4 - 16 | 1 1/8 | 1.13 | 4.5 | 4.5 | 2.9 |
| **3/4-12 FHG5** | 3/4 - 14 | 1 1/16 - 12 | 1 3/8 | 1.97 | 4.5 | 4.5 | 2.9 |
| **1-16 FHG5** | 1 - 11 1/2 | 1 5/16 - 12 | 1 5/8 | 2.13 | 3.5 | 3.5 | 2.2 |

Dimensions and pressures for reference only, subject to change.



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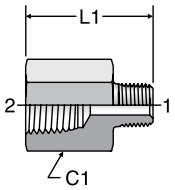
F

# FG

Expander / Adapter
NPTF / NPTF

SAE 140139
HPD Base # 0201

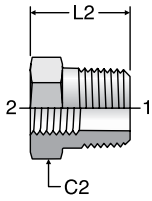



| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPTF | C1 HEX (in.) | L1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8 x 1/16 FG** | 1/16 - 27 | 1/8 - 27 | 5/8 | 1.03 | 6.0 | 6.0 | 3.3 |
| **1/8 FG** | 1/8 - 27 | 1/8 - 27 | 5/8 | 1.03 | 6.0 | 6.0 | 3.3 |
| **1/4 x 1/8 FG** | 1/8 - 27 | 1/4 - 18 | 3/4 | 1.21 | 6.0 | 6.0 | 3.9 |
| **1/4 FG** | 1/4 - 18 | 1/4 - 18 | 3/4 | 1.39 | 6.0 | 6.0 | 3.9 |
| **3/8 x 1/8 FG** | 1/8 - 27 | 3/8 - 18 | 7/8 | 1.25 | 6.0 | 6.0 | 3.3 |
| **3/8 x 1/4 FG** | 1/4 - 18 | 3/8 - 18 | 7/8 | 1.44 | 6.0 | 6.0 | 3.9 |
| **3/8 FG** | 3/8 - 18 | 3/8 - 18 | 7/8 | 1.44 | 6.0 | 6.0 | 3.9 |
| **1/2 x 1/8 FG** | 1/8 - 27 | 1/2 - 14 | 1 1/8 | 1.50 | 5.0 | 6.0 | 3.2 |
| **1/2 x 1/4 FG** | 1/4 - 18 | 1/2 - 14 | 1 1/8 | 1.69 | 5.0 | 6.0 | 3.2 |
| **1/2 x 3/8 FG** | 3/8 - 18 | 1/2 - 14 | 1 1/8 | 1.69 | 5.0 | 6.0 | 3.2 |
| **1/2 FG** | 1/2 - 14 | 1/2 - 14 | 1 1/8 | 1.87 | 5.0 | 6.0 | 3.2 |
| **3/4 FG** | 3/4 - 14 | 3/4 - 14 | 1 3/8 | 1.93 | 4.0 | 4.8 | 2.6 |
| **3/4 x 1/4 FG** | 1/4 - 18 | 3/4 - 14 | 1 3/8 | 1.75 | 4.0 | 4.8 | 2.6 |
| **3/4 x 3/8 FG** | 3/8 - 18 | 3/4 - 14 | 1 3/8 | 1.75 | 4.0 | 4.8 | 2.6 |
| **3/4 x 1/2 FG** | 1/2 - 14 | 3/4 - 14 | 1 3/8 | 1.93 | 4.0 | 4.8 | 2.6 |
| **1 FG** | 1 - 11 1/2 | 1 - 11 1/2 | 1 5/8 | 2.37 | 3.0 | 3.6 | 2.3 |
| **1 x 1/4 FG** | 1/4 - 18 | 1 - 11 1/2 | 1 5/8 | 2.01 | 3.0 | 3.6 | 2.3 |
| **1 x 1/2 FG** | 1/2 - 14 | 1 - 11 1/2 | 1 5/8 | 2.19 | 3.0 | 3.6 | 2.3 |
| **1 x 3/4 FG** | 3/4 - 14 | 1 - 11 1/2 | 1 5/8 | 2.19 | 3.0 | 3.6 | 2.3 |
| **1 1/4 FG** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 2 | 2.50 | 2.5 | 3.0 | 1.9 |
| **1 1/4 x 1 FG** | 1 - 11 1/2 | 1 1/4 - 11 1/2 | 2 | 2.47 | 2.5 | 3.0 | 1.9 |
| **1 1/2 x 1 FG** | 1 - 11 1/2 | 1 1/2 - 11 1/2 | 2 3/8 | 2.47 | 2.0 | 2.4 | 1.5 |
| **1 1/2 x 1 1/4 FG** | 1 1/4 - 11 1/2 | 1 1/2 - 11 1/2 | 2 3/8 | 2.50 | 2.0 | 2.4 | 1.5 |
| **2 FG** | 2 - 11 1/2 | 2 - 11 1/2 | 2 7/8 | 2.66 | 2.0 | 2.4 | 1.5 |

# PTR

Pipe Thread Reducer
NPTF / NPTF

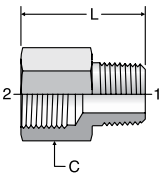
SAE 140140
HPD Base # 0102




| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPTF | C2 HEX (in.) | L2 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/4 x 1/8 PTR** | 1/4 - 18 | 1/8 - 27 | 5/8 | 0.86 | 6.0 | 6.0 | 3.9 |
| **3/8 x 1/8 PTR** | 3/8 - 18 | 1/8 - 27 | 3/4 | 0.86 | 6.0 | 6.0 | 3.9 |
| **3/8 x 1/4 PTR** | 3/8 - 18 | 1/4 - 18 | 3/4 | 0.86 | 6.0 | 6.0 | 3.9 |
| **1/2 x 1/8 PTR** | 1/2 - 14 | 1/8 - 27 | 7/8 | 1.11 | 6.0 | 6.0 | 3.2 |
| **1/2 x 1/4 PTR** | 1/2 - 14 | 1/4 - 18 | 7/8 | 1.11 | 6.0 | 6.0 | 3.2 |
| **1/2 x 3/8 PTR** | 1/2 - 14 | 3/8 - 18 | 7/8 | 1.11 | 6.0 | 6.0 | 3.2 |
| **3/4 x 1/8 PTR** | 3/4 - 14 | 1/8 - 27 | 1 1/8 | 1.17 | 5.5 | 6.0 | 3.3 |
| **3/4 x 1/4 PTR** | 3/4 - 14 | 1/4 - 18 | 1 1/8 | 1.17 | 5.5 | 6.0 | 3.7 |
| **3/4 x 3/8 PTR** | 3/4 - 14 | 3/8 - 18 | 1 1/8 | 1.17 | 5.5 | 6.0 | 3.7 |
| **3/4 x 1/2 PTR** | 3/4 - 14 | 1/2 - 14 | 1 1/8 | 1.17 | 5.0 | 6.0 | 3.3 |
| **1 x 1/8 PTR** | 1 - 11 1/2 | 1/8 - 27 | 1 3/8 | 1.36 | 4.5 | 5.4 | 3.3 |
| **1 x 1/4 PTR** | 1 - 11 1/2 | 1/4 - 18 | 1 3/8 | 1.36 | 4.5 | 5.4 | 3.3 |
| **1 x 3/8 PTR** | 1 - 11 1/2 | 3/8 - 18 | 1 3/8 | 1.36 | 4.5 | 5.4 | 3.0 |
| **1 x 1/2 PTR** | 1 - 11 1/2 | 1/2 - 14 | 1 3/8 | 1.36 | 4.5 | 5.4 | 3.0 |
| **1 x 3/4 PTR** | 1 - 11 1/2 | 3/4 - 14 | 1 3/8 | 1.36 | 4.0 | 4.8 | 2.7 |
| **1 1/4 x 1/4 PTR** | 1 1/4 - 11 1/2 | 1/4 - 18 | 1 3/4 | 1.47 | 3.0 | 3.6 | 2.3 |
| **1 1/4 x 3/8 PTR** | 1 1/4 - 11 1/2 | 3/8 - 18 | 1 3/4 | 1.47 | 3.0 | 3.6 | 2.3 |
| **1 1/4 x 1/2 PTR** | 1 1/4 - 11 1/2 | 1/2 - 14 | 1 3/4 | 1.47 | 3.0 | 3.6 | 2.3 |
| **1 1/4 x 3/4 PTR** | 1 1/4 - 11 1/2 | 3/4 - 14 | 1 3/4 | 1.47 | 3.0 | 3.6 | 2.3 |
| **1 1/4 x 1 PTR** | 1 1/4 - 11 1/2 | 1 - 11 1/2 | 1 3/4 | 1.47 | 3.0 | 3.6 | 2.3 |
| **1 1/2 x 1/4 PTR** | 1 1/2 - 11 1/2 | 1/4 - 18 | 2 | 1.52 | 3.0 | 3.6 | 2.3 |
| **1 1/2 x 3/8 PTR** | 1 1/2 - 11 1/2 | 3/8 - 18 | 2 | 1.58 | 3.0 | 3.6 | 2.3 |
| **1 1/2 x 1/2 PTR** | 1 1/2 - 11 1/2 | 1/2 - 14 | 2 | 1.58 | 3.0 | 3.6 | 2.3 |
| **1 1/2 x 3/4 PTR** | 1 1/2 - 11 1/2 | 3/4 - 14 | 2 | 1.58 | 3.0 | 3.6 | 2.3 |
| **1 1/2 x 1 PTR** | 1 1/2 - 11 1/2 | 1 - 11 1/2 | 2 | 1.58 | 3.0 | 3.6 | 2.3 |
| **1 1/2 x 1 1/4 PTR** | 1 1/2 - 11 1/2 | 1 1/4 - 11 1/2 | 2 | 1.58 | 2.5 | 3.0 | 1.9 |
| **2 x 1/2 PTR** | 2 - 11 1/2 | 1/2 - 14 | 2 1/2 | 1.75 | 2.0 | 2.4 | 1.5 |
| **2 x 3/4 PTR** | 2 - 11 1/2 | 3/4 - 14 | 2 1/2 | 1.75 | 2.0 | 2.4 | 1.5 |
| **2 x 1 PTR** | 2 - 11 1/2 | 1 - 11 1/2 | 2 1/2 | 1.75 | 2.0 | 2.4 | 1.5 |
| **2 x 1 1/4 PTR** | 2 - 11 1/2 | 1 1/4 - 11 1/2 | 2 1/2 | 1.75 | 2.0 | 2.4 | 1.5 |
| **2 x 1 1/2 PTR** | 2 - 11 1/2 | 1 1/2 - 11 1/2 | 2 1/2 | 1.75 | 2.0 | 2.4 | 1.5 |

# FHG8

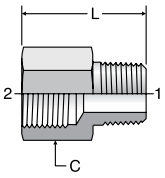
Conversion Adapter
NPTF / Metric




| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 METRIC STR | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **1/8M10FHG8** | 1/8 - 27 | M10X1 | 5/8 | 0.95 | 6.0 | 6.0 | 3.3 |
| **1/8M12FHG8** | 1/8 - 27 | M12X1.5 | 3/4 | 1.16 | 6.0 | 6.0 | 3.3 |
| **1/4M14FHG8** | 1/4 - 18 | M14X1.5 | 13/16 | 1.35 | 6.0 | 6.0 | 3.3 |
| **1/4M16FHG8** | 1/4 - 18 | M16X1.5 | 15/16 | 1.37 | 6.0 | 6.0 | 3.3 |
| **3/8M18FHG8** | 3/8 - 18 | M18X1.5 | 1 | 1.36 | 6.0 | 6.0 | 3.3 |
| **1/2M22FHG8** | 1/2 - 14 | M22X1.5 | 1 3/16 | 1.65 | 6.0 | 5.0 | 3.3 |
| **3/4M27FHG8** | 3/4 - 14 | M27X2 | 1 1/2 | 1.77 | 5.5 | 4.5 | 2.9 |

# FHG4

Conversion Adapter
NPTF / BSPP




| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 BSPP | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/4X1/4FHG4** | 1/4 - 18 | 1/4 - 19 | 3/4 | 1.33 | 6.0 | 6.0 | 3.3 |
| **1/4X3/8FHG4** | 1/4 - 18 | 3/8 - 19 | 13/16 | 1.40 | 6.0 | 6.0 | 3.3 |
| **3/8X1/4FHG4** | 3/8 - 18 | 1/4 - 19 | 3/4 | 1.31 | 6.0 | 6.0 | 3.3 |
| **3/8X3/8FHG4** | 3/8 - 18 | 3/8 - 19 | 1 | 1.34 | 6.0 | 6.0 | 3.3 |
| **1/2X3/8FHG4** | 1/2 - 14 | 3/8 - 19 | 15/16 | 1.50 | 6.0 | 6.0 | 3.3 |
| **1/2X1/2FHG4** | 1/2 - 14 | 1/2 - 14 | 1 1/8 | 1.66 | 5.0 | 5.0 | 3.3 |
| **3/4X3/4FHG4** | 3/4 - 14 | 3/4 - 14 | 1 7/16 | 1.75 | 4.0 | 4.0 | 2.6 |

Dimensions and pressures for reference only, subject to change.



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Tube Fittings Division
Columbus, Ohio
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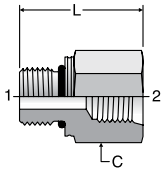
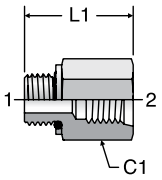
ISO 6149 / ISO 6149




| TUBE FITTING PART # | END SIZE 1 METRIC STR | END SIZE 2 METRIC STR | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **M8M10F87OHG87M** | M8X1 | M10X1 | 17 | 27.0 | 10.0 | 6.0 | 3.3 |
| **M10M8F87OHG87M** | M10X1 | M8X1 | 14 | 27.5 | 10.0 | 7.5 | 3.3 |
| **M10M12F87OHG87M** | M10X1 | M12X1.5 | 19 | 30.0 | 8.0 | 6.0 | 3.3 |
| **M12M10F87OHG87M** | M12X1.5 | M10X1 | 17 | 29.5 | 10.0 | 6.0 | 3.3 |
| **M12M14F87OHG87M** | M12X1.5 | M14X1.5 | 22 | 32.0 | 7.0 | 6.0 | 3.3 |
| **M12M16F87OHG87M** | M12X1.5 | M16X1.5 | 24 | 33.5 | 6.0 | 6.0 | 3.3 |
| **M14M12F87OHG87M** | M14X1.5 | M12X1.5 | 19 | 32.0 | 8.0 | 6.0 | 3.3 |
| **M14M16F87OHG87M** | M14X1.5 | M16X1.5 | 24 | 33.5 | 6.0 | 6.0 | 3.3 |
| **M16M14F87OHG87M** | M16X1.5 | M14X1.5 | 22 | 34.0 | 7.0 | 6.0 | 3.3 |
| **M16M18F87OHG87M** | M16X1.5 | M18X1.5 | 27 | 37.0 | 6.0 | 6.0 | 3.3 |
| **M18M16F87OHG87M** | M18X1.5 | M16X1.5 | 24 | 37.0 | 6.0 | 6.0 | 3.3 |
| **M18M20F87OHG87M** | M18X1.5 | M20X1.5 | 30 | 39.5 | 6.0 | 6.0 | 3.3 |
| **M20M18F87OHG87M** | M20X1.5 | M18X1.5 | 27 | 38.5 | 6.0 | 6.0 | 3.3 |
| **M20M22F87OHG87M** | M20X1.5 | M22X1.5 | 30 | 39.5 | 5.0 | 5.0 | 3.3 |
| **M22M20F87OHG87M** | M22X1.5 | M20X1.5 | 27 | 41.5 | 5.0 | 5.0 | 3.3 |
| **M27M22F87OHG87M** | M27X2.0 | M22X1.5 | 32 | 46.0 | 5.0 | 5.0 | 3.3 |
| **M27M33F87OHG87M** | M27X2.0 | M33X2.0 | 46 | 52.0 | 5.0 | 5.0 | 3.3 |
| **M33M27F87OHG87M** | M33X2.0 | M27X2.0 | 41 | 48.0 | 5.0 | 5.0 | 3.3 |
| **M33M42F87OHG87M** | M33X2.0 | M42X2.0 | 55 | 54.0 | 4.0 | 4.0 | 2.6 |
| **M42M27F87OHG87M** | M42X2.0 | M27X2.0 | 50 | 54.0 | 3.0 | 3.0 | 1.9 |
| **M42M33F87OHG87M** | M42X2.0 | M33X2.0 | 50 | 46.0 | 3.0 | 3.0 | 1.9 |
| **M42M48F87OHG87M** | M42X2.0 | M48X2.0 | 65 | 57.0 | 2.0 | 2.0 | 1.3 |

# F8OHG5

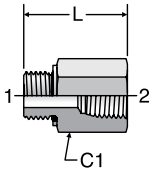
Conversion Adapter
Metric-ORR / SAE-ORB
(for ISO 9974 / DIN 3852-1 Port)




| TUBE FITTING PART # | END SIZE 1 METRIC STR | END SIZE 2 UN/UNF-2B | C1 HEX (in.) | L1 (in.) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **M10-4F8OHG5** | M10x1 | 7/16 - 20 | 11/16 | 1.06 | 5.0 | 5.0 | 3.3 |
| **M10-6F8OHG5** | M10X1 | 9/16 - 18 | 7/8 | 1.15 | 5.0 | 5.0 | 3.3 |
| **M14-6F8OHG5** | M14x1.5 | 9/16 - 18 | 13/16 | 1.19 | 5.0 | 5.0 | 3.3 |
| **M16-8F8OHG5** | M16x1.5 | 3/4 - 16 | 1 | 1.31 | 5.0 | 5.0 | 3.3 |
| **M18-8F8OHG5** | M18X1.5 | 3/4 - 16 | 1 | 1.38 | 3.5 | 3.5 | 2.2 |
| **M22-10F8OHG5** | M22x1.5 | 7/8 - 14 | 1 1/8 | 1.50 | 3.5 | 3.5 | 2.2 |
| **M27-12F8OHG5** | M27x2 | 1 1/16 - 12 | 1 1/4 | 1.88 | 3.5 | 3.5 | 2.2 |
| **M33-16F8OHG5** | M33x2 | 1 5/16 - 12 | 1 5/8 | 1.91 | 3.0 | 3.0 | 1.9 |
| **M42-20F8OHG5** | M42x2 | 1 5/8 - 12 | 2 | 1.91 | 2.0 | 2.0 | 1.3 |

# F8OHG

Conversion Adapter
Metric-ORR / NPTF
(for ISO 9974 / DIN 3852-1 Port)




| TUBE FITTING PART # | END SIZE 1 METRIC STR | END SIZE 2 NPTF | C1 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **M10-1/8F8OHG** | M10X1.0 | 1/8 - 27 | 9/16 | 0.99 | 5.0 | 5.0 | 3.3 |
| **M12-1/4F8OHG** | M12X1.5 | 1/4 - 18 | 3/4 | 1.24 | 5.0 | 5.0 | 3.3 |
| **M14-1/4F8OHG** | M14X1.5 | 1/4 - 18 | 3/4 | 1.24 | 5.0 | 5.0 | 3.3 |
| **M16-3/8F8OHG** | M16X1.5 | 3/8 - 18 | 7/8 | 1.36 | 5.0 | 5.0 | 3.3 |
| **M16-1/2F8OHG** | M16X1.5 | 1/2 - 14 | 1 1/8 | 1.58 | 5.0 | 5.0 | 3.3 |
| **M18-3/8F8OHG** | M18X1.5 | 3/8 - 18 | 15/16 | 1.42 | 5.0 | 5.0 | 3.3 |
| **M18-1/2F8OHG** | M18X1.5 | 1/2 - 14 | 1 1/8 | 1.67 | 5.0 | 5.0 | 3.3 |
| **M22-1/2F8OHG** | M22X1.5 | 1/2 - 14 | 1 1/8 | 1.68 | 3.5 | 3.5 | 2.2 |
| **M27-3/4F8OHG** | M27X2.0 | 3/4 - 14 | 1 3/8 | 1.87 | 3.5 | 3.5 | 2.2 |
| **M33-1F8OHG** | M33X2.0 | 1 - 11 1/2 | 1 5/8 | 2.11 | 3.0 | 3.0 | 1.9 |

Dimensions and pressures for reference only, subject to change.



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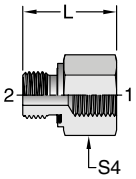
# F82HG8

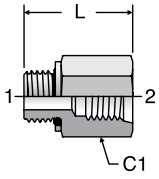
Conversion Adapter
Metric-ED / Metric-ORR
(for ISO 9974 / DIN 3852-1 Port)




| TUBE FITTING PART # | End Size 1 Metric Str | End Size 2 Metric Str | S4 Hex (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **M10-M8F82EDHG8** | M10X1 | M8X1 | 17 | 21.3 | 5.0 |
| **M10-M12F82EDHG8** | M10X1 | M12X1.5 | 17 | 27.4 | 5.0 |
| **M12-M10F82EDHG8** | M12X1.5 | M10X1 | 19 | 31.8 | 5.0 |
| **M12-M14F82EDHG8** | M12X1.5 | M15X1.5 | 19 | 32.8 | 5.0 |
| **M12-M16F82EDHG8** | M12X1.5 | M16X1.5 | 22 | 33.5 | 5.0 |
| **M14-M12F82EDHG8** | M14X1.5 | M12X1.5 | 22 | 32.3 | 5.0 |
| **M14-M16F82EDHG8** | M14X1.5 | M16X1.5 | 22 | 33.3 | 5.0 |
| **M16-M14F82EDHG8** | M16X1.5 | M14X1.5 | 24 | 32.3 | 5.0 |
| **M16-M18F82EDHG8** | M16X1.5 | M18X1.5 | 24 | 33.5 | 5.0 |
| **M18-M16F82EDHG8** | M18X1.5 | M16X1.5 | 27 | 32.8 | 3.4 |
| **M18-M20F82EDHG8** | M18X1.5 | M20X1.5 | 27 | 36.1 | 3.4 |
| **M22-M20F82EDHG8** | M22X1.5 | M20X1.5 | 30 | 36.8 | 3.4 |

# F4OHG5

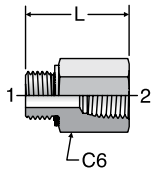
Conversion Adapter
BSPP-ORR / SAE-ORB
(for ISO 1179-1 / DIN 3852-2 Port)




| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 UN/UNF-2B | C1 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8-4F4OHG5** | 1/8 - 28 | 7/16 - 20 | 11/16 | 1.00 | 5.0 | 5.0 | 3.3 |
| **1/4-4F4OHG5** | 1/4 - 19 | 7/16 - 20 | 3/4 | 1.11 | 5.0 | 5.0 | 3.3 |
| **1/4-6F4OHG5** | 1/4 - 19 | 9/16 - 18 | 13/16 | 1.25 | 5.0 | 5.0 | 3.3 |
| **3/8-4F4OHG5** | 3/8 - 19 | 7/16 - 20 | 7/8 | 1.19 | 5.0 | 5.0 | 3.3 |
| **3/8-5F4OHG5** | 3/8 - 19 | 1/2 - 20 | 7/8 | 1.19 | 5.0 | 5.0 | 3.3 |
| **3/8-6F4OHG5** | 3/8 - 19 | 9/16 - 18 | 7/8 | 1.25 | 5.0 | 5.0 | 3.3 |
| **3/8-8F4OHG5** | 3/8 - 19 | 3/4 - 16 | 1 | 1.33 | 5.0 | 5.0 | 3.3 |
| **1/2-10F4OHG5** | 1/2 - 14 | 7/8 - 14 | 1 1/8 | 1.60 | 3.5 | 3.5 | 2.2 |
| **3/4-12F4OHG5** | 3/4 - 14 | 1 1/16 - 12 | 1 3/8 | 1.74 | 3.5 | 3.5 | 2.2 |
| **1-16F4OHG5** | 1 - 11 | 1 5/16 - 12 | 1 3/4 | 1.92 | 3.5 | 3.5 | 2.2 |
| **1 1/4-16F4OHG5** | 1 1/4 - 11 | 1 5/16 - 12 | 2 | 1.95 | 2.0 | 2.0 | 1.3 |
| **1 1/4-20F4OHG5** | 1 1/4 - 11 | 1 5/8 - 12 | 2 | 1.95 | 2.0 | 2.0 | 1.3 |

# F4OHG

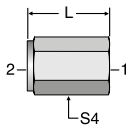
Conversion Adapter
BSPP-ORR / NPTF
(for ISO 1179-1 / DIN 3852-2 Port)




| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 NPTF | C6 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8x1/8F4OHG** | 1/8 - 28 | 1/8 - 27 | 5/8 | 0.97 | 5.0 | 5.0 | 3.3 |
| **1/4x1/4F4OHG** | 1/4 - 19 | 1/4 - 18 | 3/4 | 1.28 | 5.0 | 5.0 | 3.3 |
| **3/8x3/8F4OHG** | 3/8 - 19 | 3/8 - 18 | 7/8 | 1.33 | 5.0 | 5.0 | 3.3 |
| **1/2x1/2F4OHG** | 1/2 - 14 | 1/2 - 14 | 1 1/8 | 1.73 | 3.5 | 3.5 | 2.2 |
| **3/4x3/4F4OHG** | 3/4 - 14 | 3/4 - 14 | 1 3/8 | 1.77 | 3.5 | 3.5 | 2.2 |
| **1x1F4OHG** | 1 - 11 | 1 - 11 1/2 | 1 3/4 | 2.17 | 3.0 | 3.0 | 1.9 |

# GHG4

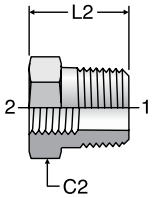
Female Pipe Adapter
BSPP / NPTF




| TUBE FITTING PART # | End Size 1 NPTF | End Size 2 BSPP | S4 Hex (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|
| **1/4 GHG4** | 1/4-18 | 1/4-19 | 3/4 | 1.23 | 6.0 |
| **3/8 GHG4** | 3/8-18 | 3/8-19 | 7/8 | 1.26 | 6.0 |
| **1/2 GHG4** | 1/2-14 | 1/2-14 | 1 1/8 | 1.50 | 5.0 |
| **3/4 GHG4** | 3/4-14 | 3/4-14 | 1 3/8 | 1.87 | 4.0 |
| **1 GHG4** | 1-11 1/2 | 1-11 | 1 5/8 | 2.17 | 3.0 |

# PTR34M

BSPT Reducing Adapter
BSPT / BSPP




| TUBE FITTING PART # | END SIZE 1 BSPT | END SIZE 2 BSPP | C2 (mm) | L2 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **1/4X1/8PTR34M** | 1/4-19 | 1/8-28 | 17 | 28 | 6.0 | 6.0 | 3.3 |
| **3/8X1/4PTR34M** | 3/8-19 | 1/4-19 | 19 | 33 | 6.0 | 6.0 | 3.3 |
| **1/2X1/4PTR34M** | 1/2-14 | 1/4-19 | 22 | 39 | 5.0 | 5.0 | 3.3 |
| **1/2X3/8PTR34M** | 1/2-14 | 3/8-19 | 22 | 39 | 5.0 | 5.0 | 3.3 |

Dimensions and pressures for reference only, subject to change.



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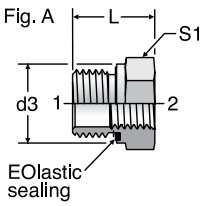
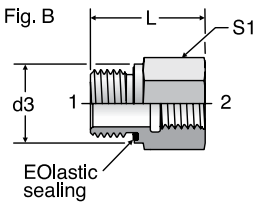
# RI-ED

BSPP Reducing Adapter / Expander
BSPP / BSPP-ED
(for ISO 1179-1 / DIN 3852-2 Port)




| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | d3 (mm) | L (mm) | S1 (mm) | Fig. | Dynamic Pressure (x 1,000 PSI) CF | 71 | MS |
|---|---|---|---|---|---|---|---|---|---|
| **RI1/8EDX1/4** | 1/8 - 28 | 1/4 - 19 | 14 | 31.0 | 19 | B | 5.8 | 5.8 | 3.3 |
| **RI1/8EDX3/8** | 1/8 - 28 | 3/8 - 19 | 14 | 32.0 | 24 | B | 5.8 | 5.8 | 3.3 |
| **RI1/4EDX1/8** | 1/4 - 19 | 1/8 - 28 | 19 | 29.0 | 19 | B | 5.8 | 5.8 | 3.3 |
| **RI1/4EDX3/8** | 1/4 - 19 | 3/8 - 19 | 19 | 36.0 | 24 | B | 5.8 | 5.8 | 3.3 |
| **RI1/4EDX1/2** | 1/4 - 19 | 1/2 - 14 | 19 | 40.0 | 30 | B | 5.8 | 5.8 | 3.3 |
| **RI1/4EDX3/4** | 1/4 - 19 | 3/4 - 14 | 19 | 43.0 | 36 | B | 5.8 | 5.8 | 3.3 |
| **RI3/8EDX1/8** | 3/8 - 19 | 1/8 - 28 | 22 | 22.5 | 22 | A | 5.8 | 5.8 | 3.3 |
| **RI3/8EDX1/4** | 3/8 - 19 | 1/4 - 19 | 22 | 36.0 | 22 | B | 5.8 | 5.8 | 3.3 |
| **RI3/8EDX1/2** | 3/8 - 19 | 1/2 - 14 | 22 | 41.0 | 30 | B | 5.8 | 5.8 | 3.3 |
| **RI3/8EDX3/4** | 3/8 - 19 | 3/4 - 14 | 22 | 44.0 | 36 | B | 4.5 | 4.5 | 3.0 |
| **RI1/2EDX1/8** | 1/2 - 14 | 1/8 - 28 | 27 | 24.0 | 27 | A | 5.8 | 5.8 | 3.3 |
| **RI1/2EDX1/4** | 1/2 - 14 | 1/4 - 19 | 27 | 24.0 | 27 | A | 5.8 | 5.8 | 3.3 |
| **RI1/2EDX3/8** | 1/2 - 14 | 3/8 - 19 | 27 | 37.0 | 27 | B | 5.8 | 5.8 | 3.3 |
| **RI1/2EDX3/4** | 1/2 - 14 | 3/4 - 14 | 27 | 46.0 | 36 | B | 4.5 | 4.5 | 3.0 |
| **RI1/2EDX1** | 1/2 - 14 | 1 - 11 | 27 | 49.0 | 41 | B | 4.5 | 4.5 | 3.0 |
| **RI1/2EDX11/4** | 1/2 - 14 | 1 1/4 - 11 | 27 | 53.0 | 55 | B | 4.5 | 4.5 | 3.0 |
| **RI3/4EDX1/4** | 3/4 - 14 | 1/4 - 19 | 32 | 26.0 | 32 | A | 4.5 | 4.5 | 3.0 |
| **RI3/4EDX3/8** | 3/4 - 14 | 3/8 - 19 | 32 | 26.0 | 32 | A | 4.5 | 4.5 | 3.0 |
| **RI3/4EDX1/2** | 3/4 - 14 | 1/2 - 14 | 32 | 43.0 | 32 | B | 4.5 | 4.5 | 3.0 |
| **RI3/4EDX1** | 3/4 - 14 | 1 - 11 | 32 | 51.0 | 41 | B | 4.5 | 4.5 | 3.0 |
| **RI3/4EDX11/4** | 3/4 - 14 | 1 1/4 - 11 | 32 | 55.0 | 55 | B | 4.5 | 4.5 | 3.0 |
| **RI3/4EDX11/2** | 3/4 - 14 | 1 1/2 - 11 | 32 | 57.0 | 60 | B | 3.6 | 3.6 | 2.3 |
| **RI1EDX1/4** | 1 - 11 | 1/4 - 19 | 40 | 29.0 | 41 | A | 4.5 | 4.5 | 3.0 |
| **RI1EDX3/8** | 1 - 11 | 3/8 - 19 | 40 | 29.0 | 41 | A | 4.5 | 4.5 | 3.0 |
| **RI1EDX1/2** | 1 - 11 | 1/2 - 14 | 40 | 29.0 | 41 | A | 4.5 | 4.5 | 3.0 |
| **RI1EDX3/4** | 1 - 11 | 3/4 - 14 | 40 | 49.0 | 41 | B | 4.5 | 4.5 | 3.0 |
| **RI1EDX11/4** | 1 - 11 | 1 1/4 - 11 | 40 | 57.0 | 55 | B | 4.5 | 4.5 | 3.0 |
| **RI1EDX11/2** | 1 - 11 | 1 1/2 - 11 | 40 | 59.0 | 60 | B | 3.6 | 3.6 | 2.3 |
| **RI11/4EDX1/2** | 1 1/4 - 11 | 1/2 - 14 | 50 | 32.0 | 50 | A | 4.5 | 4.5 | 3.0 |
| **RI11/4EDX3/4** | 1 1/4 - 11 | 3/4 - 14 | 50 | 32.0 | 50 | A | 4.5 | 4.5 | 3.0 |
| **RI11/4EDX1** | 1 1/4 - 11 | 1 - 11 | 50 | 53.0 | 50 | B | 4.5 | 4.5 | 3.0 |
| **RI11/4EDX11/2** | 1 1/4 - 11 | 1 1/2 - 11 | 50 | 60.0 | 60 | B | 3.6 | 3.6 | 2.3 |
| **RI11/2EDX1/2** | 1 1/2 - 11 | 1/2 - 14 | 55 | 36.0 | 55 | A | 3.6 | 3.6 | 2.3 |
| **RI11/2EDX3/4** | 1 1/2 - 11 | 3/4 - 14 | 55 | 36.0 | 55 | A | 3.6 | 3.6 | 2.3 |
| **RI11/2EDX1** | 1 1/2 - 11 | 1 - 11 | 55 | 36.0 | 55 | A | 3.6 | 3.6 | 2.3 |
| **RI11/2EDX11/4** | 1 1/2 - 11 | 1 1/4 - 11 | 55 | 58.0 | 55 | B | 3.6 | 3.6 | 2.3 |
| **RI2EDX11/2** | 2 - 11 | 1 1/2 - 11 | 72 | 65.0 | 75 | B | 2.3 | 2.3 | 1.5 |

Dimensions and pressures for reference only, subject to change.



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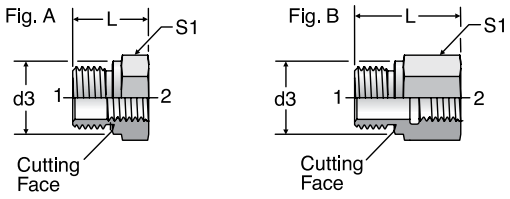
# RI

BSPP Reducing Adatper / Expander
BSPP / BSPP-CF
(for ISO 1179-1 / DIN 3852-2 Port)




| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | d3 (mm) | L (mm) | S1 (mm) | Fig. | Dynamic Pressure (x 1,000 PSI) CF | 71 | MS |
|---|---|---|---|---|---|---|---|---|---|
| **RI1/8X1/4** | 1/8 - 28 | 1/4 - 19 | 14 | 31.0 | 19 | B | 5.8 | 5.8 | 3.3 |
| **RI1/8X3/8** | 1/8 - 28 | 3/8 - 19 | 14 | 32.0 | 24 | B | 5.8 | 5.8 | 3.3 |
| **RI1/4X1/8** | 1/4 - 19 | 1/8 - 28 | 18 | 28.0 | 19 | B | 5.8 | 5.8 | 3.3 |
| **RI1/4X3/8** | 1/4 - 19 | 3/8 - 19 | 18 | 36.0 | 24 | B | 5.8 | 5.8 | 3.3 |
| **RI1/4X1/2** | 1/4 - 19 | 1/2 - 14 | 18 | 40.0 | 30 | B | 5.8 | 5.8 | 3.3 |
| **RI1/4X3/4** | 1/4 - 19 | 3/4 - 14 | 18 | 43.0 | 36 | B | 4.5 | 4.5 | 3.0 |
| **RI3/8X1/8** | 3/8 - 19 | 1/8 - 28 | 22 | 22.5 | 22 | A | 5.8 | 5.8 | 3.3 |
| **RI3/8X1/4** | 3/8 - 19 | 1/4 - 19 | 22 | 36.0 | 22 | B | 5.8 | 5.8 | 3.3 |
| **RI3/8X1/2** | 3/8 - 19 | 1/2 - 14 | 22 | 41.0 | 30 | B | 5.8 | 5.8 | 3.3 |
| **RI3/8X3/4** | 3/8 - 19 | 3/4 - 14 | 22 | 44.0 | 36 | B | 4.5 | 4.5 | 3.0 |
| **RI1/2X1/8** | 1/2 - 14 | 1/8 - 28 | 26 | 24.0 | 27 | A | 5.8 | 5.8 | 3.3 |
| **RI1/2X1/4** | 1/2 - 14 | 1/4 - 19 | 26 | 24.0 | 27 | A | 4.5 | 4.5 | 3.0 |
| **RI1/2X3/8** | 1/2 - 14 | 3/8 - 19 | 26 | 36.0 | 27 | B | 4.5 | 4.5 | 3.0 |
| **RI1/2X3/4** | 1/2 - 14 | 3/4 - 14 | 26 | 46.0 | 36 | B | 4.5 | 4.5 | 3.0 |
| **RI1/2X1** | 1/2 - 14 | 1 - 11 | 26 | 49.0 | 41 | B | 2.3 | 2.3 | 1.5 |
| **RI1/2X11/4** | 1/2 - 14 | 1 1/4 - 11 | 26 | 53.0 | 55 | B | 4.5 | 4.5 | 3.0 |
| **RI3/4X1/4** | 3/4 - 14 | 1/4 - 19 | 32 | 26.0 | 32 | A | 4.5 | 4.5 | 3.0 |
| **RI3/4X3/8** | 3/4 - 14 | 3/8 - 19 | 32 | 26.0 | 32 | A | 4.5 | 4.5 | 3.0 |
| **RI3/4X1/2** | 3/4 - 14 | 1/2 - 14 | 32 | 41.0 | 32 | B | 4.5 | 4.5 | 3.0 |
| **RI3/4X1** | 3/4 - 14 | 1 - 11 | 32 | 51.0 | 41 | B | 2.3 | 2.3 | 1.5 |
| **RI3/4X11/4** | 3/4 - 14 | 1 1/4 - 11 | 32 | 55.0 | 55 | B | 2.3 | 2.3 | 1.5 |
| **RI3/4X11/2** | 3/4 - 14 | 1 1/2 - 11 | 32 | 57.0 | 60 | B | 4.5 | 4.5 | 3.0 |
| **RI1X1/4** | 1 - 11 | 1/4 - 19 | 39 | 29.0 | 41 | A | 4.5 | 4.5 | 3.0 |
| **RI1X3/8** | 1 - 11 | 3/8 - 19 | 39 | 29.0 | 41 | A | 4.5 | 4.5 | 3.0 |
| **RI1X1/2** | 1 - 11 | 1/2 - 14 | 39 | 29.0 | 41 | A | 4.5 | 4.5 | 3.0 |
| **RI1X3/4** | 1 - 11 | 3/4 - 14 | 39 | 47.0 | 41 | B | 2.3 | 2.3 | 1.5 |
| **RI1X11/4** | 1 - 11 | 1 1/4 - 11 | 39 | 57.0 | 55 | B | 2.3 | 2.3 | 1.5 |
| **RI1X11/2** | 1 - 11 | 1 1/2 - 11 | 39 | 59.0 | 60 | B | 2.3 | 2.3 | 1.5 |
| **RI11/4X1/2** | 1 1/4 - 11 | 1/2 - 14 | 49 | 32.0 | 50 | A | 2.3 | 2.3 | 1.5 |
| **RI11/4X3/4** | 1 1/4 - 11 | 3/4 - 14 | 49 | 32.0 | 50 | A | 2.3 | 2.3 | 1.5 |
| **RI11/4X1** | 1 1/4 - 11 | 1 - 11 | 49 | 52.0 | 50 | B | 2.3 | 2.3 | 1.5 |
| **RI11/4X11/2** | 1 1/4 - 11 | 1 1/2 - 11 | 49 | 60.0 | 60 | B | 2.3 | 2.3 | 1.5 |
| **RI11/2X1/2** | 1 1/2 - 11 | 1/2 - 14 | 55 | 36.0 | 55 | A | 2.3 | 2.3 | 1.5 |
| **RI11/2X3/4** | 1 1/2 - 11 | 3/4 - 14 | 55 | 36.0 | 55 | A | 2.3 | 2.3 | 1.5 |
| **RI11/2X1** | 1 1/2 - 11 | 1 - 11 | 55 | 36.0 | 55 | A | 2.3 | 2.3 | 1.5 |
| **RI11/2X11/4** | 1 1/2 - 11 | 1 1/4 - 11 | 55 | 58.0 | 55 | B | 2.3 | 2.3 | 1.5 |
| **RI2X11/2** | 2 - 11 | 1 1/2 - 11 | 68 | 62.0 | 70 | B | 2.3 | 2.3 | 1.5 |

Dimensions and pressures for reference only, subject to change.



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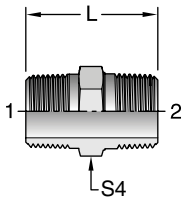
# FHF3

Male Pipe Adapter
BSPT / NPTF

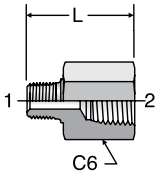



| TUBE FITTING PART # | End Size 1 NPTF | End Size 2 BSPT | S4 Hex (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|
| **1/8 FHF3** | 1/8-27 | 1/8-28 | 7/16 | 1.09 | 6.0 |
| **1/4 FHF3** | 1/4-18 | 1/4-19 | 5/8 | 1.45 | 6.0 |
| **3/8 x 1/4 FHF3** | 3/8-18 | 1/4-19 | 3/4 | 1.45 | 6.0 |
| **1/4 x 3/8 FHF3** | 1/4-18 | 1/8-28 | 3/4 | 1.45 | 6.0 |
| **3/8 FHF3** | 3/8-18 | 3/8-19 | 3/4 | 1.45 | 6.0 |
| **1/2 FHF3** | 1/2-14 | 1/2-14 | 7/8 | 1.89 | 6.0 |
| **3/4 FHF3** | 3/4-14 | 3/4-14 | 1 1/8 | 1.96 | 5.5 |
| **1 FHF3** | 1-11 | 1-11 | 1 3/8 | 2.34 | 4.5 |

Note: The BSPT thread end has an identification collar.

# F3HG

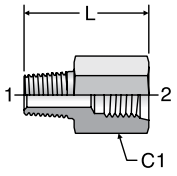
Conversion Adapter
NPTF / BSPT




| TUBE FITTING PART # | END SIZE 1 BSPT | END SIZE 2 NPTF | C6 HEX (in.) | L (mm) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8 x 1/8F3HG** | 1/8 - 38 | 1/8 - 27 | 9/16 | 1.08 | 6.0 | 6.0 | 3.3 |
| **1/4 x 1/4F3HG** | 1/4 - 19 | 1/4 - 18 | 3/4 | 1.37 | 6.0 | 6.0 | 3.3 |
| **3/8 x 3/8F3HG** | 3/8 - 19 | 3/8 - 19 | 7/8 | 1.38 | 6.0 | 6.0 | 3.3 |
| **1/2 x 1/2F3HG** | 1/2 - 14 | 1/2 - 14 | 1 1/8 | 1.88 | 5.0 | 5.0 | 3.3 |
| **3/4 x 3/4F3HG** | 3/4 - 14 | 3/4 - 14 | 1 3/8 | 1.95 | 4.0 | 4.0 | 2.6 |
| **1 x 1F3HG** | 1 - 11 | 1 - 11 | 1 5/8 | 2.38 | 3.0 | 3.0 | 1.9 |
| **1 1/2 x 1 1/2F3HG** | 1 1/2 - 11 | 1 1/2 - 11 | 2 3/8 | 2.53 | 2.0 | 2.0 | 1.3 |

# F3HG5

Conversion Adapter
BSPT / SAE-ORB

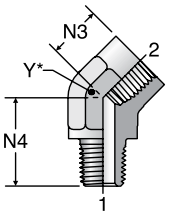



| TUBE FITTING PART # | END SIZE 1 BSPT | END SIZE 2 UN/UNF-2B | C1 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8-4F3HG5** | 1/8 - 28 | 7/16 - 20 | 11/16 | 1.09 | 6.0 | 6.0 | 3.3 |
| **1/8-5F3HG5** | 1/8 - 28 | 1/2 - 20 | 3/4 | 1.09 | 6.0 | 6.0 | 3.3 |
| **1/4-6F3HG5** | 1/4 - 19 | 9/16 - 18 | 13/16 | 1.36 | 6.0 | 6.0 | 3.3 |
| **3/8-8F3HG5** | 3/8 - 19 | 3/4 - 16 | 1 | 1.45 | 5.0 | 5.0 | 3.3 |
| **1/2-10F3HG5** | 1/2 - 14 | 7/8 - 14 | 1 1/8 | 1.78 | 4.5 | 4.5 | 2.9 |
| **3/4-12F3HG5** | 3/4 - 14 | 1 1/16 - 12 | 1 3/8 | 1.92 | 4.5 | 4.5 | 2.9 |
| **1-16F3HG5** | 1 - 11 | 1 5/16 - 12 | 1 5/8 | 2.13 | 3.5 | 3.5 | 2.2 |

# CD45

45° Pipe Elbow
NPTF / NPTF

SAE 140339
HPD Base # 3102




| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPTF | N3 (in.) | N4 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **1/8 CD45** | 1/8 - 27 | 1/8 - 27 | 0.47 | 0.72 | 9/16 | 5.0 | 5.0 | 3.2 |
| **1/4 CD45** | 1/4 - 18 | 1/4 - 18 | 0.63 | 1.05 | 3/4 | 5.0 | 5.0 | 3.2 |
| **3/8 CD45** | 3/8 - 18 | 3/8 - 18 | 0.72 | 1.06 | 7/8 | 4.5 | 4.5 | 2.9 |
| **1/2 CD45** | 1/2 - 14 | 1/2 - 14 | 0.91 | 1.34 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **3/4 CD45** | 3/4 - 14 | 3/4 - 14 | 0.97 | 1.38 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **1 CD45** | 1 - 11 1/2 | 1 - 11 1/2 | 1.13 | 1.72 | 1 5/8 | 1.8 | 1.8 | 1.1 |
| **1 1/4 CD45** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 1.63 | 1.80 | 1 7/8 | 1.5 | 1.5 | 1.0 |

Dimensions and pressures for reference only, subject to change.



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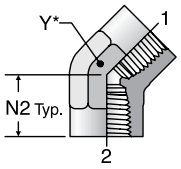
# DD45

45° Female Pipe Elbow
NPTF / NPTF

SAE 140338
HPD Base # 4202

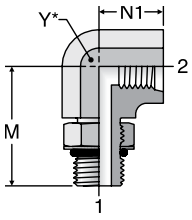



| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPTF | N2 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/4 DD45** | 1/4 - 18 | 1/4 - 18 | 0.69 | 3/4 | 5.0 | 5.0 | 3.3 |
| **3/8 DD45** | 3/8 - 18 | 3/8 - 18 | 0.75 | 7/8 | 4.5 | 4.5 | 2.9 |
| **1/2 DD45** | 1/2 - 14 | 1/2 - 14 | 0.94 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **3/4 DD45** | 3/4 - 14 | 3/4 - 14 | 1.00 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **1 DD45** | 1 - 11 1/2 | 1 - 11 1/2 | 1.19 | 1 5/8 | 1.8 | 1.8 | 1.1 |

# AOEG5

Straight Thread Elbow
SAE-ORB / SAE-ORB

HPD Base # 2510



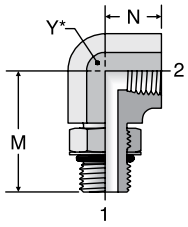

* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 UN/UNF-2B | M (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **4 AOEG5** | 7/16 - 20 | 7/16 - 20 | 1.23 | 0.63 | 3/4 | 6.0 | 6.0 | 3.3 |
| **6 AOEG5** | 9/16 - 18 | 9/16 - 18 | 1.38 | 0.75 | 7/8 | 5.0 | 5.0 | 3.3 |
| **8 AOEG5** | 3/4 - 16 | 3/4 - 16 | 1.59 | 0.88 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **10 AOEG5** | 7/8 - 14 | 7/8 - 14 | 1.81 | 1.02 | 1 1/16 | 2.5 | 2.5 | 1.6 |
| **12 AOEG5** | 1 1/16 - 12 | 1 1/16 - 12 | 2.00 | 1.21 | 1 5/16 | 2.5 | 2.5 | 1.6 |
| **16 AOEG5** | 1 5/16 - 12 | 1 5/16 - 12 | 2.26 | 1.33 | 1 5/8 | 2.5 | 2.5 | 1.6 |

# AOEG

Female Pipe Elbow
NPT / SAE-ORB

HPD Base # 2502

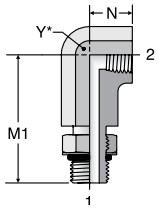



| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 NPTF | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **6-1/4 AOEG** | 9/16 - 18 | 1/4 - 18 | 1.34 | 0.63 | 3/4 | 5.0 | 5.0 | 3.3 |
| **8-3/8 AOEG** | 3/4 - 16 | 3/8 - 18 | 1.47 | 0.63 | 7/8 | 4.5 | 4.5 | 2.9 |
| **10-1/2 AOEG** | 7/8 - 14 | 1/2 - 14 | 1.81 | 0.75 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **12-3/4 AOEG** | 1 1/16 - 12 | 3/4 - 14 | 2.00 | 0.81 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **16-1 AOEG** | 1 5/16 - 12 | 1 - 11 1/2 | 2.25 | 1.00 | 1 5/8 | 1.8 | 1.8 | 1.1 |

# AOE4G

Extra Long Female Pipe Elbow
NPTF / SAE-ORB

HPD Base # 5502




| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 NPTF | M1 (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **8-3/8 AOE4G** | 3/4 - 16 | 3/8 - 18 | 2.94 | 0.63 | 7/8 | 4.5 | 4.5 | 2.9 |
| **10-1/2 AOE4G** | 7/8 - 14 | 1/2 - 14 | 3.56 | 0.75 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **12-3/4 AOE4G** | 1 1/16 - 12 | 3/4 - 14 | 4.06 | 0.81 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **16-1 AOE4G** | 1 5/16 - 12 | 1 - 11 1/2 | 4.63 | 1.00 | 1 5/8 | 1.8 | 1.8 | 1.1 |

Dimensions and pressures for reference only, subject to change.



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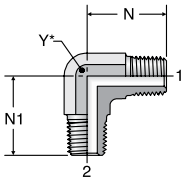
# CR

Male Pipe Elbow
NPTF / NPTF

SAE 140237*




* Y – Across Wrench Flats

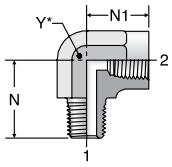
| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPTF | N (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **1/8 CR** | 1/8 - 27 | 1/8 - 27 | 0.78 | 0.78 | 7/16 | 6.0 | 6.0 | 3.9 |
| **1/4 CR** | 1/4 - 18 | 1/4 - 18 | 1.09 | 1.09 | 9/16 | 6.0 | 6.0 | 3.9 |
| **3/8 CR** | 3/8 - 18 | 3/8 - 18 | 1.22 | 1.22 | 3/4 | 6.0 | 6.0 | 3.9 |
| **3/8 x 1/4 CR** | 3/8 - 18 | 1/4 - 18 | 1.22 | 1.22 | 3/4 | 6.0 | 6.0 | 3.3 |
| **1/2 CR** | 1/2 - 14 | 1/2 - 14 | 1.47 | 1.47 | 7/8 | 6.0 | 6.0 | 3.9 |
| **1/2 x 3/8 CR** | 1/2 - 14 | 3/8 - 18 | 1.47 | 1.28 | 7/8 | 6.0 | 6.0 | 3.3 |
| **3/4 CR** | 3/4 - 14 | 3/4 - 14 | 1.59 | 1.59 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **3/4 x 1/2 CR** | 3/4 - 14 | 1/2 - 14 | 1.59 | 1.47 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **1 CR** | 1 - 11 1/2 | 1 - 11 1/2 | 1.97 | 1.97 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **1 x 3/4 CR** | 1 - 11 1/2 | 3/4 - 14 | 1.97 | 1.78 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **1 1/4 CR** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 2.22 | 2.22 | 1 7/8 | 2.5 | 2.5 | 1.6 |
| **1 1/2 CR** | 1 1/2 - 11 1/2 | 1 1/2 - 11 1/2 | 2.34 | 2.34 | 1 7/8 | 2.5 | 2.5 | 1.6 |

* Not shown in SAE J514, but coded per SAE J846.

# CD

Street Elbow
NPTF / NPT

SAE 140239
HPD Base # 2102

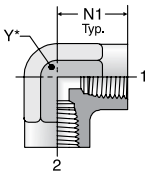



| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPT | N (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **1/8 CD** | 1/8 - 27 | 1/8 - 27 | 0.78 | 0.66 | 9/16 | 5.0 | 5.0 | 3.2 |
| **1/8 x 1/4 CD** | 1/8 - 27 | 1/4 - 18 | 0.90 | 0.88 | 3/4 | 5.0 | 5.0 | 3.2 |
| **1/4 CD** | 1/4 - 18 | 1/4 - 18 | 1.09 | 0.88 | 3/4 | 5.0 | 5.0 | 3.2 |
| **1/4 x 1/8 CD** | 1/4 - 18 | 1/8 - 27 | 1.09 | 0.66 | 9/16 | 5.0 | 5.0 | 3.2 |
| **1/4 x 1/2 CD** | 1/4 - 18 | 1/2 - 14 | 1.28 | 1.23 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **1/4 x 3/8 CD** | 1/4 - 18 | 3/8 - 18 | 1.22 | 1.01 | 7/8 | 4.5 | 4.5 | 2.9 |
| **3/8 CD** | 3/8 - 18 | 3/8 - 18 | 1.22 | 1.02 | 7/8 | 4.5 | 4.5 | 3.0 |
| **3/8 x 1/4 CD** | 3/8 - 18 | 1/4 - 18 | 1.22 | 0.88 | 3/4 | 5.0 | 5.0 | 3.2 |
| **3/8 x 1/2 CD** | 3/8 - 18 | 1/2 - 14 | 1.28 | 1.23 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **1/2 CD** | 1/2 - 14 | 1/2 - 14 | 1.47 | 1.23 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **1/2 x 3/8 CD** | 1/2 - 14 | 3/8 - 18 | 1.48 | 1.25 | 7/8 | 4.5 | 4.5 | 2.9 |
| **1/2 x 3/4 CD** | 1/2 - 14 | 3/4 - 14 | 1.58 | 1.36 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **3/4 CD** | 3/4 - 14 | 3/4 - 14 | 1.59 | 1.36 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **3/4 x 1/2 CD** | 3/4 - 14 | 1/2 - 14 | 1.59 | 1.23 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **1 CD** | 1 - 11 1/2 | 1 - 11 1/2 | 1.97 | 1.63 | 1 5/8 | 1.8 | 1.8 | 1.2 |
| **1 1/4 CD** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 2.38 | 1.70 | 1 7/8 | 1.5 | 1.5 | 1.0 |
| **1 1/4 x 1 1/2 CD** | 1 1/4 - 11 1/2 | 1 1/2 - 11 1/2 | 2.61 | 2.08 | 2 1/2 | 1.5 | 1.5 | 1.0 |
| **1 1/2 CD** | 1 1/2 - 11 1/2 | 1 1/2 - 11 1/2 | 2.64 | 2.08 | 2 1/2 | 1.5 | 1.5 | 1.0 |

# DD

Female Pipe Elbow
NPT / NPT

SAE 140238
HPD Base # 2202




| TUBE FITTING PART # | END SIZE 1 NPT | END SIZE 2 NPT | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8 DD** | 1/8 - 27 | 1/8 - 27 | 0.66 | 9/16 | 5.0 | 5.0 | 3.2 |
| **1/4 DD** | 1/4 - 18 | 1/4 - 18 | 0.88 | 3/4 | 5.0 | 5.0 | 3.2 |
| **3/8 DD** | 3/8 - 18 | 3/8 - 18 | 1.02 | 7/8 | 4.5 | 4.5 | 3.0 |
| **1/2 DD** | 1/2 - 14 | 1/2 - 14 | 1.23 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **1/2 x 3/8 DD** | 1/2 - 14 | 3/8 - 18 | 1.23 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **3/4 DD** | 3/4 - 14 | 3/4 - 14 | 1.36 | 1 5/8 | 3.0 | 3.0 | 1.9 |
| **1 DD** | 1 - 11 1/2 | 1 - 11 1/2 | 1.63 | 1 7/8 | 1.8 | 1.8 | 1.2 |
| **1 1/4 DD** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 1.70 | 1 7/8 | 1.5 | 1.5 | 1.5 |
| **1 1/2 DD** | 1 1/2 - 11 1/2 | 1 1/2 - 11 1/2 | 2.08 | 2 1/2 | 1.5 | 1.5 | 1.5 |

Dimensions and pressures for reference only, subject to change.



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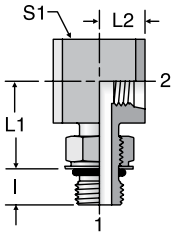
# A87LPOEG87LPM

ISO 6149* Female Elbow
SHORT ISO 6149 / SHORT ISO 6149

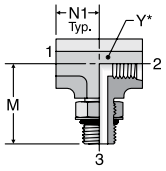



| TUBE FITTING PART # | END SIZE 1 Metric | END SIZE 2 Metric | I (mm) | L1 (mm) | L2 (mm) | S1 (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|---|---|
| **M08A87LPOEG87LPM** | M8X1 | M8X1 | 8.5 | 13.5 | 7.5 | 15 | 4.0 | 4.0 | 2.6 |
| **M10A87LPOEG87LPM** | M10X1 | M10X1 | 8.5 | 14.5 | 7.5 | 15 | 4.0 | 4.0 | 2.6 |
| **M12A87LPOEG87LPM** | M12X1.5 | M12X1.5 | 11.0 | 17.0 | 10.0 | 20 | 3.6 | 3.6 | 2.3 |
| **M14A87LPOEG87LPM** | M14X1.5 | M14X1.5 | 11.0 | 18.0 | 10.0 | 20 | 3.6 | 3.6 | 2.3 |

* Male and female thread lengths have been shortened for compact design. The lengths do not conform to ISO 6149.

# G5G5JAO

Straight Thread Branch Tee
SAE-ORB (all three ends)




* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 UN/UNF-2B | END SIZE 2 UN/UNF-2B | END SIZE 3 UN/UNF-2A | M (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|
| **4 G5G5JAO** | 7/16 - 20 | 7/16 - 20 | 7/16 - 20 | 1.23 | 0.63 | 3/4 | 6.0 | 6.0 | 3.3 |
| **6 G5G5JAO** | 9/16 - 18 | 9/16 - 18 | 9/16 - 18 | 1.38 | 0.75 | 7/8 | 5.0 | 5.0 | 3.3 |
| **8 G5G5JAO** | 3/4 - 16 | 3/4 - 16 | 3/4 - 16 | 1.59 | 0.88 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **10 G5G5JAO** | 7/8 - 14 | 7/8 - 14 | 7/8 - 14 | 1.81 | 1.02 | 1 1/16 | 2.5 | 2.5 | 1.6 |
| **12 G5G5JAO** | 1 1/16 - 12 | 1 1/16 - 12 | 1 1/16 - 12 | 2.00 | 1.21 | 1 5/16 | 2.5 | 2.5 | 1.6 |
| **16 G5G5JAO** | 1 5/16 - 12 | 1 5/16 - 12 | 1 5/16 - 12 | 2.25 | 1.33 | 1 5/8 | 2.5 | 2.5 | 1.6 |

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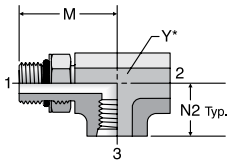
# AOG5JG5

Straight Thread Run Tee
SAE-ORB (all three ends)

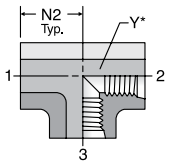



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 UN/UNF-2B | END SIZE 3 UN/UNF-2B | M (in.) | N2 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|
| **4 AOG5JG5** | 7/16 - 20 | 7/16 - 20 | 7/16 - 20 | 1.23 | 0.74 | 3/4 | 6.0 | 6.0 | 3.3 |
| **6 AOG5JG5** | 9/16 - 18 | 9/16 - 18 | 9/16 - 18 | 1.38 | 0.86 | 7/8 | 5.0 | 5.0 | 3.3 |
| **8 AOG5JG5** | 3/4 - 16 | 3/4 - 16 | 3/4 - 16 | 1.59 | 1.03 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **10 AOG5JG5** | 7/8 - 14 | 7/8 - 14 | 7/8 - 14 | 1.81 | 1.18 | 1 1/16 | 2.5 | 2.5 | 1.6 |
| **12 AOG5JG5** | 1 1/16 - 12 | 1 1/16 - 12 | 1 1/16 - 12 | 2.00 | 1.39 | 1 5/16 | 2.5 | 2.5 | 1.6 |
| **16 AOG5JG5** | 1 5/16 - 12 | 1 5/16 - 12 | 1 5/16 - 12 | 2.25 | 1.52 | 1 5/8 | 2.5 | 2.5 | 1.6 |

# G5G5JG5

Female Straight Thread Tee
SAE-ORB (all three ends)



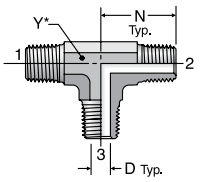

* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1-3 UN/UNF-2B | N2 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| **4 G5G5JG5** | 7/16 - 20 | 0.74 | 3/4 | 6.0 | 6.0 | 3.3 |
| **6 G5G5JG5** | 9/16 - 18 | 0.86 | 7/8 | 5.0 | 5.0 | 3.3 |
| **8 G5G5JG5** | 3/4 - 16 | 1.03 | 1 1/16 | 4.0 | 4.0 | 2.6 |
| **10 G5G5JG5** | 7/8 - 14 | 1.18 | 1 1/16 | 2.5 | 2.5 | 1.6 |
| **12 G5G5JG5** | 1 1/16 - 12 | 1.39 | 1 5/16 | 2.5 | 2.5 | 1.6 |
| **16 G5G5JG5** | 1 5/16 - 12 | 1.52 | 1 5/8 | 2.5 | 2.5 | 1.6 |

# RRS

Male Pipe Tee
NPTF (all three ends)

SAE 140437

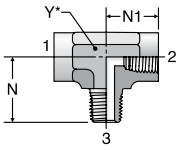



| TUBE FITTING PART # | END SIZE 1-3 NPTF | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| **1/8 RRS** | 1/8 - 27 | 0.78 | 7/16 | 6.0 | 6.0 | 3.9 |
| **1/4 RRS** | 1/4 - 18 | 1.09 | 9/16 | 6.0 | 6.0 | 3.9 |
| **3/8 RRS** | 3/8 - 18 | 1.22 | 3/4 | 6.0 | 6.0 | 3.9 |
| **1/2 RRS** | 1/2 - 14 | 1.47 | 7/8 | 6.0 | 6.0 | 3.9 |
| **3/4 RRS** | 3/4 - 14 | 1.59 | 1 1/16 | 4.0 | 4.0 | 2.6 |

# MMS

Male Branch Tee
NPTF (all three ends)

SAE 140425
HPD Base # 212T

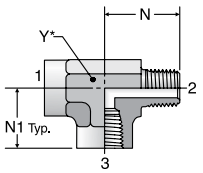



| TUBE FITTING PART # | END SIZE 1-3 NPTF | N (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8 MMS** | 1/8 - 27 | 0.78 | 0.66 | 9/16 | 5.0 | 5.0 | 3.2 |
| **1/4 MMS** | 1/4 - 18 | 1.09 | 0.88 | 3/4 | 5.0 | 5.0 | 3.2 |
| **3/8 MMS** | 3/8 - 18 | 1.22 | 1.02 | 7/8 | 4.5 | 4.5 | 3.0 |
| **1/2 MMS** | 1/2 - 14 | 1.47 | 1.23 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **3/4 MMS** | 3/4 - 14 | 1.59 | 1.36 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **1 MMS** | 1 - 11 1/2 | 1.97 | 1.62 | 1 5/8 | 1.8 | 1.8 | 1.1 |

# MRO

Male Run Tee
NPTF (all three ends)

SAE 140424
HPD Base # 012T




| TUBE FITTING PART # | END SIZE 1-3 NPTF | N (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **1/8 MRO** | 1/8 - 27 | 0.78 | 0.66 | 9/16 | 5.0 | 5.0 | 3.2 |
| **1/4 MRO** | 1/4 - 18 | 1.09 | 0.88 | 3/4 | 5.0 | 5.0 | 3.2 |
| **3/8 MRO** | 3/8 - 18 | 1.22 | 1.02 | 7/8 | 4.5 | 4.5 | 3.0 |
| **1/2 MRO** | 1/2 - 14 | 1.47 | 1.23 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **3/4 MRO** | 3/4 - 14 | 1.59 | 1.36 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **1 MRO** | 1 - 11 1/2 | 1.97 | 1.63 | 1 5/8 | 1.8 | 1.8 | 1.1 |
| **1 1/4 MRO** | 1 1/4 - 11 1/2 | 2.38 | 1.70 | 1 7/8 | 1.5 | 1.5 | 1.0 |
| **1 1/2 MRO** | 1 1/2 - 11 1/2 | 2.64 | 2.08 | 2 1/2 | 1.5 | 1.5 | 1.0 |

Dimensions and pressures for reference only, subject to change.



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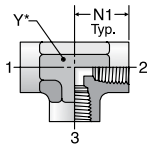
F

# MMO

Female Pipe Tee
NPTF (all three ends)

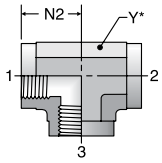
SAE 140438
HPD Base # 022T




| TUBE FITTING PART # | END SIZE 1-3 NPTF | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| **1/8 MMO** | 1/8 - 27 | 0.66 | 9/16 | 5.0 | 5.0 | 3.2 |
| **1/4 MMO** | 1/4 - 18 | 0.88 | 3/4 | 5.0 | 5.0 | 3.2 |
| **3/8 MMO** | 3/8 - 18 | 1.02 | 7/8 | 4.5 | 4.5 | 3.0 |
| **1/2 MMO** | 1/2 - 14 | 1.23 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **3/4 MMO** | 3/4 - 14 | 1.36 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **1 MMO** | 1 - 11 1/2 | 1.63 | 1 5/8 | 1.8 | 1.8 | 1.2 |
| **1 1/4 MMO** | 1 1/4 - 11 1/2 | 1.70 | 1 7/8 | 1.5 | 1.5 | 1.0 |
| **1 1/2 MMO** | 1 1/2 - 11 1/2 | 2.08 | 2 1/2 | 1.5 | 1.5 | 1.0 |

# MMO444M

Female BSPP Tee
BSPP (all three ends)

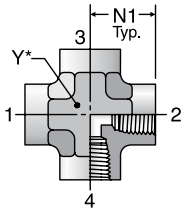



| TUBE FITTING PART # | END SIZE 1-3 BSPP | N2 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|
| **1/4MMO444M** | 1/4 - 19 | 22 | 19 | 5.0 | 5.0 | 3.3 |
| **3/8MMO444M** | 3/8 - 19 | 26 | 22 | 4.5 | 4.5 | 2.9 |
| **1/2MMO444M** | 1/2 - 14 | 31 | 27 | 3.0 | 3.0 | 1.9 |
| **3/4MMO444M** | 3/4 - 14 | 40 | 33 | 3.0 | 3.0 | 1.9 |
| **1MMO444M** | 1 - 11 | 46 | 41 | 1.8 | 1.8 | 1.1 |

# KMMOO

Female Pipe Cross
NPTF (all four ends)

SAE 140538
HPD Base # 022X

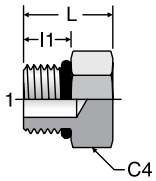



| TUBE FITTING PART # | END SIZE 1-4 NPTF | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| **1/8 KMMOO** | 1/8 - 27 | 0.66 | 9/16 | 5.0 | 5.0 | 3.2 |
| **1/4 KMMOO** | 1/4 - 18 | 0.88 | 3/4 | 5.0 | 5.0 | 3.2 |
| **3/8 KMMOO** | 3/8 - 18 | 1.02 | 7/8 | 4.5 | 4.5 | 2.9 |
| **1/2 KMMOO** | 1/2 - 14 | 1.23 | 1 1/16 | 3.0 | 3.0 | 1.9 |
| **3/4 KMMOO** | 3/4 - 14 | 1.36 | 1 5/16 | 3.0 | 3.0 | 1.9 |
| **1 KMMOO** | 1 - 11 1/2 | 1.63 | 1 5/8 | 1.8 | 1.8 | 1.1 |

# P5ON

Hex Head Plug
SAE-ORB

SAE 090109A
HPD Base # 05CP




| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | C4 HEX (in.) | I1 (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **2 P5ON** | 5/16 - 24 | 7/16 | 0.30 | 0.60 | 7.5 | 9.0 | 3.3 |
| **3 P5ON** | 3/8 - 24 | 1/2 | 0.30 | 0.60 | 7.5 | 9.0 | 3.3 |
| **4 P5ON** | 7/16 - 20 | 9/16 | 0.36 | 0.67 | 7.5 | 9.0 | 3.3 |
| **5 P5ON** | 1/2 - 20 | 5/8 | 0.36 | 0.67 | 6.0 | 7.2 | 3.3 |
| **6 P5ON** | 9/16 - 18 | 11/16 | 0.39 | 0.73 | 6.0 | 7.2 | 3.3 |
| **8 P5ON** | 3/4 - 16 | 7/8 | 0.44 | 0.80 | 6.0 | 7.2 | 3.3 |
| **10 P5ON** | 7/8 - 14 | 1 | 0.50 | 0.94 | 6.0 | 7.2 | 3.3 |
| **12 P5ON** | 1 1/16 - 12 | 1 1/4 | 0.59 | 1.09 | 6.0 | 7.2 | 3.3 |
| **14 P5ON** | 1 3/16 - 12 | 1 3/8 | 0.59 | 1.09 | 5.5 | 6.6 | 3.3 |
| **16 P5ON** | 1 5/16 - 12 | 1 1/2 | 0.59 | 1.13 | 5.5 | 6.6 | 3.3 |
| **20 P5ON** | 1 5/8 - 12 | 1 7/8 | 0.59 | 1.20 | 4.0 | 4.8 | 2.6 |
| **24 P5ON** | 1 7/8 - 12 | 2 1/8 | 0.59 | 1.27 | 3.0 | 3.6 | 1.9 |
| **32 P5ON** | 2 1/2 - 12 | 2 3/4 | 0.59 | 1.44 | 2.0 | 2.4 | 1.3 |

Dimensions and pressures for reference only, subject to change.



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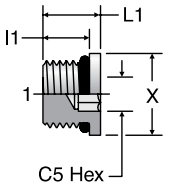
# HP5ON

Hollow Hex Plug
SAE-ORB

SAE 090109B
HPD Base # 05HP

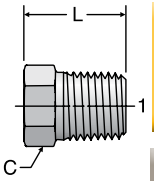



| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | C5 HEX (in.) | I1 (in.) | L1 (in.) | X DIA (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **2 HP5ON** | 5/16 - 24 | 1/8 | 0.30 | 0.40 | 0.44 | 6.0 | 6.0 | 3.3 |
| **3 HP5ON** | 3/8 - 24 | 5/32 | 0.30 | 0.40 | 0.50 | 6.0 | 6.0 | 3.3 |
| **4 HP5ON** | 7/16 - 20 | 3/16 | 0.36 | 0.47 | 0.56 | 6.0 | 6.0 | 3.3 |
| **5 HP5ON** | 1/2 - 20 | 7/32 | 0.36 | 0.47 | 0.63 | 6.0 | 6.0 | 3.3 |
| **6 HP5ON** | 9/16 - 18 | 1/4 | 0.40 | 0.50 | 0.69 | 6.0 | 6.0 | 3.3 |
| **8 HP5ON** | 3/4 - 16 | 5/16 | 0.44 | 0.58 | 0.88 | 6.0 | 6.0 | 3.3 |
| **10 HP5ON** | 7/8 - 14 | 3/8 | 0.50 | 0.65 | 1.00 | 6.0 | 6.0 | 3.3 |
| **12 HP5ON** | 1 1/16 - 12 | 9/16 | 0.59 | 0.77 | 1.25 | 6.0 | 6.0 | 3.3 |
| **14 HP5ON** | 1 3/16 - 12 | 9/16 | 0.59 | 0.77 | 1.38 | 5.5 | 5.5 | 3.3 |
| **16 HP5ON** | 1 5/16 - 12 | 5/8 | 0.59 | 0.77 | 1.50 | 5.5 | 5.5 | 3.3 |
| **20 HP5ON** | 1 5/8 - 12 | 3/4 | 0.59 | 0.77 | 1.88 | 4.0 | 4.0 | 2.6 |
| **24 HP5ON** | 1 7/8 - 12 | 3/4 | 0.59 | 0.77 | 2.13 | 3.0 | 3.0 | 1.9 |

# HP

Hex Head Pipe Plug
NPTF

SAE 130109E
HPD Base # 01CP

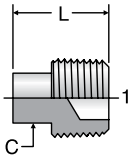



| TUBE FITTING PART # | END SIZE 1 NPTF | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| **1/8 HP** | 1/8 - 27 | 7/16 | 0.56 | 6.0 | 7.2 | 3.9 |
| **1/4 HP** | 1/4 - 18 | 9/16 | 0.75 | 6.0 | 7.2 | 3.9 |
| **3/8 HP** | 3/8 - 18 | 11/16 | 0.78 | 6.0 | 7.2 | 3.9 |
| **1/2 HP** | 1/2 - 14 | 7/8 | 0.97 | 6.0 | 7.2 | 3.9 |
| **3/4 HP** | 3/4 - 14 | 1 1/16 | 1.06 | 5.5 | 6.6 | 3.5 |
| **1 HP*** | 1 - 11 1/2 | 1 5/16 | 1.25 | 4.5 | 5.4 | 3.0 |
| **1 1/4 HP** | 1 1/4 - 11 1/2 | 1 3/4 | 1.41 | 3.0 | 3.6 | 1.9 |
| **1 1/2 HP** | 1 1/2 - 11 1/2 | 2 | 1.50 | 3.0 | 3.6 | 1.9 |
| **2 HP** | 2 - 11 1/2 | 2 1/2 | 1.69 | 2.0 | 3.0 | 1.3 |

*** 1 HP-SS Hex is 1 3/8**

# SHP

Square Head Plug
NPTF

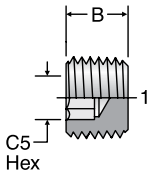



| TUBE FITTING PART # | END SIZE 1 NPTF | C SQUARE (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| **1/8 SHP** | 1/8 - 27 | 9/32 | 0.51 | 6.0 | 7.2 | 3.3 |
| **1/4 SHP** | 1/4 - 18 | 3/8 | 0.75 | 6.0 | 6.0 | 3.3 |
| **3/8 SHP** | 3/8 - 18 | 7/16 | 0.83 | 6.0 | 6.0 | 3.3 |
| **1/2 SHP** | 1/2 - 14 | 9/16 | 1.08 | 6.0 | 6.0 | 3.3 |
| **3/4 SHP** | 3/4 - 14 | 5/8 | 1.14 | 6.0 | 6.0 | 3.3 |
| **1 SHP** | 1 - 11 1/2 | 13/16 | 1.38 | 5.5 | 5.5 | 3.3 |

# HHP

Hollow Hex Pipe Plug
NPTF

SAE 130109N
HPD Base # 01HP




| TUBE FITTING PART # | END SIZE 1 NPTF | B (in.) | C5 INTERNAL HEX (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| **1/16 HHP** | 1/16 - 27 | 0.30 | 5/32 | 6.0 | 7.2 | 3.3 |
| **1/8 HHP** | 1/8 - 27 | 0.30 | 3/16 | 6.0 | 7.2 | 3.9 |
| **1/4 HHP** | 1/4 - 18 | 0.46 | 1/4 | 6.0 | 7.2 | 3.9 |
| **3/8 HHP** | 3/8 - 18 | 0.46 | 5/16 | 6.0 | 7.2 | 3.3 |
| **1/2 HHP** | 1/2 - 14 | 0.61 | 3/8 | 6.0 | 7.2 | 3.3 |
| **3/4 HHP** | 3/4 - 14 | 0.62 | 9/16 | 5.5 | 6.6 | 3.3 |
| **1 HHP** | 1 - 11 1/2 | 0.77 | 3/4 | 4.5 | 5.4 | 3.3 |
| **1 1/4 HHP** | 1 1/4 - 11 1/2 | 0.77 | 3/4 | 3.0 | 5.0 | 3.3 |
| **1 1/2 HHP** | 1 1/2 - 11 1/2 | 0.83 | 3/4 | 3.0 | 3.0 | 1.9 |
| **2 HHP** | 2 - 11 1/2 | 0.86 | 3/4 | 2.0 | 2.5 | 1.6 |

Dimensions and pressures for reference only, subject to change.



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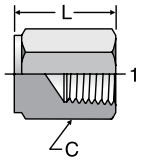
# HPC

Hex Pipe Cap
NPTF

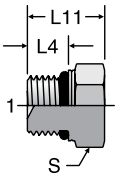



| TUBE FITTING PART # | END SIZE 1 NPTF | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|
| **1/8 HPC** | 1/8 - 27 | 9/16 | .75 | 6.0 | 6.0 | 3.3 |
| **1/4 HPC** | 1/4 - 18 | 3/4 | .91 | 6.0 | 6.0 | 3.3 |
| **3/8 HPC** | 3/8 - 18 | 7/8 | 1.03 | 6.0 | 6.0 | 3.3 |
| **1/2 HPC** | 1/2 - 14 | 1 1/16 | 1.34 | 6.0 | 6.0 | 3.3 |
| **3/4 HPC** | 3/4 - 14 | 1 1/4 | 1.44 | 4.8 | 4.8 | 3.1 |
| **1 HPC** | 1 - 11 1/2 | 1 5/8 | 1.68 | 3.6 | 3.6 | 2.3 |
| **1 1/2 HPC** | 1 1/2 - 1 1/2 | 2 3/8 | 1.92 | 2.4 | 2.4 | 1.5 |

# P87OMN

ISO 6149 Hex Head Plug
ISO 6149
(for ISO 6149-1 Port)

SAE J2244-4* 62M0109A



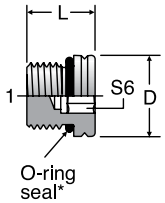

| TUBE FITTING PART # | END SIZE 1 THREAD | L4 (mm) | L11 (mm) | S HEX (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **M8P87OMN** | M8X1 | 8.5 | 16.2 | 12 | 9.0 | 9.0 | 3.3 |
| **M10P87OMN** | M10X1 | 8.5 | 16.2 | 14 | 8.0 | 8.0 | 3.3 |
| **M12P87OMN** | M12X1.5 | 11.0 | 18.5 | 17 | 9.0 | 9.0 | 3.3 |
| **M14P87OMN** | M14X1.5 | 11.0 | 19.5 | 19 | 9.0 | 9.0 | 3.3 |
| **M16P87OMN** | M16X1.5 | 11.5 | 21.5 | 22 | 9.0 | 9.0 | 3.3 |
| **M18P87OMN** | M18X1.5 | 12.5 | 23.5 | 24 | 9.0 | 9.0 | 3.3 |
| **M20P87OMN** | M20X1.5 | 12.5 | 24.0 | 27 | 6.0 | 6.0 | 3.3 |
| **M22P87OMN** | M22X1.5 | 13.0 | 25.5 | 27 | 6.0 | 6.0 | 3.3 |
| **M27P87OMN** | M27X2 | 16.0 | 32.0 | 32 | 6.0 | 6.0 | 3.3 |
| **M30P87OMN** | M30X2 | 16.0 | 32.0 | 36 | 6.0 | 6.0 | 3.3 |
| **M33P87OMN** | M33X2 | 16.0 | 32.0 | 41 | 6.0 | 6.0 | 3.3 |
| **M42P87OMN** | M42X2 | 16.0 | 34.0 | 50 | 4.0 | 4.0 | 2.6 |
| **M48P87OMN** | M48X2 | 17.5 | 35.5 | 55 | 2.0 | 2.0 | 1.3 |
| **M60P87OMN** | M60X2 | 17.5 | 42.0 | 65 | 1.0 | 1.0 | 0.6 |

* SAE J2244-4 and ISO 6149-4 are draft standards.

# VSTI M-OR

ISO 6149 Hollow Hex Plug
ISO 6149
(for ISO 6149-1 Port)

SAE J2244-4* 62M0109B

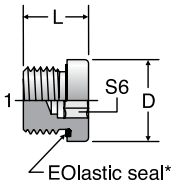



| TUBE FITTING PART # | END SIZE 1 METRIC | D (mm) | L (mm) | S6 (mm) | Dynamic Pressure (x 1,000 PSI) CF | 71 | MS |
|---|---|---|---|---|---|---|---|
| **VSTI10X1OR** | M10 x 1 | 13 | 13.5 | 5 | 9.1 | 9.1 | 3.3 |
| **VSTI12X1.5OR** | M12 x 1.5 | 17 | 15.1 | 6 | 9.1 | 9.1 | 3.3 |
| **VSTI14X1.5OR** | M14 x 1.5 | 19 | 16.0 | 6 | 9.1 | 9.1 | 3.3 |
| **VSTI16X1.5OR** | M16 x 1.5 | 21 | 17.5 | 8 | 9.1 | 9.1 | 3.3 |
| **VSTI18X1.5OR** | M18 x 1.5 | 23 | 19.0 | 8 | 9.1 | 9.1 | 3.3 |
| **VSTI22X1.5OR** | M22 x 1.5 | 27 | 20.0 | 10 | 9.1 | 9.1 | 3.3 |
| **VSTI27X2OR** | M27 x 2 | 32 | 23.5 | 12 | 5.8 | 5.8 | 3.3 |
| **VSTI33X2OR** | M33 x 2 | 38 | 25.0 | 14 | 5.8 | 5.8 | 3.3 |
| **VSTI42X2OR** | M42 x 2 | 48 | 25.5 | 22 | 5.8 | 5.8 | 3.3 |

* SAE J2244-4 is a draft standard

# VSTI M-ED

Metric Hollow Hex Plug
Metric-ED
(for ISO 9974-1 / DIN 3852-1 Port)




| TUBE FITTING PART # | END SIZE 1 THREAD | D (mm) | L (mm) | S6 (mm) | Dynamic Pressure (x 1,000 PSI) CF | 71 | MS |
|---|---|---|---|---|---|---|---|
| **VSTI10X1ED** | M10 x 1 | 14 | 12.0 | 5 | 5.8 | 5.8 | 3.3 |
| **VSTI12X1.5ED** | M12 x 1.5 | 17 | 17.0 | 6 | 5.8 | 5.8 | 3.3 |
| **VSTI14X1.5ED** | M14 x 1.5 | 19 | 17.0 | 6 | 5.8 | 5.8 | 3.3 |
| **VSTI16X1.5ED** | M16 x 1.5 | 22 | 17.0 | 8 | 5.8 | 5.8 | 3.3 |
| **VSTI18X1.5ED** | M18 x 1.5 | 24 | 17.0 | 8 | 5.8 | 5.8 | 3.3 |
| **VSTI20X1.5ED** | M20 x 1.5 | 26 | 19.0 | 10 | 5.8 | 5.8 | 3.3 |
| **VSTI22X1.5ED** | M22 x 1.5 | 27 | 19.0 | 10 | 5.8 | 5.8 | 3.3 |
| **VSTI26X1.5ED** | M26 x 1.5 | 32 | 21.0 | 12 | 5.8 | 5.8 | 3.3 |
| **VSTI27X2ED** | M27 x 2 | 32 | 21 | 12 | 5.8 | 5.8 | 3.3 |
| **VSTI33X2ED** | M33 x 2 | 40 | 22.5 | 17 | 5.8 | 5.8 | 3.3 |
| **VSTI42X2ED** | M42 x 2 | 50 | 22.5 | 22 | 4.5 | 4.5 | 2.9 |
| **VSTI48X2ED** | M48 x 2 | 55 | 22.5 | 24 | 4.5 | 4.5 | 2.9 |

Dimensions and pressures for reference only, subject to change.



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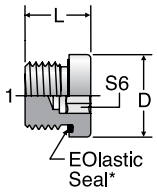
# VSTI R-ED

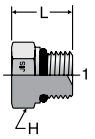
BSPP Hollow Hex Plug
BSPP-ED
(for ISO 1179-1 / DIN 3852-2 Port)




| TUBE FITTING PART # | END SIZE 1 BSPP | D (mm) | L (mm) | S6 (mm) | Dynamic Pressure (x 1,000 PSI) CF | 71 | MS |
|---|---|---|---|---|---|---|---|
| **VSTI1/8ED** | 1/8 - 28 | 14 | 12.0 | 5 | 5.8 | 5.8 | 3.3 |
| **VSTI1/4ED** | 1/4 - 19 | 19 | 17.0 | 6 | 5.8 | 5.8 | 3.3 |
| **VSTI3/8ED** | 3/8 - 19 | 22 | 17.0 | 8 | 5.8 | 5.8 | 3.3 |
| **VSTI1/2ED** | 1/2 - 14 | 27 | 19.0 | 10 | 5.8 | 5.8 | 3.3 |
| **VSTI3/4ED** | 3/4 - 14 | 32 | 21.0 | 12 | 5.8 | 5.8 | 3.3 |
| **VSTI1ED** | 1 - 11 | 40 | 22.5 | 17 | 5.8 | 5.8 | 3.3 |
| **VSTI1 1/4ED** | 1 1/4 - 11 | 50 | 22.5 | 22 | 4.5 | 4.5 | 2.9 |
| **VSTI1 1/2ED** | 1 1/2 - 11 | 55 | 22.5 | 24 | 4.5 | 4.5 | 2.9 |

# P47OMN

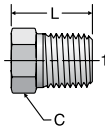
Hex Head Plug
BSPP-ORB




| TUBE FITTING PART # | END SIZE 1 BSPP | H HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|
| **4P47OMNS** | 1/4-19 | 19 | 19.1 | 5.0 | | |
| **6P47OMNS** | 3/8-19 | 22 | 20.0 | 5.0 | | |
| **8P47OMNS** | 1/2-14 | 27 | 24.1 | 5.0 | | |
| **12P47OMNS** | 3/4-14 | 36 | 26.9 | 4.0 | | |
| **16P47OMNS** | 1-11 | 41 | 31.0 | 3.0 | | |

# HP3M

Hex Head Pipe Plug
BSPT




| TUBE FITTING PART # | END SIZE 1 BSPT | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|
| **1/8HP3M** | 1/8 - 28 | 10 | 14.2 | 6.0 | 6.0 | 3.3 |
| **1/4HP3M** | 1/4 - 19 | 14 | 19.1 | 6.0 | 6.0 | 3.3 |
| **3/8HP3M** | 3/8 - 19 | 17 | 19.8 | 6.0 | 6.0 | 3.3 |
| **1/2HP3M** | 1/2 - 14 | 22 | 24.6 | 6.0 | 6.0 | 3.3 |
| **3/4HP3M** | 3/4 - 14 | 27 | 26.9 | 5.5 | 5.5 | 3.3 |
| **1HP3M** | 1 - 11 | 36 | 31.8 | 4.5 | 4.5 | 2.9 |

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# Pipe Swivels

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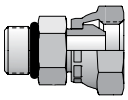
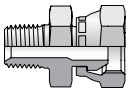
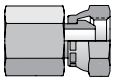
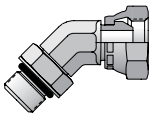
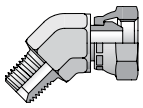
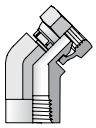
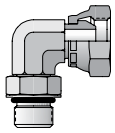
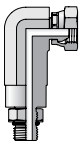
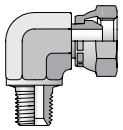
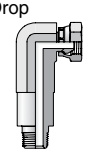
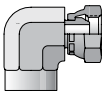
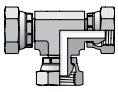
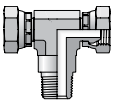
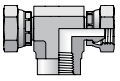
| **Straights** | **0507**<br>SAE-ORB / NPSM Swivel<br>  <br>G5 | **0107**<br>NPTF / NPSM Swivel<br>  <br>G5 | **0207**<br>NPTF / NPSM Swivel<br>  <br>G5 | **45° Elbows** | **3507**<br>SAE-ORB / NPSM Swivel<br>  <br>G5 |
| **3107**<br>NPTF / NPSM Swivel<br>  <br>G6 | **3207**<br>NPTF / NPSM Swivel<br>  <br>G6 | **90° Elbows** | **2507**<br>SAE-ORB / NPSM Swivel<br>  <br>G6 | **5507**<br>SAE-ORB / NPSM Swivel<br>  <br>G6 | **2107**<br>NPTF / NPSM Swivel<br>  <br>G7 |
| **5607**<br>NPTF / NPSM Swivel<br>Long Drop<br>  <br>G7 | **2207**<br>NPTF / NPSM Swivel<br>  <br>G7 | **Tees** | **077T**<br>NPSM Swivel / NPSM Swivel / NPSM Swivel<br>  <br>G7 | **217T**<br>NPSM Swivel / NPSM Swivel / NPTF<br>  <br>G8 | **227T**<br>NPSM Swivel / NPSM Swivel / NPTF<br>  <br>G8 |



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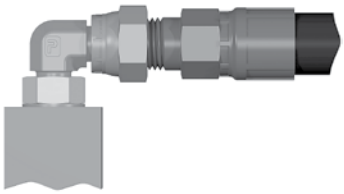
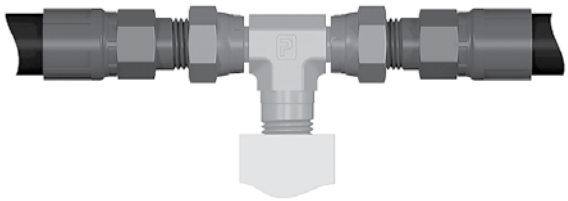
# Pipe Swivels

Pipe swivel connections are one of the most traditional types of hydraulic connections. NPSM swivel adapters add versatility to male NPT hose and adapter connections. They are especially suited for manufacturers and end users that rely on this versatility. As a result, equipment manufacturers can simplify their hose assembly requirements by specifying NPSM adapters. See Fig. G1 for an illustration of this product flexibility.

Parker offers a full line of NPSM pipe swivel adapters. Fourteen configurations are available as standard, many of which are available in steel and stainless steel. Parker's pipe swivels are designed for use with male NPT/NPTF hose fittings and adapters with a 30° machined seat.



Adapter Port Connection



NPSM / NPT Union

**Fig. G1 — Illustration of the flexibility of the NPT Port and Hose Adapter system**

# How Pipe Swivel Fittings Work

Pipe swivel adapters are manufactured in accordance to SAE J514 specifications, and thus are designed to work in conjunction with several manufacturers' hose and adapter products. Unlike most pipe thread connections, NPSM swivel adapters do not seal on the threads. NPSM swivel connections incorporate parallel threads, as opposed to tapered. Sealing is accomplished between the nose of the swivel and the mating seat of the NPT pipe thread. This creates a metal-to-metal seal as shown in Fig. G2. Thus, a mating NPT male connector must have this 30° seat to ensure proper sealing. A full internal 30° seat with surface finish requirements of 125 Ra or better is required. See SAE J516 for specific requirements of the 30° seat.

**Not all male NPT ends have the 30° seat. Parts that have this seat will include a note in the catalog.**

**Threads:**

| | |
|---|---|
| NPTF: | ANSI B1.20.1, FED-STD-H28/7 |
| NPT: | SAEJ476, ANSI B1.20.3, FED-STD-H28/8 |
| NPSM: | ANSI B1.20.1, FED-STD-H28/7 |
| *UN/UNF: | ANSI B1.1, FED-STD-H28/2 (*Class 2A or 2B) |

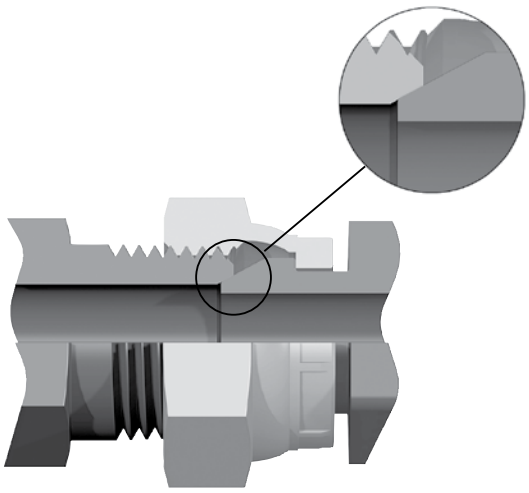


**Fig. G2 — Illustration showing how NPSM swivel adapters seal on mating chamfer in male pipe thread**

# Reference Locations

**Assembly and Installation:** Please refer to Section S for the assembly and installation instructions for Pipe Swivels.

**Standard material specifications:** Please refer to Table U1 located in the Appendix Section.

# Pipe Swivel (NPSM) Ends

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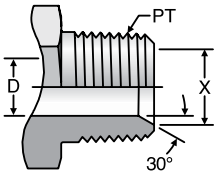
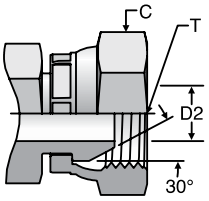



**Male Pipe End**




**NPSM Pipe Swivel**

| | NPT/NPTF Thread | NPSM Thread | Hex - Swivel | Drill - Male | Drill - Swivel | Chamfer Dia. | Thread Length |
|---|---|---|---|---|---|---|---|
| **Size** | **PT** NPT/NPTF | **T** NPSM | **C** (in.) | **D** (in.) | **D2** (in.) | **X** (in.) | **L** (in.) |
| **2** | 1/8-27 | 1/8-27 | 9/16 | 0.188 | 0.156 | 0.281 | 0.38 |
| **4** | 1/4-18 | 1/4-18 | 11/16 | 0.281 | 0.219 | 0.344 | 0.56 |
| **6** | 3/8-18 | 3/8-18 | 7/8 | 0.406 | 0.344 | 0.469 | 0.56 |
| **8** | 1/2-14 | 1/2-14 | 1 | 0.531 | 0.469 | 0.625 | 0.75 |
| **12** | 3/4-14 | 3/4-14 | 1 1/4 | 0.719 | 0.641 | 0.813 | 0.75 |
| **16** | 1-11 1/2 | 1-11 1/2 | 1 1/2 | 0.938 | 0.844 | 1.031 | 0.94 |
| **20** | 1 1/4-11 1/2 | 1 1/4-11 1/2 | 1 7/8 | 1.250 | 1.141 | 1.344 | 0.97 |
| **24** | 1 1/2-11 1/2 | 1 1/2-11 1/2 | 2 1/8 | 1.500 | 1.359 | 1.625 | 1.00 |
| **32** | 2-11 1/2 | 2-11 1/2 | 2 5/8 | 1.938 | 1.813 | 2.063 | 1.03 |

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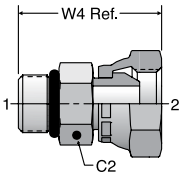
# 0507

## Straight Thread Adapter
## SAE-ORB / NPSM Swivel

SAE 140157

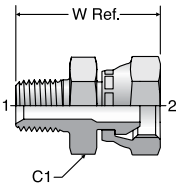



| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 NPSM | C2 HEX BODY (in.) | W4 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **0507-4-2** | 7/16 - 20 | 1/8 - 27 | 9/16 | 1.21 | 6.0 | 6.0 | 3.3 |
| **0507-4-4** | 7/16 - 20 | 1/4 - 18 | 9/16 | 1.32 | 6.0 | 6.0 | 3.3 |
| **0507-5-4** | 1/2 - 20 | 1/4 - 18 | 5/8 | 1.32 | 6.0 | 6.0 | 3.3 |
| **0507-6-4** | 9/16 - 18 | 1/4 - 18 | 11/16 | 1.35 | 6.0 | 6.0 | 3.3 |
| **0507-6-6** | 9/16 - 18 | 3/8 - 18 | 11/16 | 1.37 | 6.0 | 6.0 | 3.3 |
| **0507-6-8** | 9/16 - 18 | 1/2 - 14 | 3/4 | 1.57 | 5.0 | 5.0 | 3.3 |
| **0507-8-4** | 3/4 - 16 | 1/4 - 18 | 7/8 | 1.43 | 6.0 | 6.0 | 3.3 |
| **0507-8-6** | 3/4 - 16 | 3/8 - 18 | 7/8 | 1.45 | 6.0 | 6.0 | 3.3 |
| **0507-8-8** | 3/4 - 16 | 1/2 - 14 | 7/8 | 1.56 | 5.0 | 5.0 | 3.3 |
| **0507-8-12** | 3/4 - 16 | 3/4 - 14 | 1 | 1.79 | 4.0 | 4.0 | 2.6 |
| **0507-10-6** | 7/8 - 14 | 3/8 - 18 | 1 | 1.59 | 5.0 | 5.0 | 3.3 |
| **0507-10-8** | 7/8 - 14 | 1/2 - 14 | 1 | 1.73 | 5.0 | 5.0 | 3.3 |
| **0507-10-12** | 7/8 - 14 | 3/4 - 14 | 1 1/4 | 1.88 | 4.0 | 4.0 | 2.6 |
| **0507-12-8** | 1 1/16 - 12 | 1/2 - 14 | 1 1/4 | 1.88 | 5.0 | 5.0 | 3.3 |
| **0507-12-12** | 1 1/16 - 12 | 3/4 - 14 | 1 1/4 | 1.97 | 4.0 | 4.0 | 2.6 |
| **0507-12-16** | 1 1/16 - 12 | 1 - 11 1/2 | 1 1/2 | 2.12 | 3.0 | 3.0 | 1.9 |
| **0507-14-12** | 1 3/16 - 12 | 3/4 - 14 | 1 3/8 | 1.97 | 4.0 | 4.0 | 2.6 |
| **0507-16-12** | 1 5/16 - 12 | 3/4 - 14 | 1 1/2 | 1.90 | 4.0 | 4.0 | 2.6 |
| **0507-16-16** | 1 5/16 - 12 | 1 - 11 1/2 | 1 1/2 | 2.12 | 3.0 | 3.0 | 1.9 |
| **0507-20-16** | 1 5/8 - 12 | 1 - 11 1/2 | 1 7/8 | 2.20 | 3.0 | 3.0 | 1.9 |
| **0507-20-20** | 1 5/8 - 12 | 1 1/4 - 11 1/2 | 1 7/8 | 2.21 | 2.5 | 2.5 | 1.6 |
| **0507-24-24** | 1 7/8 - 12 | 1 1/2 - 11 1/2 | 2 1/8 | 2.39 | 2.0 | 2.0 | 1.3 |
| **0507-32-32** | 2 1/2 - 12 | 2 - 11 1/2 | 2 3/4 | 2.49 | 1.5 | 1.5 | 1.0 |

# 0107

## Male Pipe Adapter
## NPTF / NPSM Swivel

SAE 140130

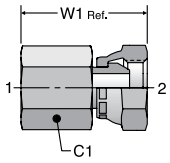



| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPSM | C1 HEX (in.) | W (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **0107-2-2** | 1/8 - 27 | 1/8 - 27 | 9/16 | 1.09 | 6.0 | 6.0 | 3.3 |
| **0107-2-4** | 1/8 - 27 | 1/4 - 18 | 5/8 | 1.24 | 6.0 | 6.0 | 3.3 |
| **0107-4-2** | 1/4 - 18 | 1/8 - 27 | 11/16 | 1.39 | 6.0 | 6.0 | 3.3 |
| **0107-4-4** | 1/4 - 18 | 1/4 - 18 | 11/16 | 1.43 | 6.0 | 6.0 | 3.3 |
| **0107-4-6** | 1/4 - 18 | 3/8 - 18 | 13/16 | 1.45 | 6.0 | 6.0 | 3.3 |
| **0107-4-8** | 1/4 - 18 | 1/2 - 14 | 15/16 | 1.44 | 5.0 | 5.0 | 3.3 |
| **0107-6-4** | 3/8 - 18 | 1/4 - 18 | 11/16 | 1.49 | 6.0 | 6.0 | 3.3 |
| **0107-6-6** | 3/8 - 18 | 3/8 - 18 | 7/8 | 1.51 | 6.0 | 6.0 | 3.3 |
| **0107-6-8** | 3/8 - 18 | 1/2 - 14 | 15/16 | 1.73 | 5.0 | 5.0 | 3.3 |
| **0107-8-4** | 1/2 - 14 | 1/4 - 18 | 1 | 1.75 | 6.0 | 6.0 | 3.3 |
| **0107-8-6** | 1/2 - 14 | 3/8 - 18 | 7/8 | 1.70 | 6.0 | 6.0 | 3.3 |
| **0107-8-8** | 1/2 - 14 | 1/2 - 14 | 1 | 1.91 | 5.0 | 5.0 | 3.3 |
| **0107-8-12** | 1/2 - 14 | 3/4 - 14 | 1 1/4 | 2.04 | 4.0 | 4.0 | 2.6 |
| **0107-12-8** | 3/4 - 14 | 1/2 - 14 | 1 1/8 | 1.91 | 5.0 | 5.0 | 2.6 |
| **0107-12-12** | 3/4 - 14 | 3/4 - 14 | 1 1/4 | 2.04 | 4.0 | 4.0 | 2.6 |
| **0107-12-16** | 3/4 - 14 | 1 - 11 1/2 | 1 1/2 | 2.17 | 3.0 | 3.0 | 1.9 |
| **0107-16-12** | 1 - 11 1/2 | 3/4 - 14 | 1 3/8 | 2.29 | 4.0 | 4.0 | 1.9 |
| **0107-16-16** | 1 - 11 1/2 | 1 - 11 1/2 | 1 1/2 | 2.37 | 3.0 | 3.0 | 1.9 |
| **0107-16-20** | 1 - 11 1/2 | 1 1/4 - 11 1/2 | 1 3/4 | 2.38 | 2.5 | 2.5 | 1.6 |
| **0107-20-16** | 1 1/4 - 11 1/2 | 1 - 11 1/2 | 1 7/8 | 2.46 | 3.0 | 3.0 | 1.6 |
| **0107-20-20** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 1 7/8 | 2.47 | 2.5 | 2.5 | 1.6 |
| **0107-20-24** | 1 1/4 - 11 1/2 | 1 1/2 - 11 1/2 | 2 1/8 | 2.58 | 2.0 | 2.0 | 1.3 |
| **0107-24-20** | 1 1/2 - 11 1/2 | 1 1/4 - 11 1/2 | 2 1/8 | 2.51 | 2.5 | 2.5 | 1.3 |
| **0107-24-24** | 1 1/2 - 11 1/2 | 1 1/2 - 11 1/2 | 2 1/8 | 2.61 | 2.0 | 2.0 | 1.3 |
| **0107-32-32** | 2 - 11 1/2 | 2 - 11 1/2 | 2 5/8 | 2.80 | 1.5 | 1.5 | 1.0 |

# 0207

## Female Pipe Adapter
## NPTF / NPSM Swivel

SAE 140131

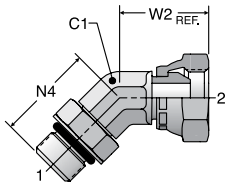



| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPSM | C1 HEX (in.) | W1 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|
| **0207-2-2** | 1/8 - 27 | 1/8 - 27 | 9/16 | 1.02 | 6.0 | 6.0 | 3.3 |
| **0207-2-4** | 1/8 - 27 | 1/4 - 18 | 11/16 | 1.33 | 6.0 | 6.0 | 3.3 |
| **0207-4-2** | 1/4 - 18 | 1/8 - 27 | 9/16 | 1.32 | 6.0 | 6.0 | 3.3 |
| **0207-4-4** | 1/4 - 18 | 1/4 - 18 | 11/16 | 1.43 | 6.0 | 6.0 | 3.3 |
| **0207-6-4** | 3/8 - 18 | 1/4 - 18 | 7/8 | 1.49 | 6.0 | 6.0 | 3.3 |
| **0207-6-6** | 3/8 - 18 | 3/8 - 18 | 7/8 | 1.51 | 6.0 | 6.0 | 3.3 |
| **0207-6-8** | 3/8 - 18 | 1/2 - 14 | 1 | 1.64 | 5.0 | 5.0 | 3.3 |
| **0207-8-4** | 1/2 - 14 | 1/4 - 18 | 1 | 1.70 | 5.0 | 5.0 | 3.3 |
| **0207-8-6** | 1/2 - 14 | 3/8 - 18 | 1 | 1.73 | 5.0 | 5.0 | 3.3 |
| **0207-8-8** | 1/2 - 14 | 1/2 - 14 | 1 | 1.79 | 5.0 | 5.0 | 3.3 |
| **0207-12-8** | 3/4 - 14 | 1/2 - 14 | 1 1/4 | 1.85 | 4.0 | 4.0 | 2.6 |
| **0207-12-12** | 3/4 - 14 | 3/4 - 14 | 1 1/4 | 1.97 | 4.0 | 4.0 | 2.6 |
| **0207-16-12** | 1 - 11 1/2 | 3/4 - 14 | 1 1/2 | 2.28 | 3.0 | 3.0 | 1.9 |
| **0207-16-16** | 1 - 11 1/2 | 1 - 11 1/2 | 1 1/2 | 2.37 | 3.0 | 3.0 | 1.9 |
| **0207-20-20** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 1 7/8 | 2.38 | 2.5 | 2.5 | 1.6 |
| **0207-24-24** | 1 1/2 - 11 1/2 | 1 1/2 - 11 1/2 | 2 1/8 | 2.42 | 2.0 | 2.0 | 1.3 |
| **0207-32-32** | 2 - 11 1/2 | 2 - 11 1/2 | 2 5/8 | 2.55 | 1.5 | 1.5 | 1.0 |

# 3507

## 45° Straight Thread Elbow
## SAE-ORB / NPSM Swivel

SAE 140357




| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 NPSM | C1 HEX (in.) | N4 (in.) | W2 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **3507-4-4** | 7/16 - 20 | 1/4 - 18 | 7/16 | 1.05 | 0.79 | 6.0 | 6.0 | 3.3 |
| **3507-6-4** | 9/16 - 18 | 1/4 - 18 | 9/16 | 1.11 | 0.94 | 6.0 | 6.0 | 3.3 |
| **3507-6-6** | 9/16 - 18 | 3/8 - 18 | 9/16 | 1.14 | 1.03 | 6.0 | 6.0 | 3.3 |
| **3507-6-8** | 9/16 - 18 | 1/2 - 14 | 3/4 | 1.08 | 1.16 | 5.0 | 5.0 | 3.3 |
| **3507-8-6** | 3/4 - 16 | 3/8 - 18 | 3/4 | 1.30 | 1.02 | 6.0 | 6.0 | 3.3 |
| **3507-8-8** | 3/4 - 16 | 1/2 - 14 | 3/4 | 1.30 | 1.18 | 5.0 | 5.0 | 3.3 |
| **3507-8-12** | 3/4 - 16 | 3/4 - 14 | 3/4 | 1.41 | 1.37 | 3.0 | 3.0 | 1.9 |
| **3507-10-6** | 7/8 - 14 | 3/8 - 18 | 1 1/16 | 1.35 | 0.98 | 5.0 | 5.0 | 3.3 |
| **3507-10-8** | 7/8 - 14 | 1/2 - 14 | 7/8 | 1.52 | 1.17 | 5.0 | 5.0 | 3.3 |
| **3507-10-12** | 7/8 - 14 | 3/4 - 14 | 1 1/16 | 1.36 | 1.40 | 3.0 | 3.0 | 1.9 |
| **3507-12-8** | 1 1/16 - 12 | 1/2 - 14 | 1 1/16 | 1.73 | 1.12 | 5.0 | 5.0 | 3.3 |
| **3507-12-12** | 1 1/16 - 12 | 3/4 - 14 | 1 1/16 | 1.73 | 1.37 | 3.0 | 3.0 | 1.9 |
| **3507-16-16** | 1 5/16 - 12 | 1 - 11 1/2 | 1 5/16 | 1.86 | 1.52 | 2.5 | 2.5 | 1.6 |

Dimensions and pressures for reference only, subject to change.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

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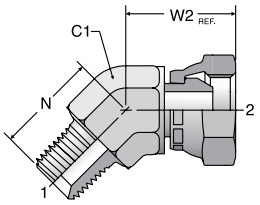
# 3107

45° Male Pipe Elbow
NPTF / NPSM Swivel

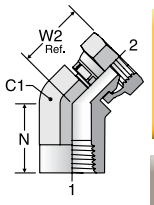
SAE 140330




| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPSM | C1 HEX (in.) | N (in.) | W2 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **3107-2-2** | 1/8 - 27 | 1/8 - 27 | 7/16 | 0.52 | 0.77 | 6.0 | 6.0 | 3.3 |
| **3107-4-4** | 1/4 - 18 | 1/4 - 18 | 9/16 | 0.86 | 0.91 | 6.0 | 6.0 | 3.3 |
| **3107-6-6** | 3/8 - 18 | 3/8 - 18 | 3/4 | 0.95 | 1.10 | 6.0 | 6.0 | 3.3 |
| **3107-6-8** | 3/8 - 18 | 1/2 - 14 | 1 1/16 | 1.09 | 1.16 | 5.0 | 5.0 | 3.3 |
| **3107-8-4** | 1/2 - 14 | 1/4 - 18 | 1 1/16 | 1.34 | 0.96 | 5.0 | 5.0 | 3.3 |
| **3107-8-6** | 1/2 - 14 | 3/8 - 18 | 7/8 | 1.17 | 1.10 | 6.0 | 6.0 | 3.3 |
| **3107-8-8** | 1/2 - 14 | 1/2 - 14 | 7/8 | 1.17 | 1.17 | 5.0 | 5.0 | 3.3 |
| **3107-8-12** | 1/2 - 14 | 3/4 - 14 | 1 1/16 | 1.50 | 1.24 | 3.0 | 3.0 | 1.9 |
| **3107-12-8** | 3/4 - 14 | 1/2 - 14 | 1 1/16 | 1.20 | 1.23 | 4.0 | 4.0 | 1.9 |
| **3107-12-12** | 3/4 - 14 | 3/4 - 14 | 1 1/16 | 1.20 | 1.37 | 3.0 | 3.0 | 1.9 |
| **3107-12-16** | 3/4 - 14 | 1 - 11 1/2 | 1 5/16 | 1.50 | 1.32 | 2.5 | 2.5 | 1.6 |
| **3107-16-12** | 1 - 11 1/2 | 3/4 - 14 | 1 5/16 | 1.48 | 1.47 | 3.0 | 3.0 | 1.6 |
| **3107-16-16** | 1 - 11 1/2 | 1 - 11 1/2 | 1 5/16 | 1.48 | 1.52 | 2.5 | 2.5 | 1.6 |
| **3107-20-16** | 1 1/4 - 11 1/2 | 1 - 11 1/2 | 1 5/8 | 1.75 | 1.55 | 2.5 | 2.5 | 1.3 |
| **3107-20-20** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 1 5/8 | 1.67 | 1.61 | 2.0 | 2.0 | 1.3 |
| **3107-24-24** | 1 1/2 - 11 1/2 | 1 1/2 - 11 1/2 | 1 7/8 | 1.77 | 1.77 | 2.0 | 2.0 | 1.3 |
| **3107-32-32** | 2 - 11 1/2 | 2 - 11 1/2 | 2 1/2 | 2.11 | 1.89 | 1.1 | 1.1 | 0.7 |

# 3207

45° Female Pipe Elbow
NPTF / NPSM Swivel

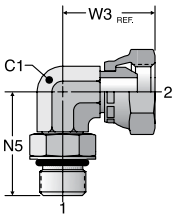



| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPSM | C1 HEX (in.) | N (in.) | W2 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **3207-4-4** | 1/4 - 18 | 1/4 - 18 | 3/4 | 0.91 | 0.94 | 5.0 | 5.0 | 3.3 |
| **3207-6-6** | 3/8 - 18 | 3/8 - 18 | 7/8 | 1.00 | 0.97 | 4.5 | 4.5 | 2.9 |
| **3207-8-8** | 1/2 - 14 | 1/2 - 14 | 1 1/16 | 1.01 | 1.12 | 3.0 | 3.0 | 1.9 |
| **3207-12-12** | 3/4 - 14 | 3/4 - 14 | 1 5/16 | 1.25 | 1.31 | 3.0 | 3.0 | 1.9 |
| **3207-16-16** | 1 - 11 1/2 | 1 - 11 1/2 | 1 5/8 | 1.44 | 1.55 | 1.8 | 1.8 | 1.1 |

# 2507

Straight Thread Elbow
SAE-ORB / NPSM Swivel

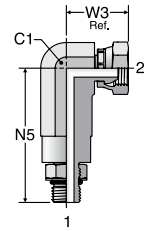
SAE 140257




| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 NPSM | C1 HEX (in.) | N5 (in.) | W3 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **2507-4-4** | 7/16 - 20 | 1/4 - 18 | 7/16 | 1.03 | 0.97 | 6.0 | 6.0 | 3.3 |
| **2507-4-6** | 7/16 - 20 | 3/8 - 18 | 9/16 | 1.28 | 1.23 | 6.0 | 6.0 | 3.3 |
| **2507-6-4** | 9/16 - 18 | 1/4 - 18 | 9/16 | 1.25 | 1.06 | 6.0 | 6.0 | 3.3 |
| **2507-6-6** | 9/16 - 18 | 3/8 - 18 | 9/16 | 1.25 | 1.10 | 6.0 | 6.0 | 3.3 |
| **2507-6-8** | 9/16 - 18 | 1/2 - 14 | 3/4 | 1.41 | 1.29 | 5.0 | 5.0 | 3.3 |
| **2507-8-4** | 3/4 - 16 | 1/4 - 18 | 3/4 | 1.30 | 1.09 | 6.0 | 6.0 | 3.3 |
| **2507-8-6** | 3/4 - 16 | 3/8 - 18 | 3/4 | 1.45 | 1.19 | 6.0 | 6.0 | 3.3 |
| **2507-8-8** | 3/4 - 16 | 1/2 - 14 | 3/4 | 1.45 | 1.33 | 5.0 | 5.0 | 3.3 |
| **2507-8-12** | 3/4 - 16 | 3/4 - 14 | 3/4 | 1.62 | 1.65 | 3.0 | 3.0 | 1.9 |
| **2507-10-6** | 7/8 - 14 | 3/8 - 18 | 7/8 | 1.70 | 1.26 | 5.0 | 5.0 | 3.3 |
| **2507-10-8** | 7/8 - 14 | 1/2 - 14 | 7/8 | 1.70 | 1.40 | 5.0 | 5.0 | 3.3 |
| **2507-10-12** | 7/8 - 14 | 3/4 - 14 | 7/8 | 1.78 | 1.62 | 3.0 | 3.0 | 1.9 |
| **2507-12-8** | 1 1/16 - 12 | 1/2 - 14 | 1 1/16 | 1.94 | 1.50 | 5.0 | 5.0 | 3.3 |
| **2507-12-12** | 1 1/16 - 12 | 3/4 - 14 | 1 1/16 | 1.94 | 1.65 | 3.0 | 3.0 | 1.9 |
| **2507-12-16** | 1 1/16 - 12 | 1 - 11 1/2 | 1 3/16 | 2.08 | 1.91 | 2.5 | 2.5 | 1.6 |
| **2507-16-12** | 1 5/16 - 12 | 3/4 - 14 | 1 3/16 | 2.08 | 1.89 | 3.0 | 3.0 | 1.9 |
| **2507-16-16** | 1 5/16 - 12 | 1 - 11 1/2 | 1 5/16 | 2.05 | 1.91 | 2.5 | 2.5 | 1.6 |
| **2507-20-20** | 1 5/8 - 12 | 1 1/4 - 11 1/2 | 1 5/8 | 2.25 | 2.16 | 2.0 | 2.0 | 1.3 |
| **2507-24-24** | 1 7/8 - 12 | 1 1/2 - 11 1/2 | 1 7/8 | 2.39 | 2.31 | 1.1 | 1.1 | 0.7 |

# 5507

Long Straight Thread Elbow
SAE-ORB / NPSM Swivel




| TUBE FITTING PART # | END SIZE 1 UN/UNF-2A | END SIZE 2 NPSM | C1 HEX (in.) | N5 (in.) | W3 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **5507-4-4** | 7/16 - 20 | 1/4 - 18 | 3/4 | 2.19 | 1.13 | 6.0 | 6.0 | 3.3 |
| **5507-6-6** | 9/16 - 18 | 3/8 - 18 | 7/8 | 2.59 | 1.20 | 6.0 | 6.0 | 3.3 |
| **5507-8-6** | 3/4 - 16 | 3/8 - 18 | 7/8 | 2.47 | 1.20 | 6.0 | 6.0 | 3.3 |

Dimensions and pressures for reference only, subject to change.



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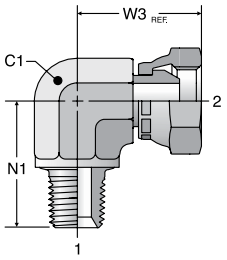
G

# 2107

Male Pipe Elbow
NPTF / NPSM Swivel

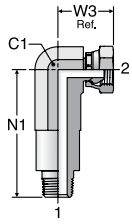
SAE 140230




| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPSM | C1 HEX (in.) | N1 (in.) | W3 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **2107-2-2** | 1/8 - 27 | 1/8 - 27 | 7/16 | 0.72 | 0.85 | 6.0 | 6.0 | 3.3 |
| **2107-2-4** | 1/8 - 27 | 1/4 - 18 | 7/16 | 1.00 | 0.97 | 6.0 | 6.0 | 3.3 |
| **2107-4-2** | 1/4 - 18 | 1/8 - 27 | 9/16 | 1.02 | 1.05 | 6.0 | 6.0 | 3.3 |
| **2107-4-4** | 1/4 - 18 | 1/4 - 18 | 9/16 | 1.09 | 1.06 | 6.0 | 6.0 | 3.3 |
| **2107-4-6** | 1/4 - 18 | 3/8 - 18 | 3/4 | 1.09 | 1.28 | 6.0 | 6.0 | 3.3 |
| **2107-6-4** | 3/8 - 18 | 1/4 - 18 | 3/4 | 1.22 | 1.17 | 6.0 | 6.0 | 3.3 |
| **2107-6-6** | 3/8 - 18 | 3/8 - 18 | 3/4 | 1.22 | 1.28 | 6.0 | 6.0 | 3.3 |
| **2107-6-8** | 3/8 - 18 | 1/2 - 14 | 3/4 | 1.22 | 1.33 | 5.0 | 5.0 | 3.3 |
| **2107-8-4** | 1/2 - 14 | 1/4 - 18 | 7/8 | 1.69 | 1.18 | 6.0 | 6.0 | 3.3 |
| **2107-8-6** | 1/2 - 14 | 3/8 - 18 | 7/8 | 1.47 | 1.35 | 6.0 | 6.0 | 3.3 |
| **2107-8-8** | 1/2 - 14 | 1/2 - 14 | 7/8 | 1.47 | 1.40 | 5.0 | 5.0 | 3.3 |
| **2107-8-12** | 1/2 - 14 | 3/4 - 14 | 1 1/16 | 1.47 | 1.65 | 3.0 | 3.0 | 1.9 |
| **2107-12-6** | 3/4 - 14 | 3/8 - 18 | 1 1/16 | 1.59 | 1.48 | 4.0 | 4.0 | 2.6 |
| **2107-12-8** | 3/4 - 14 | 1/2 - 14 | 1 1/16 | 1.59 | 1.53 | 4.0 | 4.0 | 2.6 |
| **2107-12-12** | 3/4 - 14 | 3/4 - 14 | 1 1/16 | 1.59 | 1.65 | 3.0 | 3.0 | 1.9 |
| **2107-12-16** | 3/4 - 14 | 1 - 11 1/2 | 1 3/16 | 2.19 | 1.72 | 2.5 | 2.5 | 1.6 |
| **2107-16-12** | 1 - 11 1/2 | 3/4 - 14 | 1 5/16 | 1.97 | 1.82 | 3.0 | 3.0 | 1.9 |
| **2107-16-16** | 1 - 11 1/2 | 1 - 11 1/2 | 1 5/16 | 1.97 | 1.91 | 2.5 | 2.5 | 1.6 |
| **2107-16-20** | 1 - 11 1/2 | 1 1/4 - 11 1/2 | 1 7/16 | 2.41 | 1.87 | 2.0 | 2.0 | 1.3 |
| **2107-20-16** | 1 1/4 - 11 1/2 | 1 - 11 1/2 | 1 5/8 | 2.62 | 1.98 | 2.5 | 2.5 | 1.6 |
| **2107-20-20** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 1 5/8 | 2.38 | 2.11 | 2.0 | 2.0 | 1.3 |
| **2107-24-24** | 1 1/2 - 11 1/2 | 1 1/2 - 11 1/2 | 1 7/8 | 2.64 | 2.31 | 2.0 | 2.0 | 1.0 |
| **2107-32-32** | 2 - 11 1/2 | 2 - 11 1/2 | 2 1/2 | 3.00 | 2.70 | 1.1 | 1.1 | 0.7 |

# 5607

Long Male Pipe Elbow
NPTF / NPSM Swivel

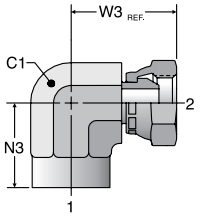



| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPSM | C1 HEX (in.) | N1 (in.) | W3 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **5607-2-2** | 1/8 - 27 | 1/8 - 27 | 9/16 | 1.64 | 0.92 | 6.0 | 6.0 | 3.3 |
| **5607-4-4** | 1/4 - 18 | 1/4 - 18 | 3/4 | 2.25 | 1.16 | 6.0 | 6.0 | 3.3 |
| **5607-6-6** | 3/8 - 18 | 3/8 - 18 | 7/8 | 2.76 | 1.20 | 6.0 | 6.0 | 3.3 |
| **5607-8-8** | 1/2 - 14 | 1/2 - 14 | 1 1/16 | 3.19 | 1.48 | 5.0 | 5.0 | 3.3 |
| **5607-12-12** | 3/4 - 14 | 3/4 - 14 | 1 5/16 | 3.66 | 1.69 | 3.0 | 3.0 | 1.9 |
| **5607-16-16** | 1 - 11 1/2 | 1 - 11 1/2 | 1 7/8 | 4.31 | 2.15 | 2.5 | 2.5 | 1.6 |

# 2207

Female Pipe Elbow
NPTF / NPSM Swivel

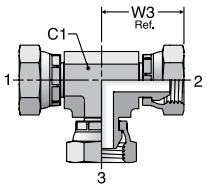
SAE 140231




| TUBE FITTING PART # | END SIZE 1 NPTF | END SIZE 2 NPSM | C1 HEX (in.) | N3 (in.) | W3 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **2207-2-2** | 1/8 - 27 | 1/8 - 27 | 9/16 | 0.66 | 0.95 | 5.0 | 5.0 | 3.3 |
| **2207-4-4** | 1/4 - 18 | 1/4 - 18 | 3/4 | 0.88 | 1.17 | 5.0 | 5.0 | 3.3 |
| **2207-4-6** | 1/4 - 18 | 3/8 - 18 | 7/8 | 0.88 | 1.26 | 4.5 | 4.5 | 2.9 |
| **2207-6-6** | 3/8 - 18 | 3/8 - 18 | 7/8 | 1.02 | 1.26 | 4.5 | 4.5 | 2.9 |
| **2207-8-6** | 1/2 - 14 | 3/8 - 18 | 1 1/16 | 1.37 | 1.34 | 3.0 | 3.0 | 1.9 |
| **2207-8-8** | 1/2 - 14 | 1/2 - 14 | 1 1/16 | 1.23 | 1.53 | 3.0 | 3.0 | 1.9 |
| **2207-12-12** | 3/4 - 14 | 3/4 - 14 | 1 5/16 | 1.36 | 1.82 | 3.0 | 3.0 | 1.9 |
| **2207-16-16** | 1 - 11 1/2 | 1 - 11 1/2 | 1 5/8 | 1.62 | 2.10 | 1.8 | 1.8 | 1.1 |
| **2207-20-20** | 1 1/4 - 11 1/2 | 1 1/4 - 11 1/2 | 1 7/8 | 1.70 | 2.21 | 1.5 | 1.5 | 1.0 |
| **2207-24-24** | 1 1/2 - 11 1/2 | 1 1/2 - 11 1/2 | 2 1/2 | 2.08 | 2.83 | 1.5 | 1.5 | 1.0 |
| **2207-32-32** | 2 - 11 1/2 | 2 - 11 1/2 | 2 13/16 | 2.39 | 3.00 | 1.1 | 1.1 | 0.7 |

# 077T

NPSM Union Tee
NPSM Swivel (all three ends)




| TUBE FITTING PART # | END SIZE 1 NPSM | END SIZE 2 NPSM | END SIZE 3 NPSM | C1 HEX (in.) | W3 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **077T-2** | 1/8 - 27 | 1/8 - 27 | 1/8 - 27 | 7/16 | 0.89 | 6.0 | 7.2 | 3.3 |
| **077T-4** | 1/4 - 18 | 1/4 - 18 | 1/4 - 18 | 9/16 | 1.06 | 6.0 | 7.2 | 3.3 |
| **077T-6** | 3/8 - 18 | 3/8 - 18 | 3/8 - 18 | 3/4 | 1.15 | 6.0 | 7.2 | 3.3 |
| **077T-8** | 1/2 - 14 | 1/2 - 14 | 1/2 - 14 | 3/4 | 1.29 | 5.0 | 6.0 | 3.3 |
| **077T-12** | 3/4 - 14 | 3/4 - 14 | 3/4 - 14 | 1 1/16 | 1.65 | 3.0 | 3.6 | 1.9 |

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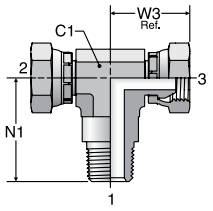
# 217T

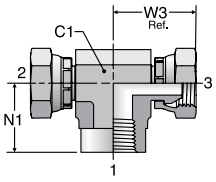
Male Pipe Branch Tee
NPTF / NPSM Swivel /
NPSM Swivel




| TUBE FITTING PART # | END SIZE 1 NPTF | 2 NPSM | 3 NPSM | C1 HEX (in.) | N1 (in.) | W3 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|
| **217T-2-2** | 1/8 - 27 | 1/8 - 27 | 1/8 - 27 | 9/16 | 0.97 | 0.92 | 6.0 | 6.0 | 3.3 |
| **217T-4-4** | 1/4 - 18 | 1/4 - 18 | 1/4 - 18 | 9/16 | 1.19 | 1.03 | 6.0 | 6.0 | 3.3 |
| **217T-6-6** | 3/8 - 18 | 3/8 - 18 | 3/8 - 18 | 3/4 | 1.50 | 1.15 | 6.0 | 6.0 | 3.3 |
| **217T-8-6** | 1/2 - 14 | 3/8 - 18 | 1/2 - 14 | 3/4 | 1.69 | 1.21 | 6.0 | 6.0 | 3.3 |
| **217T-8-8** | 1/2 - 14 | 1/2 - 14 | 1/2 - 14 | 3/4 | 1.81 | 1.35 | 5.0 | 5.0 | 3.3 |
| **217T-12-12** | 3/4 - 14 | 3/4 - 14 | 3/4 - 14 | 1 1/16 | 2.00 | 1.60 | 3.0 | 3.0 | 1.9 |
| **217T-16-16** | 1 - 11 1/2 | 1 - 11 1/2 | 1 - 11 1/2 | 1 1/16 | 2.37 | 1.86 | 2.5 | 2.5 | 1.6 |

# 227T

Female Pipe Branch Tee
NPTF / NPSM Swivel /
NPSM Swivel




| TUBE FITTING PART # | END SIZE 1 NPTF | 2 NPSM | 3 NPSM | C1 HEX (in.) | N1 (in.) | W3 (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|
| **227T-4-4** | 1/4 - 18 | 1/4 - 18 | 1/4 - 18 | 3/4 | 0.94 | 1.13 | 5.0 | 5.0 | 3.2 |
| **227T-6-6** | 3/8 - 18 | 3/8 - 18 | 3/8 - 18 | 7/8 | 1.00 | 1.20 | 4.5 | 4.5 | 2.9 |
| **227T-8-8** | 1/2 - 14 | 1/2 - 14 | 1/2 - 14 | 1 1/16 | 1.17 | 1.46 | 3.0 | 3.0 | 1.9 |
| **227T-12-12** | 3/4 - 14 | 3/4 - 14 | 3/4 - 14 | 1 3/16 | 1.44 | 1.60 | 3.0 | 3.0 | 1.9 |

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# JIS Fittings

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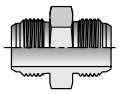
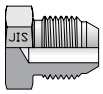
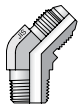
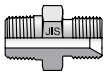
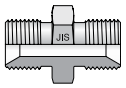
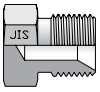
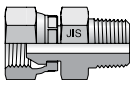
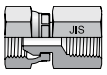
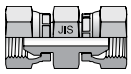
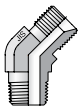
| | | | | | |
|---|---|---|---|---|---|
| **30° Flare** | **HT4**<br>JIS Union / 30° Flare<br>  <br>H5 | **F3T4**<br>BSPT / 30° Flare<br> <br>H5 | **PNMT4**<br>Plug<br>  <br>H5 | **FNMT4**<br>Cap<br> <br>H5 | **V3T4**<br>BSPT / 30° Flare<br>  <br>H5 |
| **C3T4**<br>BSPT / 30° Flare<br> <br>H5 | **60° Cone** | **F3P4**<br>BSPT / 60° Cone<br>  <br>H6 | **HP4**<br>Union<br>  <br>H6 | **G3P4**<br>BSPT / 60° Cone<br> <br>H6 | **PNMP4**<br>Plug<br>  <br>H6 |
| **F63P4**<br>60° Swivel / BSPT<br>  <br>H6 | **G63P4**<br>60° Swivel / BSPT<br>  <br>H6 | **HP46**<br>Union Swivel<br>  <br>H7 | **FNMP4**<br>Cap<br> <br>H7 | **C3P4**<br>BSPT / 60° Cone<br> <br>H7 | **V3P4**<br>BSPT / 60° Cone<br>  <br>H7 |
| **B2351 Port** | **P47OMN**<br>Hex Head Plug<br> <br>H7 | | | | |

## O-Rings and Seals (Shown in Section N)

| | |
|---|---|
| **JIS O-Rings and Seals** | **JIS B2351 O-Ring**<br> <br>N7 |

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# JIS Fittings

Parker introduced Japanese Industrial Standard (JIS) adapters in the early 1990s to address market requirements for OEM and replacement fittings. These fittings are typically used as hose adapters on equipment designed and/or manufactured in Japan and Korea. Parker's JIS adapters are designed with 30° flare and 60° cone connections and typically incorporate BSP threads.

Parker JIS adapters are designed with BSPP and BSPT port ends and two styles of hose ends: T4 (30° flare, BSPP threads) and P4 (60° cone, BSPP threads). Two additional Parker series of fittings, KA (Komatsu flare) and K4 (BS B5200) adapters, are similar to JIS style fittings and appear in sections I and J of this catalog.

The T4 and P4 interfaces, as shown in Fig. H1, provide end user flexibility of connecting to the most common Parker hose ends available as listed in Table H1.

Parker's JIS adapter offering that uses the BSPP port connection are manufactured in accordance with the JIS B2351 type "O" port connection which is commonly used for higher pressure systems. Fig. H2 illustrates this port connection and Table H2 shows appropriate JIS B2351 O-rings and dash sizes.

It should be noted that Parker offers two very similar cone style BSPP adapters — P4 and K4. Parker's K4 (60 cone, BSPP) fittings conform to BS5200, while Parker's JIS cone adapters meet JIS B8363 specifications. ***These fittings, while very similar, are not interchangeable.*** See the I section of this catalog for more specific information on their differences.

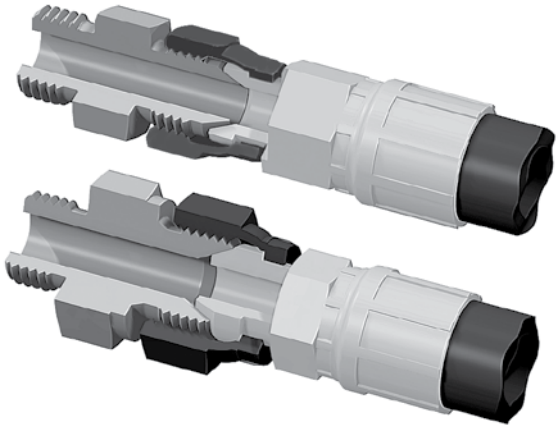

**Fig. H1 – JIS T4 and P4 Interfaces**

| Adapter Connection End | Mating Parker Hose Fitting Series |
|---|---|
| P4 / P46 | UT, GU, G1, G2 |
| T4 / T46 | FU |

**Table H1 – Parker JIS Fittings Hose Adaptability**

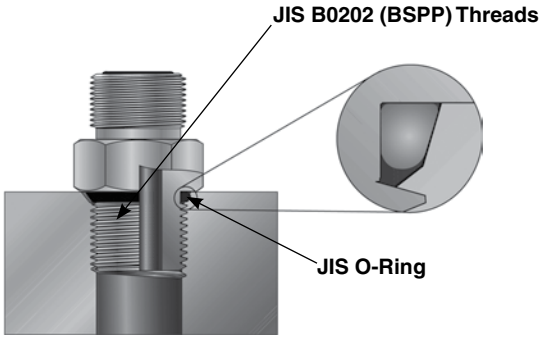


**Fig. H2 – JIS B2351 Type "O" Port Connection**

# Design and Construction

**Construction:** Shaped JIS adapters are manufactured from a hot forged construction. Straight adapters are manufactured from cold drawn barstock.

**Threads:** The standard JIS products are manufactured with the thread forms listed below:

BSPP Threads: ISO 228-1 G, JIS B 0202,
BSPT Threads: ISO 7/1, JIS B 0203

**Identification:** All Parker JIS fittings are stamped with "JIS" for positive identification and differentiation from similar style fittings.

# Reference Locations

**Dynamic Pressure Ratings:** Please refer to the last column of part number tables located on the following pages of this section for the appropriate dynamic pressure ratings.

**Standard Material Specifications:** Please refer to Table U1 located in the Appendix section.

| "G" Thread BSPP per ISO 228-1 JIS B 0202 | Dash Size | Port O-Ring (See Pg. N6) |
|---|---|---|
| 1/8-28 | 2 | P8 |
| 1/4-19 | 4 | P11 |
| 3/8-19 | 6 | P14 |
| 1/2-14 | 8 | P18 |
| 3/4-14 | 12 | P24 |
| 1-11 | 16 | P29 |

**Table H2 – JIS B2351 Port Threads and O-Rings as shown in Fig. H2**

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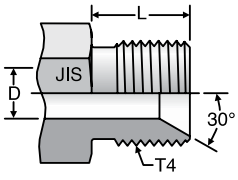
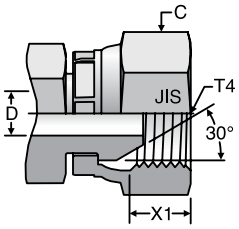
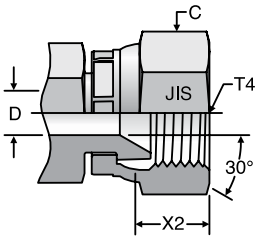
# JIS Ends



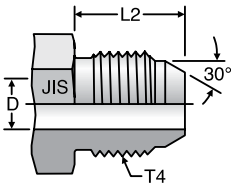

**JIS Male, 60° Seat**




**JIS Swivel for 60° Seat**




**JIS Swivel for 30° Flare**




**JIS Male, 30° Flare**

| | BSPP Thread | Swivel Hex | Drill | Male Turn Back | | Assembly Allowance | |
|---|---|---|---|---|---|---|---|
| **Dash Size** | **T4** BSPP | **C** (in) | **D** (in) | **L** (in) | **L2** (in) | **X1** (in) | **X2** (in) |
| **4** | 1/4-19 | .75 | 0.177 | .570 | .606 | 0.35 | 0.36 |
| **6** | 3/8-19 | .88 | 0.275 | .609 | .684 | 0.29 | 0.38 |
| **8** | 1/2-14 | 1.06 | 0.433 | .726 | .763 | 0.46 | 0.53 |
| **12** | 3/4-14 | 1.44 | 0.625 | .805 | .842 | 0.55 | 0.56 |
| **16** | 1-11 | 1.63 | 0.828 | .883 | .881 | 0.53 | 0.58 |

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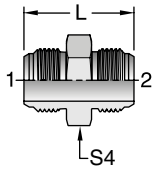
# HT4

JIS Union Flare
30° Flare / 30° Flare

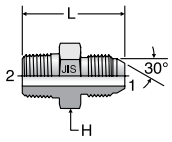



| TUBE FITTING PART # | End Size 1 BSPP | End Size 2 BSPP | S4 Hex (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|
| 4 HT4 | 1/4-19 | 1/4-19 | 3/4 | 1.45 | 5.0 |
| 6 HT4 | 3/8-19 | 3/8-19 | 7/8 | 1.68 | 5.0 |
| 8 HT4 | 1/2-14 | 1/2-14 | 1 1/16 | 1.88 | 5.0 |
| 12 HT4 | 3/4-14 | 3/4-14 | 1 7/16 | 2.12 | 4.0 |
| 16 HT4 | 1-11 | 1-11 | 1 5/8 | 2.28 | 3.0 |

# F3T4

Male Connector
30° Flare / BSPT

Mates with FU Style hose fittings

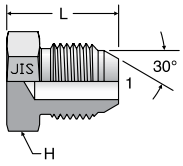



| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPT | H HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| 4F3T4 | 1/4 - 19 | 1/4 - 19 | 0.75 | 1.46 | 5.0 |
| 4-6F3T4 | 1/4 - 19 | 3/8 - 19 | 0.88 | 1.51 | 5.0 |
| 6-4F3T4 | 3/8 - 19 | 1/4 - 19 | 0.88 | 1.59 | 5.0 |
| 6F3T4 | 3/8 - 19 | 3/8 - 19 | 0.88 | 1.59 | 5.0 |
| 8-6F3T4 | 1/2 - 14 | 3/8 - 19 | 1.06 | 1.70 | 5.0 |
| 8F3T4 | 1/2 - 14 | 1/2 - 14 | 1.06 | 1.89 | 5.0 |
| 12F3T4 | 3/4 - 14 | 3/4 - 14 | 1.44 | 2.10 | 4.0 |
| 16F3T4 | 1-11 | 1-11 | 1.63 | 2.30 | 3.0 |

# PNMT4

Plug
30° Flare

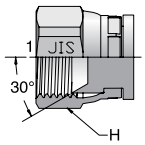
Mates with FU Style hose fittings




| TUBE FITTING PART # | END SIZE 1 BSPP | H HEX (mm) | L (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|
| 4PNMT4 | 1/4 - 19 | 17 | 0.89 | 5.0 |
| 6PNMT4 | 3/8 - 19 | 19 | 0.97 | 5.0 |
| 8PNMT4 | 1/2 - 14 | 22 | 1.11 | 5.0 |
| 12PNMT4 | 3/4 - 14 | 30 | 1.26 | 4.0 |
| 16PNMT4 | 1-11 | 36 | 1.30 | 3.0 |

# FNMT4

Cap
30° Flare

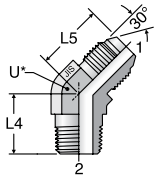



| TUBE FITTING PART # | END SIZE 1 BSPP | H HEX (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|
| 4FNMT4 | 1/4 - 19 | 0.75 | 5.0 |
| 6FNMT4 | 3/8 - 19 | 0.88 | 5.0 |
| 8FNMT4 | 1/2 - 14 | 1.06 | 5.0 |
| 12FNMT4 | 3/4 - 14 | 1.44 | 4.0 |
| 16FNMT4 | 1-11 | 1.63 | 3.0 |

# V3T4

45° Male Elbow
30° Flare / BSPT

Mates with FU Style hose fittings



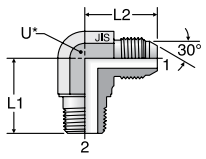

* Across wrench flats

| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPT | L4 (in.) | L5 (in.) | U (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|---|
| 4V3T4 | 1/4 - 19 | 1/4 - 19 | 0.75 | 0.87 | 0.56 | 5.0 |
| 6V3T4 | 3/8 - 19 | 3/8 - 19 | 0.87 | 0.97 | 0.75 | 5.0 |
| 8V3T4 | 1/2 - 14 | 1/2 - 14 | 1.06 | 1.10 | 0.88 | 5.0 |
| 12V3T4 | 3/4 - 14 | 3/4 - 14 | 1.18 | 1.24 | 1.06 | 4.0 |
| 16V3T4 | 1-11 | 1-11 | 1.37 | 1.26 | 1.31 | 3.0 |

# C3T4

Male Elbow
30° Flare / BSPT

Mates with FU Style hose fittings




* Across wrench flats

| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPT | L1 (in.) | L2 (in.) | U (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|---|
| 4C3T4 | 1/4 - 19 | 1/4 - 19 | 1.00 | 0.98 | 0.56 | 5.0 |
| 6C3T4 | 3/8 - 19 | 3/8 - 19 | 1.18 | 1.14 | 0.75 | 5.0 |
| 8C3T4 | 1/2 - 14 | 1/2 - 14 | 1.42 | 1.33 | 0.88 | 5.0 |
| 12C3T4 | 3/4 - 14 | 3/4 - 14 | 1.69 | 1.50 | 1.06 | 4.0 |
| 16C3T4 | 1-11 | 1-11 | 1.97 | 1.74 | 1.31 | 3.0 |

Dimensions and pressures for reference only, subject to change.



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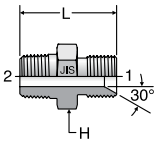
Male Connector
60° Cone / BSPT

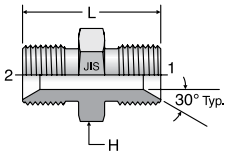



Mates with GU, G1 and G2 Style hose fittings

| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPT | H HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| 4F3P4 | 1/4 - 19 | 1/4 - 19 | 0.75 | 1.44 | 5.0 |
| 6F3P4 | 3/8 - 19 | 3/8 - 19 | 0.88 | 1.50 | 5.0 |
| 8F3P4 | 1/2 - 14 | 1/2 - 14 | 1.06 | 1.81 | 5.0 |
| 12F3P4 | 3/4 - 14 | 3/4 - 14 | 1.44 | 2.05 | 4.0 |
| 16F3P4 | 1-11 | 1-11 | 1.63 | 2.28 | 3.0 |

# HP4

Union
60° Cone

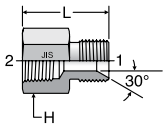



Mates with GU, G1 and G2 Style hose fittings

| TUBE FITTING PART # | END SIZE 1 & 2 BSPP | H HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|
| 4HP4 | 1/4 - 19 | 0.75 | 1.34 | 5.0 |
| 6HP4 | 3/8 - 19 | 0.88 | 1.50 | 5.0 |
| 8HP4 | 1/2 - 14 | 1.06 | 1.81 | 5.0 |
| 12HP4 | 3/4 - 14 | 1.44 | 2.05 | 4.0 |
| 16HP4 | 1-11 | 1.63 | 2.28 | 3.0 |

# G3P4

Female Connector
60° Cone / BSPT

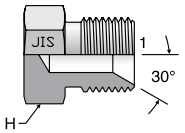



Mates with GU, G1 and G2 Style hose fittings

| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPT | H HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| 4G3P4 | 1/4 - 19 | 1/4 - 19 | 0.75 | 1.22 | 5.0 |
| 6G3P4 | 3/8 - 19 | 3/8 - 19 | 0.88 | 1.34 | 5.0 |
| 8G3P4 | 1/2 - 14 | 1/2 - 14 | 1.06 | 1.58 | 5.0 |
| 12G3P4 | 3/4 - 14 | 3/4 - 14 | 1.44 | 1.73 | 4.0 |
| 16G3P4 | 1-11 | 1-11 | 1.63 | 1.93 | 3.0 |

# PNMP4

Plug
60° Cone

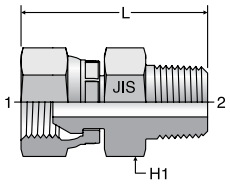



Mates with GU, G1 and G2 Style hose fittings

| TUBE FITTING PART # | END SIZE 1 BSPP | H HEX (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|
| 4PNMP4 | 1/4 - 19 | 17 | 5.0 |
| 6PNMP4 | 3/8 - 19 | 19 | 5.0 |
| 8PNMP4 | 1/2 - 14 | 22 | 5.0 |
| 12PNMP4 | 3/4 - 14 | 30 | 4.0 |
| 16PNMP4 | 1-11 | 36 | 3.0 |

# F63P4

Swivel Male Connector
60° Swivel / BSPT

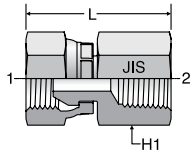



Mates with UT Style hose fittings

| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPT | H1 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| 4F63P4 | 1/4 - 19 | 1/4 - 19 | 0.75 | 1.73 | 5.0 |
| 6F63P4 | 3/8 - 19 | 3/8 - 19 | 0.88 | 1.94 | 5.0 |
| 8F63P4 | 1/2 - 14 | 1/2 - 14 | 1.06 | 2.25 | 5.0 |
| 12F63P4 | 3/4 - 14 | 3/4 - 14 | 1.44 | 2.55 | 4.0 |
| 16F63P4 | 1-11 | 1-11 | 1.63 | 2.77 | 3.0 |

# G63P4

Swivel Female Connector
60° Swivel / BSPT




Mates with UT Style hose fittings

| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPT | H1 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| 4G63P4 | 1/4 - 19 | 1/4 - 19 | 0.75 | 1.61 | 5.0 |
| 6G63P4 | 3/8 - 19 | 3/8 - 19 | 0.88 | 1.78 | 5.0 |
| 8G63P4 | 1/2 - 14 | 1/2 - 14 | 1.06 | 2.02 | 5.0 |
| 12G63P4 | 3/4 - 14 | 3/4 - 14 | 1.44 | 2.20 | 4.0 |
| 16G63P4 | 1-11 | 1-11 | 1.63 | 2.52 | 3.0 |

Dimensions and pressures for reference only, subject to change.



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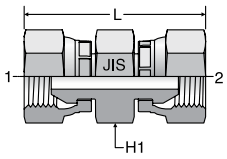
# HP46

Swivel Union Connector
60° Swivel

Mates with UT Style hose fittings

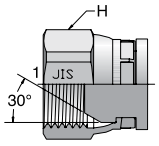



| TUBE FITTING PART # | END SIZE 1 & 2 BSPP | H1 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|
| **4HP46** | 1/4 - 19 | 0.75 | 2.12 | 5.0 |
| **6HP46** | 3/8 - 19 | 0.88 | 2.37 | 5.0 |
| **8HP46** | 1/2 - 14 | 1.06 | 2.73 | 5.0 |
| **12HP46** | 3/4 - 14 | 1.44 | 2.96 | 4.0 |
| **16HP46** | 1-11 | 1.63 | 3.24 | 3.0 |

# FNMP4

Cap
60° Cone

Mates with UT Style hose fittings

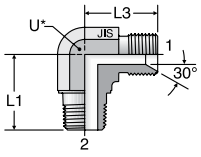



| TUBE FITTING PART # | END SIZE 1 BSPP | H HEX (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|
| **4FNMP4** | 1/4 - 19 | 0.75 | 5.0 |
| **6FNMP4** | 3/8 - 19 | 0.88 | 5.0 |
| **8FNMP4** | 1/2 - 14 | 1.06 | 5.0 |
| **12FNMP4** | 3/4 - 14 | 1.44 | 4.0 |
| **16FNMP4** | 1-11 | 1.63 | 3.0 |

# C3P4

90° Male Elbow
60° Cone / BSPT

Mates with GU, G1 and G2
Style hose fittings



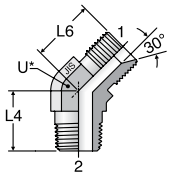

* Across wrench flats

| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPT | L1 (in.) | L3 (in.) | U (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|---|
| **4C3P4** | 1/4 - 19 | 1/4 - 19 | 1.00 | 0.96 | 0.56 | 5.0 |
| **6C3P4** | 3/8 - 19 | 3/8 - 19 | 1.18 | 1.14 | 0.75 | 5.0 |
| **8C3P4** | 1/2 - 14 | 1/2 - 14 | 1.42 | 1.28 | 0.88 | 5.0 |
| **12C3P4** | 3/4 - 14 | 3/4 - 14 | 1.69 | 1.56 | 1.06 | 4.0 |
| **16C3P4** | 1-11 | 1-11 | 1.97 | 1.74 | 1.31 | 3.0 |

# V3P4

45° Male Elbow
60° Cone / BSPT

Mates with GU, G1 and G2
Style hose fittings

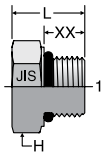



| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPT | L4 (in.) | L6 (in.) | U (in.) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|---|
| **4V3P4** | 1/4 - 19 | 1/4 - 19 | 0.75 | 0.81 | 0.56 | 5.0 |
| **6V3P4** | 3/8 - 19 | 3/8 - 19 | 0.87 | 0.91 | 0.75 | 5.0 |
| **8V3P4** | 1/2 - 14 | 1/2 - 14 | 1.06 | 1.05 | 0.88 | 5.0 |
| **12V3P4** | 3/4 - 14 | 3/4 - 14 | 1.18 | 1.18 | 1.06 | 4.0 |
| **16V3P4** | 1-11 | 1-11 | 1.37 | 1.30 | 1.31 | 3.0 |

# P47OMN

Plug

Hex head plug for JIS B2351




| TUBE FITTING PART # | END SIZE 1 BSPP | H HEX (mm) | L (mm) | XX (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **4P47OMN** | 1/4 - 19 | 19 | 19.1 | 11.2 | 5.0 |
| **6P47OMN** | 3/8 - 19 | 22 | 20.0 | 11.2 | 5.0 |
| **8P47OMN** | 1/2 - 14 | 27 | 24.1 | 14.5 | 5.0 |
| **12P47OMN** | 3/4 - 14 | 36 | 26.9 | 14.5 | 4.0 |
| **16P47OMN** | 1-11 | 41 | 31.0 | 18.5 | 3.0 |

Dimensions and pressures for reference only, subject to change.



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# K4 BSP Adapters

I

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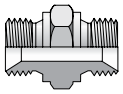
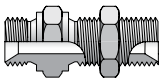
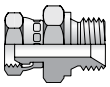
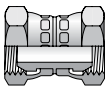
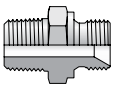
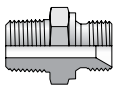
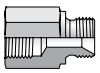
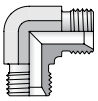
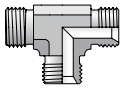
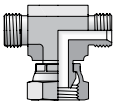
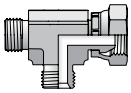
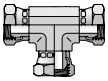
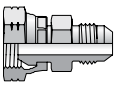
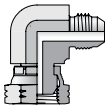
| **60° Cone BSP Adapters** | **Straights** | **HMK4**<br>Union<br>  <br>I6 | **WMK4WL4NM**<br>Bulkhead Union<br>  <br>I6 | **F6MK4**<br>60° Swivel / 60° Cone<br>  <br>I6 | **H6MK4**<br>Swivel Union<br>  <br>I6 |
| **FMK4**<br>NPTF / 60° Cone<br>  <br>I7 | **F3MK4**<br>BSPT / 60° Cone<br>  <br>I7 | **G4MK4**<br>BSPP / 60° Cone<br>  <br>I7 | **K4HF8O**<br>Metric BSP / 60° Cone<br> <br>I7 | **Elbows** | **EMK4**<br>Union Elbow<br>  <br>I8 |
| **C6MK4**<br>60° Swivel / 60° Cone<br> <br>I8 | **E6MK4**<br>Swivel Union<br> <br>I9 | **Tees** | **JMK4**<br>Union Tee<br>  <br>I9 | **S6MK4**<br>60° Swivel Branch Tee<br>  <br>I9 | **R6MK4**<br>60° Swivel Run Tee<br>  <br>I9 |
| **J6MK4**<br>Swivel Union Tee<br>  <br>I10 | **Plug Caps** | **PNMK4**<br>Hex Head Plug<br> <br>I8 | **FNMK4**<br>Cap<br> <br>I8 | | |

## Conversion Adapters (Shown in Section K)

| | | |
|---|---|---|
| **K4 BSP Conversion Adapters** | **XHMK46**<br>37° Flare / BSPP Swivel<br>  <br>K5 | **XEMK46**<br>37° Flare / BSPP Swivel<br>  <br>K6 |

## O-Rings and Seals (Shown in Section N)

| | |
|---|---|
| **K4 BSP O-Rings and Seals** | **D9DT**<br>BSPP Bonded Seal<br> <br>N7 |

Dimensions and pressures for reference only, subject to change.



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# K4 BSP Adapters

Parker K4 (BSP) adapters are typically used as hose adapters on equipment designed and/or manufactured throughout Europe, especially equipment with ties to the UK, Scandinavia, the Netherlands, Spain and Italy. BSP cone adapters are similar in function to NPSM (07 Adapters) but with BSPP threads.

The metal-to-metal sealing is achieved by a single line of contact between the conical surface of the 60° cone seat and the corresponding surface of the ballnose or cone swivel, as shown in Fig. I1.

K4 adapters are manufactured in accordance with BS5200 standards. The 60° internal seat is designed for sealing with BSP hose swivel connections offered by many manufacturers. K4 adapters mate with Parker hose fitting series shown in Table I1.

Further enhancing the flexibility of the K4 adapter product line is the ability for the male BSP cone end of the straight fittings to also be used as a port adapter in ISO 1179-1 / DIN 3852 ports. This is accomplished with the addition of a bonded seal (often referred to as a "Dowty®" seal). This product feature is illustrated in Fig. I2.

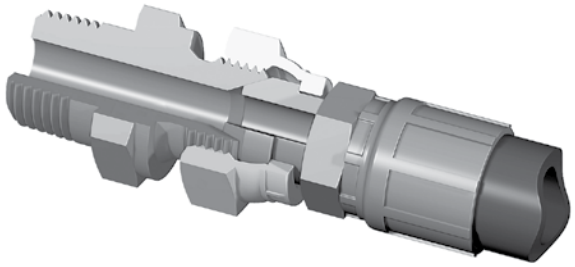

**Fig. I1 – K4 Interface**

| Adapter Connection End | Mating Parker Hose Fitting Series |
|---|---|
| K4 / K46 | D9/92, B1, B2, B4 |

**Table I1 – Parker K4 Fittings Hose Adaptability**

# Design and Construction

**Construction:** Shaped K4 adapters are manufactured from a hot forged construction. Straight adapters are manufactured from cold drawn barstock.

**Threads:** The standard K4 products are manufactured with the thread forms listed below:

BSPP Threads: ISO 228-1 G
BSPT Threads: ISO 7/1, JIS B 0203
NPTF Threads: SAE J476, ANSI B1.20.3, FED-STD-H28/8

# Reference Locations

**Dynamic Pressure Ratings:** Please refer to the last column of the part number tables located on the following pages of this section for appropriate dynamic pressure ratings.

**Standard Material Specification:** Please refer to Table U2 in the Appendix Section.

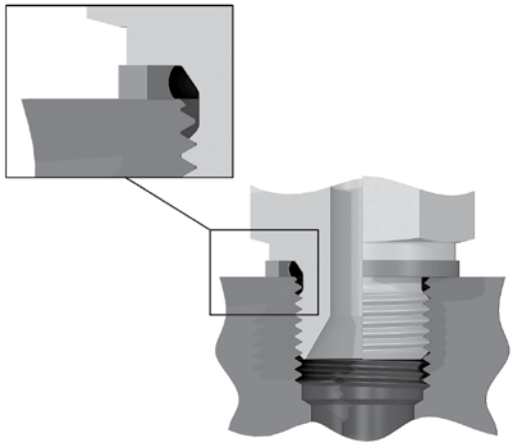

**Fig. I2 – K4 End Used as a BSPP Port Adapter (in ISO 1179/ DIN 3852, Part 2 Port)**

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# 60° Cone Adapters: JIS vs. K4

**K4 Adapters, while very similar to JIS P4 cones (shown in previous section), are not interchangeable.**

Parker's P4 JIS 60° cone adapters are manufactured in accordance to JIS B8363 while Parker's K4 BSP adapters are manufactured in accordance to BS5200. The following are some pronounced differences that may help in distinguishing between the K4 and P4 fittings:

1. Thread length ("A" dimensions)
2. 60° angle diameter ("B" dimensions)
3. The undercut area (area between threads and hex body) on the straight K4 fittings incorporates a bonded seal "locating pilot" for bonded seal
4. Parker's JIS fittings are stamped with "JIS" on the forging body or hex of fitting

See Figs. I3 and I4 for details and see Tables I2 and I3 below for specific dimensional differences.

| Size | BSPP Thread | M | A | B |
|---|---|---|---|---|
| 2 | 1/8-28 | 0.38 | 0.418 | 0.276 |
| 4 | 1/4-19 | 0.51 | 0.570 | 0.394 |
| 6 | 3/8-19 | 0.65 | 0.609 | 0.531 |
| 8 | 1/2-14 | 0.82 | 0.726 | 0.650 |
| 12 | 3/4-14 | 1.04 | 0.805 | 0.866 |
| 16 | 1-11 | 1.30 | 0.883 | 1.102 |
| 20 | 1 1/4-11 | 1.64 | 0.945 | 1.417 |
| 24 | 1 1/2-11 | 1.87 | 0.962 | 1.654 |
| 32 | 2-11 | 2.34 | 1.102 | 2.126 |

**Table I2 – Dimensions of JIS B8363 60° Cone Connection (JIS P4)**

| Size | BSPP Thread | M | A | B |
|---|---|---|---|---|
| 2 | 1/8-28 | 0.38 | 0.315 | 0.295 |
| 4 | 1/4-19 | 0.51 | 0.433 | 0.409 |
| 6 | 3/8-19 | 0.65 | 0.472 | 0.551 |
| 8 | 1/2-14 | 0.82 | 0.551 | 0.689 |
| 10 | 5/8-14 | 0.90 | 0.630 | 0.760 |
| 12 | 3/4-14 | 1.04 | 0.630 | 0.902 |
| 16 | 1-11 | 1.30 | 0.748 | 1.130 |
| 20 | 1 1/4-11 | 1.64 | 0.787 | 1.449 |
| 24 | 1 1/2-11 | 1.87 | 0.866 | 1.681 |
| 32 | 2-11 | 2.34 | 0.984 | 2.150 |

**Table I3 – Dimensions of BS B5200 60° Cone Connection (K4)**

While the 60° cone versions of JIS and K4 fittings utilize the same BSPP threads and seat angle, not all dimensions are consistent. Therefore, they cannot be interchanged because the differences can cause leakage problems. An example of this is illustrated in Fig. I5, where a gap exists between sealing surfaces. The combination of matching proper components will create an effective seal as illustrated in Fig I6.

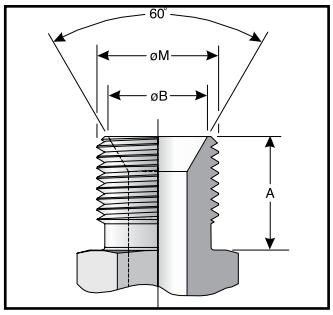


**Fig. I3 – JIS B8363 60° Cone Connection (P4)**

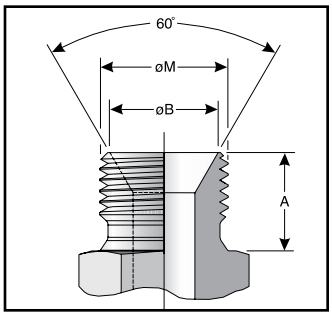


**Fig. I4 – BS B5200 60° Cone Connection (K4)**

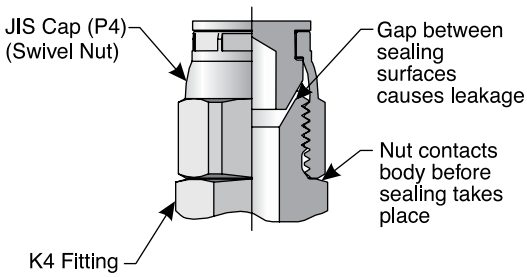


**Fig. I5 – Illustration Showing Potential Leakage Problem When Mixing JIS and K4 Components**

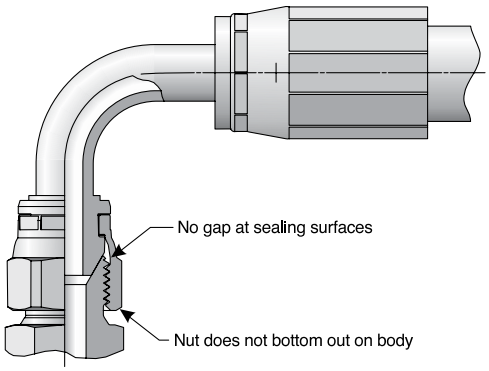


**Fig. I6 – An Effective Seal Created with the Proper Combination of Components**

Dimensions and pressures for reference only, subject to change.



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# K4 BSP Ends

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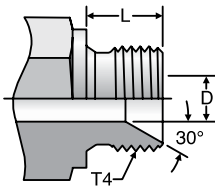
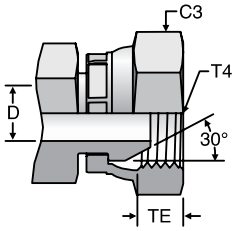
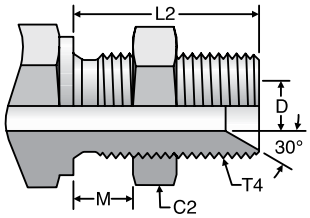



**K4 Male**




**K4 Swivel**




**K4 Bulkhead**

| | BSPP Thread | Bulkhead Nut Hex | Swivel Hex | Drill | Male Turn Back | Bulkhead Length | Max Bulkhead Thickness | Assembly Allowance |
|---|---|---|---|---|---|---|---|---|
| **Dash Size** | **T4** BSPP | **C2** (mm) | **C3** (mm) | **D** (mm) | **L** (mm) | **L2** (mm) | **M** (mm) | **TE** (mm) |
| **2** | 1/8-28 | — | 14 | 3.5 | 8 | — | — | — |
| **4** | 1/4-19 | 19 | 19 | 4.7 | 11 | 28 | 9.5 | 7.3 |
| **6** | 3/8-19 | 22 | 22 | 7.9 | 12 | 32 | 12.5 | 8.4 |
| **8** | 1/2-14 | 27 | 27 | 11.1 | 14 | 35 | 12.3 | 9.3 |
| **10** | 5/8-14 | 30 | 30 | 14.3 | 16 | 35 | 10.7 | — |
| **12** | 3/4-14 | 36 | 32 | 16.7 | 16 | 38 | 13.3 | 11.3 |
| **16** | 1-11 | 41 | 41 | 22.2 | 19 | 41 | 10.0 | 13.6 |
| **20** | 1 1/4-11 | 50 | 50 | 28.6 | 20 | 44 | 12.0 | — |
| **24** | 1 1/2-11 | 55 | 60 | 33.3 | 22 | 48 | 14.0 | — |
| **32** | 2-11 | — | — | 46.0 | 25 | — | — | — |

Dimensions and pressures for reference only, subject to change.



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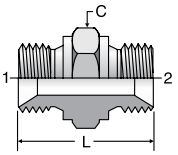
# HMK4

Union
60° Cone / 60° Cone

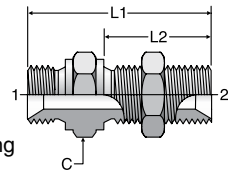



Mates with 92, B1, B2 and B4 style hose fitting

| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **2HMK4** | 1/8 - 28 | 1/8 - 28 | 14 | 23.5 | 5.1 |
| **4-2HMK4** | 1/4 - 19 | 1/8 - 28 | 19 | 28.0 | 5.1 |
| **4HMK4** | 1/4 - 19 | 1/4 - 19 | 19 | 31.5 | 5.1 |
| **6-4HMK4** | 3/8 - 19 | 1/4 - 19 | 22 | 33.2 | 2.9 |
| **6HMK4** | 3/8 - 19 | 3/8 - 19 | 22 | 34.7 | 2.9 |
| **8-4HMK4** | 1/2 - 14 | 1/4 - 19 | 27 | 36.7 | 2.9 |
| **8-6HMK4** | 1/2 - 14 | 3/8 - 19 | 27 | 38.2 | 2.9 |
| **8HMK4** | 1/2 - 14 | 1/2 - 14 | 27 | 40.7 | 2.9 |
| **10-8HMK4** | 5/8 - 14 | 1/2 - 14 | 30 | 43.2 | 2.9 |
| **10HMK4** | 5/8 - 14 | 5/8 - 14 | 30 | 45.2 | 2.9 |
| **12-4HMK4** | 3/4 - 14 | 1/4 - 19 | 32 | 39.2 | 2.9 |
| **12-6HMK4** | 3/4 - 14 | 3/8 - 19 | 32 | 40.7 | 2.9 |
| **12-8HMK4** | 3/4 - 14 | 1/2 - 14 | 32 | 43.2 | 2.9 |
| **12-10HMK4** | 3/4 - 14 | 5/8 - 14 | 32 | 45.2 | 2.9 |
| **12HMK4** | 3/4 - 14 | 3/4 - 14 | 32 | 45.2 | 2.9 |
| **16-8HMK4** | 1 - 11 | 1/2 - 14 | 41 | 46.9 | 1.7 |
| **16-10HMK4** | 1 - 11 | 5/8 - 14 | 41 | 48.9 | 1.7 |
| **16-12HMK4** | 1 - 11 | 3/4 - 14 | 41 | 48.9 | 1.7 |
| **16HMK4** | 1 - 11 | 1 - 11 | 41 | 51.9 | 1.7 |
| **20-12HMK4** | 1 1/4 - 11 | 3/4 - 14 | 50 | 57.4 | 1.5 |
| **20-16HMK4** | 1 1/4 - 11 | 1 - 11 | 50 | 60.4 | 1.5 |
| **20HMK4** | 1 1/4 - 11 | 1 1/4 - 11 | 50 | 61.4 | 1.5 |
| **24-16HMK4** | 1 1/2 - 11 | 1 - 11 | 55 | 64.4 | 1.5 |
| **24-20HMK4** | 1 1/2 - 11 | 1 1/4 - 11 | 55 | 65.4 | 1.5 |
| **24HMK4** | 1 1/2 - 11 | 1 1/2 - 11 | 55 | 67.4 | 1.5 |
| **32-24HMK4** | 2 - 11 | 1 1/2 - 11 | 70 | 72.9 | 1.0 |
| **32HMK4** | 2 - 11 | 2 - 11 | 70 | 76.4 | 1.0 |

# WMK4WL4NM

Bulkhead Union
60° Cone / 60° Cone



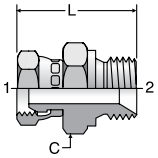

Mates with 92, B1, B2 and B4 style hose fitting

| TUBE FITTING PART # | END SIZE 1 & 2 BSPP | C HEX (mm) | L1 (mm) | L2 (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **4WMK4WL4NM** | 1/4 - 19 | 19 | 46.8 | 28 | 5.1 |
| **6WMK4WL4NM** | 3/8 - 19 | 22 | 52.5 | 32 | 5.1 |
| **8WMK4WL4NM** | 1/2 - 14 | 27 | 59.0 | 35 | 2.9 |
| **10WMK4WL4NM** | 5/8 - 14 | 30 | 61.5 | 35 | 2.9 |
| **12WMK4WL4NM** | 3/4 - 14 | 32 | 64.5 | 38 | 2.9 |
| **16WMK4WL4NM** | 1 - 11 | 41 | 71.2 | 41 | 1.7 |
| **20WMK4WL4NM** | 1 1/4 - 11 | 50 | 82.7 | 44 | 1.5 |
| **24WMK4WL4NM** | 1 1/2 - 11 | 55 | 90.7 | 48 | 1.5 |

Includes Bulkhead nut.

# F6MK4

Swivel Nut Connector
60° Swivel / 60° Cone

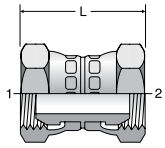



Mates with D9/92, B1, B2 and B4 style hose fitting

| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **4-4F6MK4** | 1/4 - 19 | 1/4 - 19 | 19 | 36.6 | 5.1 |
| **4-6F6MK4** | 1/4 - 19 | 3/8 - 19 | 22 | 38.5 | 5.1 |
| **4-8F6MK4** | 1/4 - 19 | 1/2 - 14 | 27 | 42.0 | 2.9 |
| **6-4F6MK4** | 3/8 - 19 | 1/4 - 19 | 22 | 38.3 | 5.1 |
| **6-6F6MK4** | 3/8 - 19 | 3/8 - 19 | 22 | 40.0 | 5.1 |
| **6-8F6MK4** | 3/8 - 19 | 1/2 - 14 | 27 | 43.6 | 2.9 |
| **8-6F6MK4** | 1/2 - 14 | 3/8 - 19 | 27 | 43.5 | 2.9 |
| **8-8F6MK4** | 1/2 - 14 | 1/2 - 14 | 27 | 46.1 | 2.9 |
| **8-12F6MK4** | 1/2 - 14 | 3/4 - 14 | 32 | 48.0 | 2.9 |
| **12-8F6MK4** | 3/4 - 14 | 1/2 - 14 | 32 | 48.6 | 2.9 |
| **12-12F6MK4** | 3/4 - 14 | 3/4 - 14 | 32 | 50.0 | 2.9 |
| **12-16F6MK4** | 3/4 - 14 | 1 - 11 | 41 | 54.3 | 1.7 |
| **16-16F6MK4** | 1 - 11 | 1 - 11 | 41 | 57.3 | 1.7 |

# H6MK4

Swivel Nut Union
60° Swivel / 60° Swivel




Mates with D9 style hose fitting

| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|
| **4H6MK4** | 1/4 - 19 | 1/4 - 19 | 37.0 | 5.1 |
| **6-4H6MK4** | 3/8 - 19 | 1/4 - 19 | 38.6 | 5.1 |
| **6H6MK4** | 3/8 - 19 | 3/8 - 19 | 40.5 | 5.1 |
| **8-4H6MK4** | 1/2 - 14 | 1/4 - 19 | 41.5 | 2.9 |
| **8-6H6MK4** | 1/2 - 14 | 3/8 - 19 | 42.9 | 2.9 |
| **8H6MK4** | 1/2 - 14 | 1/2 - 14 | 45.8 | 2.9 |
| **10H6MK4** | 5/8 - 14 | 5/8 - 14 | 47.5 | 2.9 |
| **12-8H6MK4** | 3/4 - 14 | 1/2 - 14 | 48.2 | 2.9 |
| **12H6MK4** | 3/4 - 14 | 3/4 - 14 | 49.5 | 2.9 |
| **16H6MK4** | 1 - 11 | 1 - 11 | 57.5 | 1.7 |
| **20H6MK4** | 1 1/4 - 11 | 1 1/4 - 11 | 66.0 | 1.5 |
| **24H6MK4** | 1 1/2 - 11 | 1 1/2 - 11 | 70.0 | 1.5 |

Dimensions and pressures for reference only, subject to change.



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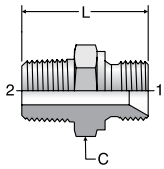
# FMK4

NPTF Male Connector
60° Cone / NPTF

Mates with 92, B1, B2 and B4 style hose fitting

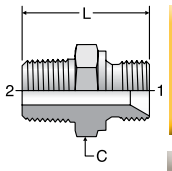



| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 NPTF | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **2FMK4** | 1/8 - 28 | 1/8 - 27 | 14 | 24.4 | 5.1 |
| **2-4FMK4** | 1/8 - 28 | 1/4 - 18 | 19 | 28.9 | 5.1 |
| **4FMK4** | 1/4 - 19 | 1/8 - 18 | 19 | 28.9 | 5.1 |
| **4-4FMK4** | 1/4 - 19 | 1/4 - 18 | 19 | 33.4 | 5.1 |
| **4-6FMK4** | 1/4 - 19 | 3/8 - 18 | 19 | 33.6 | 5.1 |
| **6FMK4** | 3/8 - 19 | 1/4 - 18 | 22 | 35.1 | 5.1 |
| **6-6FMK4** | 3/8 - 19 | 3/8 - 18 | 22 | 35.1 | 5.1 |
| **6-8FMK4** | 3/8 - 19 | 1/2 - 14 | 22 | 39.9 | 5.1 |
| **8FMK4** | 1/2 - 14 | 3/8 - 18 | 27 | 38.6 | 2.9 |
| **8-8FMK4** | 1/2 - 14 | 1/2 - 14 | 27 | 43.4 | 2.9 |
| **8-12FMK4** | 1/2 - 14 | 3/4 - 14 | 27 | 43.9 | 2.9 |
| **12-8FMK4** | 3/4 - 14 | 1/2 - 14 | 32 | 45.9 | 2.9 |
| **12FMK4** | 3/4 - 14 | 3/4 - 14 | 32 | 45.9 | 2.9 |
| **12-16FMK4** | 3/4 - 14 | 1 - 11 1/2 | 36 | 50.8 | 2.9 |
| **16-12FMK4** | 1 - 11 | 3/4 - 14 | 41 | 49.6 | 1.7 |
| **16FMK4** | 1 - 11 | 1 - 11 1/2 | 41 | 54.5 | 1.7 |

# F3MK4

BSPT Male Connector
60° Cone / BSPT

Mates with 92, B1, B2 and B4 style hose fitting

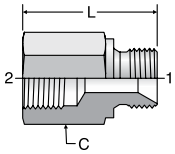



| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPT | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **2F3MK4** | 1/8 - 28 | 1/8 - 28 | 14 | 24.4 | 5.1 |
| **2-4F3MK4** | 1/8 - 28 | 1/4 - 19 | 14 | 28.9 | 5.1 |
| **4F3MK4** | 1/4 - 19 | 1/8 - 28 | 19 | 28.9 | 5.1 |
| **4-4F3MK4** | 1/4 - 19 | 1/4 - 19 | 19 | 33.4 | 5.1 |
| **4-6F3MK4** | 1/4 - 19 | 3/8 - 19 | 19 | 33.4 | 5.1 |
| **6F3MK4** | 3/8 - 19 | 1/4 - 19 | 22 | 35.1 | 5.1 |
| **6-6F3MK4** | 3/8 - 19 | 3/8 - 19 | 22 | 35.1 | 5.1 |
| **6-8F3MK4** | 3/8 - 19 | 1/2 - 14 | 22 | 39.9 | 2.9 |
| **8F3MK4** | 1/2 - 14 | 3/8 - 19 | 27 | 38.6 | 5.1 |
| **8-8F3MK4** | 1/2 - 14 | 1/2 - 14 | 22 | 43.4 | 2.9 |
| **10F3MK4** | 5/8 - 14 | 1/2 - 14 | 27 | 45.9 | 2.9 |
| **10-12F3MK4** | 5/8 - 14 | 3/4 - 14 | 30 | 45.9 | 2.9 |
| **12F3MK4** | 3/4 - 14 | 3/4 - 14 | 30 | 45.9 | 2.9 |
| **12-8F3MK4** | 3/4 - 14 | 1/2 - 14 | 32 | 46.0 | 1.7 |
| **12-16F3MK4** | 3/4 - 14 | 1 - 11 | 36 | 50.8 | 1.7 |
| **16F3MK4** | 1 - 11 | 1 - 11 | 41 | 54.5 | 1.7 |
| **16-12F3MK4** | 1 - 11 | 3/4 - 14 | 41 | 49.6 | 1.7 |
| **20F3MK4** | 1 1/4 - 11 | 1 1/4 - 11 | 50 | 63.7 | 1.5 |
| **24F3MK4** | 1 1/2 - 11 | 1 1/2 - 11 | 55 | 68.5 | 1.5 |

# G4MK4

BSPP Female Connector
60° Cone / BSPP

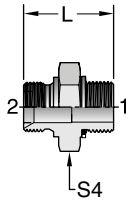
Mates with 92, B1, B2 and B4 style hose fitting




| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **6G4MK4** | 3/8 - 19 | 1/4 - 19 | 22 | 37.1 | 5.1 |
| **6-6G4MK4** | 3/8 - 19 | 3/8 - 19 | 23 | 36.9 | 1.7 |
| **8-4G4MK4** | 1/2 - 14 | 1/4 - 19 | 27 | 38.0 | 2.9 |
| **8G4MK4** | 1/2 - 14 | 3/8 - 19 | 30 | 45.3 | 2.9 |
| **12-4G4MK4** | 3/4 - 14 | 1/4 - 19 | 32 | 40.0 | 2.9 |
| **12-6G4MK4** | 3/4 - 14 | 3/8 - 19 | 32 | 41.6 | 2.9 |
| **12-8G4MK4** | 3/4 - 14 | 1/2 - 14 | 32 | 47.3 | 2.9 |
| **16-4G4MK4** | 1 - 11 | 1/4 - 19 | 41 | 43.0 | 1.7 |
| **16-6G4MK4** | 1 - 11 | 3/8 - 19 | 41 | 44.6 | 1.7 |
| **16-8G4MK4** | 1 - 11 | 1/2 - 14 | 41 | 50.3 | 1.7 |
| **16-12G4MK4** | 1 - 11 | 3/4 - 14 | 41 | 52.2 | 1.7 |

# K4HF8O

Metric Male Connector
BSP 60° Cone / Metric-ORR
(for ISO 9974 / DIN 3852-1 Port)




| TUBE FITTING PART # | End Size 1 BSPP | End Size 2 Metric Str | S4 Hex (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **2M10K4HF8O** | 1/8-28 | M10X1 | 17 | 25.7 | 5.1 |
| **4M12K4HF8O** | 1/4-19 | M12X1.5 | 19 | 30.1 | 5.1 |
| **4M14K4HF8O** | 1/4-19 | M14X1.5 | 19 | 30.1 | 5.1 |
| **6M16K4HF8O** | 3/8-19 | M16X1.5 | 22 | 32.6 | 5.1 |
| **8M16K4HF8O** | 1/2-14 | M16X1.5 | 27 | 34.6 | 2.9 |
| **6M18K4HF8O** | 3/8-19 | M18X1.5 | 27 | 34.1 | 2.9 |
| **8M18K4HF8O** | 1/2-14 | M18X1.5 | 27 | 33.1 | 2.9 |
| **8M22K4HF8O** | 1/2-14 | M22X1.5 | 32 | 40.4 | 2.9 |
| **12M27K4HF8O** | 3/4-14 | M27X2 | 41 | 47.9 | 2.9 |
| **16M33K4HF8O** | 1-11 | M33X2 | 41 | 56.7 | 1.7 |

Dimensions and pressures for reference only, subject to change.



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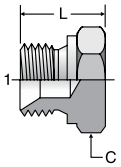
Hex Plug
60° Cone

Mates with 92, B1, B2 and B4 style hose fitting

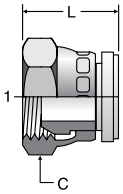



| TUBE FITTING PART # | END SIZE 1 BSPP | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|
| 2PNMK4 | 1/8 - 28 | 14 | 14.3 | 5.1 |
| 4PNMK4 | 1/4 - 19 | 19 | 18.8 | 5.1 |
| 6PNMK4 | 3/8 - 19 | 22 | 20.5 | 5.1 |
| 8PNMK4 | 1/2 - 14 | 27 | 24.0 | 2.9 |
| 10PNMK4 | 5/8 - 14 | 30 | 24.0 | 2.9 |
| 12PNMK4 | 3/4 - 14 | 32 | 26.5 | 2.9 |
| 16PNMK4 | 1 - 11 | 41 | 30.2 | 1.7 |
| 20PNMK4 | 1 1/4 - 11 | 50 | 38.7 | 1.5 |
| 24PNMK4 | 1 1/2 - 11 | 55 | 42.7 | 1.5 |
| 32PNMK4 | 2 - 11 | 70 | 48.2 | 1.0 |

# FNMK4

Cap
60° Cone

Mates with D9 style hose fitting

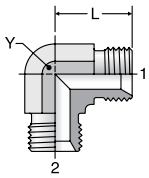



| TUBE FITTING PART # | END SIZE 1 BSPP | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|
| 2FNMK4 | 1/8 - 28 | 14 | 16.0 | 5.1 |
| 4FNMK4 | 1/4 - 19 | 19 | 20.6 | 5.1 |
| 6FNMK4 | 3/8 - 19 | 22 | 22.3 | 5.1 |
| 8FNMK4 | 1/2 - 14 | 27 | 22.7 | 2.9 |
| 10FNMK4 | 5/8 - 14 | 30 | 26.6 | 2.9 |
| 12FNMK4 | 3/4 - 14 | 32 | 28.0 | 2.9 |
| 16FNMK4 | 1 - 11 | 41 | 31.6 | 1.7 |
| 20FNMK4 | 1 1/4 - 11 | 50 | 35.9 | 1.5 |
| 24FNMK4 | 1 1/2 - 11 | 60 | 37.9 | 1.5 |

# EMK4

Union Elbow
60° Cone / 60° Cone

Mates with D9/92, B1, B2 and B4 style hose fitting

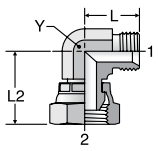



| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | L (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| 2EMK4 | 1/8 - 28 | 1/8 - 28 | 16.6 | 11 | 5.1 |
| 4EMK4 | 1/4 - 19 | 1/4 - 19 | 27.8 | 14 | 5.1 |
| 6EMK4 | 3/8 - 19 | 3/8 - 19 | 31.7 | 19 | 5.1 |
| 8EMK4 | 1/2 - 14 | 1/2 - 14 | 37.0 | 22 | 2.9 |
| 10EMK4 | 5/8 - 14 | 5/8 - 14 | 39.0 | 22 | 2.9 |
| 12EMK4 | 3/4 - 14 | 3/4 - 14 | 41.6 | 27 | 2.9 |
| 16EMK4 | 1 - 11 | 1 - 11 | 49.7 | 23 | 1.7 |
| 20EMK4 | 1 1/4 - 11 | 1 1/4 - 11 | 54.4 | 41 | 1.5 |
| 24EMK4 | 1 1/2 - 11 | 1 1/2 - 11 | 53.7 | 48 | 1.5 |

# C6MK4

Swivel Nut Elbow
60° Cone / 60° Swivel

Mates with D9/92, B1, B2 and B4 style hose fitting




| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | L (mm) | L2 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|---|
| 2C6MK4 | 1/8 - 28 | 1/8 - 28 | 16.6 | 22.0 | 11 | 5.1 |
| 4C6MK4 | 1/4 - 19 | 1/4 - 19 | 27.8 | 31.2 | 19 | 5.1 |
| 6C6MK4 | 3/8 - 19 | 3/8 - 19 | 31.7 | 36.2 | 22 | 5.1 |
| 8C6MK4 | 1/2 - 14 | 1/2 - 14 | 37.0 | 41.0 | 27 | 2.9 |
| 10C6MK4 | 5/8 - 14 | 5/8 - 14 | 39.0 | 41.6 | 27 | 2.9 |
| 12C6MK4 | 3/4 - 14 | 3/4 - 14 | 41.6 | 45.3 | 33 | 2.9 |
| 16C6MK4 | 1 - 11 | 1 - 11 | 49.7 | 53.9 | 41 | 1.7 |
| 20C6MK4 | 1 1/4 - 11 | 1 1/4 - 11 | 54.4 | 60.0 | 48 | 1.5 |
| 24C6MK4 | 1 1/2 - 11 | 1 1/2 - 11 | 53.7 | 63.3 | 48 | 1.5 |

Dimensions and pressures for reference only, subject to change.



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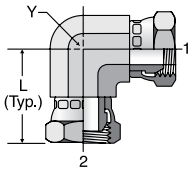
# E6MK4

Swivel Nut Union Elbow
60° Swivel / 60° Swivel

Mates with D9 style hose fitting

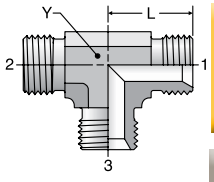



| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | L (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **4E6MK4** | 1/4 - 19 | 1/4 - 19 | 30.5 | 14 | 5.1 |
| **6E6MK4** | 3/8 - 19 | 3/8 - 19 | 33.0 | 19 | 5.1 |
| **8E6MK4** | 1/2 - 14 | 1/2 - 14 | 38.8 | 22 | 2.9 |
| **10E6MK4** | 5/8 - 14 | 5/8 - 14 | 39.4 | 22 | 2.9 |
| **12E6MK4** | 3/4 - 14 | 3/4 - 14 | 42.3 | 27 | 2.9 |
| **16E6MK4** | 1 - 11 | 1 - 11 | 49.0 | 33 | 1.7 |
| **20E6MK4** | 1 1/4 - 11 | 1 1/4 - 11 | 58.2 | 41 | 1.5 |
| **24E6MK4** | 1 1/2 - 11 | 1 1/2 - 11 | 63.3 | 48 | 1.5 |

# JMK4

Union Tee
60° Cone (all three ends)

Mates with 92, B1, B2 and B4 style hose fitting

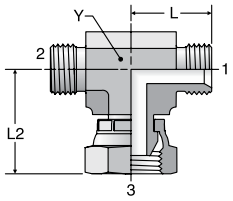



| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | END SIZE 3 BSPP | L (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|---|
| **2JMK4** | 1/8 - 28 | 1/8 - 28 | 1/8 - 28 | 16.6 | 11 | 5.1 |
| **4JMK4** | 1/4 - 19 | 1/4 - 19 | 1/4 - 19 | 27.8 | 19 | 5.1 |
| **6JMK4** | 3/8 - 19 | 3/8 - 19 | 3/8 - 19 | 31.7 | 22 | 5.1 |
| **8JMK4** | 1/2 - 14 | 1/2 - 14 | 1/2 - 14 | 37.0 | 27 | 2.9 |
| **10JMK4** | 5/8 - 14 | 5/8 - 14 | 5/8 - 14 | 39.0 | 27 | 2.9 |
| **12JMK4** | 3/4 - 14 | 3/4 - 14 | 3/4 - 14 | 41.9 | 33 | 2.9 |
| **16JMK4** | 1 - 11 | 1 - 11 | 1 - 11 | 49.7 | 41 | 1.7 |
| **20JMK4** | 1 1/4 - 11 | 1 1/4 - 11 | 1 1/4 - 11 | 54.4 | 48 | 1.5 |
| **24JMK4** | 1 1/2 - 11 | 1 1/2 - 11 | 1 1/2 - 11 | 53.7 | 48 | 1.5 |

# S6MK4

Swivel Nut Branch Tee
60° Cone / 60° Cone / 60° Swivel

Mates with D9/92, B1, B2 and B4 style hose fitting

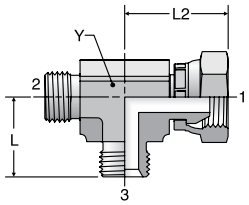



| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | END SIZE 3 BSPP | L (mm) | L2 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|---|---|
| **2S6MK4** | 1/8 - 28 | 1/8 - 28 | 1/8 - 28 | 16.6 | 22.0 | 11 | 5.1 |
| **4S6MK4** | 1/4 - 19 | 1/4 - 19 | 1/4 - 19 | 27.8 | 31.2 | 19 | 5.1 |
| **6S6MK4** | 3/8 - 19 | 3/8 - 19 | 3/8 - 19 | 31.7 | 36.2 | 27 | 5.1 |
| **8S6MK4** | 1/2 - 14 | 1/2 - 14 | 1/2 - 14 | 37.0 | 41.0 | 27 | 2.9 |
| **10S6MK4** | 5/8 - 14 | 5/8 - 14 | 5/8 - 14 | 39.0 | 41.6 | 27 | 2.9 |
| **12S6MK4** | 3/4 - 14 | 3/4 - 14 | 3/4 - 14 | 41.6 | 45.3 | 33 | 2.9 |
| **16S6MK4** | 1 - 11 | 1 - 11 | 1 - 11 | 49.7 | 53.9 | 41 | 1.8 |
| **20S6MK4** | 1 1/4 - 11 | 1 1/4 - 11 | 1 1/4 - 11 | 54.4 | 60.0 | 48 | 1.5 |

# R6MK4

Swivel Nut Run Tee
60° Swivel / 60° Cone / 60° Cone

Mates with D9/92, B1, B2 and B4 style hose fitting




| TUBE FITTING PART # | END SIZE 1 BSPP | END SIZE 2 BSPP | END SIZE 3 BSPP | L (mm) | L2 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|---|---|
| **2R6MK4** | 1/8 - 28 | 1/8 - 28 | 1/8 - 28 | 16.6 | 22.0 | 11 | 5.1 |
| **4R6MK4** | 1/4 - 19 | 1/4 - 19 | 1/4 - 19 | 27.8 | 31.2 | 19 | 5.1 |
| **6R6MK4** | 3/8 - 19 | 3/8 - 19 | 3/8 - 19 | 31.7 | 36.2 | 27 | 5.1 |
| **8R6MK4** | 1/2 - 14 | 1/2 - 14 | 1/2 - 14 | 37.0 | 41.0 | 27 | 2.9 |
| **10R6MK4** | 5/8 - 14 | 5/8 - 14 | 5/8 - 14 | 39.0 | 41.6 | 27 | 2.9 |
| **12R6MK4** | 3/4 - 14 | 3/4 - 14 | 3/4 - 14 | 41.6 | 45.3 | 33 | 2.9 |
| **16R6MK4** | 1 - 11 | 1 - 11 | 1 - 11 | 49.7 | 53.9 | 41 | 1.8 |
| **20R6MK4** | 1 1/4 - 11 | 1 1/4 - 11 | 1 1/4 - 11 | 54.4 | 60.0 | 48 | 1.5 |

Dimensions and pressures for reference only, subject to change.



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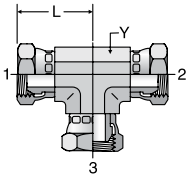
Swivel Nut Union Tee
60° Swivel (all three ends)

Mates with D9 style hose fitting




| TUBE FITTING PART # | END SIZE 1 BSPP | 2 BSPP | 3 BSPP | L (TYP.) (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|---|
| **4J6MK4** | 1/4 - 19 | 1/4 - 19 | 1/4 - 19 | 30.5 | 14 | 5.1 |
| **6J6MK4** | 3/8 - 19 | 3/8 - 19 | 3/8 - 19 | 33.0 | 19 | 5.1 |
| **8J6MK4** | 1/2 - 14 | 1/2 - 14 | 1/2 - 14 | 38.8 | 22 | 2.9 |
| **10J6MK4** | 5/8 - 14 | 5/8 - 14 | 5/8 - 14 | 39.4 | 22 | 2.9 |
| **12J6MK4** | 3/4 - 14 | 3/4 - 14 | 3/4 - 14 | 42.3 | 27 | 2.9 |
| **16J6MK4** | 1 - 11 | 1 - 11 | 1 - 11 | 49.0 | 33 | 1.7 |
| **20J6MK4** | 1 1/4 - 11 | 1 1/4 - 11 | 1 1/4 - 11 | 58.2 | 41 | 1.5 |

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# Komatsu® Style Adapters

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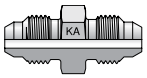
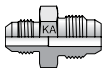
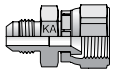
| 30° Flare Metric Thread | PNMKA<br>Plug | FNMKA<br>Cap | HMKA<br>Union | XHMKA<br>37° Flare / 30° Flare | XHMKA6<br>37° Flare / 30° Swivel |
|---|---|---|---|---|---|
| | <br>J5 | <br>J5 |  <br>J5 |  <br>J5 |  <br>J5 |

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# Komatsu Style Adapters

The 30° flare, metric thread interface, also known as the Komatsu style flare fitting, is one of the most common specialized OEM mobile equipment fittings in the marketplace. Parker offers a line of caps, plugs and conversion adapters to mate with this specialty connection. Parker's line of products is designated as "KA" adapters.

The Komatsu style connection is generally rated at 4000 psi (280 kg/cm$^2$ or 27.5 Mpa). Parker's caps, plugs and conversion adapters are rated at the full pressure rating in sizes 4-16, with slight pressure reductions in the less common sizes of -20 and -24.

Parker's offering of Komatsu style adapters allow for more aftermarket flexibility. Parker's caps and plugs enable technicians to protect critical sealing surfaces of hoses and adapters from damage and contamination. This protection is important during testing, repair and/or implement installation and removal.

Parker's line of Komatsu style conversion adapters are ideal for emergency situations, field repair, or "plumbing in" hydraulic attachments and options. Parker's exclusive swivel nut design minimizes the sealing surface damage to mating components.

# Design and Construction

Parker's line of Komatsu style fitting is sold only as a hose adapter and thus tube nuts and sleeves are not available. The adapter consists of a single body. The mating hose swivel mates directly to the 30° nose of the adapter, as shown in Fig. J1. This simple, metal-to-metal connection provides a very effective seal between the fitting nose and the hose swivel seat.

The Komatsu style adapter offers the traditional advantages of the 37° flare fitting but incorporates the following differences:

1) 30° nose flare
2) Metric threads with 1.5 mm pitch
3) Used only as a hose adapter
4) Heavy duty crimp nut for higher assembly torques

Due to the prevalent field repair needs of mobile equipment and relative simplicity of the Komatsu style fitting, several manufacturers offer a similar product line. Even though some manufacturers conform to the same dimensional standards, there are significant performance advantages to Parker's product offering due to higher integrity manufacturing methods and Parker's commitment to quality.

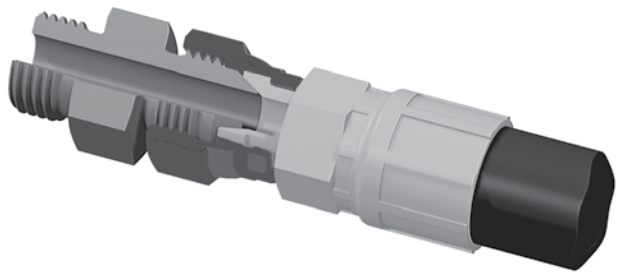

**Fig. J1 – Cutaway of Komatsu Style Adapter**

# Product Specifications

Komatsu style fittings are offered in eight common sizes. See Table J1 below, which shows the Komatsu nominal size and the equivalent Parker TFD Dash Size. The table also shows the equivalent Parker Hose Products / Parflex Division mating hose series.

| Komatsu Nominal Size | Parker TFD Equivalent Dash Size | Komatsu Thread | Parker Hose Fitting Mating Series |
|---|---|---|---|
| 02 | -4 | M14 x 1.5 | MU |
| 03 | -6 | M18 x 1.5 | MU |
| 04 | -8 | M22 x 1.5 | MU |
| 05 | -10 | M24 x 1.5 | XU |
| 06 | -12 | M30 x 1.5 | XU |
| 10 | -16 | M33 x 1.5 | XU |
| 12 | -20 | M36 x 1.5 | XU |
| 14 | -24 | M42 x 1.5 | XU |

**Table J1 – Parker equivalent dash sizes and mating hose series for Komatsu Style Fittings**

# Reference Locations

**Dynamic Pressure Ratings:** Please refer to the last column of the part number tables located on the following pages of this section for the appropriate dynamic pressure ratings.

**Standard Material Specifications:** Please refer to Table U1 located in the Appendix Section.



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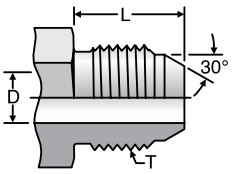
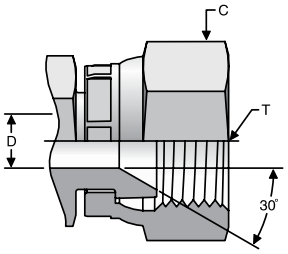
# Komatsu Ends




**Komatsu Male, 30° Flare**




**Komatsu Swivel**

| | Metric Thread | Hex | Drill | Male Turn Back |
|---|---|---|---|---|
| **Dash Size** | **T** Metric | **C** (mm) | **D** (mm) | **L** (mm) |
| **4** | M14x1.5 | 19 | 5 | 17.0 |
| **6** | M18x1.5 | 24 | 8 | 18.0 |
| **8** | M22x1.5 | 27 | 10 | 20.0 |
| **10** | M24x1.5 | 32 | 13 | 33.0 |
| **12** | M30x1.5 | 36 | 14 | 26.0 |
| **16** | M33x1.5 | 41 | 19 | 30.0 |

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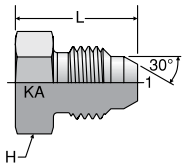
# PNMKA

Plug
30° Flare

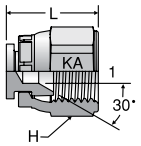
Mates with XU and MU series hose fittings




| TUBE FITTING PART # | END SIZE 1 Metric Thread | H HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|
| **4PNMKA** | M14 X 1.5 | 17 | 23.4 | 4.0 |
| **6PNMKA** | M18 X 1.5 | 22 | 25.1 | 4.0 |
| **8PNMKA** | M22 X 1.5 | 24 | 28.7 | 4.0 |
| **10PNMKA** | M24 X 1.5 | 27 | 32.0 | 4.0 |
| **12PNMKA** | M30 X 1.5 | 32 | 36.6 | 4.0 |
| **16PNMKA** | M33 X 1.5 | 38 | 40.6 | 4.0 |

# FNMKA

Cap
30° Flare

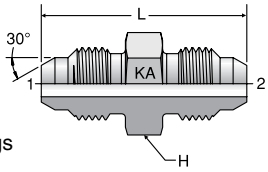



| TUBE FITTING PART # | END SIZE 1 Metric Thread | H HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|
| **4FNMKA** | M14 X 1.5 | 19 | 21.4 | 4.0 |
| **6FNMKA** | M18 X 1.5 | 24 | 23.1 | 4.0 |
| **8FNMKA** | M22 X 1.5 | 27 | 27.1 | 4.0 |
| **10FNMKA** | M24 X 1.5 | 32 | 31.8 | 4.0 |
| **12FNMKA** | M30 X 1.5 | 36 | 35.5 | 4.0 |
| **16FNMKA** | M33 X 1.5 | 41 | 40.9 | 4.0 |

# HMKA

Male Union
30° Flare

Mates with XU and MU series hose fittings

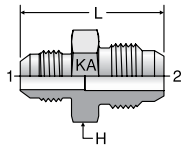



| TUBE FITTING PART # | END SIZE 1&2 Metric Thread | H HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|
| **4-4HMKA** | M14 X 1.5 | 17 | 39.4 | 4.0 |
| **6-6HMKA** | M18 X 1.5 | 22 | 43.4 | 4.0 |
| **8-8HMKA** | M22 X 1.5 | 24 | 47.5 | 4.0 |
| **10-10HMKA** | M24 X 1.5 | 27 | 52.1 | 4.0 |
| **12-12HMKA** | M30 X 1.5 | 32 | 63.2 | 4.0 |
| **16-16HMKA** | M33 X 1.5 | 38 | 72.1 | 4.0 |

# XHMKA

37° Conversion Adapter
30° Flare / 37° Flare

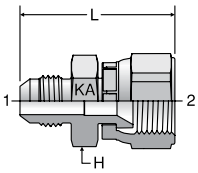
End 2 mates with XU and MU series hose fittings




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 Metric Thread | H HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **4-4XHMKA** | 1/4 | M14 X 1.5 | 17 | 37.1 | 4.0 |
| **6-6XHMKA** | 3/8 | M18 X 1.5 | 22 | 39.6 | 4.0 |
| **8-8XHMKA** | 1/2 | M22 X 1.5 | 24 | 44.2 | 4.0 |
| **10-10XHMKA** | 5/8 | M24 X 1.5 | 27 | 49.8 | 4.0 |
| **12-12XHMKA** | 3/4 | M30 X 1.5 | 32 | 59.2 | 4.0 |
| **16-16XHMKA** | 1 | M33 X 1.5 | 38 | 65.3 | 4.0 |

# XHMKA6

37° Swivel Conversion Adapter
37° Flare / 30° Swivel




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 Metric Thread | H HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **4-4XHMKA6** | 1/4 | M14 X 1.5 | 17 | 40.6 | 4.0 |
| **6-6XHMKA6** | 3/8 | M18 X 1.5 | 22 | 42.7 | 4.0 |
| **8-8XHMKA6** | 1/2 | M22 X 1.5 | 24 | 49.0 | 4.0 |
| **10-10XHMKA6** | 5/8 | M24 X 1.5 | 27 | 57.4 | 4.0 |
| **12-12XHMKA6** | 3/4 | M30 X 1.5 | 32 | 65.8 | 4.0 |
| **16-16XHMKA6** | 1 | M33 X 1.5 | 38 | 73.9 | 4.0 |

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# Conversion Adapters

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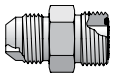
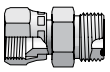
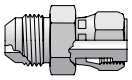
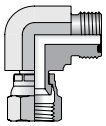
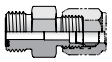
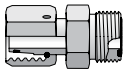
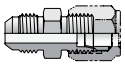
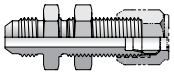
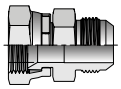
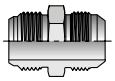
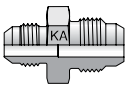
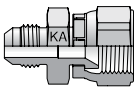
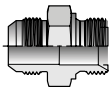
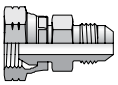
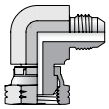
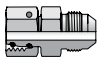
| **ORFS to 37° Flare** | **XHLO**<br>37° Flare / ORFS<br>  <br>K3 | **LOHX6**<br>37° Swivel / ORFS<br>  <br>K3 | **XHL6**<br>37° Flare / ORFS Swivel<br>  <br>K3 | **LOEX6**<br>ORFS / 37° Flare Swivel<br>  <br>K3 | |
| **ORFS to 24° Flareless** | **BUHLO**<br>ORFS / 24° Flareless<br>  <br>K4 | **ORFS to Metric 24° Flareless** | **LOHU86**<br>Metric 24° Flareless/ORFS<br>  <br>K4 | | |
| **37° Flare to 24° Flareless** | **XHBU**<br>37° Flare / Flareless<br>  <br>K4 | **XHBU2**<br>37° / Flareless Bulkhead<br>  <br>K4 | **37° Flare to JIS 30° Flare** | **XHT46**<br>37° Flare / 30° Flare<br>  <br>K5 | **XHT4**<br>37° Flare / JIS 30° Flare<br>  <br>K5 |
| **37° Flare to Komatsu Style 30° Flare** | **XHMKA**<br>37° Flare / 30° Flare<br>  <br>J5 | **XHMKA6**<br>37° Flare / 30° Swivel<br>  <br>J5 | | | |
| **37° Flare to 60° Cone (K4)** | **XHK4**<br>37° Flare / 60° Cone<br>  <br>K5 | **XHMK46**<br>37° Flare / BSPP Swivel<br>  <br>K5 | **XEMK46**<br>37° Flare / BSPP Swivel<br>  <br>K6 | **37° Flare to Metric 24° Flareless** | **XHU86**<br>37° / Metric 24° Flareless<br>  <br>K6 |

## O-Rings and Seals (Shown in Section N)

| | | |
|---|---|---|
| **O-Rings** | **ORFS O-Ring**<br> <br>N4 | **EO O-Ring**<br> <br>N10 |



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# XHLO

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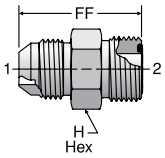
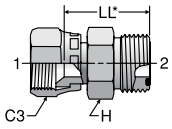
37° Flare / ORFS




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | FF (in.) | H HEX (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 XHLO** | 1/4 | 1/4 | 1.25 | 5/8 | 7.5 | 9.0 |
| **6 XHLO** | 3/8 | 3/8 | 1.34 | 3/4 | 6.0 | 7.2 |
| **8 XHLO** | 1/2 | 1/2 | 1.55 | 7/8 | 6.0 | 7.2 |
| **10 XHLO** | 5/8 | 5/8 | 1.83 | 1 1/16 | 5.0 | 6.0 |
| **12 XHLO** | 3/4 | 3/4 | 2.05 | 1 1/4 | 5.0 | 6.0 |
| **16 XHLO** | 1 | 1 | 2.16 | 1 1/2 | 4.5 | 5.4 |
| **20 XHLO** | 1 1/4 | 1 1/4 | 2.29 | 1 3/4 | 4.0 | 4.8 |
| **24 XHLO** | 1 1/2 | 1 1/2 | 2.48 | 2 1/8 | 3.0 | 3.6 |

# LOHX6

Swivel Adapter
37° Flare Swivel / ORFS

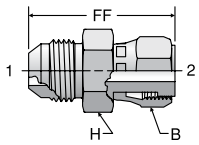



*LL – End to base of flare

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C3 HEX (in.) | H HEX (in.) | LL Ref. (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 LOHX6** | 1/4 | 1/4 | 9/16 | 5/8 | 0.89 | 7.5 | 9.0 |
| **6 LOHX6** | 3/8 | 3/8 | 11/16 | 3/4 | 1.06 | 5.0 | 6.0 |
| **8 LOHX6** | 1/2 | 1/2 | 7/8 | 7/8 | 1.21 | 5.0 | 6.0 |
| **10 LOHX6** | 5/8 | 5/8 | 1 | 1 1/16 | 1.40 | 5.0 | 6.0 |
| **12 LOHX6** | 3/4 | 3/4 | 1 1/4 | 1 1/4 | 1.48 | 5.0 | 6.0 |
| **16 LOHX6** | 1 | 1 | 1 1/2 | 1 1/2 | 1.64 | 3.6 | 4.3 |
| **20 LOHX6** | 1 1/4 | 1 1/4 | 2 | 1 3/4 | 1.77 | 3.6 | 4.3 |

# XHL6

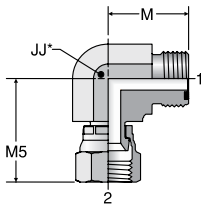
Male Swivel Adapter
ORFS Swivel / 37° Flare




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | B HEX (in.) | FF (in.) | H HEX (inch) (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 XHL6** | 1/4 | 1/4 | 11/16 | 1.50 | 5/8 | 7.5 | 9.2 |
| **6 XHL6** | 3/8 | 3/8 | 13/16 | 1.61 | 3/4 | 6.0 | 7.2 |
| **8 XHL6** | 1/2 | 1/2 | 15/16 | 1.90 | 7/8 | 6.0 | 7.2 |
| **10 XHL6** | 5/8 | 5/8 | 1 1/8 | 2.20 | 1 1/16 | 5.0 | 6.0 |
| **12 XHL6** | 3/4 | 3/4 | 1 3/8 | 2.50 | 1 1/4 | 5.0 | 6.0 |
| **16 XHL6** | 1 | 1 | 1 5/8 | 2.66 | 1 1/2 | 4.5 | 5.4 |
| **20 XHL6** | 1 1/4 | 1 1/4 | 1 7/8 | 2.80 | 1 11/16 | 4.0 | 4.8 |

# LOEX6

Swivel Elbow
ORFS / 37° Flare Swivel




* JJ – Across wrench flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 UN/UNF-2B | JJ (in.) | M (in.) | M5 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|
| **4 LOEX6** | 1/4 | 1/4 | 9/16 | 0.85 | 1.08 | 7.5 | 7.5 |
| **6 LOEX6** | 3/8 | 3/8 | 3/4 | 0.98 | 1.25 | 5.0 | 5.0 |
| **8 LOEX6** | 1/2 | 1/2 | 3/4 | 1.10 | 1.38 | 5.0 | 5.0 |
| **10 LOEX6** | 5/8 | 5/8 | 1 1/16 | 1.31 | 1.63 | 5.0 | 5.0 |
| **12 LOEX6** | 3/4 | 3/4 | 1 3/16 | 1.47 | 1.80 | 5.0 | 5.0 |
| **16 LOEX6** | 1 | 1 | 1 7/16 | 1.64 | 2.00 | 4.0 | 4.0 |
| **20 LOEX6** | 1 1/4 | 1 1/4 | 1 5/8 | 1.76 | 2.31 | 3.6 | 3.6 |
| **24 LOEX6** | 1 1/2 | 1 1/2 | 1 7/8 | 1.92 | 2.59 | 3.0 | 3.0 |

Dimensions and pressures for reference only, subject to change.



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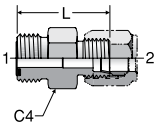
# BUHLO

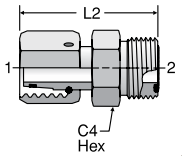
Ferulok Male Adapter
ORFS / SAE Flareless




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C4 HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **6 BUHLO** | 3/8 | 3/8 | 3/4 | 1.25 | 6.0 | 7.2 |
| **8 BUHLO** | 1/2 | 1/2 | 7/8 | 1.45 | 5.0 | 6.0 |
| **10 BUHLO** | 5/8 | 5/8 | 1 1/16 | 1.70 | 5.0 | 6.0 |
| **12 BUHLO** | 3/4 | 3/4 | 1 1/4 | 1.88 | 4.5 | 5.4 |
| **16 BUHLO** | 1 | 1 | 1 1/2 | 1.94 | 4.0 | 4.8 |

# LOHU86

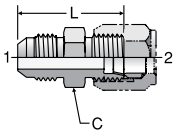
EO Swivel Adapter
24° Flareless Metric
Swivel (EO) / ORFS




| TUBE FITTING PART # | END SIZE 1 EO Swivel | END SIZE 2 (in.) | C4 HEX (in.) | L2 (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **L Series** | | | | | | |
| **4 -6L LOHU86** | 6L | 1/4 | 5/8 | 1.32 | 4.5 | 5.4 |
| **4-8L LOHU86** | 8L | 1/4 | 5/8 | 1.32 | 4.5 | 5.4 |
| **6-10L LOHU86** | 10L | 3/8 | 3/4 | 1.44 | 4.5 | 5.4 |
| **8-12L LOHU86** | 12L | 1/2 | 7/8 | 1.53 | 4.5 | 5.4 |
| **10-15L LOHU86** | 15L | 5/8 | 1 1/16 | 1.82 | 4.5 | 5.4 |
| **12-18L LOHU86** | 18L | 3/4 | 1 1/4 | 1.89 | 4.5 | 5.4 |
| **16-22L LOHU86** | 22L | 1 | 1 1/2 | 2.08 | 2.5 | 3.0 |
| **S Series** | | | | | | |
| **4-6S LOHU86** | 6S | 1/4 | 5/8 | 1.32 | 9.2 | 9.2 |
| **4-8S LOHU86** | 8S | 1/4 | 5/8 | 1.34 | 9.2 | 9.2 |
| **6-10S LOHU86** | 10S | 3/8 | 3/4 | 1.44 | 9.2 | 9.2 |
| **8-12S LOHU86** | 12S | 1/2 | 7/8 | 1.59 | 9.2 | 9.2 |
| **10-14S LOHU86** | 14S | 5/8 | 1 1/16 | 1.84 | 9.2 | 9.2 |
| **10-16S LOHU86** | 16S | 5/8 | 1 1/16 | 1.84 | 5.8 | 5.8 |
| **12-20S LOHU86** | 20S | 3/4 | 1 1/4 | 2.05 | 5.8 | 5.8 |
| **16-25S LOHU86** | 25S | 1 | 1 1/2 | 2.15 | 5.8 | 5.8 |

# XHBU

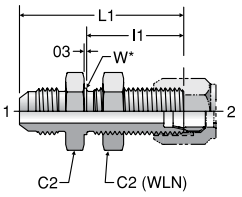
Union Adapter
SAE Flareless / 37° Flare




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C HEX (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **4 XHBU** | 1/4 | 1/4 | 1/2 | 1.19 | 5.0 | 7.7 |
| **6 XHBU** | 3/8 | 3/8 | 5/8 | 1.28 | 5.0 | 7.7 |
| **8 XHBU** | 1/2 | 1/2 | 13/16 | 1.47 | 5.0 | 7.7 |
| **10 XHBU** | 5/8 | 5/8 | 15/16 | 1.69 | 5.0 | 6.0 |
| **12 XHBU** | 3/4 | 3/4 | 1 1/8 | 1.94 | 4.5 | 6.0 |
| **16 XHBU** | 1 | 1 | 1 5/8 | 1.97 | 4.0 | 4.8 |
| **20 XHBU** | 1 1/4 | 1 1/4 | 1 3/4 | 2.00 | 3.0 | 3.6 |
| **24 XHBU** | 1 1/2 | 1 1/2 | 2 1/8 | 2.16 | 2.0 | 2.4 |

# XHBU2

Bulkhead Union Adapter
SAE Flareless Bulkhead /
37° Flare




*W – Bulkhead pilot dia. recommended clearance hole is +.015 over W dia.

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C2 HEX (in.) | I1 (in.) | L1 (in.) | W (in.) | Max. Bulkhead Thickness | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|
| **4 XHBU2** | 1/4 | 1/4 | 11/16 | 1.13 | 1.94 | 0.44 | 0.38 | 5.0 | 7.7 |
| **6 XHBU2** | 3/8 | 3/8 | 13/16 | 1.17 | 2.08 | 0.56 | 0.40 | 5.0 | 7.7 |
| **8 XHBU2** | 1/2 | 1/2 | 1 | 1.31 | 2.31 | 0.75 | 0.40 | 5.0 | 7.7 |
| **10 XHBU2** | 5/8 | 5/8 | 1 1/8 | 1.45 | 2.56 | 0.88 | 0.37 | 5.0 | 7.7 |
| **12 XHBU2** | 3/4 | 3/4 | 1 3/8 | 1.56 | 2.94 | 1.06 | 0.43 | 4.5 | 5.4 |
| **16 XHBU2** | 1 | 1 | 1 5/8 | 1.56 | 2.95 | 1.31 | 0.43 | 4.0 | 4.8 |

Dimensions and pressures for reference only, subject to change.



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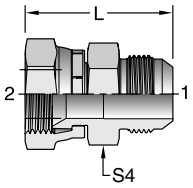
# XHT46

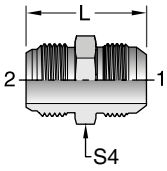
BSPP Swivel Adapter
37° Flare / 30° Flare Swivel




| TUBE FITTING PART # | End Size 1 (in.) | End Size 2 BSPP | S4 Hex (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|
| **4 XHT46** | 1/4 | 1/4-19 | 9/16 | 1.22 | 5.0 |
| **6 XHT46** | 3/8 | 3/8-19 | 11/16 | 1.32 | 5.0 |
| **8 XHT46** | 1/2 | 1/2-14 | 7/8 | 1.46 | 5.0 |
| **12 XHT46** | 3/4 | 3/4-14 | 1 1/4 | 1.92 | 4.0 |
| **16 XHT46** | 1 | 1-11 | 1 1/2 | 2.05 | 3.0 |

# XHT4

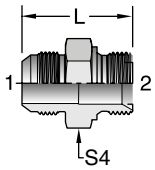
Union Adapter
37° Flare / JIS 30° Flare




| TUBE FITTING PART # | End Size 1 (in.) | End Size 2 BSPP | S4 Hex (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|
| **4-4 XHT4** | 1/4 | 1/4-19 | 3/4 | 1.42 | 5.0 |
| **6 XHT4** | 3/8 | 3/8-19 | 3/4 | 1.55 | 5.0 |
| **8 XHT4** | 1/2 | 1/2-14 | 7/8 | 1.75 | 5.0 |
| **12 XHT4** | 3/4 | 3/4-14 | 1 1/8 | 2.06 | 4.0 |
| **16 XHT4** | 1 | 1-11 | 1 3/8 | 2.17 | 3.0 |

# XHK4

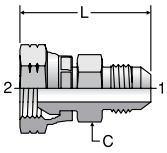
BSPP Swivel Adapter
37° Flare / 60° Cone




| TUBE FITTING PART # | End Size 1 (in.) | End Size 2 BSPP | S4 Hex (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|
| **4-4 XHK4** | 1/4 | 1/4-19 | 3/4 | 1.25 | 5.1 |
| **6-4 XHK4** | 3/8 | 1/4-19 | 7/8 | 1.42 | 2.9 |
| **6-6 XHK4** | 3/8 | 3/8-19 | 7/8 | 1.46 | 2.9 |
| **8-6 XHK4** | 1/2 | 3/8-19 | 1 1/16 | 1.61 | 2.9 |
| **8-8 XHK4** | 1/2 | 1/2-14 | 1 1/16 | 1.69 | 2.9 |
| **10-8 XHK4** | 5/8 | 1/2-14 | 1 1/8 | 1.89 | 2.9 |
| **12-12 XHK4** | 3/4 | 3/4-14 | 1 5/16 | 2.13 | 2.9 |
| **12-16XHK4** | 3/4 | 1-11 | 1 5/8 | 2.27 | 1.7 |
| **16-16 XHK4** | 1 | 1-11 | 1 5/8 | 2.32 | 1.7 |

# XHMK46

BSPP Swivel Adapter
37° Flare / BSPP 60° Cone Swivel




Swivel end mates with BS5200 (Parker K4) adapters and Parker D9 hose fittings.

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 BSPP | C HEX (mm) | L (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|
| **6-4XHMK46** | 3/8 | 1/4-19 | 17 | 40.0 | 5.0 |
| **6XHMK46** | 3/8 | 3/8-19 | 17 | 39.2 | 4.0 |
| **8-6XHMK46** | 1/2 | 3/8-19 | 19 | 42.3 | 4.0 |
| **8XHMK46** | 1/2 | 1/2-14 | 19 | 45.0 | 4.0 |
| **10-8XHMK46** | 5/8 | 1/2-14 | 24 | 48.6 | 4.0 |
| **12XHMK46** | 3/4 | 3/4-14 | 30 | 50.0 | 4.0 |
| **12-16XHMK46** | 3/4 | 1-11 | 36 | 56.8 | 3.0 |
| **16XHMK46** | 1 | 1-11 | 36 | 58.0 | 3.0 |

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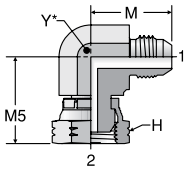
# XEMK46

90° BSP Swivel Adapter
37° Flare / BSPP 60° Cone Swivel



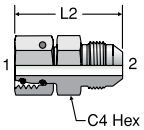

* Y – Across wrench flats

Swivel end mates with BS5200 (Parker K4) adapters and Parker D9 hose fittings.

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 BSPP | M (mm) | M5 (mm) | Y (mm) | Dynamic Pressure (x 1,000 PSI) S |
|---|---|---|---|---|---|---|
| **6-4XEMK46** | 3/8 | 1/4-19 | 26.9 | 33.2 | 19 | 4.0 |
| **6XEMK46** | 3/8 | 3/8-19 | 26.9 | 32.6 | 19 | 4.0 |
| **8-6XEMK46** | 1/2 | 3/8-19 | 31.8 | 32.6 | 19 | 4.0 |
| **8XEMK46** | 1/2 | 1/2-14 | 31.8 | 38.8 | 22 | 4.0 |
| **10-8XEMK46** | 5/8 | 1/2-14 | 36.8 | 38.8 | 22 | 4.0 |
| **12XEMK46** | 3/4 | 3/4-14 | 42.2 | 40.3 | 27 | 4.0 |
| **12-16XEMK46** | 3/4 | 1-11 | 42.2 | 48.8 | 33 | 3.0 |
| **16XEMK46** | 1 | 1-11 | 46.0 | 48.8 | 33 | 3.0 |

# XHU86

EO Swivel Adapter
Metric Swivel (EO) / 37° Flare




| TUBE FITTING PART # | END SIZE 1 EO Swivel | END SIZE 2 (in.) | C4 HEX (in.) | L2 (in.) | Dynamic Pressure (x 1,000 PSI) S | SS | B |
|---|---|---|---|---|---|---|---|
| **L Series** | | | | | | | |
| **4-6L XHU86** | 6L | 1/4 | 1/2 | 1.47 | 4.5 | 4.5 | 2.9 |
| **6-8L XHU86** | 8L | 3/8 | 5/8 | 1.52 | 4.5 | 4.5 | 2.9 |
| **6-10L XHU86** | 10L | 3/8 | 5/8 | 1.57 | 4.5 | 4.5 | 2.9 |
| **8-12L XHU86** | 12L | 1/2 | 13/16 | 1.69 | 4.5 | 4.5 | 2.9 |
| **10-15L XHU86** | 15L | 5/8 | 15/16 | 1.98 | 4.5 | 4.5 | 2.9 |
| **12-18L XHU86** | 18L | 3/4 | 1 1/8 | 2.11 | 4.5 | 4.5 | 2.9 |
| **16-22L XHU86** | 22L | 1 | 1 3/8 | 2.36 | 2.3 | 2.3 | 1.5 |
| **16-28L XHU86** | 28L | 1 | 1 3/8 | 2.45 | 2.3 | 2.3 | 1.5 |
| **S Series** | | | | | | | |
| **4-6S XHU86** | 6S | 1/4 | 1/2 | 1.49 | 7.5 | 7.5 | 4.9 |
| **6-8S XHU86** | 8S | 3/8 | 5/8 | 1.57 | 7.5 | 7.5 | 4.9 |
| **6-10S XHU86** | 10S | 3/8 | 11/16 | 1.57 | 7.5 | 7.5 | 4.9 |
| **8-12S XHU86** | 12S | 1/2 | 13/16 | 1.75 | 6.0 | 6.0 | 3.9 |
| **10-16S XHU86** | 16S | 5/8 | 15/16 | 2.04 | 5.0 | 5.0 | 3.3 |
| **12-20S XHU86** | 20S | 3/4 | 1 1/8 | 2.29 | 5.0 | 5.0 | 3.3 |
| **16-25S XHU86** | 25S | 1 | 1 3/8 | 2.45 | 4.5 | 4.5 | 2.9 |

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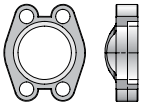
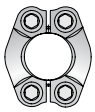
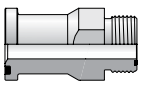
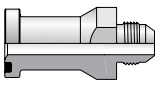
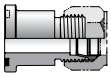
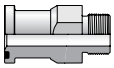
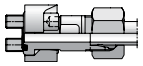
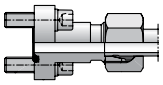
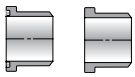
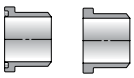
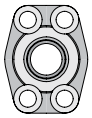
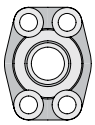
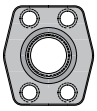
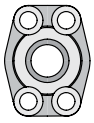
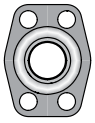
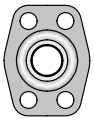
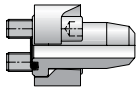
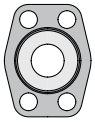
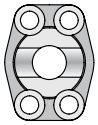
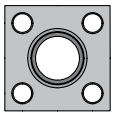
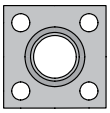
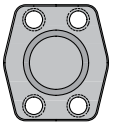
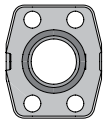
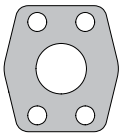
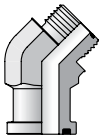
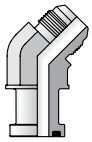
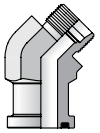
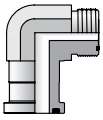
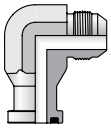
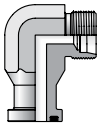
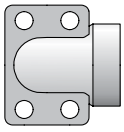
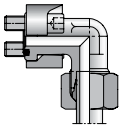
|---|---|---|---|---|---|
| **Flange Clamps** | **FCS**<br>Flange Clamps – Split<br> <br>L9 | **FCC**<br>Flange Clamp – Captive<br>  <br>L9 | **FHS3**<br>Code 61 Flange Clamps – Metric<br>  <br>L10 | **FHS6**<br>Code 62 Flange Clamps – Metric<br> <br>L11 | |
| **Straight Flange Adapters / Flanges** | **LOHQ**<br>Code 61, 62 / ORFS<br>  <br>L12 | **XHQ**<br>Code 61, 62 / 37° Flare<br>  <br>L12 | **BUHQ1**<br>Code 61 / Flareless<br>  <br>L12 | **F5OHQ**<br>Code 61, 62 / SAE-ORB<br>  <br>L13 | **GFS**<br>Code 61, 62 / Metric Flareless<br>  <br>L14 |
| **BFG**<br>DIN Flange / Metric Flareless<br>  <br>L15 | **B3HQ**<br>Code 61, 62 / Flareless<br> <br>L13 | **P**<br>Flange Head Plug<br> <br>L15 | **W7HQ**<br>Flange Head / Pipe Socket<br> <br>L16 | **G5HQ**<br>Flange Head / SAE-ORB<br> <br>L16 | **GHQ**<br>Flange Head / NPT<br> <br>L16 |
| **WB1/3/5HQ1**<br>Code 61 / Weld Butt – Pipe<br>  <br>L17 | **WB3/5/7HQ2**<br>Code 62 / Weld Butt – Pipe<br>  <br>L17 | **G5Q**<br>Code 61, 62 / SAE-ORB<br> <br>L18 | **GQ**<br>Code 61, 62 / NPT<br>  <br>L18 | **G4Q**<br>Code 61, 62 / BSPP<br>  <br>L19 | **W5Q**<br>Code 61, 62 / Socket – Pipe<br> <br>L20 |
| **W4Q**<br>Code 61, 62 / Socket – Tube<br>  <br>L21 | **W7Q**<br>Code 61, 62 / Ext Socket – Pipe<br> <br>L22 | **W6Q**<br>Code 61, 62 / Ext Socket – Tube<br>  <br>L23 | **WB1/3/5Q1**<br>Code 61 / Weld Butt – Pipe<br>  <br>L24 | **WB3/5/7Q2**<br>Code 62 / Weld Butt – Pipe<br>  <br>L25 | **AS**<br>Code 61, 62 / Weld Butt – Tube Metric<br>  <br>L26 |
| **WBT**<br>Code 61 / Weld Tank Adapter<br>  <br>L26 | **WSD**<br>Code 61, 62 / Weld Saddle<br>  <br>L27 | **GQS**<br>Square Flange / NPT<br>  <br>L27 | **W5SQS**<br>Square Flange / Weld Socket – Pipe<br>  <br>L28 | **PQ**<br>Code 61, 62 / Blank<br>  <br>L28 | **SPGG5**<br>Flange Spacer w/Gage Ports<br>  <br>L29 |
| **CP**<br>Flange Connector Plate<br>  <br>L29 | **45° Flange Adapters** | **LOVQ**<br>Code 61, 62 / ORFS<br>  <br>L30 | **XVQ**<br>Code 61, 62 / 37° Flare<br>  <br>L30 | **BUVQ1**<br>Code 61 / Flareless<br>  <br>L30 | |
| **90° Flange Adapters** | **LOEQ**<br>Code 61, 62 / ORFS<br>  <br>L31 | **XEQ**<br>Code 61, 62 / 37° Flare<br>  <br>L31 | **BUEQ1**<br>Code 61 / Flareless<br>  <br>L31 | **W7EQ**<br>Code 61, 62 / Weld Socket – Pipe<br>  <br>L32 | **WFS**<br>Code 61, 62 / Metric Flareless<br>  <br>L33 |



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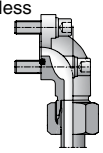
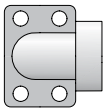
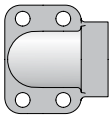
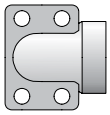
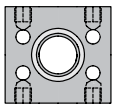
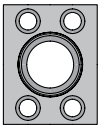
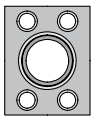
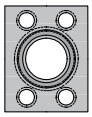
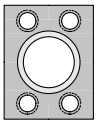
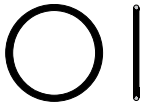
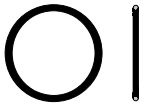
| **BFW**<br>DIN Flange / Metric<br>Flareless<br>  <br>L34 | **90° Elbows** | **G5EQ**<br>Code 61, 62 / SAE-ORB<br>  <br>L35 | **GEQ**<br>Code 61, 62 / NPT<br>  <br>L36 | **W6EQ**<br>Code 61, 62 / Weld<br>Socket – Tube<br>  <br>L37 | |
| **Tee** | **QPQPJQ**<br>Code 61, 62 Junction Tee<br>  <br>L35 | **Stainless Steel Flanges** | **G5Q**<br>Code 61, 62 / SAE-ORB<br>  <br>L38 | **GQ**<br>Code 61, 62 / NPT<br>  <br>L38 | **W5Q**<br>Code 61, 62 / Weld<br>Socket – Pipe<br>  <br>L39 |
| **PQ**<br>Code 61, 62 / Blank<br>  <br>L40 | | | | | |

## O-Rings and Seals (Shown in Section N)

| | | |
|---|---|---|
| **O-Rings and Seals** | **ORFS O-Ring**<br>  <br>N4 | **SAE 4-Bolt Flange O-Ring**<br>  <br>N10 |

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# Dual Seal Flanges

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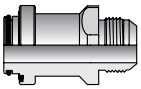
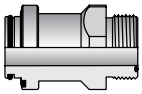
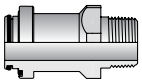
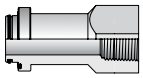
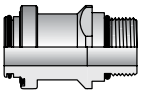
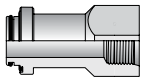
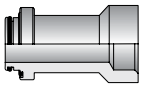
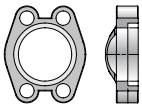
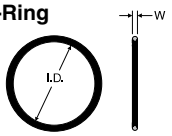
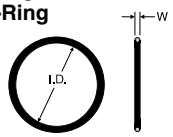
|---|---|---|---|---|---|
| 37° Flare | **XHQ4O**<br>37° Flare<br>  <br>L41 | ORFS | **LOHQ4O**<br>ORFS<br>  <br>L41 | NPTF | **FHQ4O**<br>Male NPTF<br>  <br>L41 |
| **GHQ4O**<br>Female NPTF<br>  <br>L42 | SAE-ORB | **F5OHQ4O**<br>Male SAE-ORB<br>  <br>L42 | **G5HQ4O**<br>Female SAE-ORB<br>  <br>L42 | Socket Weld Pipe | **W7HQ4O**<br>Socket Weld Pipe<br>  <br>L43 |
| Dual Seal Plug | **PQ4O**<br>Dual Seal Plug<br> <br>L43 | Q4 Insert | **Q4 Insert**<br>Flange Insert<br> <br>L43 | | |
| Flange Clamps | **FCS**<br>Flange Clamps – Split<br> <br>L9 | **FCC**<br>Flange Clamp – Captive<br>  <br>L9 | | | |

# O-Rings and Seals (Shown in Section N)

| | | |
|---|---|---|
| O-Rings and Seals | **Radial Seal O-Ring**<br>  <br>N10 | **Flange Seal O-Ring**<br>  <br>N10 |



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# Hydraulic Flanges and Components

The 4-bolt flange connections conforming to SAE J518 and ISO 6162-1 and -2 are proven, leak-free connections, especially suited for larger sizes, higher pressures and assembly in tight quarters. Threaded port connections such as SAE straight thread O-ring and ISO 6149 are reasonably easy to assemble and provide 6000 psi and higher pressure capability up to size 12 (M27). Beyond this size the pressure rating starts to decrease and assembly torques increase rapidly. The 4-bolt flange port connections provide ability to connect larger sizes and achieve higher-pressure capability at reasonable assembly torques. Because of the lower assembly torques compared to an equivalent size threaded port, these connections are well suited for tight quarters where wrench clearances are limited. Parker 4-bolt flange products described in this part of the catalog provide various means of connecting tubes, hoses, pipes and threaded fittings to 4-bolt flange ports. The discussion below provides an overview of some of the available flange products.

# Design and Construction

Parker 4-bolt flange products are designed to provide different methods of connecting a tube, hose, pipe or another fitting to the SAE standard 4-bolt flange port.

**Flange Fittings** — All Parker flange fittings, except for those with square mounting hole patterns (nomenclature code QS), are designed to conform to O-ring groove, bolt holes and bolt pattern dimensions of either Code 61 or Code 62 of SAE J518 and ISO 6162-1 (Code 61) or -2 (Code 62).

The flange adapters (Code Q1 and Q2), and flange block fittings (Codes Q1B, Q2B and QSB) have O-ring grooves conforming to dimensions in SAE J518. The flange block fittings (Codes Q1B and Q2B) have through holes for the mounting bolts, again conforming to SAE J518. There is no industry standard for the bolt pattern of the square pattern block flanges with codes QSP and QSB.

The flange pad fittings (Codes Q1P, Q2P, and QSP) have a flat face (no O-ring groove) and the mounting holes are tapped. Where these fittings are used, the seal is in the mating part (flange adapter, flange hose fitting, flange block fitting, etc.) as shown in Fig. L1.

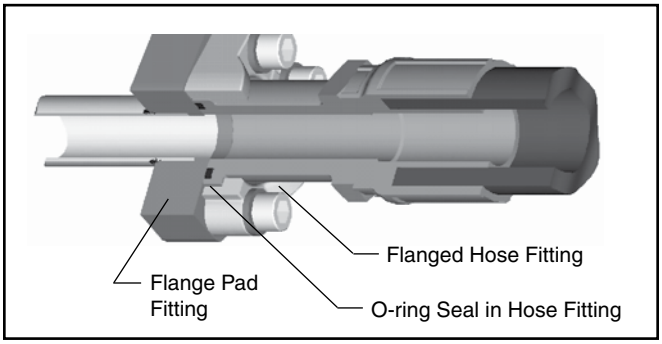


**Fig. L1 – Flange Pad Fitting**

Dimensions other than the O-ring groove, bolt holes, bolt pattern, and the flange foot print (for codes Q1B and Q2B only) are not governed by any industry standard. However, Parker product design follows common industry practice and sound engineering.

**Flange Clamps** — Clamps are used for providing the holding power to the 4-bolt flange connection. They are offered in split and captive (one-piece) versions. The captive version is also offered with either drilled or tapped bolt holes. The captive flange clamp with tapped holes is used while connecting a tube to another tube or a hose.

Parker flange clamps are forged for higher strength and durability. They meet all requirements of SAE J518. The split clamps make it easy to assemble the connection in close quarters. They also make removal of the flange head component, such as a hose assembly, easy by loosening all four bolts and removing one clamp half, as shown in Fig. L2.

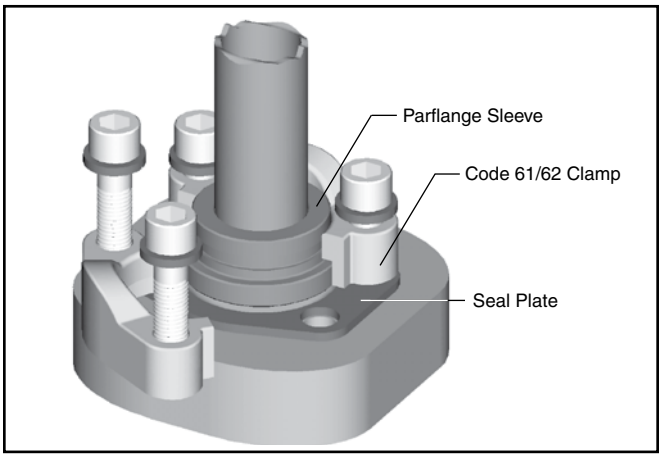


**Fig. L2 – Assembly / Removal SAE J518 Connection**

**Junction Block Tees** — These are solid block union fittings to connect two tube/hose assemblies using 4-bolt flange connection, at a junction, to SAE 4-bolt flange port, or three tube/hose assemblies to each other.

**Connector Plate** — Connector plate is used as a middle plate to connect two flange heads with O-ring grooves, such as two hose assemblies with flange connection ends. The flat surface of the plate provides sealing surface on each side for the O-ring housed in the hose ends.

**Spacer Plate** — Spacer plate provides access to the system fluid via the gage port on the side. The plate is between the flange connection to provide this access.

**Plugs** — Plugs provide a means to block off the 4-bolt flange port with and without clamps, and to plug the end of a pipe (via welding).

**Tank Weld Adapter** — Tank weld adapters provide a means of flange connection to a fabricated reservoir or tank.

| Hydraulic Flanges | Steel | | Stainless Steel | |
|---|---|---|---|---|
| | ASTM | Type | ASTM | Type |
| 4-Bolt Flanges | A108 | C1020 | A240 | 316L |
| Flange Clamps | A108 | C1045 | A351 / A743 | Nitronic 50 |
| HHCS Bolts | SAE Grade 8 | | — | — |
| SHCS Bolts | — | — | A240 | 316 |

**Table L1 – Standard Material Specifications for Hydraulic Flanges and Components**

**Note:** Split flange clamps are zinc clear (or Cr6 free) chromate. All other steel flanges are oil dipped. Flange adapters are not plated.

Dimensions and pressures for reference only, subject to change.



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# How Flange Connections Work

The four-bolt flange connection (SAE J518) is a proven leak-free connection, especially suited for larger sizes. As a result, it has achieved worldwide acceptance.

The connection's success is in its simplicity. It is a static face seal using a high durometer O-ring for the seal and clamps and bolts for holding power as shown in Fig. L3. Alternatively, a bonded seal plate is between the port face and the flat face of a mechanically formed (flanged with Parflange® process) tube as shown in Fig. L4 to achieve the same results.

The (O-ring) seal is compressed between the bottom of the groove in the flange head and the flat surface of the port or flange pad, providing a reliable soft seal. The alternate seal plate has a high durometer bonded rubber seal on the inside edge, which compresses between the two flat surfaces, providing a soft seal with the same reliability. A metal-to-metal contact at the outer face of the flange with the port face keeps the seal from extruding under pressure. This metal-to-metal contact is maintained by the clamping force provided by tightening the bolts via the clamps.

This simple design provides several advantages over threaded port connections, such as NPTF, SAE, BSPP, ISO 6149, etc., in larger sizes:

- Ability to connect up to 5 inch O.D tube (Code 61 only)
- Much lower tightening torque required from the four bolts compared to that required for equivalent size threaded port
- Less tightening torque means smaller wrenches and wrench swing clearances — providing ease of assembly in tight quarters
- Up to 6000 psi capability through 2" size (Code 62 only)
- Single seal point between tube/pipe/hose assembly and the port
- Ease of disassembly through use of split clamps

The connection has one disadvantage — it requires a larger area (foot print) on the component than an equivalent threaded port.

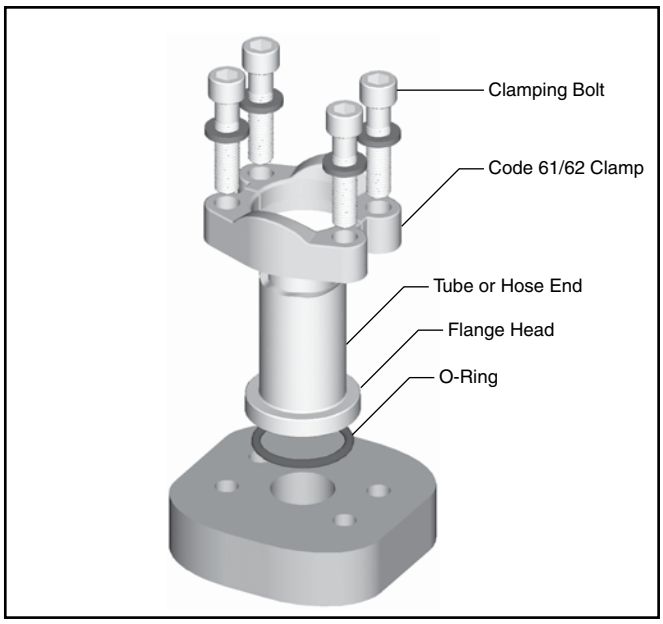


**Fig. L3 – Four-Bolt Flange Connection (SAE J518)**

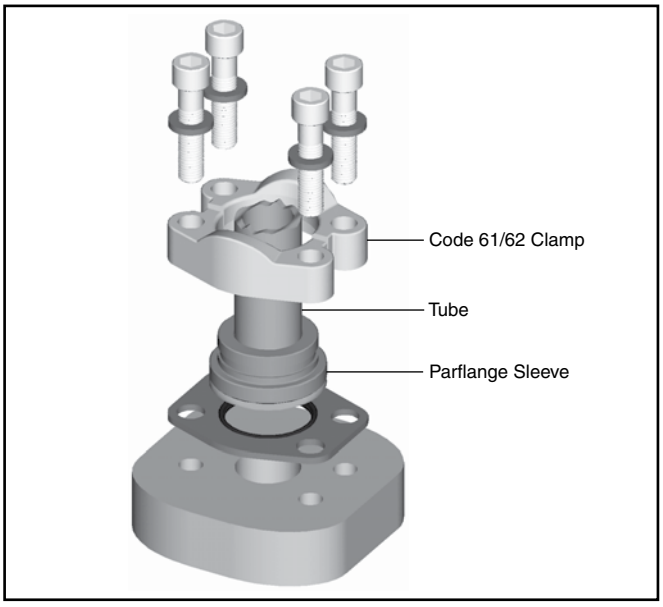


**Fig. L4 – Formed Tube with ISO 6162 (SAE J518) Connection**

# Assembly and Installation

Please refer to Section S for the assembly and installation instructions for Hydraulic Flanges and Components fittings.

| Feature | Advantage | Benefit |
|---|---|---|
| Conform to SAE J518 and ISO 6162 | Controls dimensions and tolerances of code 61 and 62 port connections | Insures interchangeability and consistency |
| Forged Construction | Reliable, long life performance | No downtime, reduced costs |
| | Compact envelope size, no sharp edges | Reduced weight |
| Over 60 Configurations | Flexibility in plumbing, match system needs | Best solution and best value |
| Parflange Technology | Designed to be used with Code 61/62 fittings | Eliminates messy and time consuming brazing process |
| Mounting Hardware | Grade 8 bolts standard | Performs in rigorous applications for the life of the flange |
| Flange Kits | Flange with hardware for mounting (o-ring, bolts and lockwashers) | Reduces order and assembly error |

Dimensions and pressures for reference only, subject to change.



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## Dual Seal Flange Adapters

Parker's Dual Seal Flange Adapter product line provides a solution for high vibration, high shock hydraulic four bolt connection styles used in various applications. This Parker innovation is offered as an alternative to traditional ISO 6121 (SAE J518) Code 62 Flange connections providing improved port retention, increased sealing capability and elimination of costly field replacement due to failure. Dual Seal Flange Adapters incorporate both radial and face seal technologies, reducing the potential for system leakage and ingression of air or water caused by side loading of traditional flange face seal connections.

Dual Seal Flange Adapters have a system working pressure rating of 7500 PSI with a 4:1 design factor. The face seal system incorporates Parker's Captive O-ring Groove technology to prevent o-ring fall out during installation minimizing connection failures seen with traditional flange connections.

## Design and Construction

The Dual Seal Flange adapter consists of three components: a body, a face sealing O-ring and a radial sealing O-ring. The body is manufactured from Heat Code Traceable 316 stainless steel and the O-rings are manufactured from 90 durometer Nitrile. Additional components used for assembly of the Dual Seal Flange adapters include four bolts, flange clamps and lock washers. Flange clamps are available from Parker Tube Fittings Division, with standard sizes listed on Page L9 of this catalog section.

### The Dual Seal Flange Adapter Body

Dual Seal Flange Adapters bodies are manufactured in ½", 1" and 1 ½" sizes with ten different cold drawn tube, pipe or hose end configurations available as standard. Straight bodies are machined from 316/316L bar stock.

### Dual Seal Flange Clamps

Flange clamps are offered in both split and captive (one-piece) versions depending on the adapter configuration being used. Flange clamps are machined from 316/316L materials. For all straight Dual Seal Flange Adapter bodies split flange clamp are required. The 90° and 45° cast shaped versions can be installed with either split or captive flange clamps.

## Industry Acceptance

Dual Seal Flange Adapters are designed to conform to bolt thread and bolt pattern dimensions of ISO 6162-2 or SAE J518 Code 62.

Materials used in the manufacture of Parker Dual Seal Flange Adapters are compliant to NACE MR0175. All products are Heat Code Traceable and have been tested to SAE requirements.

## How Dual Seal Flange Adapters Work

As shown below, Dual Seal Flange connections use both a radial seal and face seal to achieve superior leak free port connection. The primary radial seal (A) improves the pressure capabilities of this adapter to 7500 PSI while offering additional system integrity. The face seal (B) provides resistance of external pressures introduced by the application environment. The flange clamps (C) and bolts (D) are used to compress the o-rings into the port and provide the clamping force necessary. Reference Fig. L5 below.



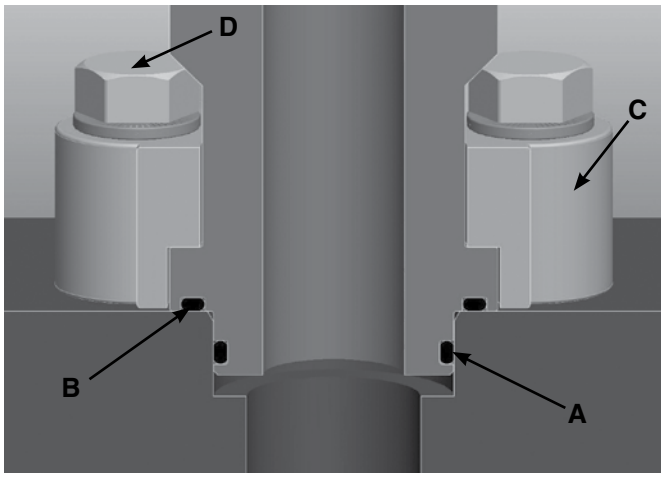


**Fig. L5**

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## The Parker Advantage

**Improved Pressure Rating:** Parker's new Dual Seal design is rated for up to 7500 PSI to meet current and future hydraulic design needs. This design has also been tested to meet standard SAE J1644 parameters.

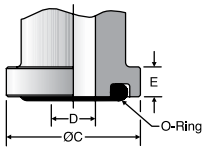
**Captive O-ring Groove:** The design of Parker's Dual Seal Flange Adapters incorporates a captive O-ring groove (CORG) which prevents O-ring fall out during installation further preventing the possibility of leaks.

**Radial Seal:** The primary radial seal (A) improves the pressure capabilities of the Dual Seal system to 7500 PSI while offering additional system integrity.

**Ingression Seal:** Reduces the potential for side loading and ultimately connection failure in high impulse and high vibration applications.

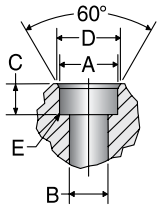
**Multiple Standard Configurations:** Parker's Dual Seal Flange Adapter product line includes a variety of tube, pipe, and hose connection styles to meet hydraulic system design needs. Included are Parker's Seal-Lok (SAE J1453), Triple-Lok (SAE J514), SAE ORB (SAE J1926) and NPTF for traditional hydraulic connections. In addition, to offer a solution for schedule pipe assemblies, Parker offers socket weld configurations.

# Code 61 and Code 62 Port Ends




| SIZE | Flange O.D. C (inch) | Drill D Max (inch) | Flange Height E (inch) |
|---|---|---|---|
| **CODE 61** | | | |
| **8** | 1.19 | 0.50 | 0.265 |
| **12** | 1.50 | 0.75 | 0.265 |
| **16** | 1.75 | 1.00 | 0.315 |
| **20** | 2.00 | 1.25 | 0.315 |
| **24** | 2.38 | 1.50 | 0.315 |
| **32** | 2.81 | 2.00 | 0.375 |
| **CODE 62** | | | |
| **8** | 1.25 | 0.50 | 0.305 |
| **12** | 1.63 | 0.75 | 0.345 |
| **16** | 1.88 | 1.00 | 0.375 |
| **20** | 2.13 | 1.25 | 0.405 |
| **24** | 2.50 | 1.50 | 0.495 |
| **32** | 3.13 | 2.00 | 0.495 |

# Port Ends for Dual Seal Flange Port




| SIZE | A (in.) | B (in.) | C (in.) | D (CSK) | E (R) |
|---|---|---|---|---|---|
| 8 | 0.750 - 0.752 | 0.500 | 0.400 | .82 X 60° | 0.02 |
| 16 | 1.375 - 1.377 | 0.938 | 0.400 | 1.445 X 60° | 0.02 |
| 24 | 1.750 - 1.752 | 1.312 | 0.530 | 1.82 X 60° | 0.02 |

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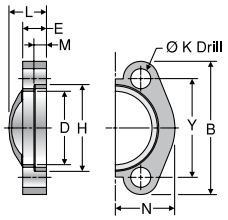
# FCS

Code 61/62 Flange Clamps, Split



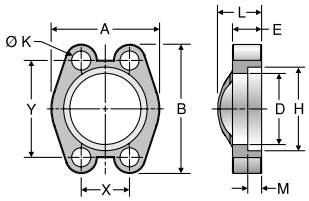

| TUBE FITTING PART # | HOSE PRODUCTS PART # | HOSE PRODUCTS PART # | FLANGE SIZE | B | D | E | H | K DRILL DIA. | L | M | N | Y | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FLANGE HALF | FLANGE HALF | KIT | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | HHCS | -S | -SS |
| **CODE 61 FLANGE CLAMPS, SPLIT** | | | | | | | | | | | | | | | |
| **8FCS1** | **51H-8** | **5151HK-8** | 0.50 | 2.12 | 0.955 | 0.50 | 1.22 | 0.344 | 0.75 | 0.245 | 0.86 | 1.50 | 5/16-18 x 1.25 | 5.0 | 5.0 |
| **12FCS1** | **51H-12** | **5151HK-12** | 0.75 | 2.56 | 1.265 | 0.56 | 1.53 | 0.406 | 0.88 | 0.245 | 0.98 | 1.88 | 3/8-16 x 1.25 | 5.0 | 5.0 |
| **16FCS1** | **51H-16** | **5151HK-16** | 1.00 | 2.75 | 1.515 | 0.62 | 1.78 | 0.406 | 0.94 | 0.295 | 1.11 | 2.06 | 3/8-16 x 1.25 | 5.0 | 5.0 |
| **20FCS1** | **51H-20** | **5151HK-20** | 1.25 | 3.12 | 1.720 | 0.56 | 2.03 | 0.469 | 0.88 | 0.295 | 1.39 | 2.31 | 7/16-14 x 1.50 | 4.0 | 4.0 |
| **24FCS1** | **51H-24** | **5151HK-24** | 1.50 | 3.69 | 2.000 | 0.62 | 2.41 | 0.531 | 1.00 | 0.295 | 1.58 | 2.75 | 1/2-13 x 1.50 | 3.0 | 3.0 |
| **32FCS1** | **51H-32** | **5151HK-32** | 2.00 | 4.00 | 2.470 | 0.62 | 2.84 | 0.531 | 1.03 | 0.355 | 1.86 | 3.06 | 1/2-13 x 1.50 | 3.0 | 3.0 |
| **40FCS1** | **51H-40** | **5151HK-40** | 2.50 | 4.50 | 2.950 | 0.75 | 3.34 | 0.531 | 1.50 | 0.355 | 2.09 | 3.50 | 1/2-13 x 1.75 | 2.5 | 2.5 |
| **48FCS1** | **51H-48** | **5151HK-48** | 3.00 | 5.31 | 3.580 | 0.88 | 4.03 | 0.656 | 1.62 | 0.355 | 2.53 | 4.19 | 5/8-11 x 1.75 | 2.0 | 2.0 |
| **56FCS1** | **51H-56** | **5151HK-56** | 3.50 | 6.00 | 4.030 | 0.88 | 4.53 | 0.656 | 1.12 | 0.422 | 2.70 | 4.75 | 5/8-11 x 1.75 | 0.5 | 0.5 |
| **64FCS1** | **51H-64** | **5151HK-64** | 4.00 | 6.38 | 4.530 | 1.00 | 5.03 | 0.656 | 1.38 | 0.422 | 2.95 | 5.13 | 5/8-11 x 2.00 | 0.5 | 0.5 |
| **CODE 62 FLANGE CLAMPS, SPLIT** | | | | | | | | | | | | | | | |
| **12FCS2** | **HFH-12** | **HFHFHK-12** | 0.75 | 2.81 | 1.280 | 0.75 | 1.66 | 0.406 | 1.12 | 0.325 | 1.14 | 2.00 | 3/8-16 x 1.50 | 6.0 | 6.0 |
| **16FCS2** | **HFH-16** | **HFHFHK-16** | 1.00 | 3.19 | 1.530 | 0.94 | 1.91 | 0.469 | 1.31 | 0.355 | 1.33 | 2.25 | 7/16-14 x 1.75 | 6.0 | 6.0 |
| **20FCS2** | **HFH-20** | **HFHFHK-20** | 1.25 | 3.75 | 1.750 | 1.06 | 2.16 | 0.531 | 1.50 | 0.385 | 1.48 | 2.63 | 1/2-13 x 1.75 | 6.0 | 6.0 |
| **24FCS2** | **HFH-24** | **HFHFHK-24** | 1.50 | 4.44 | 2.030 | 1.19 | 2.53 | 0.656 | 1.69 | 0.475 | 1.83 | 3.13 | 5/8-11 x 2.25 | 6.0 | 6.0 |
| **32FCS2** | **HFH-32** | **HFHFHK-32** | 2.00 | 5.25 | 2.660 | 1.44 | 3.16 | 0.781 | 2.06 | 0.475 | 2.20 | 3.81 | 3/4-10 x 2.75 | 6.0 | 6.0 |

To order a flange clamp split kit, insert a “K” after the material designator in the Tube Fitting part number. The Kit includes two flange clamp halves, 4 HHCS bolts, 4 lock washers and an O-ring.

L

# FCC

Code 61/62 Flange Clamp, Captive




| TUBE FITTING PART # | | FLANGE SIZE | A | B | D | E | H | K DRILL DIA. | L | M | T TAP | X | Y | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DRILLED HOLES | TAPPED HOLES | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UN-2B | (in.) | (in.) | HHCS | -SX | -SS |
| **CODE 61 FLANGE CLAMP, CAPTIVE** | | | | | | | | | | | | | | | | |
| **8FCC1** | **8FCCT1** | 0.50 | 1.81 | 2.125 | 0.955 | 0.50 | 1.219 | 0.344 | 0.75 | 0.245 | 5/16-18 | 0.688 | 1.500 | 5/16-18 x 1.25 | 5.0 | |
| **12FCC1** | **12FCCT1** | 0.75 | 2.06 | 2.560 | 1.265 | 0.56 | 1.531 | 0.406 | 0.88 | 0.245 | 3/8-16 | 0.875 | 1.875 | 3/8-16 x 1.25 | 5.0 | |
| **16FCC1** | **16FCCT1** | 1.00 | 2.31 | 2.750 | 1.515 | 0.62 | 1.781 | 0.406 | 0.94 | 0.295 | 3/8-16 | 1.031 | 2.062 | 3/8-16 x 1.25 | 5.0 | |
| **20FCC1** | **20FCCT1** | 1.25 | 2.88 | 3.125 | 1.720 | 0.56 | 2.031 | 0.469 | 0.88 | 0.295 | 7/16-14 | 1.188 | 2.312 | 7/16-14 x 1.50 | 4.0 | |
| **24FCC1** | **24FCCT1** | 1.50 | 3.25 | 3.705 | 2.000 | 0.62 | 2.406 | 0.531 | 1.00 | 0.295 | 1/2-13 | 1.406 | 2.750 | 1/2-13 x 1.50 | 3.0 | |
| **32FCC1** | **32FCCT1** | 2.00 | 3.81 | 4.000 | 2.470 | 0.62 | 2.844 | 0.531 | 1.03 | 0.355 | 1/2-13 | 1.688 | 3.062 | 1/2-13 x 1.50 | 3.0 | |
| **40FCC1** | **40FCCT1** | 2.50 | 4.28 | 4.500 | 2.950 | 0.75 | 3.344 | 0.531 | 1.50 | 0.355 | 1/2-13 | 2.000 | 3.500 | 1/2-13 x 1.75 | 2.5 | |
| **48FCC1** | **48FCCT1** | 3.00 | 5.16 | 5.315 | 3.580 | 0.88 | 4.031 | 0.656 | 1.62 | 0.355 | 5/8-11 | 2.438 | 4.188 | 5/8-11 x 1.75 | 2.0 | |
| **56FCC1** | **56FCCT1** | 3.50 | 5.50 | 6.000 | 4.030 | 0.88 | 4.531 | 0.656 | 1.12 | 0.422 | 5/8-11 | 2.750 | 4.750 | 5/8-11 x 1.75 | 0.5 | |
| **64FCC1** | **64FCCT1** | 4.00 | 6.00 | 6.375 | 4.530 | 1.00 | 5.031 | 0.656 | 1.38 | 0.422 | 5/8-11 | 3.062 | 5.125 | 5/8-11 x 2.00 | 0.5 | |
| **CODE 62 FLANGE CLAMP, CAPTIVE** | | | | | | | | | | | | | | | | |
| **12FCC2** | **12FCCT2** | 0.75 | 2.38 | 2.810 | 1.280 | 0.75 | 1.656 | 0.406 | 1.12 | 0.325 | 3/8-16 | 0.938 | 2.000 | 3/8-16 x 1.50 | 6.0 | |
| **16FCC2** | **16FCCT2** | 1.00 | 2.75 | 3.190 | 1.530 | 0.94 | 1.906 | 0.469 | 1.31 | 0.355 | 7/16-14 | 1.094 | 2.250 | 7/16-14 x 1.75 | 6.0 | |
| **20FCC2** | **20FCCT2** | 1.25 | 3.06 | 3.750 | 1.750 | 1.06 | 2.156 | 0.531 | 1.50 | 0.385 | 1/2-13 | 1.250 | 2.625 | 1/2-13 x 1.75 | 6.0 | |
| **24FCC2** | **24FCCT2** | 1.50 | 3.75 | 4.440 | 2.030 | 1.19 | 2.531 | 0.656 | 1.69 | 0.475 | 5/8-11 | 1.438 | 3.125 | 5/8-11 x 2.25 | 6.0 | |
| **32FCC2** | **32FCCT2** | 2.00 | 4.50 | 5.250 | 2.660 | 1.44 | 3.156 | 0.781 | 2.06 | 0.475 | 3/4-10 | 1.750 | 3.8120 | 3/4-10 x 2.75 | 6.0 | |

Dimensions and pressures for reference only, subject to change.



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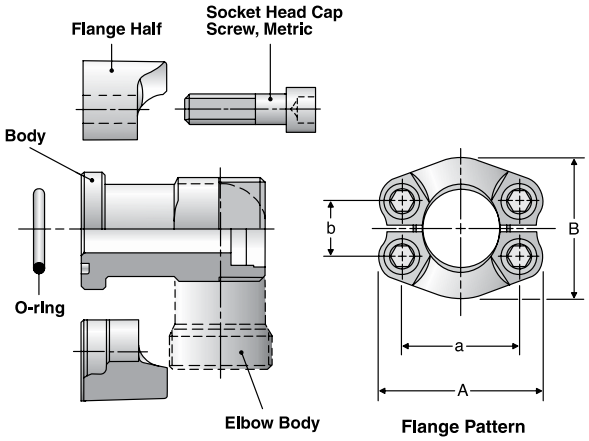
# FHS3

Flange Components




## Code 61

For Straights and Elbows
(ISO 6162-1, Type 1)

| Size | For Tube O.D. Series | Working Pressure (bar) | SAE Flange Halves | 4 Socket Head Cap Screws DIN 912-8.8 | O-Ring |
|---|---|---|---|---|---|
| 1/2 | 15L | 315 | **FHS 32CFX** | M8X30 | OR18.64 x 3.53X |
| 1/2 | 16S | 350 | | | |
| 3/4 | 18L | 315 | **FHS 33CFX** | M10X35 | OR25.00 x 3.53X |
| 3/4 | 22L | 160 | | | |
| 3/4 | 20S | 350 | | | |
| 3/4 | 25S | 350 | | | |
| 1 | 28L | 160 | **FHS 34CFX** | M10X35 | OR32.92 x 3.53X |
| 1 | 30S | 350 | | | |
| 1 1/4 | 35L | 160 | **FHS 35CFX** | M12X40* | OR37.70 x 3.53X |
| 1 1/4 | 25S | 280 | | | |
| 1 1/4 | 30S | 280 | | | |
| 1 1/4 | 38S | 280 | | | |
| 1 1/2 | 42L | 160 | **FHS 36CFX** | M12X40 | OR47.22 x 3.53X |
| 1 1/2 | 38S | 210 | | | |

| Size | For Tube O.D. Series | A ≈ | B ≈ | a | b |
|---|---|---|---|---|---|
| 1/2 | 15L | 54 | 46 | 38.1 | 17.5 |
| 1/2 | 16S | 54 | 46 | 38.1 | 17.5 |
| 3/4 | 18L | 65 | 52 | 47.6 | 22.2 |
| 3/4 | 22L | 65 | 52 | 47.6 | 22.2 |
| 3/4 | 20S | 65 | 52 | 47.6 | 22.2 |
| 3/4 | 25S | 65 | 52 | 47.6 | 22.2 |
| 1 | 28L | 70 | 59 | 52.4 | 26.2 |
| 1 | 30S | 70 | 59 | 52.4 | 26.2 |
| 1 1/4 | 35L | 79 | 73 | 58.7 | 30.2 |
| 1 1/4 | 25S | 79 | 73 | 58.7 | 30.2 |
| 1 1/4 | 30S | 79 | 73 | 58.7 | 30.2 |
| 1 1/4 | 38S | 79 | 73 | 58.7 | 30.2 |
| 1 1/2 | 42L | 94 | 83 | 69.9 | 35.7 |
| 1 1/2 | 38S | 94 | 83 | 69.9 | 35.7 |

Temperature range without pressure reductions for fittings with O-ring sealing of NBR (e.g., buna N series) -35°C up to +100°C, FPM (e.g., fluorocarbon on request) -25°C up to +120°C.

Tightening torques for socket head cap screws see Table S6.

* Does not meet ISO 6162 specification.

Note: Clamp halves are sold separately, not as a set.

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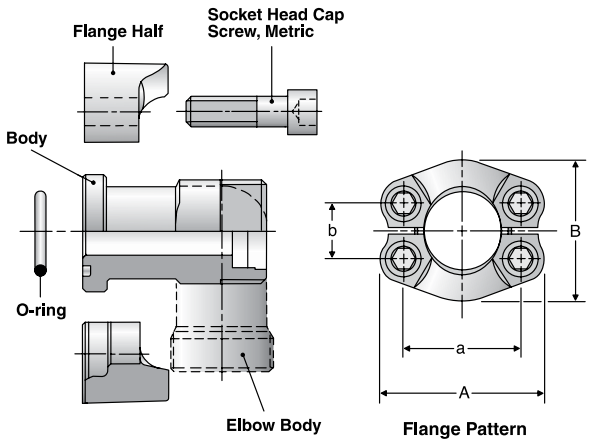
# FHS6

Flange Components




## Code 62

For Straights and Elbows
(ISO 6162-2, Type 1)

| Size | For Tube O.D. Series | Working Pressure (bar) | SAE Flange Halves | 4 Socket Head Cap Screws DIN 912-8.8 | O-Ring |
|---|---|---|---|---|---|
| 1/2 | 16S | 400 | **FHS 62CFX** | M8X35 | OR18.64 x 3.53X |
| 3/4 | 16S | 400 | **FHS 63CFX** | M10X35 | OR25.00 x 3.53X |
| 3/4 | 20S | 400 | **FHS 63CFX** | M10X35 | OR25.00 x 3.53X |
| 3/4 | 25S | 400 | **FHS 63CFX** | M10X35 | OR25.00 x 3.53X |
| 1 | 25S | 400 | **FHS 64CFX** | M12X45 | OR32.92 x 3.53X |
| 1 | 30S | 400 | **FHS 64CFX** | M12X45 | OR32.92 x 3.53X |
| 1 1/4 | 30S | 400 | **FHS 65CFX** | M14X50* | OR37.70 x 3.53X |
| 1 1/4 | 38S | 315 | **FHS 65CFX** | M14X50* | OR37.70 x 3.53X |
| 1 1/2 | 38S | 315 | **FHS 66CFX** | M16X55 | OR47.22 x 3.53X |

| Size | For Tube O.D. Series | A ≈ | a | B ≈ | b |
|---|---|---|---|---|---|
| 1/2 | 16S | 56 | 40.5 | 47 | 18.2 |
| 3/4 | 16S | 71 | 50.8 | 60 | 23.8 |
| 3/4 | 20S | 71 | 50.8 | 60 | 23.8 |
| 3/4 | 25S | 71 | 50.8 | 60 | 23.8 |
| 1 | 25S | 81 | 57.2 | 70 | 27.8 |
| 1 | 30S | 81 | 57.2 | 70 | 27.8 |
| 1 1/4 | 30S | 95 | 66.7 | 77 | 31.8 |
| 1 1/4 | 38S | 95 | 66.7 | 77 | 31.8 |
| 1 1/2 | 38S | 113 | 79.4 | 95 | 36.5 |

Temperature range without pressure reductions for fittings with O-ring sealing of NBR (e.g., buna N series) -35° up to +100°C, FPM (e.g., fluorocarbon on request) -25° up to +120°C.

Tightening torques for socket head cap screws see Table S7.

* Does not meet ISO 6162 specification.

Note: Clamp halves are sold separately, not as a set.





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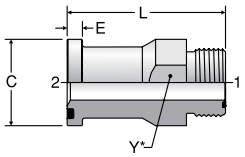
# LOHQ1

Code 61 Flange Connector
Code 61 / ORFS

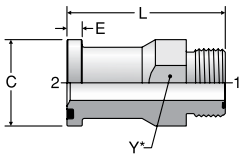



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 Code 61 | C (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|
| **12 LOHQ1** | 3/4 | 3/4 | 1.500 | 0.265 | 2.79 | 1 3/8 | 5.0 |
| **16 LOHQ1** | 1 | 1 | 1.750 | 0.315 | 2.81 | 1 5/8 | 5.0 |
| **20 LOHQ1** | 1 1/4 | 1 1/4 | 2.000 | 0.315 | 3.21 | 1 7/8 | 4.0 |
| **24 LOHQ1** | 1 1/2 | 1 1/2 | 2.375 | 0.315 | 3.29 | 2 1/8 | 3.0 |

# LOHQ2

Code 62 Flange Connector
Code 62 / ORFS

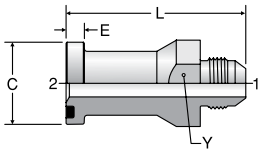



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 Code 62 | C (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|
| **12 LOHQ2** | 3/4 | 3/4 | 1.625 | 0.345 | 3.02 | 1 3/8 | 6.0 |
| **12-16 LOHQ2** | 3/4 | 1 | 1.875 | 0.375 | 3.34 | 1 5/8 | 6.0 |
| **16 LOHQ2** | 1 | 1 | 1.875 | 0.375 | 3.36 | 1 5/8 | 6.0 |
| **20 LOHQ2** | 1 1/4 | 1 1/4 | 2.125 | 0.405 | 3.48 | 1 7/8 | 5.0 |
| **24 LOHQ2** | 1 1/2 | 1 1/2 | 2.500 | 0.495 | 4.14 | 2 1/8 | 4.5 |

# XHQ1

Code 61 Flange Connector
Code 61 / 37° Flare

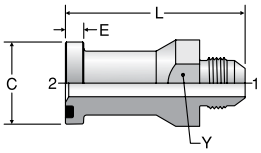



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 Code 61 | C (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|
| **12 XHQ1** | 3/4 | 3/4 | 1.500 | 0.265 | 2.77 | 1 3/8 | 5.0 |
| **16 XHQ1** | 1 | 1 | 1.750 | 0.315 | 2.91 | 1 5/8 | 5.0 |
| **20 XHQ1** | 1 1/4 | 1 1/4 | 2.000 | 0.315 | 3.36 | 1 7/8 | 4.0 |
| **24 XHQ1** | 1 1/2 | 1 1/2 | 2.375 | 0.315 | 3.57 | 2 1/8 | 3.0 |
| **32 XHQ1** | 2 | 2 | 2.812 | 0.375 | 4.04 | 2 5/8 | 2.0 |

# XHQ2

Code 62 Flange Connector
Code 62 / 37° Flare

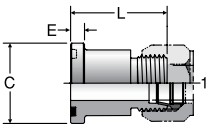



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 Code 62 | C (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|
| **12 XHQ2** | 3/4 | 3/4 | 1.625 | 0.345 | 3.08 | 1 3/8 | 5.0 |
| **16 XHQ2** | 1 | 1 | 1.875 | 0.375 | 3.43 | 1 5/8 | 5.0 |
| **20 XHQ2** | 1 1/4 | 1 1/4 | 2.125 | 0.405 | 3.60 | 1 7/8 | 4.0 |
| **24 XHQ2** | 1 1/2 | 1 1/2 | 2.500 | 0.495 | 4.34 | 2 1/8 | 3.0 |

# BUHQ1

Code 61 Connector
Code 61 / Flareless




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 Code 61 | C (in.) | E (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|
| **12 BUHQ1** | 3/4 | 3/4 | 1.500 | 0.265 | 1.82 | |
| **16 BUHQ1** | 1 | 1 | 1.750 | 0.315 | 1.88 | |
| **20 BUHQ1** | 1 1/4 | 1 1/4 | 2.000 | 0.315 | 1.82 | |
| **24 BUHQ1** | 1 1/2 | 1 1/2 | 2.375 | 0.315 | 1.94 | |
| **32 BUHQ1** | 2 | 2 | 2.812 | 0.375 | 1.97 | |

Dimensions and pressures for reference only, subject to change.



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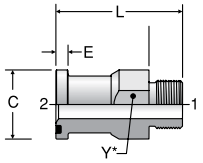
Code 61 Connector
Code 61 / SAE-ORB

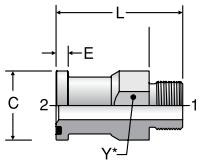



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 Code 61 | C (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|
| **12 F5OHQ1** | 3/4 | 3/4 | 1.500 | 0.265 | 2.63 | 1 3/8 | 5.0 |
| **16 F5OHQ1** | 1 | 1 | 1.750 | 0.315 | 2.73 | 1 5/8 | 4.5 |
| **20 F5OHQ1** | 1 1/4 | 1 1/4 | 2.000 | 0.315 | 3.13 | 1 7/8 | 4.0 |
| **24 F5OHQ1** | 1 1/2 | 1 1/2 | 2.375 | 0.315 | 3.22 | 2 1/8 | 3.0 |
| **32 F5OHQ1** | 2 | 2 | 2.812 | 0.375 | 3.49 | 2 3/4 | 3.0 |

# F5OHQ2

Code 62 Connector
Code 62 / SAE-ORB



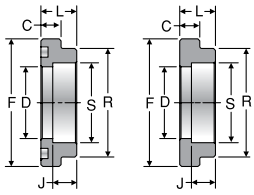

* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 Code 62 | C (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|
| **12 F5OHQ2** | 3/4 | 3/4 | 1.625 | 0.345 | 3.08 | 1 3/8 | 6.0 |
| **16 F5OHQ2** | 1 | 1 | 1.875 | 0.375 | 3.25 | 1 5/8 | 5.5 |
| **20 F5OHQ2** | 1 1/4 | 1 1/4 | 2.125 | 0.405 | 3.37 | 1 7/8 | 4.5 |
| **24 F5OHQ2** | 1 1/2 | 1 1/2 | 2.500 | 0.495 | 3.99 | 2 1/8 | 4.5 |
| **32 F5OHQ2** | 2 | 2 | 3.125 | 0.495 | 4.86 | 2 3/4 | 3.0 |

# B3HQ

Braze Flange Head Connector, Tube
Tube Braze Socket* / Code 61/62 Flange Head

*** For clearance brazing**




O-ring Face Flat Face

| TUBE FITTING PART # O-RING FACE | TUBE FITTING PART # FLAT FACE | FLANGE SIZE (in.) | TUBE O.D. (in.) | C (in.) | D (in.) | F (in.) | J (in.) | L (in.) | R (in.) | S (in.) | Dynamic Pressure (x 1,000 PSI) -SX | -SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TUBE BRAZE SOCKET / CODE 61 FLANGE HEAD** | | | | | | | | | | | | |
| **8B3HQ1** | **8B3HQ1N** | 0.50 | 1/2 | 0.265 | 0.406 | 1.188 | 0.312 | 0.50 | 0.940 | 0.502 | 5.0 | |
| **10-8B3HQ1** | **10-8B3HQ1N** | 0.50 | 5/8 | 0.265 | 0.500 | 1.188 | 0.312 | 0.50 | 0.940 | 0.625 | 5.0 | |
| **12B3HQ1** | **12B3HQ1N** | 0.75 | 3/4 | 0.265 | 0.656 | 1.500 | 0.375 | 0.56 | 1.250 | 0.752 | 4.5 | |
| **16-12B3HQ1** | **16-12B3HQ1N** | 0.75 | 1 | 0.315 | 0.750 | 1.500 | 0.375 | 0.56 | 1.250 | 1.002 | 4.5 | |
| **16B3HQ1** | **16B3HQ1N** | 1.00 | 1 | 0.315 | 0.906 | 1.750 | 0.375 | 0.56 | 1.500 | 1.002 | 4.5 | |
| **20-16B3HQ1** | **20-16B3HQ1N** | 1.00 | 1 1/4 | 0.315 | 1.000 | 1.750 | 0.375 | 0.56 | 1.500 | 1.252 | 4.0 | |
| **20B3HQ1** | **20B3HQ1N** | 1.25 | 1 1/4 | 0.315 | 1.125 | 2.000 | 0.375 | 0.56 | 1.700 | 1.252 | 3.5 | |
| **24-20B3HQ1** | **24-20B3HQ1N** | 1.25 | 1 1/2 | 0.315 | 1.250 | 2.000 | 0.375 | 0.56 | 1.700 | 1.502 | 3.5 | |
| **24B3HQ1** | **24B3HQ1N** | 1.50 | 1 1/2 | 0.315 | 1.375 | 2.380 | 0.438 | 0.62 | 1.980 | 1.502 | 3.0 | |
| **28-24B3HQ1** | **28-24B3HQ1N** | 1.50 | 1 3/4 | 0.315 | 1.500 | 2.380 | 0.438 | 0.62 | 1.980 | 1.752 | 2.7 | |
| **32B3HQ1** | **32B3HQ1N** | 2.00 | 2 | 0.375 | 1.875 | 2.810 | 0.500 | 0.62 | 2.450 | 2.002 | 3.0 | |
| **36-32B3HQ1** | **36-32B3HQ1N** | 2.00 | 2 1/4 | 0.375 | 2.000 | 2.810 | 0.500 | 0.62 | 2.450 | 2.252 | 3.0 | |
| **40B3HQ1** | **40B3HQ1N** | 2.50 | 2 1/2 | 0.375 | 2.375 | 3.312 | 0.562 | 0.68 | 2.921 | 2.502 | 2.2 | |
| **44-40B3HQ1** | **44-40B3HQ1N** | 2.50 | 2 3/4 | 0.375 | 2.500 | 3.312 | 0.500 | 0.68 | 2.921 | 2.752 | 2.2 | |
| **48B3HQ1** | **48B3HQ1N** | 3.00 | 3 | 0.375 | 2.875 | 4.000 | 0.562 | 0.75 | 3.546 | 3.002 | 1.7 | |
| **TUBE BRAZE SOCKET / CODE 62 FLANGE HEAD** | | | | | | | | | | | | |
| **12B3HQ2** | **12B3HQ2N** | 0.75 | 3/4 | 0.345 | 0.656 | 1.625 | 0.500 | 0.69 | 1.250 | 0.752 | 6.0 | |
| **16-12B3HQ2** | **16-12B3HQ2N** | 0.75 | 1 | 0.345 | 0.750 | 1.625 | 0.500 | 0.69 | 1.250 | 1.002 | 6.0 | |
| **16B3HQ2** | **16B3HQ2N** | 1.00 | 1 | 0.375 | 0.810 | 1.875 | 0.625 | 0.81 | 1.500 | 1.002 | 6.0 | |
| **20-16B3HQ2** | **20-16B3HQ2N** | 1.00 | 1 1/4 | 0.375 | 1.000 | 1.875 | 0.625 | 0.81 | 1.500 | 1.252 | 6.0 | |
| **20B3HQ2** | **20B3HQ2N** | 1.25 | 1 1/4 | 0.405 | 1.010 | 2.125 | 0.812 | 1.00 | 1.718 | 1.252 | 6.0 | |
| **24-20B3HQ2** | **24-20B3HQ2N** | 1.25 | 1 1/2 | 0.405 | 1.250 | 2.125 | 0.812 | 1.00 | 1.718 | 1.502 | 5.5 | |
| **24B3HQ2** | **24B3HQ2N** | 1.50 | 1 1/2 | 0.495 | 1.250 | 2.500 | 1.000 | 1.19 | 2.000 | 1.502 | 6.0 | |
| **28-24B3HQ2** | **28-24B3HQ2N** | 1.50 | 1 3/4 | 0.495 | 1.500 | 2.500 | 1.000 | 1.19 | 2.000 | 1.752 | 4.5 | |
| **32B3HQ2** | **32B3HQ2N** | 2.00 | 2 | 0.495 | 1.750 | 3.125 | 1.375 | 1.50 | 2.620 | 2.002 | 5.5 | |
| **36-32B3HQ2** | **36-32B3HQ2N** | 2.00 | 2 1/4 | 0.495 | 2.000 | 3.125 | 1.312 | 1.50 | 2.620 | 2.252 | 4.0 | |



Dimensions and pressures for reference only, subject to change.



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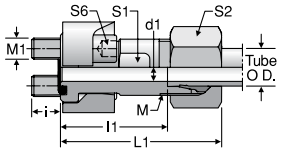
# GFS

SAE Flange Connector – Standard Series
Code 61 & 62 / Metric Flareless




| TUBE FITTING PART # | SIZE (in.) | TUBE O.D. (mm) | WORKING PRESSURE (bar) | M THREAD | d1 (mm) | i (mm) | l 1 (mm) | L1 ≈ (mm) | S1 (mm) | S2 (mm) | S6 (mm) | MATERIAL FROM STOCK CF | MATERIAL FROM STOCK 71 | EO-2 FROM STOCK CF | EO-2 FROM STOCK 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SAE FLANGE CONNECTIONS – CODE 61 – STANDARD SERIES** | | | | | | | | | | | | | | | |
| GFS32/15LCF | 1/2 | 15L | 200 | M22 x 1.5 | 12 | 11.5 | 41 | 56 | 24 | 27 | 6 | • | | • | |
| GFS32/16SCF | 1/2 | 16S | 220 | M24 x 1.5 | 12 | 11.5 | 41.5 | 60 | 24 | 30 | 6 | • | | • | |
| GFS33/18LCF | 3/4 | 18L | 200 | M26 x 1.5 | 15 | 15.5 | 45.5 | 62 | 30 | 32 | 8 | • | | • | |
| GFS33/22LCF | 3/4 | 22L | 100 | M30 x 2 | 19 | 15.5 | 45.5 | 62 | 30 | 36 | 8 | • | | • | |
| GFS33/20SCF | 3/4 | 20S | 220 | M30 x 2 | 16 | 15.5 | 46.5 | 68 | 30 | 36 | 8 | • | | • | |
| GFS33/25SCF | 3/4 | 25S | 220 | M36 x 2 | 17 | 15.5 | 45 | 69 | 30 | 46 | 8 | • | | • | |
| GFS34/28LCF | 1 | 28L | 100 | M36 x 2 | 24 | 13.5 | 46.5 | 63 | 36 | 41 | 8 | • | | • | |
| GFS34/30SCF | 1 | 30S | 220 | M42 x 2 | 24 | 13.5 | 49.5 | 76 | 36 | 50 | 8 | • | | • | |
| GFS35/35LCF | 1 1/4 | 35L | 100 | M45 x 2 | 30 | 18.5 | 47.5 | 69 | 41 | 50 | 8 | • | | • | |
| GFS35/25SCF | 1 1/4 | 25S | 175 | M36 x 2 | 20 | 18.5 | 48 | 72 | 41 | 46 | 8 | • | | • | |
| GFS35/30SCF | 1 1/4 | 30S | 175 | M42 x 2 | 25 | 18.5 | 48.5 | 75 | 41 | 50 | 8 | • | | • | |
| GFS35/38SCF | 1 1/4 | 38S | 175 | M52 x 2 | 28 | 18.5 | 50 | 81 | 46 | 60 | 8 | • | | • | |
| GFS36/42LCF | 1 1/2 | 42L | 100 | M52 x 2 | 36 | 18.5 | 53 | 76 | 46 | 60 | 10 | • | | • | |
| GFS36/38SCF | 1 1/2 | 38S | 130 | M52 x 2 | 32 | 18.5 | 54 | 85 | 46 | 60 | 10 | • | | • | |
| **SAE FLANGE CONNECTIONS – CODE 62 – HIGH PRESSURE SERIES** | | | | | | | | | | | | | | | |
| GFS62/16SCF | 1/2 | 16S | 250 | M24 x 1.5 | 12 | 13.5 | 44.5 | 63 | 24 | 30 | 6 | • | | • | |
| GFS63/16SCF | 3/4 | 16S | 250 | M24 x 1.5 | 12 | 15.5 | 50.5 | 69 | 30 | 30 | 8 | • | | • | |
| GFS63/20SCF | 3/4 | 20S | 250 | M30 x 2 | 16 | 15.5 | 50.5 | 72 | 30 | 36 | 8 | • | | • | |
| GFS63/25SCF | 3/4 | 25S | 250 | M36 x 2 | 17 | 15.5 | 51 | 75 | 30 | 46 | 8 | • | | • | |
| GFS64/25SCF | 1 | 25S | 250 | M36 x 2 | 20 | 20.5 | 60 | 84 | 36 | 46 | 10 | • | | • | |
| GFS64/30SCF | 1 | 30S | 250 | M42 x 2 | 24 | 20.5 | 60.5 | 87 | 36 | 50 | 10 | • | | • | |
| GFS65/30SCF | 1 1/4 | 30S | 250 | M42 x 2 | 25 | 22.5 | 65.5 | 92 | 41 | 50 | 10 | • | | • | |
| GFS65/38SCF | 1 1/4 | 38S | 200 | M52 x 2 | 30 | 22.5 | 67 | 98 | 46 | 60 | 10 | • | | • | |
| GFS66/38SCF | 1 1/2 | 38S | 200 | M52 x 2 | 30 | 24.5 | 73 | 104 | 46 | 60 | 14 | • | | • | |

**EO-2 Part Number example: GFS33/18ZLCF**

Temperature range without pressure reductions for fittings with O-ring sealing of NBR (e.g., buna N series) -35°C up to +100°C, FPM (e.g., fluorocarbon on request) -25°C up to +120°C.

Tightening torques for socket head cap screws see Tables S6 and S7.

Dimensions and pressures for reference only, subject to change.



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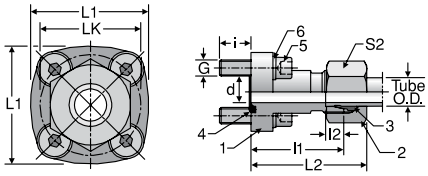
# BFG

DIN Flange / Metric Flareless

Tube connection according to DIN 2353




| TUBE FITTING PART # | WORKING PRESSURE (bar) | TUBE O.D. (mm) | d (mm) | G | i (mm) | l 1 (mm) | l 2 (mm) | L1 (mm) | L2 (mm) | LK (mm) | S2 (mm) | MATERIAL FROM STOCK CF | MATERIAL FROM STOCK 71 | EO-2 FROM STOCK CF | EO-2 FROM STOCK 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BFG15L/LK40CF** | 65 | 15 | 12 | M 6 | 12.5 | 35 | 7 | 42 | 43 | 40 | 27 | • | | • | |
| **BFG18L/LK40CF** | 65 | 18 | 15 | M 6 | 12.5 | 35 | 7.5 | 42 | 44 | 40 | 32 | • | | • | |
| **BFG22L/LK40CF** | 65 | 22 | 19 | M 6 | 12.5 | 35 | 7.5 | 42 | 44.5 | 40 | 36 | • | | • | |
| **BFG15L/LK35CF** | 155 | 15 | 12 | M 6 | 12.5 | 30 | 7 | 39 | 38 | 35 | 27 | • | | • | |
| **BFG10L/LK35CF** | 200 | 10 | 8 | M 6 | 12.5 | 30 | 7 | 39 | 39 | 35 | 19 | • | | • | |
| **BFG12L/LK35CF** | 200 | 12 | 10 | M 6 | 12.5 | 30 | 7 | 39 | 39 | 35 | 22 | • | | • | |

## Unassembled BFG Fitting Components

| 1 Straight Body | 2 Nut | 3 Progressive Ring | 4 O-Ring | 5 Cap Screws DIN 912-8.8 (4 pcs.) | 6 Spring Washer DIN 127 (4 pcs.) |
|---|---|---|---|---|---|
| **BFG15L/LK40CFX** | M15LCFX | DPR15LCFX | OR26X2.5X | M6X22 | A6 |
| **BFG15L/LK40CFX** | M18LCFX | DPR18LCFX | OR26X2.5X | M6X22 | A6 |
| **BFG22L/LK40CFX** | M22LCFX | DPR22LCFX | OR26X2.5X | M6X22 | A6 |
| **BFG15L/LK35CFX** | M15LCFX | DPR15LCFX | OR20X2.5X | M6X22 | A6 |
| **BFG10L/LK35CFX** | M10LCFX | DPR10LCFX | OR20X2.5X | M6X22 | A6 |
| **BFG12L/LK35CFX** | M12LCFX | DPR12LCFX | OR20X2.5X | M6X22 | A6 |

**EO-2 Part Number example: BFG15ZL/LK40CF**

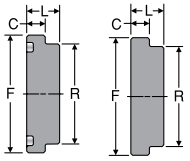
Temperature range without pressure reductions for fittings with O-ring sealing of NBR (e.g., buna N series) -35°C up to +100°C, FPM (e.g., fluorocarbon on request) -25°C up to 120°C.

Tightening torques for socket head cap screws see Table S6.

L

# P

Flange Head Plug
Code 61/62 Flange Head Plug




O-ring Face  Flat Face

| TUBE FITTING PART # O-RING FACE | TUBE FITTING PART # FLAT FACE | FLANGE SIZE (in.) | C (in.) | F (in.) | L (in.) | R (in.) | Dynamic Pressure (x 1,000 PSI) -SX | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|
| **CODE 61 FLANGE HEAD PLUG** | | | | | | | | |
| **8PQ1** | **8PQ1N** | 0.50 | 0.265 | 1.188 | 0.500 | 0.940 | 5.0 | |
| **12PQ1** | **12PQ1N** | 0.75 | 0.265 | 1.500 | 0.560 | 1.250 | 5.0 | |
| **16PQ1** | **16PQ1N** | 1.00 | 0.315 | 1.750 | 0.560 | 1.500 | 5.0 | |
| **20PQ1** | **20PQ1N** | 1.25 | 0.315 | 2.000 | 0.560 | 1.700 | 4.0 | |
| **24PQ1** | **24PQ1N** | 1.50 | 0.315 | 2.380 | 0.620 | 1.980 | 3.0 | |
| **32PQ1** | **32PQ1N** | 2.00 | 0.375 | 2.810 | 0.620 | 2.450 | 3.0 | |
| **40PQ1** | **40PQ1N** | 2.50 | 0.375 | 3.312 | 0.680 | 2.921 | 2.5 | |
| **48PQ1** | **48PQ1N** | 3.00 | 0.375 | 4.000 | 0.750 | 3.546 | 2.0 | |
| **CODE 62 FLANGE HEAD PLUG** | | | | | | | | |
| **12PQ2** | **12PQ2N** | 0.75 | 0.345 | 1.625 | 0.687 | 1.250 | 6.0 | |
| **16PQ2** | **16PQ2N** | 1.00 | 0.375 | 1.875 | 0.812 | 1.500 | 6.0 | |
| **20PQ2** | **20PQ2N** | 1.25 | 0.405 | 2.125 | 1.000 | 1.718 | 6.0 | |
| **24PQ2** | **24PQ2N** | 1.50 | 0.495 | 2.500 | 1.187 | 2.000 | 6.0 | |
| **32PQ2** | **32PQ2N** | 2.00 | 0.495 | 3.125 | 1.500 | 2.625 | 6.0 | |

Dimensions and pressures for reference only, subject to change.



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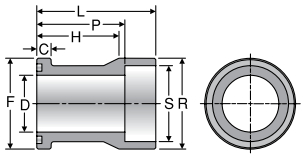
# W7HQ

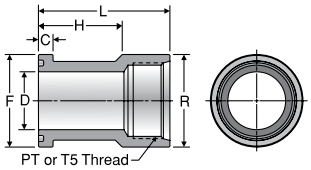
Weld Socket Flange Connector, Pipe
Extended Weld Socket, Pipe / Code 61 or 62 Flange Head




| TUBE FITTING PART # | PIPE SIZE (in.) | FLANGE SIZE (in.) | C (in.) | D (in.) | F (in.) | H (in.) | L (in.) | P (in.) | R (in.) | S (in.) | Dynamic Pressure (x 1,000 PSI) SX | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EXTENDED WELD SOCKET, PIPE / CODE 61 FLANGE HEAD** | | | | | | | | | | | | |
| **12W7HQ1** | 3/4 | 0.75 | 0.265 | 0.750 | 1.500 | 1.62 | 2.34 | 1.78 | 1.500 | 1.062 | 3.5 | |
| **16W7HQ1** | 1 | 1.00 | 0.315 | 1.000 | 1.750 | 1.62 | 2.38 | 1.75 | 1.750 | 1.328 | 3.5 | |
| **20W7HQ1** | 1 1/4 | 1.25 | 0.315 | 1.250 | 2.000 | 1.81 | 2.62 | 1.94 | 2.000 | 1.672 | 3.5 | |
| **24W7HQ1** | 1 1/2 | 1.50 | 0.315 | 1.500 | 2.375 | 2.00 | 2.88 | 2.12 | 2.375 | 1.922 | 2.7 | |
| **32W7HQ1** | 2 | 2.00 | 0.375 | 2.000 | 2.812 | 2.00 | 3.00 | 2.12 | 2.812 | 2.406 | 2.5 | |
| **EXTENDED WELD SOCKET, PIPE / CODE 62 FLANGE HEAD** | | | | | | | | | | | | |
| **16W7HQ2** | 1 | 1.00 | 0.375 | 1.000 | 1.875 | 2.34 | 3.06 | 2.43 | 2.000 | 1.328 | 5.5 | |
| **20W7HQ2** | 1 1/4 | 1.25 | 0.405 | 1.125 | 2.125 | 2.50 | 3.31 | 2.62 | 2.312 | 1.672 | 5.5 | |
| **24W7HQ2** | 1 1/2 | 1.50 | 0.495 | 1.375 | 2.500 | 3.06 | 3.93 | 3.18 | 2.750 | 1.922 | 5.5 | |
| **32W7HQ2** | 2 | 2.00 | 0.495 | 1.875 | 3.125 | 3.18 | 4.06 | 3.18 | 3.250 | 2.406 | 5.0 | |

# GHQ / G5HQ

Threaded Port Flange Adapter
NPTF or SAE Port / Code 61 Flange Head




## GHQ

| TUBE FITTING PART # | PT PORT THREAD NPTF | FLANGE SIZE (in.) | C (in.) | D (in.) | F (in.) | H (in.) | L (in.) | R (in.) | Dynamic Pressure (x 1,000 PSI) -SX | -SS |
|---|---|---|---|---|---|---|---|---|---|---|
| **NPTF PORT / CODE 61 FLANGE HEAD** | | | | | | | | | | |
| **12GHQ1** | 3/4-14 | 0.75 | 0.265 | 0.75 | 1.500 | 1.62 | 2.47 | 1.50 | 4.0 | |
| **16GHQ1** | 1-11 1/2 | 1.00 | 0.315 | 1.00 | 1.750 | 1.62 | 2.66 | 1.75 | 4.0 | |
| **20GHQ1** | 1 1/4-11 1/2 | 1.25 | 0.315 | 1.25 | 2.000 | 1.81 | 2.84 | 2.00 | 3.0 | |
| **24GHQ1** | 1 1/2-11 1/2 | 1.50 | 0.315 | 1.50 | 2.375 | 2.00 | 3.00 | 2.38 | 2.0 | |
| **32GHQ1** | 2-11 1/2 | 2.00 | 0.375 | 2.00 | 2.812 | 2.00 | 3.00 | 2.81 | 2.0 | |

## G5HQ

| TUBE FITTING PART # | T5 PORT THREAD UN-2B | SAE PORT DASH SIZE | FLANGE SIZE (in.) | C (in.) | D (in.) | F (in.) | H (in.) | L (in.) | R (in.) | Dynamic Pressure (x 1,000 PSI) -SX | -SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SAE PORT / CODE 61 FLANGE HEAD** | | | | | | | | | | | |
| **12G5HQ1** | 1 1/6-12 | 12 | 0.75 | 0.265 | 0.75 | 1.500 | 1.62 | 2.47 | 1.50 | 4.0 | |
| **16G5HQ1** | 1 5/16-12 | 15 | 1.00 | 0.315 | 1.00 | 1.750 | 1.62 | 2.66 | 1.75 | 3.0 | |
| **20G5HQ1** | 1 5/8-12 | 20 | 1.25 | 0.315 | 1.25 | 2.000 | 1.81 | 2.84 | 2.00 | 2.2 | |
| **24G5HQ1** | 1 7/8-12 | 24 | 1.50 | 0.315 | 1.50 | 2.375 | 2.00 | 3.00 | 2.38 | 2.5 | |
| **32G5HQ1** | 2 1/2-12 | 32 | 2.00 | 0.375 | 2.00 | 2.812 | 2.00 | 3.00 | 2.81 | 1.2 | |

Dimensions and pressures for reference only, subject to change.



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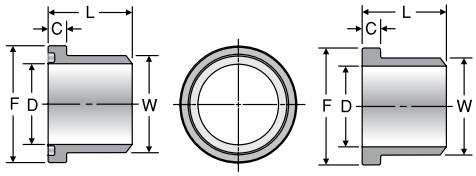
# WB1HQ1 / WB3HQ1 / WB5HQ1

Code 61 Weld Butt Flange
Connector, Pipe
Schedule 40, 80 or 160 Weld Butt /
Code 61 Flange Head




O-ring Face Flat Face

| WELD BUTT FLANGE CONNECTION TYPE | TUBE FITTING PART # | | PIPE SIZE | FLANGE SIZE | C | D | F | L | W | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | -SX | -SS |
| **SCHEDULE 40 WELD BUTT / CODE 61 FLANGE HEAD** | | | | | | | | | | | |
| **WB1HQ1** For Schedule 40 pipe | 8WB1HQ1 | 8WB1HQ1N | 1/2 | 0.50 | 0.265 | 0.622 | 1.188 | 1.06 | 0.840 | 5.3 | |
| | 12WB1HQ1 | 12WB1HQ1N | 3/4 | 0.75 | 0.265 | 0.824 | 1.500 | 1.06 | 1.050 | 4.6 | |
| | 16WB1HQ1 | 16WB1HQ1N | 1 | 1.00 | 0.315 | 1.049 | 1.750 | 1.25 | 1.315 | 4.0 | |
| | 20WB1HQ1 | 20WB1HQ1N | 1 1/4 | 1.25 | 0.315 | 1.380 | 2.000 | 1.44 | 1.660 | 3.6 | |
| | 24WB1HQ1 | 24WB1HQ1N | 1 1/2 | 1.50 | 0.315 | 1.610 | 2.375 | 1.75 | 1.900 | 3.0 | |
| | 32WB1HQ1 | 32WB1HQ1N | 2 | 2.00 | 0.375 | 2.067 | 2.812 | 2.00 | 2.375 | 2.6 | |
| | 40WB1HQ1 | 40WB1HQ1N | 2 1/2 | 2.50 | 0.375 | 2.469 | 3.312 | 2.31 | 2.875 | 2.6 | |
| | 48WB1HQ1 | 48WB1HQ1N | 3 | 3.00 | 0.375 | 3.068 | 4.000 | 2.32 | 3.500 | 2.3 | |
| **SCHEDULE 80 WELD BUTT / CODE 61 FLANGE HEAD** | | | | | | | | | | | |
| **WB3HQ1** For Schedule 80 pipe | 8WB3HQ1 | 8WB3HQ1N | 1/2 | 0.50 | 0.265 | 0.546 | 1.188 | 1.06 | 0.840 | 5.0 | |
| | 12WB3HQ1 | 12WB3HQ1N | 3/4 | 0.75 | 0.265 | 0.742 | 1.500 | 1.06 | 1.050 | 3.5 | |
| | 16WB3HQ1 | 16WB3HQ1N | 1 | 1.00 | 0.315 | 0.957 | 1.750 | 1.25 | 1.315 | 4.0 | |
| | 20WB3HQ1 | 20WB3HQ1N | 1 1/4 | 1.25 | 0.315 | 1.278 | 2.000 | 1.44 | 1.660 | 3.5 | |
| | 24WB3HQ1 | 24WB3HQ1N | 1 1/2 | 1.50 | 0.315 | 1.500 | 2.375 | 1.75 | 1.900 | 3.0 | |
| | 32WB3HQ1 | 32WB3HQ1N | 2 | 2.00 | 0.375 | 1.939 | 2.812 | 2.00 | 2.375 | 3.0 | |
| | 40WB3HQ1 | 40WB3HQ1N | 2 1/2 | 2.50 | 0.375 | 2.323 | 3.312 | 2.31 | 2.875 | 2.7 | |
| | 48WB3HQ1 | 48WB3HQ1N | 3 | 3.00 | 0.375 | 2.900 | 4.000 | 2.32 | 3.500 | 2.2 | |
| **SCHEDULE 160 WELD BUTT / CODE 61 FLANGE HEAD** | | | | | | | | | | | |
| **WB5HQ1** For Schedule 160 pipe | 8WB5HQ1 | 8WB5HQ1N | 1/2 | 0.50 | 0.265 | 0.464 | 1.188 | 1.06 | 0.840 | 5.0 | |
| | 12WB5HQ1 | 12WB5HQ1N | 3/4 | 0.75 | 0.265 | 0.614 | 1.500 | 1.06 | 1.050 | 4.0 | |
| | 16WB5HQ1 | 16WB5HQ1N | 1 | 1.00 | 0.315 | 0.815 | 1.750 | 1.25 | 1.315 | 4.5 | |
| | 20WB5HQ1 | 20WB5HQ1N | 1 1/4 | 1.25 | 0.315 | 1.160 | 2.000 | 1.44 | 1.660 | 4.0 | |
| | 24WB5HQ1 | 24WB5HQ1N | 1 1/2 | 1.50 | 0.315 | 1.337 | 2.375 | 1.75 | 1.900 | 3.0 | |
| | 32WB5HQ1 | 32WB5HQ1N | 2 | 2.00 | 0.375 | 1.689 | 2.812 | 2.00 | 2.375 | 3.0 | |
| | 40WB5HQ1 | 40WB5HQ1N | 2 1/2 | 2.50 | 0.375 | 2.125 | 3.312 | 2.31 | 2.875 | 2.5 | |
| | 48WB5HQ1 | 48WB5HQ1N | 3 | 3.00 | 0.375 | 2.624 | 4.000 | 2.32 | 3.500 | 2.0 | |

# WB3HQ2 / WB5HQ2 / WB7HQ2

Code 62 Weld Butt Flange
Connector, Pipe
Schedule 80, 160 or
XXS Weld Butt / Code 62
Flange Head

| WELD BUTT FLANGE CONNECTION TYPE | TUBE FITTING PART # | | PIPE SIZE | FLANGE SIZE | C | D | F | L | W | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | -SX | -SS |
| **SCHEDULE 80 WELD BUTT / CODE 62 FLANGE HEAD** | | | | | | | | | | | |
| **WB3HQ2** For Schedule 80 pipe | **12WB3HQ2** | **12WB3HQ2N** | **3/4** | 0.75 | 0.345 | 0.742 | 1.625 | 1.42 | 1.050 | 5.0 | |
| | **16WB3HQ2** | **16WB3HQ2N** | **1** | 1.00 | 0.375 | 0.957 | 1.875 | 1.61 | 1.315 | 4.5 | |
| | **20WB3HQ2** | **20WB3HQ2N** | **1 1/4** | 1.25 | 0.405 | 1.278 | 2.125 | 1.73 | 1.660 | 3.5 | |
| | **24WB3HQ2** | **24WB3HQ2N** | **1 1/2** | 1.50 | 0.495 | 1.500 | 2.500 | 2.17 | 1.900 | 3.0 | |
| | **32WB3HQ2** | **32WB3HQ2N** | **2** | 2.00 | 0.495 | 1.939 | 3.125 | 2.48 | 2.375 | 3.0 | |
| **SCHEDULE 160 WELD BUTT / CODE 62 FLANGE HEAD** | | | | | | | | | | | |
| **WB5HQ2** For Schedule 160 pipe | **12WB5HQ2** | **12WB5HQ2N** | **3/4** | 0.75 | 0.345 | 0.614 | 1.625 | 1.42 | 1.050 | 6.0 | |
| | **16WB5HQ2** | **16WB5HQ2N** | **1** | 1.00 | 0.375 | 0.815 | 1.875 | 1.61 | 1.315 | 5.5 | |
| | **20WB5HQ2** | **20WB5HQ2N** | **1 1/4** | 1.25 | 0.405 | 1.160 | 2.125 | 1.73 | 1.660 | 5.0 | |
| | **24WB5HQ2** | **24WB5HQ2N** | **1 1/2** | 1.50 | 0.495 | 1.337 | 2.500 | 2.17 | 1.900 | 5.0 | |
| | **32WB5HQ2** | **32WB5HQ2N** | **2** | 2.00 | 0.495 | 1.689 | 3.125 | 2.48 | 2.375 | 4.5 | |
| **SCHEDULE XXS WELD BUTT / CODE 62 FLANGE HEAD** | | | | | | | | | | | |
| **WB7HQ2** For Schedule XXS pipe | **12WB7HQ2** | **12WB7HQ2N** | **3/4** | 0.75 | 0.345 | 0.434 | 1.625 | 1.42 | 1.050 | 6.0 | |
| | **16WB7HQ2** | **16WB7HQ2N** | **1** | 1.00 | 0.375 | 0.599 | 1.875 | 1.61 | 1.315 | 6.0 | |
| | **20WB7HQ2** | **20WB7HQ2N** | **1 1/4** | 1.25 | 0.405 | 0.896 | 2.125 | 1.73 | 1.660 | 6.0 | |
| | **24WB7HQ2** | **24WB7HQ2N** | **1 1/2** | 1.50 | 0.495 | 1.100 | 2.500 | 2.17 | 1.900 | 6.0 | |
| | **32WB7HQ2** | **32WB7HQ2N** | **2** | 2.00 | 0.495 | 1.503 | 3.125 | 2.48 | 2.375 | 6.0 | |

Dimensions and pressures for reference only, subject to change.



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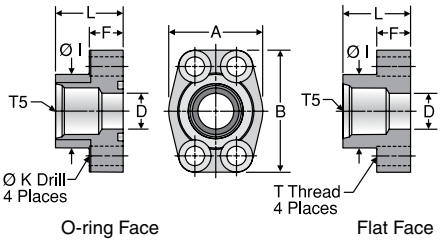
# G5Q

SAE Port Block Adapter
SAE Port / Code 61 or 62 Block Flange or Pad



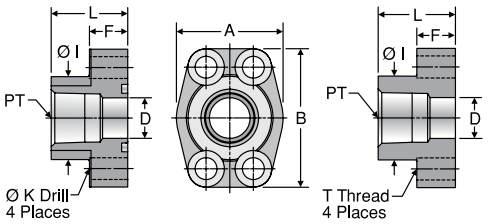

| TUBE FITTING PART # | | SAE PORT DASH SIZE | T5 STRAIGHT THREAD UN-2B | FLANGE SIZE (in.) | A (in.) | B (in.) | D (in.) | F (in.) | I (in.) | K DRILL DIA. (in.) | L (in.) | T THREAD UNC-2B | MOUNTING HARDWARE -SHCS | Dynamic Pressure (x 1,000 PSI) -SX | -SS[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | | | | | | | | | | | | | | |
| **SAE PORT / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | |
| **8G5Q1B** | **8G5Q1P** | 8 | 3/4-16 | 0.50 | 1.81 | 2.13 | 0.50 | 0.63 | 1.25 | 0.344 | 1.42 | 5/16-18 | 5/16-18 x 1.25 | 5.0 | |
| **12G5Q1B** | **12G5Q1P** | 12 | 1 1/16-12 | 0.75 | 1.97 | 2.56 | 0.75 | 0.71 | 1.54 | 0.406 | 1.42 | 3/8-16 | 3/8-16 x 1.50 | 4.0 | |
| **16G5Q1B** | **16G5Q1P** | 16 | 1 5/16-12 | 1.00 | 2.17 | 2.75 | 1.00 | 0.71 | 1.81 | 0.406 | 1.50 | 3/8-16 | 3/8-16 x 1.50 | 3.5 | |
| **20G5Q1B** | **20G5Q1P** | 20 | 1 5/8-12 | 1.25 | 2.68 | 3.12 | 1.25 | 0.83 | 2.22 | 0.469 | 1.61 | 7/16-14 | 7/16-14 x 1.75 | 3.0 | |
| **24G5Q1B** | **24G5Q1P** | 24 | 1 7/8-12 | 1.50 | 3.07 | 3.66 | 1.50 | 0.98 | 2.50 | 0.531 | 1.77 | 1/2-13 | 1/2-13 x 1.75 | 2.5 | |
| **SAE PORT / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | |
| **8G5Q2B** | **8G5Q2P** | 8 | 3/4-16 | 0.50 | 1.81 | 2.21 | 0.50 | 0.63 | 1.33 | 0.344 | 1.42 | 5/16-18 | 5/16-18 x 1.25 | 6.0 | |
| **12G5Q2B** | **12G5Q2P** | 12 | 1 1/16-12 | 0.75 | 2.17 | 2.80 | 0.75 | 0.83 | 1.65 | 0.406 | 1.38 | 3/8-16 | 3/8-16 x 1.50 | 5.5 | |
| **16G5Q2B** | **16G5Q2P** | 16 | 1 5/16-12 | 1.00 | 2.56 | 3.19 | 1.00 | 0.98 | 1.98 | 0.409 | 1.65 | 7/16-14 | 7/16-14 x 1.75 | 4.5 | |
| **20G5Q2B** | **20G5Q2P** | 20 | 1 5/8-12 | 1.25 | 3.07 | 3.75 | 1.25 | 1.06 | 2.36 | 0.531 | 1.77 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| **24G5Q2B** | **24G5Q2P** | 24 | 1 7/8-12 | 1.50 | 3.70 | 4.41 | 1.50 | 1.18 | 2.68 | 0.656 | 1.97 | 5/8-11 | 5/8-11 x 2.25 | 2.7 | |
| **32G5Q2B** | **32G5Q2P** | 32 | 2 1/2-12 | 2.00 | 4.50 | 5.28 | 2.00 | 1.46 | 3.38 | 0.781 | 2.56 | 3/4-10 | 3/4-10 x 2.75 | 2.0 | |

1) See page L38 for standard stainless steel sizes and dimensions.

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

# GQ

NPTF Port Block Adapter
NPTF Port / Code 61 or 62 Block Flange or Pad




| TUBE FITTING PART # | | PT PORT THREAD NPTF | FLANGE SIZE (in.) | A (in.) | B (in.) | D (in.) | F (in.) | I (in.) | K DRILL DIA. (in.) | L (in.) | T THREAD UNC-2B | MOUNTING HARDWARE SHCS | Dynamic Pressure (x 1,000 PSI) -SX | -SS[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | | | | | | | | | | | | | |
| **NPTF PORT / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | |
| **8GQ1B** | **8GQ1P** | 1/2 - 14 | 0.50 | 1.81 | 2.13 | 0.50 | 0.63 | 1.25 | 0.344 | 1.42 | 5/16-18 | 5/16-18 x 1.25 | 5.0 | |
| **12GQ1B** | **12GQ1P** | 3/4 -14 | 0.75 | 1.97 | 2.56 | 0.75 | 0.71 | 1.54 | 0.406 | 1.42 | 3/8-16 | 3/8-16 x 1.50 | 4.5 | |
| **16GQ1B** | **16GQ1P** | 1 - 11 1/2 | 1.00 | 2.17 | 2.75 | 1.00 | 0.71 | 1.81 | 0.406 | 1.50 | 3/8-16 | 3/8-16 x 1.50 | 4.0 | |
| **20GQ1B** | **20GQ1P** | 1 1/4 - 11 1/2 | 1.25 | 2.68 | 3.12 | 1.25 | 0.83 | 2.22 | 0.469 | 1.61 | 7/16-14 | 7/16-14 x 1.75 | 3.5 | |
| **24GQ1B** | **24GQ1P** | 1 1/2 - 11 1/2 | 1.50 | 3.07 | 3.66 | 1.50 | 0.98 | 2.50 | 0.531 | 1.77 | 1/2-13 | 1/2-13 x 1.75 | 2.7 | |
| **32GQ1B** | **32GQ1P** | 2 - 11 1/2 | 2.00 | 3.54 | 4.00 | 2.00 | 0.98 | 3.12 | 0.531 | 1.77 | 1/2-13 | 1/2-13 x 1.75 | 2.2 | |
| **40GQ1B** | **40GQ1P** | 2 1/2 - 8 | 2.50 | 4.09 | 4.49 | 2.50 | 0.98 | 3.62 | 0.531 | 1.97 | 1/2-13 | 1/2-13 x 1.75 | 2.0 | |
| **48GQ1B** | **48GQ1P** | 3 1/2 - 8 | 3.00 | 4.88 | 5.28 | 3.00 | 1.06 | 4.47 | 0.656 | 1.97 | 5/8-11 | 5/8-11 x 2.00 | 1.1 | |
| **NPTF PORT / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | |
| **8GQ2B** | **8GQ2P** | 1/2 - 14 | 0.50 | 1.81 | 2.21 | 0.50 | 0.63 | 1.33 | 0.344 | 1.42 | 5/16-18 | 5/16-18 x 1.25 | 6.0 | |
| **12GQ2B** | **12GQ2P** | 3/4 - 14 | 0.75 | 2.17 | 2.80 | 0.75 | 0.83 | 1.65 | 0.406 | 1.38 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| **16GQ2B** | **16GQ2P** | 1 - 11 1/2 | 1.00 | 2.56 | 3.19 | 1.00 | 0.98 | 1.98 | 0.469 | 1.65 | 7/16-14 | 7/16-14 x 1.75 | 4.0 | |
| **20GQ2B** | **20Q2P** | 1 1/4 - 11 1/2 | 1.25 | 3.07 | 3.75 | 1.25 | 1.06 | 2.36 | 0.531 | 1.77 | 1/2-13 | 1/2-13 x 1.75 | 3.5 | |
| **24GQ2B** | **24GQ2P** | 1 1/2 - 11 1/2 | 1.50 | 3.70 | 4.41 | 1.50 | 1.18 | 2.68 | 0.656 | 1.97 | 5/8-11 | 5/8-11 x 2.25 | 3.0 | |
| **32GQ2B** | **32GQ2P** | 2 - 11 1/2 | 2.00 | 4.50 | 5.28 | 2.00 | 1.46 | 3.38 | 0.781 | 2.56 | 3/4-10 | 3/4-10 x 2.75 | 2.5 | |

1) See page L38 for standard stainless steel sizes and dimensions.

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

Dimensions and pressures for reference only, subject to change.



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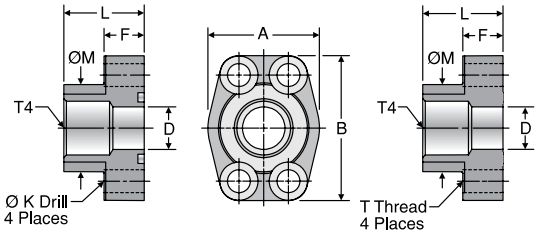
BSPP Port Block Adapter
BSPP Port / Code 61 or 62
Block Flange or Pad




O-ring Face

Flat Face

| TUBE FITTING PART # | | T4 THREAD | FLANGE SIZE | A | B | D | F | K DRILL DIA. | L | M | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | BSPP | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | SX | SS |
| **BSPP PORT / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | |
| **8G4Q1B** | **8G4Q1P** | 1/2-14 | 0.50 | 1.81 | 2.13 | 0.500 | 0.63 | 0.344 | 1.42 | 1.25 | 5/16-18 | 5/16-18 x 1.25 | 5.0 | |
| **12G4Q1B** | **12G4Q1P** | 3/4-14 | 0.75 | 1.97 | 2.56 | 0.750 | 0.71 | 0.406 | 1.42 | 1.54 | 3/8-16 | 3/8-16 x 1.50 | 4.0 | |
| **16G4Q1B** | **16G4Q1P** | 1-11 | 1.00 | 2.17 | 2.75 | 1.000 | 0.71 | 0.406 | 1.50 | 1.81 | 3/8-16 | 3/8-16 x 1.50 | 3.0 | |
| **20G4Q1B** | **20G4Q1P** | 1 1/4-11 | 1.25 | 2.68 | 3.12 | 1.250 | 0.83 | 0.469 | 1.61 | 2.22 | 7/16-14 | 7/16-14 x 1.75 | 2.5 | |
| **24G4Q1B** | **24G4Q1P** | 1 1/2-11 | 1.50 | 3.07 | 3.66 | 1.500 | 0.98 | 0.531 | 1.77 | 2.50 | 1/2-13 | 1/2-13 x 1.75 | 2.2 | |
| **32G4Q1B** | **32G4Q1P** | 2-11 | 2.00 | 3.54 | 4.00 | 2.000 | 0.98 | 0.531 | 1.77 | 3.12 | 1/2-13 | 1/2-13 x 1.75 | 1.7 | |
| **BSPP PORT / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | |
| **8G4Q2B** | **8G4Q2P** | 1/2-14 | 0.50 | 1.81 | 2.21 | 0.500 | 0.63 | 0.344 | 1.42 | 1.33 | 5/16-18 | 5/16-18 x 1.25 | 6.0 | |
| **12G4Q2B** | **12G4Q2P** | 3/4-14 | 0.75 | 2.17 | 2.80 | 0.750 | 0.83 | 0.406 | 1.38 | 1.65 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| **16G4Q2B** | **16G4Q2P** | 1-11 | 1.00 | 2.56 | 3.19 | 1.000 | 0.98 | 0.469 | 1.65 | 1.98 | 7/16-14 | 7/16-14 x 1.75 | 4.0 | |
| **20G4Q2B** | **20G4Q2P** | 1 1/4-11 | 1.25 | 3.07 | 3.75 | 1.250 | 1.06 | 0.531 | 1.77 | 2.36 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| **24G4Q2B** | **24G4Q2P** | 1 1/2-11 | 1.50 | 3.70 | 4.41 | 1.500 | 1.18 | 0.656 | 1.97 | 2.68 | 5/8-11 | 5/8-11 x 2.25 | 2.5 | |
| **32G4Q2B** | **32G4Q2P** | 2-11 | 2.00 | 4.50 | 5.28 | 2.000 | 1.46 | 0.781 | 2.56 | 3.35 | 3/4-10 | 3/4-10 x 2.75 | 2.0 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.



Dimensions and pressures for reference only, subject to change.



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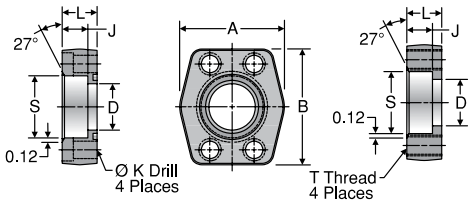
# W5Q

Flat Weld Socket Block Connector, Pipe
Flat Weld Socket, Pipe / Code 61 or 62
Block Flange or Pad




O-ring Face Flat Face

| TUBE FITTING PART # | | PIPE SIZE | FLANGE SIZE | A | B | D | J | K DRILL DIA. | L | S | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SX | -SS[1] |
| **FLAT WELD SOCKET, PIPE / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | |
| **8W5Q1B** | **8W5Q1P** | 1/2 | 0.50 | 1.813 | 2.125 | 0.500 | 0.560 | 0.344 | 0.750 | 0.855 | 5/16-18 | 5/16-18 x 1.50 | 5.0 | |
| **12W5Q1B** | **12W5Q1P** | 3/4 | 0.75 | 2.063 | 2.563 | 0.750 | 0.560 | 0.406 | 0.750 | 1.062 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| **16W5Q1B** | **16W5Q1P** | 1 | 1.00 | 2.313 | 2.750 | 1.000 | 0.630 | 0.406 | 0.880 | 1.326 | 3/8-16 | 3/8-16 x 1.75 | 5.0 | |
| **20W5Q1B** | **20W5Q1P** | 1 1/4 | 1.25 | 2.875 | 3.125 | 1.250 | 0.690 | 0.469 | 0.940 | 1.672 | 7/16-14 | 7/16-14 x 1.75 | 4.0 | |
| **24W5Q1B** | **24W5Q1P** | 1 1/2 | 1.50 | 3.250 | 3.688 | 1.500 | 0.750 | 0.531 | 1.190 | 1.922 | 1/2-13 | 1/2-13 x 2.25 | 3.0 | |
| **32W5Q1B** | **32W5Q1P** | 2 | 2.00 | 3.813 | 4.000 | 2.000 | 0.875 | 0.531 | 1.380 | 2.406 | 1/2-13 | 1/2-13 x 2.50 | 3.0 | |
| **40W5Q1B** | **40W5Q1P** | 2 1/2 | 2.50 | 4.281 | 4.500 | 2.500 | 1.000 | 0.531 | 1.750 | 2.906 | 1/2-13 | 1/2-13 x 2.75 | 2.5 | |
| **48W5Q1B** | **48W5Q1P** | 3 | 3.00 | 5.156 | 5.313 | 3.000 | 1.250 | 0.656 | 2.120 | 3.547 | 5/8-11 | 5/8-11 x 3.50 | 2.0 | |
| **56W5Q1B** | **56W5Q1P** | 3 1/2 | 3.50 | 5.500 | 6.000 | 3.500 | 1.190 | 0.656 | 1.440 | 4.047 | 5/8-11 | 5/8-11 x 2.75 | 0.5 | |
| **64W5Q1B** | **64W5Q1P** | 4 | 4.00 | 6.000 | 6.380 | 4.000 | 1.250 | 0.656 | 1.500 | 4.578 | 5/8-11 | 5/8-11 x 2.75 | 0.5 | |
| **80W5Q1B** | **80W5Q1P** | 5 | 5.00 | 7.120 | 7.250 | 4.500 | 1.380 | 0.656 | 1.750 | 5.641 | 5/8-11 | 5/8-11 x 3.00 | 0.5 | |
| **FLAT WELD SOCKET, PIPE / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | |
| **8W5Q2B** | **8W5Q2P** | 1/2 | 0.50 | 1.940 | 2.300 | 0.500 | 0.560 | 0.344 | 1.250 | 0.855 | 5/16-18 | 5/16-18 x 2.00 | 6.0 | |
| **12W5Q2B** | **12W5Q2P** | 3/4 | 0.75 | 2.500 | 2.950 | 0.750 | 0.560 | 0.406 | 1.250 | 1.062 | 3/8-16 | 3/8-16 x 2.00 | 6.0 | |
| **16W5Q2B** | **16W5Q2P** | 1 | 1.00 | 2.750 | 3.190 | 1.000 | 0.630 | 0.469 | 1.500 | 1.326 | 7/16-14 | 7/16-14 x 2.50 | 6.0 | |
| **20W5Q2B** | **20W5Q2P** | 1 1/4 | 1.25 | 3.060 | 3.750 | 1.250 | 0.690 | 0.531 | 1.500 | 1.672 | 1/2-13 | 1/2-13 x 2.50 | 6.0 | |
| **24W5Q2B** | **24W5Q2P** | 1 1/2 | 1.50 | 3.750 | 4.440 | 1.500 | 0.750 | 0.656 | 1.750 | 1.922 | 5/8-11 | 5/8-11 x 3.00 | 6.0 | |
| **32W5Q2B** | **32W5Q2P** | 2 | 2.00 | 4.500 | 5.250 | 2.000 | 0.875 | 0.781 | 1.750 | 2.406 | 3/4-10 | 3/4-10 x 3.00 | 6.0 | |
| **40W5Q2B[2]** | **40W5Q2P[2]** | 2 1/2 | 2.50 | 5.870 | 6.870 | 2.500 | 1.000 | 0.906 | 2.060 | 2.906 | 7/8-9 | 7/8-9 x 3.50 | 3.0 | |
| **48W5Q2B[2]** | **48W5Q2P[2]** | 3 | 3.00 | 7.000 | 8.500 | 3.000 | 1.250 | 1.156 | 2.620 | 3.547 | 1 1/8-7 | 1 1/8-7 x 4.50 | 3.0 | |

1) See page L39 for standard stainless steel sizes and dimensions.
2) Not covered in SAE J518. Bolt hole centerline dimensions are: 2.312” x 4.875” for 40W5Q2 and 2.812” x 6.000” for 48W5Q2.

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

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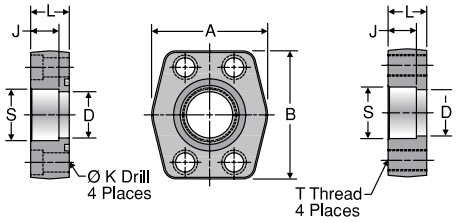
# W4Q

Flat Weld Socket Block Connector, Tube
Flat Weld Socket, Tube / Code 61 or 62
Block Flange or Pad




O-ring Face Flat Face

| TUBE FITTING PART # | | TUBE O.D. | FLANGE SIZE | A | B | D | J | K DRILL DIA. | L | S | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SX | -SS |
| **FLAT WELD SOCKET, TUBE / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | |
| **12W4Q1B** | **12W4Q1P** | 3/4 | 0.75 | 2.06 | 2.56 | 0.625 | 0.560 | 0.406 | 0.750 | 0.752 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| **16-12W4Q1B** | **16-12W4Q1P** | 1 | 0.75 | 2.06 | 2.56 | 0.750 | 0.560 | 0.406 | 0.750 | 1.002 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| **16W4Q1B** | **16W4Q1P** | 1 | 1.00 | 2.31 | 2.75 | 0.875 | 0.630 | 0.406 | 0.880 | 1.002 | 3/8-16 | 3/8-16 x 1.75 | 5.0 | |
| **20-16W4Q1B** | **20-16W4Q1P** | 1 1/4 | 1.00 | 2.31 | 2.75 | 1.000 | 0.630 | 0.406 | 0.880 | 1.252 | 3/8-16 | 3/8-16 x 1.75 | 5.0 | |
| **20W4Q1B** | **20W4Q1P** | 1 1/4 | 1.25 | 2.88 | 3.12 | 1.125 | 0.690 | 0.469 | 0.940 | 1.252 | 7/16-14 | 7/16-14 x 1.75 | 4.0 | |
| **24-20W4Q1B** | **24-20W4Q1P** | 1 1/2 | 1.25 | 2.88 | 3.12 | 1.250 | 0.690 | 0.469 | 0.940 | 1.502 | 7/16-14 | 7/16-14 x 1.75 | 4.0 | |
| **24W4Q1B** | **24W4Q1P** | 1 1/2 | 1.50 | 3.25 | 3.69 | 1.375 | 0.750 | 0.531 | 1.190 | 1.502 | 1/2-13 | 1/2-13 x 2.25 | 3.0 | |
| **28-24W4Q1B** | **28-24W4Q1P** | 1 3/4 | 1.50 | 3.25 | 3.69 | 1.500 | 0.750 | 0.531 | 1.190 | 1.752 | 1/2-13 | 1/2-13 x 2.25 | 3.0 | |
| **32W4Q1B** | **32W4Q1P** | 2 | 2.00 | 3.81 | 4.00 | 1.875 | 0.875 | 0.531 | 1.375 | 2.002 | 1/2-13 | 1/2-13 x 2.50 | 3.0 | |
| **36-32W4Q1B** | **36-32W4Q1P** | 2 1/4 | 2.00 | 3.81 | 4.00 | 2.000 | 0.875 | 0.531 | 1.375 | 2.252 | 1/2-13 | 1/2-13 x 2.50 | 3.0 | |
| **FLAT WELD SOCKET, TUBE / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | |
| **12W4Q2B** | **12W4Q2P** | 3/4 | 0.75 | 2.38 | 2.81 | 0.625 | 0.560 | 0.406 | 1.250 | 0.752 | 3/8-16 | 3/8-16 x 2.00 | 6.0 | |
| **16-12W4Q2B** | **16-12W4Q2P** | 1 | 0.75 | 2.38 | 2.81 | 0.750 | 0.560 | 0.406 | 1.250 | 1.002 | 3/8-16 | 3/8-16 x 2.00 | 6.0 | |
| **16W4Q2B** | **16W4Q2P** | 1 | 1.00 | 2.75 | 3.19 | 0.875 | 0.630 | 0.469 | 1.500 | 1.002 | 7/16-14 | 7/16-14 x 2.25 | 6.0 | |
| **20-16W4Q2B** | **20-16W4Q2P** | 1 1/4 | 1.00 | 2.75 | 3.19 | 1.000 | 0.630 | 0.469 | 1.500 | 1.252 | 7/16-14 | 7/16-14 x 2.25 | 6.0 | |
| **20W4Q2B** | **20W4Q2P** | 1 1/4 | 1.25 | 3.06 | 3.75 | 1.125 | 0.690 | 0.531 | 1.500 | 1.252 | 1/2-13 | 1/2-13 x 2.50 | 6.0 | |
| **24-20W4Q2B** | **24-20W4Q2P** | 1 1/5 | 1.25 | 3.06 | 3.75 | 1.250 | 0.690 | 0.531 | 1.500 | 1.502 | 1/2-13 | 1/2-13 x 2.50 | 6.0 | |
| **24W4Q2B** | **24W4Q2P** | 1 1/2 | 1.50 | 3.75 | 4.44 | 1.375 | 0.750 | 0.656 | 1.750 | 1.502 | 5/8-11 | 5/8-11 x 2.75 | 6.0 | |
| **28-24W4Q2B** | **28-24W4Q2P** | 1 3/4 | 1.50 | 3.75 | 4.44 | 1.500 | 0.750 | 0.656 | 1.750 | 1.752 | 5/8-11 | 5/8-11 x 2.75 | 6.0 | |
| **32W4Q2B1**[1] | **32W4Q2P1**[1] | 2 | 2.00 | 4.50 | 5.25 | 1.875 | 0.875 | 0.781 | 1.750 | 2.002 | 3/4-10 | 3/4-10 x 3.00 | 6.0 | |
| **36-32W4Q2B1**[1] | **36-32W4Q2P1**[1] | 2 1/4 | 2.00 | 4.50 | 5.25 | 2.000 | 0.875 | 0.781 | 1.750 | 2.252 | 3/4-10 | 3/4-10 x 3.00 | 6.0 | |

1) Not covered in SAE J518.

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

L

Dimensions and pressures for reference only, subject to change.



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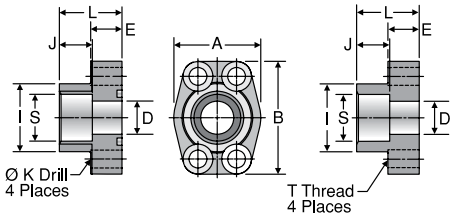
# W7Q

Extended Weld Socket Block Connector, Pipe
Deep Weld Socket, Pipe / Code 61 or 62
Block Flange or Pad




O-ring Face Flat Face

| TUBE FITTING PART # | | PIPE SIZE | FLANGE SIZE | A | B | D | E | I | J | K DRILL DIA. | L | S | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SX | -SS |
| **EXTENDED WELD SOCKET, PIPE / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | | |
| **12W7Q1B** | **12W7Q1P** | 3/4 | 0.75 | 1.97 | 2.56 | 0.75 | 0.710 | 1.54 | 0.750 | 0.406 | 1.420 | 1.062 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| **16W7Q1B** | **16W7Q1P** | 1 | 1.00 | 2.17 | 2.75 | 1.00 | 0.710 | 1.81 | 0.750 | 0.406 | 1.500 | 1.328 | 3/8-16 | 3/8-16 x 1.50 | 4.5 | |
| **20W7Q1B** | **20W7Q1P** | 1 1/4 | 1.25 | 2.68 | 3.12 | 1.25 | 0.830 | 2.22 | 0.870 | 0.469 | 1.610 | 1.672 | 7/16-14 | 7/16-14 x 1.75 | 2.7 | |
| **24W7Q1B** | **24W7Q1P** | 1 1/2 | 1.50 | 3.07 | 3.66 | 1.50 | 0.980 | 2.50 | 0.940 | 0.531 | 1.770 | 1.922 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| **32W7Q1B** | **32W7Q1P** | 2 | 2.00 | 3.54 | 4.00 | 2.00 | 0.980 | 3.12 | 1.020 | 0.531 | 1.770 | 2.406 | 1/2-13 | 1/2-13 x 1.75 | 2.5 | |
| **40W7Q1B** | **40W7Q1P** | 2 1/2 | 2.50 | 4.09 | 4.49 | 2.50 | 0.980 | 3.62 | 1.180 | 0.531 | 1.970 | 2.906 | 1/2-13 | 1/2-13 x 1.75 | 2.2 | |
| **EXTENDED WELD SOCKET, PIPE / C ODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | | |
| **12W7Q2B** | **12W7Q2P** | 3/4 | 0.75 | 2.17 | 2.80 | 0.75 | 0.830 | 1.65 | 0.870 | 0.406 | 1.380 | 1.062 | 3/8-16 | 3/8-16 x 1.50 | 6.0 | |
| **16W7Q2B** | **16W7Q2P** | 1 | 1.00 | 2.56 | 3.19 | 1.00 | 0.980 | 1.98 | 0.870 | 0.469 | 1.650 | 1.328 | 7/16-14 | 7/16-14 x 1.75 | 6.0 | |
| **20W7Q2B** | **20W7Q2P** | 1 1/4 | 1.25 | 3.07 | 3.75 | 1.25 | 1.060 | 2.36 | 0.980 | 0.531 | 1.770 | 1.672 | 1/2-13 | 1/2-13 x 1.75 | 5.5 | |
| **24W7Q2B** | **24W7Q2P** | 1 1/2 | 1.50 | 3.7 | 4.41 | 1.50 | 1.180 | 2.68 | 1.100 | 0.656 | 1.970 | 1.922 | 5/8-11 | 5/8-11 x 2.25 | 5.5 | |
| **32W7Q2B** | **32W7Q2P** | 2 | 2.00 | 4.5 | 5.28 | 2.00 | 1.460 | 3.35 | 0.940 | 0.781 | 2.560 | 2.406 | 3/4-10 | 3/4-10 x 2.75 | 5.0 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

Dimensions and pressures for reference only, subject to change.



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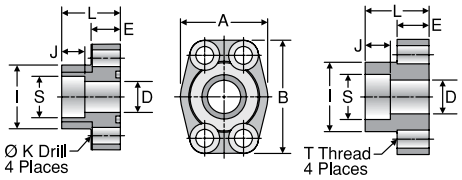
# W6Q

Extended Weld Socket Block Connector, Tube
Deep Weld Socket, Tube / Code 61 or 62
Block Flange or Pad




O-ring Face Flat Face

| TUBE FITTING PART # | | TUBE O.D. | FLANGE SIZE | A | B | D | E | I | J | K DRILL DIA. | L | S | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SX | -SS |
| **EXTENDED WELD SOCKET, TUBE / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | | |
| **12W6Q1B** | **12W6Q1P** | 3/4 | 0.75 | 1.97 | 2.56 | 0.625 | 0.71 | 1.54 | 0.560 | 0.406 | 1.420 | 0.752 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| **16-12W6Q1B** | **16-12W6Q1P** | 1 | 0.75 | 1.97 | 2.56 | 0.750 | 0.71 | 1.54 | 0.560 | 0.406 | 1.420 | 1.002 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| **16W6Q1B** | **16W6Q1P** | 1 | 1.00 | 2.17 | 2.75 | 0.875 | 0.71 | 1.81 | 0.630 | 0.406 | 1.500 | 1.002 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| **20-16W6Q1B** | **20-16W6Q1P** | 1 1/4 | 1.00 | 2.17 | 2.75 | 1.000 | 0.71 | 1.81 | 0.630 | 0.406 | 1.500 | 1.252 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| **20W6Q1B** | **20W6Q1P** | 1 1/4 | 1.25 | 2.68 | 3.12 | 1.125 | 0.83 | 2.22 | 0.690 | 0.469 | 1.610 | 1.252 | 7/16-14 | 7/16-14 x 1.75 | 4.0 | |
| **24-20W6Q1B** | **24-20W6Q1P** | 1 1/2 | 1.25 | 2.68 | 3.12 | 1.250 | 0.83 | 2.22 | 0.690 | 0.469 | 1.610 | 1.502 | 7/16-14 | 7/16-14 x 1.75 | 4.0 | |
| **24W6Q1B** | **24W6Q1P** | 1 1/2 | 1.50 | 3.07 | 3.66 | 1.375 | 0.98 | 2.50 | 0.750 | 0.531 | 1.770 | 1.502 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| **28-24W6Q1B** | **28-24W6Q1P** | 1 3/4 | 1.50 | 3.07 | 3.66 | 1.500 | 0.98 | 2.50 | 0.750 | 0.531 | 1.770 | 1.752 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| **32W6Q1B** | **32W6Q1P** | 2 | 2.00 | 3.54 | 4.00 | 1.875 | 0.98 | 3.12 | 0.870 | 0.531 | 1.770 | 2.002 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| **36-32W6Q1B** | **36-32W6Q1P** | 2 1/4 | 2.00 | 3.54 | 4.00 | 2.000 | 0.98 | 3.12 | 0.870 | 0.531 | 1.770 | 2.252 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| **40W6Q1B** | **40W6Q1P** | 2 1/2 | 2.50 | 4.09 | 4.49 | 2.375 | 0.98 | 3.62 | 1.000 | 0.531 | 1.970 | 2.502 | 1/2-13 | 1/2-13 x 1.75 | 2.5 | |
| **44-40W6Q1B** | **44-40W6Q1P** | 2 3/4 | 2.50 | 4.09 | 4.49 | 2.500 | 0.98 | 3.62 | 1.000 | 0.531 | 1.970 | 2.752 | 1/2-13 | 1/2-13 x 1.75 | 2.2 | |
| **EXTENDED WELD SOCKET, TUBE / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | | |
| **12W6Q2B** | **12W6Q2P** | 3/4 | 0.75 | 2.17 | 2.80 | 0.625 | 0.83 | 1.65 | 0.560 | 0.406 | 1.380 | 0.752 | 3/8-16 | 3/8-16 x 1.50 | 6.0 | |
| **16-12W6Q2B** | **16-12W6Q2P** | 1 | 0.75 | 2.17 | 2.80 | 0.750 | 0.83 | 1.65 | 0.560 | 0.406 | 1.380 | 1.002 | 3/8-16 | 3/8-16 x 1.50 | 6.0 | |
| **16W6Q2B** | **16W6Q2P** | 1 | 1.00 | 2.56 | 3.19 | 0.875 | 0.98 | 1.98 | 0.630 | 0.469 | 1.650 | 1.002 | 7/16-14 | 7/16-14 x 1.75 | 6.0 | |
| **20-16W6Q2B** | **20-16W6Q2P** | 1 1/4 | 1.00 | 2.56 | 3.19 | 1.000 | 0.98 | 1.98 | 0.630 | 0.469 | 1.650 | 1.252 | 7/16-14 | 7/16-14 x 1.75 | 6.0 | |
| **20W6Q2B** | **20W6Q2P** | 1 1/4 | 1.25 | 3.07 | 3.75 | 1.125 | 1.06 | 2.36 | 0.690 | 0.531 | 1.770 | 1.252 | 1/2-13 | 1/2-13 x 1.75 | 6.0 | |
| **24-20W6Q2B** | **24-20W6Q2P** | 1 1/2 | 1.25 | 3.07 | 3.75 | 1.250 | 1.06 | 2.36 | 0.690 | 0.531 | 1.770 | 1.502 | 1/2-13 | 1/2-13 x 1.75 | 6.0 | |
| **24W6Q2B** | **24W6Q2P** | 1 1/2 | 1.50 | 3.70 | 4.41 | 1.375 | 1.18 | 2.68 | 0.750 | 0.656 | 1.970 | 1.502 | 5/8-11 | 5/8-11 x 2.25 | 6.0 | |
| **28-24W6Q2B** | **28-24W6Q2P** | 1 3/4 | 1.50 | 3.70 | 4.41 | 1.500 | 1.18 | 2.68 | 0.750 | 0.656 | 1.970 | 1.752 | 5/8-11 | 5/8-11 x 2.25 | 6.0 | |
| **32W6Q2B** | **32W6Q2P** | 2 | 2.00 | 4.50 | 5.28 | 1.875 | 1.46 | 3.35 | 0.870 | 0.781 | 2.560 | 2.002 | 3/4-10 | 3/4-10 x 2.75 | 6.0 | |
| **36-32W6Q2B** | **36-32W6Q2P** | 2 1/4 | 2.00 | 4.50 | 5.28 | 2.000 | 1.46 | 3.35 | 0.870 | 0.781 | 2.560 | 2.252 | 3/4-10 | 3/4-10 x 2.75 | 5.5 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.



Dimensions and pressures for reference only, subject to change.



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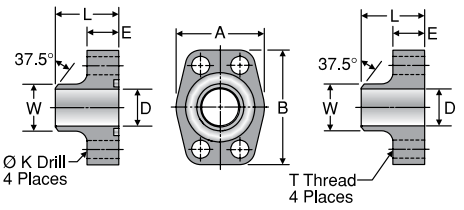
# WB1Q1 / WB3Q1 / WB5Q1

Code 61 Weld Butt Block Connector, Pipe
Schedule 40, 80 or 160 Weld Butt /
Code 61 Block Flange or Pad




O-ring Face Flat Face

| WELD BUTT BLOCK CONNECTION TYPE | TUBE FITTING PART # | | PIPE SIZE | FLANGE SIZE | A | B | D PIPE I.D. | E | K DRILL DIA. | L | T THREAD | W PIPE O.D. | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | (in.) | SHCS | -SX | -SS |
| **SCHEDULE 40 WELD BUTT / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | |
| **WB1Q1** For Schedule 40 pipe | **12WB1Q1B** | **12WB1Q1P** | 3/4 | 0.75 | 1.97 | 2.56 | 0.826 | 0.710 | 0.406 | 1.420 | 3/8-16 | 1.050 | 3/8-16 x 1.50 | 3.5 | |
| | **16WB1Q1B** | **16WB1Q1P** | 1 | 1.00 | 2.17 | 2.75 | 1.051 | 0.710 | 0.406 | 1.500 | 3/8-16 | 1.315 | 3/8-16 x 1.50 | 3.0 | |
| | **20WB1Q1B** | **20WB1Q1P** | 1 1/4 | 1.25 | 2.68 | 3.12 | 1.382 | 0.830 | 0.469 | 1.610 | 7/16-14 | 1.660 | 7/16-14 x 1.75 | 2.7 | |
| | **24WB1Q1B** | **24WB1Q1P** | 1 1/2 | 1.50 | 3.07 | 3.66 | 1.612 | 0.980 | 0.531 | 1.730 | 1/2-13 | 1.900 | 1/2-13 x 1.75 | 2.2 | |
| | **32WB1Q1B** | **32WB1Q1P** | 2 | 2.00 | 3.54 | 4.00 | 2.069 | 0.980 | 0.531 | 1.770 | 1/2-13 | 2.375 | 1/2-13 x 1.75 | 2.0 | |
| | **40WB1Q1B** | **40WB1Q1P** | 2 1/2 | 2.50 | 4.09 | 4.49 | 2.471 | 0.980 | 0.531 | 1.970 | 1/2-13 | 2.875 | 1/2-13 x 1.75 | 2.0 | |
| | **48WB1Q1B** | **48WB1Q1P** | 3 | 3.00 | 4.88 | 5.28 | 3.070 | 1.060 | 0.656 | 1.970 | 5/8-11 | 3.500 | 5/8-11 x 2.00 | 1.7 | |
| **SCHEDULE 80 WELD BUTT / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | |
| **WB3Q1** For Schedule 80 pipe | **12WB3Q1B** | **12WB3Q1P** | 3/4 | 0.75 | 1.97 | 2.56 | 0.744 | 0.710 | 0.406 | 1.420 | 3/8-16 | 1.050 | 3/8-16 x 1.50 | 5.0 | |
| | **16WB3Q1B** | **16WB3Q1P** | 1 | 1.00 | 2.17 | 2.75 | 0.959 | 0.710 | 0.406 | 1.500 | 3/8-16 | 1.315 | 3/8-16 x 1.50 | 4.5 | |
| | **20WB3Q1B** | **20WB3Q1P** | 1 1/4 | 1.25 | 2.68 | 3.12 | 1.280 | 0.830 | 0.469 | 1.610 | 7/16-14 | 1.660 | 7/16-14 x 1.75 | 4.0 | |
| | **24WB3Q1B** | **24WB3Q1P** | 1 1/2 | 1.50 | 3.07 | 3.66 | 1.502 | 0.980 | 0.531 | 1.730 | 1/2-13 | 1.900 | 1/2-13 x 1.75 | 3.0 | |
| | **32WB3Q1B** | **32WB3Q1P** | 2 | 2.00 | 3.54 | 4.00 | 1.941 | 0.980 | 0.531 | 1.770 | 1/2-13 | 2.375 | 1/2-13 x 1.75 | 3.0 | |
| | **40WB3Q1B** | **40WB3Q1P** | 2 1/2 | 2.50 | 4.09 | 4.49 | 2.325 | 0.980 | 0.531 | 1.970 | 1/2-13 | 2.875 | 1/2-13 x 1.75 | 2.5 | |
| | **48WB3Q1B** | **48WB3Q1P** | 3 | 3.00 | 4.88 | 5.28 | 2.902 | 1.060 | 0.656 | 1.970 | 5/8-11 | 3.500 | 5/8-11 x 2.00 | 2.0 | |
| **SCHEDULE 160 WELD BUTT / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | |
| **WB5Q1** For Schedule 160 pipe | **12WB5Q1B** | **12WB5Q1P** | 3/4 | 0.75 | 1.97 | 2.56 | 0.614 | 0.710 | 0.406 | 1.420 | 3/8-16 | 1.050 | 3/8-16 x 1.50 | 5.0 | |
| | **16WB5Q1B** | **16WB5Q1P** | 1 | 1.00 | 2.17 | 2.75 | 0.817 | 0.710 | 0.406 | 1.500 | 3/8-16 | 1.315 | 3/8-16 x 1.50 | 5.0 | |
| | **20WB5Q1B** | **20WB5Q1P** | 1 1/4 | 1.25 | 2.68 | 3.12 | 1.162 | 0.830 | 0.469 | 1.610 | 7/16-14 | 1.660 | 7/16-14 x 1.75 | 4.0 | |
| | **24WB5Q1B** | **24WB5Q1P** | 1 1/2 | 1.50 | 3.07 | 3.66 | 1.340 | 0.980 | 0.531 | 1.730 | 1/2-13 | 1.900 | 1/2-13 x 1.75 | 3.0 | |
| | **32WB5Q1B** | **32WB5Q1P** | 2 | 2.00 | 3.54 | 4.00 | 1.689 | 0.980 | 0.531 | 1.770 | 1/2-13 | 2.375 | 1/2-13 x 1.75 | 3.0 | |
| | **40WB5Q1B** | **40WB5Q1P** | 2 1/2 | 2.50 | 4.09 | 4.49 | 2.127 | 0.980 | 0.531 | 1.970 | 1/2-13 | 2.875 | 1/2-13 x 1.75 | 2.5 | |
| | **48WB5Q1B** | **48WB5Q1P** | 3 | 3.00 | 4.88 | 5.28 | 2.626 | 1.060 | 0.656 | 1.970 | 5/8-11 | 3.500 | 5/8-11 x 2.00 | 2.0 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

Dimensions and pressures for reference only, subject to change.



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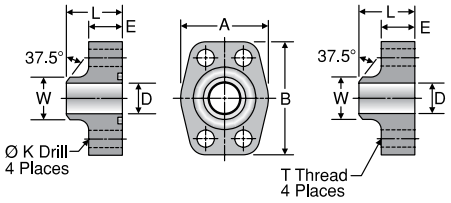
# WB3Q2 / WB5Q2 / WB7Q2

Code 62 Weld Butt Block Connector, Pipe Schedule 80, 160 or XXS Weld Butt / Code 62 Block Flange or Pad




O-ring Face Flat Face

| WELD BUTT BLOCK CONNECTION TYPE | TUBE FITTING PART # O-RING FACE | TUBE FITTING PART # FLAT FACE | PIPE SIZE (in.) | FLANGE SIZE (in.) | A (in.) | B (in.) | D PIPE I.D. (in.) | E (in.) | K DRILL DIA. (in.) | L (in.) | T THREAD UNC-2B | W PIPE O.D. (in.) | MOUNTING HARDWARE SHCS | Dynamic Pressure (x 1,000 PSI) -SX | -SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SCHEDULE 80 WELD BUTT / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | |
| **WB3Q2** For Schedule 80 pipe | **12WB3Q2B** | **12WB3Q2P** | 3/4 | 0.75 | 2.17 | 2.80 | 0.744 | 0.83 | 0.406 | 1.38 | 3/8-16 | 1.050 | 3/8-16 x 1.50 | 5.0 | |
| | **16WB3Q2B** | **16WB3Q2P** | 1 | 1.00 | 2.56 | 3.19 | 0.959 | 0.83 | 0.469 | 1.61 | 7/16-14 | 1.315 | 7/16-14 x 1.75 | 4.5 | |
| | **20WB3Q2B** | **20WB3Q2P** | 1 1/4 | 1.25 | 3.07 | 3.75 | 1.280 | 0.98 | 0.531 | 1.73 | 1/2-13 | 1.660 | 1/2-13 x 1.75 | 3.5 | |
| | **24WB3Q2B** | **24WB3Q2P** | 1 1/2 | 1.50 | 3.70 | 4.41 | 1.502 | 1.18 | 0.656 | 2.17 | 5/8-11 | 1.900 | 5/8-11 x 2.25 | 3.0 | |
| | **32WB3Q2B** | **32WB3Q2P** | 2 | 2.00 | 4.50 | 5.28 | 1.941 | 1.46 | 0.781 | 2.56 | 3/4-10 | 2.375 | 3/4-10 x 2.75 | 3.0 | |
| **SCHEDULE 160 WELD BUTT / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | |
| **WB5Q2** For Schedule 160 pipe | **12WB5Q2B** | **12WB5Q2P** | 3/4 | 0.75 | 2.17 | 2.80 | 0.614 | 0.83 | 0.406 | 1.38 | 3/8-16 | 1.050 | 3/8-16 x 1.50 | 6.0 | |
| | **16WB5Q2B** | **16WB5Q2P** | 1 | 1.00 | 2.56 | 3.19 | 0.817 | 0.83 | 0.469 | 1.61 | 7/16-14 | 1.315 | 7/16-14 x 1.75 | 6.0 | |
| | **20WB5Q2B** | **20WB5Q2P** | 1 1/4 | 1.25 | 3.07 | 3.75 | 1.162 | 0.98 | 0.531 | 1.73 | 1/2-13 | 1.660 | 1/2-13 x 1.75 | 5.0 | |
| | **24WB5Q2B** | **24WB5Q2P** | 1 1/2 | 1.50 | 3.70 | 4.41 | 1.340 | 1.18 | 0.656 | 2.17 | 5/8-11 | 1.900 | 5/8-11 x 2.25 | 5.0 | |
| | **32WB5Q2B** | **32WB5Q2P** | 2 | 2.00 | 4.50 | 5.28 | 1.689 | 1.46 | 0.781 | 2.56 | 3/4-10 | 2.375 | 3/4-10 x 2.75 | 6.0 | |
| **SCHEDULE XXS WELD BUTT / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | |
| **WB7Q2** For Schedule XXS pipe | **12WB7Q2B** | **12WB7Q2P** | 3/4 | 0.75 | 2.17 | 2.80 | 0.436 | 0.83 | 0.406 | 1.38 | 3/8-16 | 1.050 | 3/8-16 x 1.50 | 6.0 | |
| | **16WB7Q2B** | **16WB7Q2P** | 1 | 1.00 | 2.56 | 3.19 | 0.601 | 0.83 | 0.469 | 1.61 | 7/16-14 | 1.315 | 7/16-14 x 1.75 | 6.0 | |
| | **20WB7Q2B** | **20WB7Q2P** | 1 1/4 | 1.25 | 3.07 | 3.75 | 0.898 | 0.98 | 0.531 | 1.73 | 1/2-13 | 1.660 | 1/2-13 x 1.75 | 6.0 | |
| | **24WB7Q2B** | **24WB7Q2P** | 1 1/2 | 1.50 | 3.70 | 4.41 | 1.102 | 1.18 | 0.656 | 2.17 | 5/8-11 | 1.900 | 5/8-11 x 2.25 | 6.0 | |
| | **32WB7Q2B** | **32WB7Q2P** | 2 | 2.00 | 4.50 | 5.28 | 1.505 | 1.46 | 0.781 | 2.56 | 3/4-10 | 2.375 | 3/4-10 x 2.75 | 6.0 | |

1) SAE J518 does not cover these sizes in Code 62.

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

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Dimensions and pressures for reference only, subject to change.



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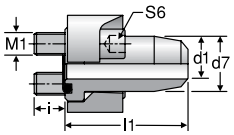
# AS3 / AS6

SAE-Flange / Weld Butt

For metric tube welded connection




| TUBE FITTING PART # | SIZE (in.) | TUBE O.D. x WALL THICKNESS (mm) | WORKING PRESSURE (bar) | d1 (mm) | d7 (mm) | l (mm) | l 1 (mm) | S6 (mm) | WELD NIPPLE BODY | FROM STOCK CF | FROM STOCK 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SAE FLANGE CONNECTION – CODE 61 – STANDARD SERIES** | | | | | | | | | | | |
| **AS32/15X2** | 1/2 | 15 x 2 | 200 | 11 | 23.9 | 11.5 | 38 | 6 | AS32/15X2X | | |
| **AS32/16X3** | 1/2 | 16 x 3 | 220 | 10 | 23.9 | 11.5 | 38 | 6 | AS32/16X3X | | |
| **AS33/18X1.5** | 3/4 | 18 x 1.5 | 130 | 15 | 31.8 | 15.5 | 50 | 8 | AS33/18X1.5X | | |
| **AS33/22X2** | 3/4 | 22 x 2 | 140 | 18 | 31.8 | 15.5 | 50 | 8 | AS33/22X2X | | |
| **AS33/20X3** | 3/4 | 20 x 3 | 220 | 14 | 31.8 | 15.5 | 50 | 8 | AS33/20X3X | | |
| **AS33/25X4** | 3/4 | 25 x 4 | 220 | 17 | 31.8 | 15.5 | 50 | 8 | AS33/25X4X | | |
| **AS34/28X2** | 1 | 28 x 2 | 115 | 24 | 38 | 13.5 | 50 | 8 | AS34/28X2X | | |
| **AS34/30X4.5** | 1 | 30 x 4.5 | 220 | 21 | 38 | 13.5 | 50 | 8 | AS34/30X4.5X | | |
| **AS35/35X2** | 1 1/4 | 35 x 2 | 90 | 31 | 43 | 18.5 | 55 | 8 | AS35/35X2X | | |
| **AS35/25X3** | 1 1/4 | 25 x 3 | 175 | 19 | 43 | 18.5 | 55 | 8 | AS35/25X3X | | |
| **AS35/30X4** | 1 1/4 | 30 x 4 | 175 | 22 | 43 | 18.5 | 55 | 8 | AS35/30X4X | | |
| **AS35/38X5** | 1 1/4 | 38 x 5 | 175 | 28 | 43 | 18.5 | 55 | 8 | AS35/38X5X | | |
| **AS36/42X3** | 1 1/2 | 42 x 3 | 115 | 36 | 50 | 18.5 | 57 | 10 | AS36/42X3X | | |
| **AS36/38X4** | 1 1/2 | 38 x 4 | 130 | 30 | 50 | 18.5 | 57 | 10 | AS36/38X4X | | |
| **AS38/50X6** | 2 | 50 x 6 | 130 | 38 | 62 | 24 | 62 | 12 | AS38/50X6X | | |
| **AS38/65X8** | 2 | 65 x 8 | 130 | 49 | 65 | 24 | 62 | 12 | AS38/65X8X | | |
| **SAE FLANGE CONNECTION – CODE 62 – HIGH PRESSURE SERIES** | | | | | | | | | | | |
| **AS62/16X3** | 1/2 | 16 x 3 | 260 | 10 | 23.9 | 13.5 | 41 | 6 | AS62/16X3X | | |
| **AS63/25X5** | 3/4 | 25 x 5 | 260 | 15 | 31.8 | 15.5 | 55 | 8 | AS63/25X5X | | |
| **AS64/25X5** | 1 | 25 x 5 | 260 | 15 | 38 | 20.5 | 67 | 10 | AS64/25X5X | | |
| **AS64/30X4** | 1 | 30 x 4 | 200 | 22 | 38 | 20.5 | 67 | 10 | AS64/30X4X | | |
| **AS65/30X4*** | 1 1/4 | 30 x 4 | 200 | 22 | 43.7 | 17.5 | 78 | 10 | AS65/30X4X | | |
| **AS65/38X5** | 1 1/4 | 38 x 5 | 200 | 28 | 43.7 | 17.5 | 78 | 10 | AS65/38X5X | | |
| **AS65/38X8*** | 1 1/4 | 38 x 8 | 260 | 22 | 43.7 | 17.5 | 78 | 10 | AS65/38X8X | | |
| **AS66/38X5** | 1 1/2 | 38 x 5 | 200 | 28 | 50.8 | 24.5 | 85 | 14 | AS66/38X5X | | |
| **AS66/38X8** | 1 1/2 | 38 x 8 | 260 | 22 | 50.8 | 24.5 | 85 | 14 | AS66/38X8X | | |
| **AS68/50X9** | 2 | 50 x 9 | 260 | 32 | 66.6 | 32.5 | 116 | 17 | AS68/50X9X | | |
| **AS68/65X9** | 2 | 65 x 8 | 190 | 49 | 66.6 | 32.5 | 116 | 17 | AS68/65X8X | | |

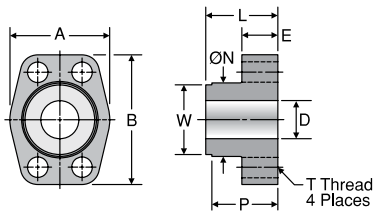
* Identical types.

Temperature range without pressure reductions for fittings with O-ring sealing of NBR (e.g., buna N series) -35°C up to +100°C, FPM (e.g., fluorocarbon on request) -25°C up to +120°C.

Tightening torques for socket head cap screws see Tables S6 and S7.

# WBT

Code 61 Weld Butt Tank Adapter
Weld Butt with Pilot / Code 61 Block Flange Pad




| TUBE FITTING PART # | FLANGE SIZE (in.) | A (in.) | B (in.) | D (in.) | E (in.) | L (in.) | P (in.) | T THREAD UNC-2B | W (in.) | Dynamic Pressure (x 1,000 PSI) -S | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **12WBTQ1P** | 0.75 | 1.97 | 2.56 | 0.75 | 0.71 | 1.42 | 1.30 | 3/8-16 | 1.375 | 0.5 | |
| **16WBTQ1P** | 1.00 | 2.17 | 2.75 | 1.00 | 0.71 | 1.50 | 1.37 | 3/8-16 | 1.500 | 0.5 | |
| **20WBTQ1P** | 1.25 | 2.68 | 3.12 | 1.25 | 0.83 | 1.61 | 1.49 | 7/16-14 | 1.750 | 0.5 | |
| **24WBTQ1P** | 1.50 | 3.07 | 3.66 | 1.50 | 0.98 | 1.77 | 1.64 | 1/2-13 | 2.125 | 0.5 | |
| **32WBTQ1P** | 2.00 | 3.54 | 4.00 | 2.00 | 0.98 | 1.77 | 1.65 | 1/2-13 | 2.500 | 0.5 | |
| **40WBTQ1P** | 2.50 | 4.09 | 4.50 | 2.50 | 0.98 | 1.97 | 1.85 | 1/2-13 | 3.250 | 0.5 | |

Dimensions and pressures for reference only, subject to change.



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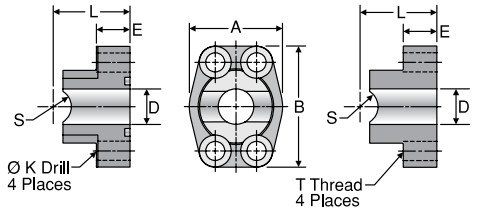
# WSD

Code 61 Weld Saddle Block Connector
Pipe or Tube Weld Saddle /
Code 61 Block Flange or Pad



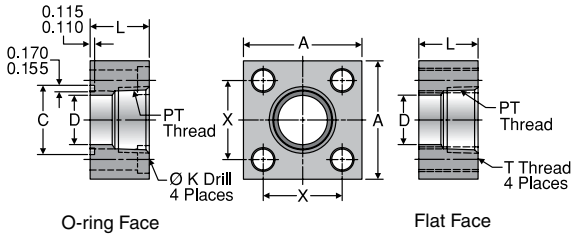

| TUBE FITTING PART # | | PIPE OR TUBE SIZE | FLANGE SIZE | A | B | D | E | K DRILL DIA. | L | S | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SX | -SS |
| PIPE WELD SADDLE / CODE 61 BLOCK FLANGE OR PAD | | | | | | | | | | | | | | |
| 12WSD1Q1B | 12WSD1Q1P | 3/4 | 0.75 | 1.97 | 2.56 | 0.75 | 0.710 | 0.406 | 1.42 | 0.532 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| 16WSD1Q1B | 16WSD1Q1P | 1 | 1.00 | 2.17 | 2.75 | 1.00 | 0.710 | 0.406 | 1.50 | 0.665 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| 20WSD1Q1B | 20WSD1Q1P | 1 1/4 | 1.25 | 2.68 | 3.12 | 1.25 | 0.830 | 0.469 | 1.61 | 0.837 | 7/16-14 | 7/16-14 x 1.75 | 4.0 | |
| 24WSD1Q1B | 24WSD1Q1P | 1 1/2 | 1.50 | 3.07 | 3.66 | 1.50 | 0.980 | 0.531 | 1.77 | 0.957 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| 32WSD1Q1B | 32WSD1Q1P | 2 | 2.00 | 3.54 | 4.00 | 2.00 | 0.980 | 0.531 | 1.77 | 1.200 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| TUBE WELD SADDLE / CODE 61 BLOCK FLANGE OR PAD | | | | | | | | | | | | | | |
| 12WSD2Q1B | 12WSD2Q1P | 3/4 | 0.75 | 1.97 | 2.56 | 0.75 | 0.710 | 0.406 | 1.42 | 0.382 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| 16-12WSD2Q1B | 16-12WSD2Q1P | 1 | 0.75 | 1.97 | 2.56 | 0.75 | 0.710 | 0.406 | 1.42 | 0.507 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| 16WSD2Q1B | 16WSD2Q1P | 1 | 1.00 | 2.17 | 2.75 | 1.00 | 0.710 | 0.406 | 1.50 | 0.507 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| 20-16WSD2Q1B | 20-16WSD2Q1P | 1 1/4 | 1.00 | 2.17 | 2.75 | 1.00 | 0.710 | 0.406 | 1.50 | 0.632 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| 20WSD2Q1B | 20WSD2Q1P | 1 1/4 | 1.25 | 2.68 | 3.12 | 1.25 | 0.830 | 0.469 | 1.61 | 0.632 | 7/16-14 | 7/16-14 x 1.75 | 4.0 | |
| 24-20WSD2Q1B | 24-20WSD2Q1P | 1 1/2 | 1.25 | 2.68 | 3.12 | 1.25 | 0.830 | 0.469 | 1.61 | 0.757 | 7/16-14 | 7/16-14 x 1.75 | 4.0 | |
| 24WSD2Q1B | 24WSD2Q1P | 1 1/2 | 1.50 | 3.07 | 3.66 | 1.50 | 0.980 | 0.531 | 1.77 | 0.757 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| 28-24WSD2Q1B | 28-24WSD2Q1P | 1 3/4 | 1.50 | 3.07 | 3.66 | 1.50 | 0.980 | 0.531 | 1.77 | 0.882 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| 32WSD2Q1B | 32WSD2Q1P | 2 | 2.00 | 3.54 | 4.00 | 2.00 | 0.980 | 0.531 | 1.77 | 1.007 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |
| 36-32WSD2Q1B | 36-32WSD2Q1P | 2 1/4 | 2.00 | 3.54 | 4.00 | 2.00 | 0.980 | 0.531 | 1.77 | 1.132 | 1/2-13 | 1/2-13 x 1.75 | 3.0 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

L

# GQS

NPTF Port Square Block Flange Adapter
NPTF Port / Square Block Flange or Pad




| TUBE FITTING PART # | | PT THREAD | FLANGE SIZE | A | B | C MIN. | D | K DRILL DIA. | L | T THREAD | X | | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | NPTF | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | (in.) | O-RING | SHCS | SX | SS |
| 12GQSB | 12GQSP | 3/4-14 | 0.75 | 2.25 | 1.12 | 1.250 | 0.75 | 0.406 | 1.25 | 3/8-16 | 1.438 | 2-214 | 3/8-16 x 2.00 | 5.0 | |
| 16GQSB | 16GQSP | 1-11 1/2 | 1.00 | 3.00 | 1.50 | 1.560 | 1.00 | 0.531 | 1.50 | 1/2-13 | 2.000 | 2-219 | 1/2-13 x 2.25 | 5.0 | |
| 20GQSB | 20GQSP | 1 1/4-11 1/2 | 1.25 | 3.00 | 1.50 | 1.750 | 1.25 | 0.531 | 1.50 | 1/2-13 | 2.000 | 2-222 | 1/2-13 x 2.25 | 4.0 | |
| 24GQSB | 24GQSP | 1 1/2-11 1/2 | 1.50 | 4.00 | 2.00 | 2.115 | 1.50 | 0.656 | 1.75 | 5/8-11 | 2.750 | 2-225 | 5/8-11 x 2.75 | 3.0 | |
| 32GQSB | 32GQSP | 2-11 1/2 | 2.00 | 4.00 | 2.00 | 2.490 | 2.00 | 0.656 | 1.75 | 5/8-11 | 2.750 | 2-228 | 5/8-11 x 2.75 | 2.7 | |
| 40GQSB | 40GQSP | 2 1/2-8 | 2.50 | 5.50 | 2.75 | 2.995 | 2.50 | 0.906 | 2.25 | 7/8-9 | 3.750 | 2-232 | 7/8-9 x 3.50 | 2.5 | |
| 48GQSB | 48GQSP | 3-8 | 3.00 | 5.50 | 2.75 | 3.615 | 3.00 | 0.906 | 2.25 | 7/8-9 | 3.750 | 2-237 | 7/8-9 x 3.50 | 1.2 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

Dimensions and pressures for reference only, subject to change.



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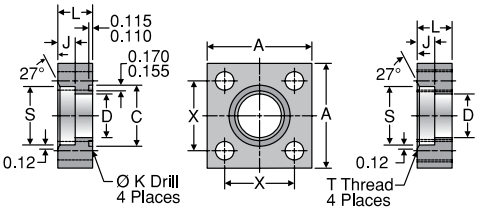
# W5SQS

Weld Socket Square Block Connector, Pipe
Pipe Weld Socket / Square Block Flange or Pad



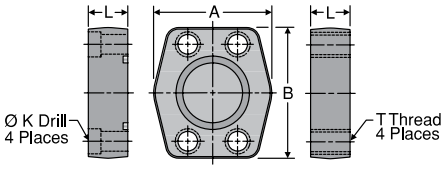

O-ring Face Flat Face

| TUBE FITTING PART # | | PIPE SIZE | FLANGE SIZE | A | B | C MIN. | D | J | K DRILL DIA. | L | S | T THREAD | X | | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | (in.) | O-RING | SHCS | -SX | -SS |
| 12W5SQSB | 12W5SQSP | 3/4 | 0.75 | 2.25 | 1.12 | 1.250 | 0.75 | 0.50 | 0.406 | 1.00 | 1.062 | 3/8-16 | 1.438 | 2-214 | 3/8-16 x 1.75 | 5.0 | |
| 16W5SQSB | 16W5SQSP | 1 | 1.00 | 3.00 | 1.50 | 1.560 | 1.00 | 0.50 | 0.531 | 1.00 | 1.328 | 1/2-13 | 2.000 | 2-219 | 1/2-13 x 1.75 | 5.0 | |
| 20W5SQSB | 20W5SQSP | 1 1/4 | 1.25 | 3.00 | 1.50 | 1.750 | 1.25 | 0.50 | 0.531 | 1.00 | 1.672 | 1/2-13 | 2.000 | 2-222 | 1/2-13 x 1.75 | 4.0 | |
| 24W5SQSB | 24W5SQSP | 1 1/2 | 1.50 | 4.00 | 2.00 | 2.115 | 1.50 | 0.62 | 0.656 | 1.25 | 1.922 | 5/8-11 | 2.750 | 2-225 | 5/8-11 x 2.25 | 3.0 | |
| 32W5SQSB | 32W5SQSP | 2 | 2.00 | 4.00 | 2.00 | 2.490 | 2.00 | 0.62 | 0.656 | 1.25 | 2.406 | 5/8-11 | 2.750 | 2-228 | 5/8-11 x 2.25 | 3.0 | |
| 40W5SQSB | 40W5SQSP | 2 1/2 | 2.50 | 5.50 | 2.75 | 2.995 | 2.50 | 0.75 | 0.906 | 1.50 | 2.906 | 7/8-9 | 3.750 | 2-232 | 7/8-9 x 2.75 | 2.5 | |
| 48W5SQSB | 48W5SQSP | 3 | 3.00 | 5.50 | 2.75 | 3.615 | 3.00 | 0.75 | 0.906 | 1.50 | 3.547 | 7/8-9 | 3.750 | 2-237 | 7/8-9 x 2.75 | 2.0 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

# PQ

Block Plug
Code 61/62 Block Flange or Pad Plug




O-ring Face Flat Face

| TUBE FITTING PART # | | FLANGE SIZE | A | B | K DRILL DIA. | L | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SX | -SS[1] |
| CODE 61 BLOCK FLANGE OR PAD PLUG | | | | | | | | | | |
| 8PQ1B | 8PQ1P | 0.50 | 1.813 | 2.125 | 0.344 | 0.750 | 5/16-18 | 5/16-18 x 1.50 | 5.0 | |
| 12PQ1B | 12PQ1P | 0.75 | 2.063 | 2.563 | 0.406 | 0.750 | 3/8-16 | 3/8-16 x 1.50 | 5.0 | |
| 16PQ1B | 16PQ1P | 1.00 | 2.313 | 2.750 | 0.406 | 0.880 | 3/8-16 | 3/8-16 x 1.75 | 5.0 | |
| 20PQ1B | 20PQ1P | 1.25 | 2.875 | 3.125 | 0.469 | 0.940 | 7/15-14 | 7/16-14 x 1.75 | 4.0 | |
| 24PQ1B | 24PQ1P | 1.50 | 3.250 | 3.688 | 0.531 | 1.190 | 1/2-13 | 1/2-13 x 2.25 | 3.0 | |
| 32PQ1B | 32PQ1P | 2.00 | 3.813 | 4.000 | 0.531 | 1.440 | 1/2-13 | 1/2-13 x 2.50 | 3.0 | |
| 40PQ1B | 40PQ1P | 2.50 | 4.281 | 4.500 | 0.531 | 1.815 | 1/2-13 | 1/2-13 x 2.75 | 2.5 | |
| 48PQ1B | 48PQ1P | 3.00 | 5.156 | 5.313 | 0.656 | 2.190 | 5/8-11 | 5/8-11 x 3.50 | 2.0 | |
| 56PQIB | 56PQ1P | 3.50 | 5.500 | 6.000 | 0.656 | 1.440 | 5/8-11 | 5/8-11 x 2.75 | 0.5 | |
| 64PQIB | 64PQIP | 4.00 | 6.000 | 6.380 | 0.656 | 1.440 | 5/8-11 | 5/8-11 x 2.75 | 0.5 | |
| CODE 62 BLOCK FLANGE OR PAD PLUG | | | | | | | | | | |
| 8PQ2B | 8PQ2P | 0.50 | 1.940 | 2.300 | 0.344 | 1.250 | 5/16-18 | 5/16-18 x 2.00 | 6.0 | |
| 12PQ2B | 12PQ2P | 0.75 | 2.500 | 2.950 | 0.406 | 1.250 | 3/8-16 | 3/8-16 x 2.00 | 6.0 | |
| 16PQ2B | 16PQ2P | 1.00 | 2.750 | 3.190 | 0.469 | 1.500 | 7/16-14 | 7/16-14 x 2.50 | 6.0 | |
| 20PQ2B | 20PQ2P | 1.25 | 3.060 | 3.750 | 0.531 | 1.430 | 1/2-13 | 1/2-13 x 2.50 | 6.0 | |
| 24PQ2B | 24PQ2P | 1.50 | 3.750 | 4.440 | 0.656 | 1.815 | 5/8-11 | 5/8-11 x 3.00 | 6.0 | |
| 32PQ2B | 32PQ2P | 2.00 | 4.500 | 5.250 | 0.781 | 1.815 | 3/4-10 | 3/4-10 x 3.00 | 6.0 | |
| 40PQ2B[2] | 40PQ2P[2] | 2.50 | 5.870 | 6.870 | 0.940 | 1.930 | 7/8-9 | 7/8-9 x 3.50 | 6.0 | |
| 48PQ2B[2] | 48PQ2P[2] | 3.00 | 7.000 | 8.500 | 1.190 | 2.690 | 1 1/8-7 | 1 1/8-7 x 4.50 | 6.0 | |

1) See page L40 for standard stainless steel sizes and dimensions.

2) SAE J518 does not cover these sizes in Code 62. Bolt hole centerline dimensions are: 2.312” x 4.875” for 4OPQ2 and 2.812” x 6.000” for 48PQ2.

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

Dimensions and pressures for reference only, subject to change.



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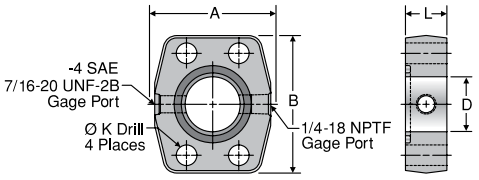
# SPGG5

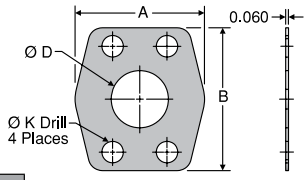
Flange Spacer with Gage Ports
Code 61/62 Spacer with Side Gage Ports




| TUBE FITTING PART # | FLANGE SIZE (in.) | A (in.) | B (in.) | D (in.) | K DRILL DIA. (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -SX | -SS |
|---|---|---|---|---|---|---|---|---|
| **CODE 61 O-RING SPACER** | | | | | | | | |
| **8SPGG5Q1B** | 0.50 | 1.813 | 2.125 | 0.500 | 0.344 | 1.25 | 5.0 | |
| **12SPGG5Q1B** | 0.75 | 2.063 | 2.563 | 0.750 | 0.406 | 1.25 | 5.0 | |
| **16SPGG5Q1B** | 1.00 | 2.313 | 2.750 | 1.000 | 0.406 | 0.88 | 5.0 | |
| **20SPGG5Q1B** | 1.25 | 2.875 | 3.125 | 1.250 | 0.469 | 0.94 | 4.0 | |
| **24SPGG5Q1B** | 1.50 | 3.250 | 3.688 | 1.500 | 0.531 | 1.19 | 3.0 | |
| **32SPGG5Q1B** | 2.00 | 3.813 | 4.000 | 2.000 | 0.531 | 1.38 | 3.0 | |
| **40SPGG5Q1B** | 2.50 | 4.281 | 4.500 | 2.500 | 0.531 | 1.75 | 2.5 | |
| **48SPGG5Q1B** | 3.00 | 5.156 | 5.313 | 3.000 | 0.656 | 2.12 | 2.0 | |
| **CODE 62 O-RING SPACER** | | | | | | | | |
| **8SPGG5Q2B** | 0.50 | 1.940 | 2.300 | 0.500 | 0.344 | 1.25 | 6.0 | |
| **12SPGG5Q2B** | 0.75 | 2.500 | 2.950 | 0.750 | 0.406 | 1.25 | 6.0 | |
| **16SPGG5Q2B** | 1.00 | 2.750 | 3.190 | 1.000 | 0.469 | 1.50 | 6.0 | |
| **20SPGG5Q2B** | 1.25 | 3.060 | 3.750 | 1.250 | 0.531 | 1.50 | 6.0 | |
| **24SPGG5Q2B** | 1.50 | 3.750 | 4.440 | 1.500 | 0.656 | 1.75 | 6.0 | |
| **32SPGG5Q2B** | 2.00 | 4.500 | 5.250 | 2.000 | 0.781 | 1.75 | 6.0 | |

# CP

Flange Connector Plate
Code 61/62 Flange Connector Plate




| TUBE FITTING PART # | FLANGE SIZE (in.) | A (in.) | B (in.) | D (in.) | K DRILL DIA. (in.) | Dynamic Pressure (x 1,000 PSI) -SX | -SS |
|---|---|---|---|---|---|---|---|
| **CODE 61 FLANGE CONNECTOR PLATE** | | | | | | | |
| **8CP1** | 0.50 | 1.81 | 2.12 | 0.50 | 0.344 | 5.0 | |
| **12CP1** | 0.75 | 2.06 | 2.56 | 0.75 | 0.406 | 5.0 | |
| **16CP1** | 1.00 | 2.31 | 2.75 | 1.00 | 0.406 | 5.0 | |
| **20CP1** | 1.25 | 2.88 | 3.12 | 1.25 | 0.469 | 4.0 | |
| **24CP1** | 1.50 | 3.25 | 3.69 | 1.50 | 0.531 | 3.0 | |
| **32CP1** | 2.00 | 3.81 | 4.00 | 2.00 | 0.531 | 3.0 | |
| **40CP1** | 2.50 | 4.12 | 4.44 | 2.50 | 0.531 | 2.5 | |
| **48CP1** | 3.00 | 5.16 | 5.31 | 3.00 | 0.656 | 2.5 | |
| **CODE 62 FLANGE CONNECTOR PLATE** | | | | | | | |
| **12CP2** | 0.75 | 2.38 | 2.81 | 0.75 | 0.406 | 6.0 | |
| **16CP2** | 1.00 | 2.75 | 3.19 | 1.00 | 0.469 | 6.0 | |
| **20CP2** | 1.25 | 3.06 | 3.75 | 1.25 | 0.531 | 6.0 | |
| **24CP2** | 1.50 | 3.75 | 4.44 | 1.50 | 0.656 | 6.0 | |
| **32CP2** | 2.00 | 4.50 | 5.25 | 2.00 | 0.781 | 6.0 | |

Dimensions and pressures for reference only, subject to change.



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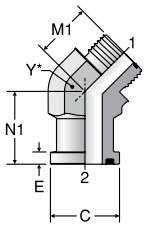
# LOVQ1

Code 61 Flange 45° Elbow
Code 61 / ORFS

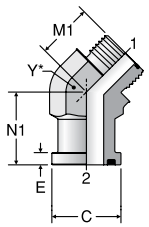



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C (in.) | E (in.) | M1 (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|---|
| **12 LOVQ1** | 3/4 | 3/4 | 1.500 | 0.265 | 1.20 | 1.58 | 1 7/16 | 5.0 |
| **16 LOVQ1** | 1 | 1 | 1.750 | 0.315 | 1.26 | 1.85 | 1 5/8 | 5.0 |
| **20 LOVQ1** | 1 1/4 | 1 1/4 | 2.000 | 0.315 | 1.29 | 2.40 | 1 7/8 | 4.0 |
| **24 LOVQ1** | 1 1/2 | 1 1/2 | 2.375 | 0.315 | 1.45 | 2.90 | 2 1/2 | 3.0 |

# LOVQ2

Code 62 Flange 45° Elbow
Code 62 / ORFS

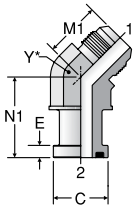



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C (in.) | E (in.) | M1 (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|---|
| **12 LOVQ2** | 3/4 | 3/4 | 1.625 | 0.345 | 1.20 | 1.83 | 1 7/16 | 6.0 |
| **16 LOVQ2** | 1 | 1 | 1.875 | 0.375 | 1.25 | 2.07 | 1 5/8 | 6.0 |
| **20 LOVQ2** | 1 1/4 | 1 1/4 | 2.125 | 0.405 | 1.29 | 2.40 | 1 7/8 | 5.0 |
| **24 LOVQ2** | 1 1/2 | 1 1/2 | 2.500 | 0.495 | 1.45 | 2.90 | 2 1/2 | 4.5 |

# XVQ1

Code 61 Flange 45° Elbow
Code 61 / 37° Flare

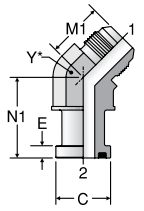



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C (in.) | E (in.) | M1 (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|---|
| **12 XVQ1** | 3/4 | 3/4 | 1.500 | 0.265 | 1.27 | 1.58 | 1 7/16 | 5.0 |
| **16 XVQ1** | 1 | 1 | 1.750 | 0.315 | 1.47 | 1.85 | 1 5/8 | 5.0 |
| **20 XVQ1** | 1 1/4 | 1 1/4 | 2.000 | 0.315 | 1.59 | 2.40 | 1 7/8 | 4.0 |
| **24 XVQ1** | 1 1/2 | 1 1/2 | 2.375 | 0.315 | 1.78 | 2.90 | 2 1/2 | 3.0 |
| **32 XVQ1** | 2 | 2 | 2.812 | 0.375 | 2.22 | 3.00 | 2 1/2 | 2.0 |

# XVQ2

Code 62 Flange 45° Elbow
Code 62 / 37° Flare

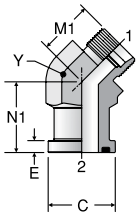



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C (in.) | E (in.) | M1 (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|---|
| **12 XVQ2** | 3/4 | 3/4 | 1.625 | 0.345 | 1.27 | 1.83 | 1 7/16 | 5.0 |
| **16 XVQ2** | 1 | 1 | 1.875 | 0.375 | 1.47 | 2.07 | 1 5/8 | 5.0 |
| **20 XVQ2** | 1 1/4 | 1 1/4 | 2.125 | 0.405 | 1.59 | 2.40 | 1 7/8 | 4.0 |
| **24 XVQ2** | 1 1/2 | 1 1/2 | 2.500 | 0.495 | 1.78 | 2.90 | 2 1/2 | 3.0 |

# BUVQ1

Code 61 45° Elbow
Code 61 / Flareless




* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C (in.) | E (in.) | M1 (in.) | N1 (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|---|
| **12 BUVQ1** | 3/4 | 3/4 | 1.500 | 0.265 | 1.27 | 1.58 | 1 7/16 | |
| **16 BUVQ1** | 1 | 1 | 1.750 | 0.315 | 1.36 | 1.85 | 1 5/8 | |
| **20 BUVQ1** | 1 1/4 | 1 1/4 | 2.000 | 0.315 | 1.45 | 2.40 | 1 7/8 | |
| **24 BUVQ1** | 1 1/2 | 1 1/2 | 2.375 | 0.315 | 1.52 | 2.90 | 2 1/2 | |
| **32 BUVQ1** | 2 | 2 | 2.812 | 0.375 | 1.83 | 3.00 | 2 1/2 | |

Dimensions and pressures for reference only, subject to change.



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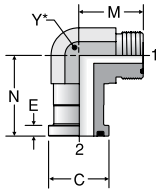
# LOEQ1

Code 61 Flange 90° Elbow
Code 61 / ORFS

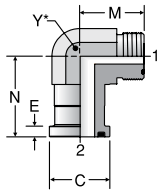



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C (in.) | E (in.) | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|---|
| **12 LOEQ1** | 3/4 | 3/4 | 1.500 | 0.265 | 1.95 | 1.81 | 1 3/16 | 5.0 |
| **16 LOEQ1** | 1 | 1 | 1.750 | 0.315 | 2.05 | 2.13 | 1 7/16 | 5.0 |
| **20 LOEQ1** | 1 1/4 | 1 1/4 | 2.000 | 0.315 | 2.22 | 2.26 | 1 5/8 | 4.0 |
| **24 LOEQ1** | 1 1/2 | 1 1/2 | 2.375 | 0.315 | 2.54 | 2.64 | 2 | 3.0 |

# LOEQ2

Code 62 Flange 90° Elbow
Code 62 / ORFS

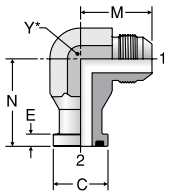



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C (in.) | E (in.) | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S |
|---|---|---|---|---|---|---|---|---|
| **12 LOEQ2** | 3/4 | 3/4 | 1.625 | 0.345 | 2.01 | 2.01 | 1 3/16 | 6.0 |
| **16 LOEQ2** | 1 | 1 | 1.875 | 0.375 | 2.17 | 2.42 | 1 7/16 | 6.0 |
| **20 LOEQ2** | 1 1/4 | 1 1/4 | 2.125 | 0.405 | 2.50 | 2.68 | 1 5/8 | 5.0 |
| **24 LOEQ2** | 1 1/2 | 1 1/2 | 2.500 | 0.495 | 2.87 | 3.13 | 2 | 4.5 |

# XEQ1

Code 61 Flange 90° Elbow
Code 61 / 37° Flare

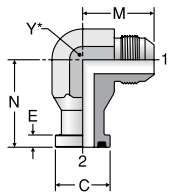



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C (in.) | E (in.) | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|
| **12 XEQ1** | 3/4 | 3/4 | 1.500 | 0.265 | 1.91 | 1.81 | 1 3/16 | 5.0 | | |
| **16 XEQ1** | 1 | 1 | 1.750 | 0.315 | 2.07 | 2.13 | 1 7/16 | 5.0 | | |
| **20 XEQ1** | 1 1/4 | 1 1/4 | 2.000 | 0.315 | 2.26 | 2.26 | 1 5/8 | 4.0 | | |
| **24 XEQ1** | 1 1/2 | 1 1/2 | 2.375 | 0.315 | 2.72 | 2.64 | 2 | 3.0 | | |
| **32 XEQ1** | 2 | 2 | 2.812 | 0.375 | 3.06 | 4.25 | 2 1/2 | 2.0 | | |

# XEQ2

Code 62 Flange 90° Elbow
Code 62 / 37° Flare

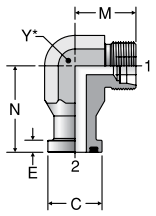



* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C (in.) | E (in.) | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|
| **12 XEQ2** | 3/4 | 3/4 | 1.625 | 0.345 | 1.97 | 2.04 | 1 3/16 | 5.0 | | |
| **16 XEQ2** | 1 | 1 | 1.875 | 0.375 | 2.19 | 2.42 | 1 7/16 | 5.0 | | |
| **20 XEQ2** | 1 1/4 | 1 1/4 | 2.125 | 0.405 | 2.56 | 2.68 | 1 5/8 | 4.0 | | |
| **24 XEQ2** | 1 1/2 | 1 1/2 | 2.500 | 0.495 | 3.03 | 3.13 | 2 | 3.0 | | |

# BUEQ1

Code 61 90° Elbow
Code 61 / Flareless




* Y – Across Wrench Flats

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 (in.) | C (in.) | E (in.) | M (in.) | N (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|---|---|
| **12 BUEQ1** | 3/4 | 3/4 | 1.500 | 0.265 | 1.73 | 1.81 | 1 3/16 | | | |
| **16 BUEQ1** | 1 | 1 | 1.750 | 0.315 | 1.99 | 2.13 | 1 7/16 | | | |
| **20 BUEQ1** | 1 1/4 | 1 1/4 | 2.000 | 0.315 | 1.99 | 2.26 | 1 5/8 | | | |
| **24 BUEQ1** | 1 1/2 | 1 1/2 | 2.375 | 0.315 | 2.33 | 2.64 | 2 | | | |
| **32 BUEQ1** | 2 | 2 | 2.812 | 0.375 | 2.45 | 4.25 | 2 1/2 | | | |

Dimensions and pressures for reference only, subject to change.



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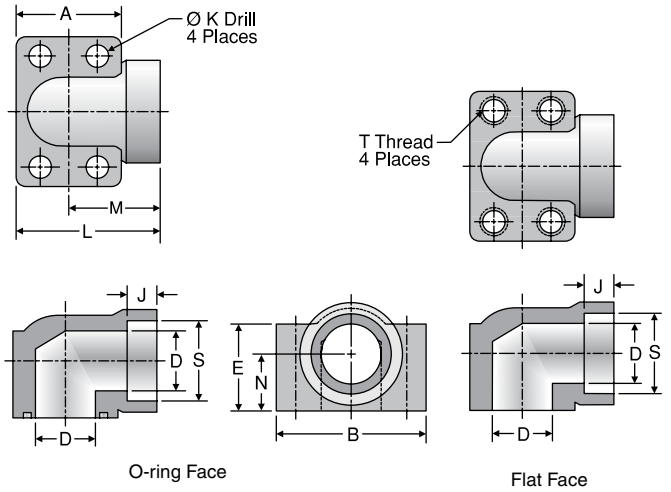
# W7EQ

Weld Socket Block Elbow Connector, Pipe
Weld Socket, Pipe / Code 61 or 62
Block Flange or Pad




O-ring Face

Flat Face

| TUBE FITTING PART # | | PIPE SIZE | FLANGE SIZE | A | B | D | E | J | K DRILL DIA. | L | M | N | S | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SX | -SS |
| **WELD SOCKET, PIPE / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | | | |
| **12W7EQ1B** | **12W7EQ1P** | 3/4 | 0.75 | 1.69 | 2.56 | 0.75 | 1.25 | 0.56 | 0.406 | 2.28 | 1.44 | 0.875 | 1.062 | 3/8-16 | 3/8-16 x 2.00 | 5.0 | |
| **16W7EQ1B** | **16W7EQ1P** | 1 | 1.00 | 1.94 | 2.75 | 1.00 | 1.50 | 0.56 | 0.406 | 2.62 | 1.66 | 1.062 | 1.328 | 3/8-16 | 3/8-16 x 2.25 | 4.5 | |
| **20W7EQ1B** | **20W7EQ1P** | 1 1/4 | 1.25 | 2.19 | 3.12 | 1.25 | 1.81 | 0.62 | 0.469 | 3.00 | 1.91 | 1.188 | 1.672 | 7/16-14 | 7/16-14 x 2.75 | 3.5 | |
| **24W7EQ1B** | **24W7EQ1P** | 1 1/2 | 1.50 | 2.56 | 3.69 | 1.50 | 2.00 | 0.69 | 0.531 | 3.33 | 2.05 | 1.312 | 1.922 | 1/2-13 | 1/2-13 x 3.00 | 3.0 | |
| **32W7EQ1B** | **32W7EQ1P** | 2 | 2.00 | 3.06 | 4.33 | 2.00 | 2.50 | 0.75 | 0.531 | 3.81 | 2.28 | 1.656 | 2.406 | 1/2-13 | 1/2-13 x 3.50 | 3.0 | |
| **WELD SOCKET, PIPE / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | | | |
| **12W7EQ2B** | **12W7EQ2P** | 3/4 | 0.75 | 1.94 | 2.75 | 0.75 | 1.50 | 0.56 | 0.406 | 2.62 | 1.66 | 1.062 | 1.062 | 3/8-16 | 3/8-16 x 2.25 | 6.0 | |
| **16W7EQ2B** | **16W7EQ2P** | 1 | 1.00 | 2.19 | 3.12 | 1.00 | 1.81 | 0.62 | 0.469 | 3.00 | 1.91 | 1.188 | 1.328 | 7/16-14 | 7/16-14 x 2.50 | 6.0 | |
| **20W7EQ2B** | **20W7EQ2P** | 1 1/4 | 1.25 | 2.56 | 3.69 | 1.25 | 2.00 | 0.69 | 0.531 | 3.32 | 2.05 | 1.312 | 1.672 | 1/2-13 | 1/2-13 x 3.00 | 5.0 | |
| **24W7EQ2B** | **24W7EQ2P** | 1 1/2 | 1.50 | 3.06 | 4.33 | 1.50 | 2.50 | 0.75 | 0.656 | 3.81 | 2.28 | 1.656 | 1.922 | 5/8-11 | 5/8-11 x 3.50 | 5.0 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

Dimensions and pressures for reference only, subject to change.



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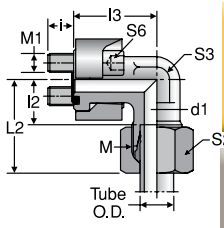
# WFS

SAE Flange Connection
Code 61 & 62 / Metric Flareless

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| TUBE FITTING PART # | SIZE (in.) | END SIZE (mm) | WORKING PRESSURE (bar) | M THREAD | d1 (mm) | l (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L1 ≈ (mm) | L2 ≈ (mm) | S1 (mm) | S2 (mm) | S3 (mm) | S6 (mm) | FROM STOCK CF | FROM STOCK 71 | FROM STOCK CF | FROM STOCK 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SAE FLANGE CONNECTIONS – CODE 61 – STANDARD SERIES** | | | | | | | | | | | | | | | | | | | |
| **WFS32/15LCF** | 1/2 | 15L | 200 | M22 x 1.5 | 12 | 11.5 | 41 | 29 | 36 | 56 | 44 | 24 | 27 | 24 | 6 | • | | • | |
| **WFS32/16SCF** | 1/2 | 16S | 220 | M24 x 1.5 | 12 | 11.5 | 41.5 | 29.5 | 36 | 60 | 48 | 24 | 30 | 24 | 6 | • | | • | |
| **WFS33/18LCF** | 3/4 | 18L | 200 | M26 x 1.5 | 15 | 15.5 | 45.5 | 31.5 | 42 | 62 | 48 | 30 | 32 | 30 | 8 | • | | • | |
| **WFS33/22LCF** | 3/4 | 22L | 100 | M30 x 2 | 19 | 15.5 | 45.5 | 33.5 | 42 | 62 | 50 | 30 | 36 | 30 | 8 | • | | • | |
| **WFS33/20SCF** | 3/4 | 20S | 220 | M30 x 2 | 16 | 15.5 | 46.5 | 32.5 | 42 | 68 | 54 | 30 | 36 | 30 | 8 | • | | • | |
| **WFS33/25SCF** | 3/4 | 25S | 220 | M36 x 2 | 17 | 15.5 | 45 | 33 | 42 | 69 | 57 | 30 | 46 | 30 | 8 | • | | • | |
| **WFS34/28LCF** | 1 | 28L | 100 | M36 x 2 | 24 | 13.5 | 46.5 | 36.5 | 45 | 63 | 53 | 36 | 41 | 36 | 8 | • | | • | |
| **WFS34/30SCF** | 1 | 30S | 220 | M42 x 2 | 24 | 13.5 | 49.5 | 36.5 | 45 | 76 | 63 | 36 | 50 | 36 | 8 | • | | • | |
| **WFS35/35LCF** | 1 1/4 | 35L | 100 | M45 x 2 | 30 | 18.5 | 47.5 | 46.5 | 50 | 69 | 68 | 41 | 50 | 41 | 8 | • | | • | |
| **WFS35/25SCF** | 1 1/4 | 25S | 175 | M36 x 2 | 20 | 18.5 | 48 | 43 | 50 | 72 | 67 | 41 | 46 | 41 | 8 | • | | • | |
| **WFS35/30SCF** | 1 1/4 | 30S | 175 | M42 x 2 | 25 | 18.5 | 48.5 | 43.5 | 50 | 75 | 70 | 41 | 50 | 41 | 8 | • | | • | |
| **WFS35/38SCF** | 1 1/4 | 38S | 175 | M52 x 2 | 28 | 18.5 | 50 | 43 | 50 | 81 | 74 | 46 | 60 | 41 | 8 | • | | • | |
| **WFS36/42LCF** | 1 1/2 | 42L | 100 | M52 x 2 | 36 | 18.5 | 53 | 47 | 55 | 76 | 70 | 46 | 60 | 50 | 10 | • | | • | |
| **WFS36/38SCF** | 1 1/2 | 38S | 130 | M52 x 2 | 32 | 18.5 | 54 | 48 | 55 | 85 | 79 | 46 | 60 | 50 | 10 | • | | • | |
| **SAE FLANGE CONNECTIONS – CODE 62 – HIGH PRESSURE SERIES** | | | | | | | | | | | | | | | | | | | |
| **WFS62/16SCF** | 1/2 | 16S | 250 | M24 x 1.5 | 12 | 13.5 | 44.5 | 29.5 | 39 | 63 | 48 | 24 | 30 | 24 | 6 | • | | • | |
| **WFS63/16SCF** | 3/4 | 16S | 250 | M24 x 1.5 | 12 | 15.5 | 50.5 | 36.5 | 48 | 69 | 55 | 30 | 30 | 32 | 8 | • | | • | |
| **WFS63/20SCF** | 3/4 | 20S | 250 | M30 x 2 | 16 | 15.5 | 50.5 | 35.5 | 48 | 72 | 57 | 30 | 36 | 32 | 8 | • | | • | |
| **WFS63/25SCF** | 3/4 | 25S | 250 | M36 x 2 | 17 | 15.5 | 51 | 36 | 48 | 75 | 60 | 30 | 46 | 32 | 8 | • | | • | |
| **WFS64/25SCF** | 1 | 25S | 250 | M36 x 2 | 20 | 20.5 | 60 | 44 | 60 | 84 | 65 | 36 | 46 | 41 | 10 | • | | • | |
| **WFS64/30SCF** | 1 | 30S | 250 | M42 x 2 | 24 | 20.5 | 60.5 | 41.5 | 60 | 87 | 68 | 36 | 50 | 41 | 10 | • | | • | |
| **WFS65/30SCF** | 1 1/4 | 30S | 250 | M42 x 2 | 25 | 22.5 | 65.5 | 44.5 | 68 | 92 | 71 | 41 | 50 | 46 | 10 | • | | • | |
| **WFS65/38SCF** | 1 1/4 | 38S | 200 | M52 x 2 | 30 | 22.5 | 67 | 45 | 68 | 98 | 76 | 46 | 60 | 46 | 10 | • | | • | |
| **WFS66/38SCF** | 1 1/2 | 38S | 200 | M52 x 2 | 30 | 24.5 | 73 | 56 | 76 | 104 | 87 | 46 | 60 | 50 | 14 | • | | • | |

**EO-2 Part Number example: WFS33/18ZLCF**

Temperature range without pressure reductions for fittings with O-ring sealing of NBR (e.g., buna N series) -35°C up to +100°C, FPM (e.g., fluorocarbon on request) -25°C up to +120°C.

Tightening torques for socket head cap screws see Tables S6 and S7.



Dimensions and pressures for reference only, subject to change.



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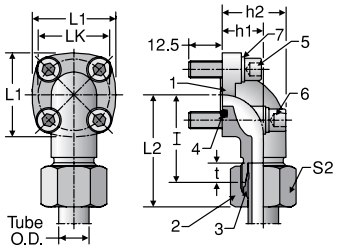
# BFW

Hydraulic Flange Elbow
DIN Flange / Metric Flareless




| TUBE FITTING PART # | WORKING PRESSURE (bar) | END SIZE (mm) | h1 (mm) | h1 (mm) | I (mm) | L1 (mm) | L2 (mm) | LK (mm) | S2 (mm) | t (mm) | MATERIAL FROM STOCK CF | MATERIAL FROM STOCK 71 | EO-2 FROM STOCK CF | EO-2 FROM STOCK 71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BFW15L/LK40CF** | 65 | 15 | 22.5 | 36.5 | 38 | 42 | 46 | 40 | 27 | 7 | • | | • | |
| **BFW18L/LK40CF** | 65 | 18 | 22.5 | 36.5 | 38 | 42 | 47 | 40 | 32 | 7.5 | • | | • | |
| **BFW22L/LK40CF** | 65 | 22 | 22.5 | 36.5 | 38 | 42 | 47.5 | 40 | 36 | 7.5 | • | | • | |
| **BFW28L/LK40CF** | 65 | 28 | 28 | 43 | 40 | 42 | 49 | 40 | 41 | 7.5 | • | | • | |
| **BFW35L/LK40CF** | 65 | 35 | 32 | 55 | 41 | 42 | 52 | 40 | 50 | 10.5 | • | | • | |
| **BFW35L/LK55CF** | 65 | 35 | 32 | 51.5 | 49 | 58 | 62 | 55 | 50 | 10.5 | • | | • | |
| **BFW42L/LK55CF** | 65 | 42 | 40 | 64.5 | 49 | 58 | 61 | 55 | 60 | 11 | • | | • | |
| **BFW15L/LK35CF** | 155 | 15 | 16.5 | 26.5 | 38 | 39 | 46 | 35 | 27 | 7 | • | | • | |
| **BFW20S/LK55CF** | 155 | 20 | 24 | 38 | 45 | 58 | 56 | 55 | 36 | 10.5 | • | | • | |
| **BFW20S/LK40CF** | 155 | 20 | 22.5 | 35.5 | 40 | 42 | 50 | 40 | 36 | 10.5 | • | | • | |
| **BFW25S/LK55CF** | 155 | 25 | 30 | 46 | 49 | 58 | 61 | 55 | 46 | 12 | • | | • | |
| **BFW30S/LK55CF** | 155 | 30 | 32 | 50 | 49 | 58 | 62 | 55 | 50 | 13.5 | • | | • | |
| **BFW10L/LK35CF** | 200 | 10 | 16.5 | 26.5 | 38 | 39 | 47 | 35 | 19 | 7 | • | | • | |
| **BFW12L/LK35CF** | 200 | 12 | 16.5 | 26.5 | 38 | 39 | 47 | 35 | 22 | 7 | • | | • | |
| **BFW16S/LK35CF** | 200 | 16 | 20 | 31 | 38 | 39 | 48 | 35 | 30 | 8.5 | • | | • | |

## Unassembled BFW Fitting Components

| 1 Elbow Body | 2 Nut | 3 Progressive Ring | 4 O-Ring | 5 2 Cap Screws DIN 912-8.8 | 6 2 Cap Screws DIN 912-8.8 | 7 4 Spr. Washers DIN 127 |
|---|---|---|---|---|---|---|
| **BFW15L/LK40CFX** | M15LCFX | DPR15LCFX | OR26X2.5X | M6X22 | M6X22 | A6 |
| **BFW18L/LK40CFX** | M18LCFX | DPR18LCFX | OR26X2.5X | M6X22 | M6X22 | A6 |
| **BFW22L/LK40CFX** | M22LCFX | DPR22LCFX | OR26X2.5X | M6X22 | M6X22 | A6 |
| **BFW28L/LK40CFX** | M28LCFX | DPR28LCFX | OR26X2.5X | M6X20 | M6X50 | A6 |
| **BFW35L/LK40CFX** | M35LCFX | DPR35LCFX | OR26X2.5X | M6X22 | M6X60 | A6 |
| **BFW35L/LK55CFX** | M35LCFX | DPR35LCFX | OR33X2.5X | M8X25 | M8X60 | A8 |
| **BFW42L/LK55CFX** | M42LCFX | DPR42LCFX | OR33X2.5X | M8X25 | M8X70 | A8 |
| **BFW15L/LK35CFX** | M15LCFX | DPR15LCFX | OR20X2.5X | M6X22 | M6X35 | A6 |
| **BFW20S/LK55CFX** | M20SCFX | DPR20SCFX | OR33X2.5X | M8X25 | M8X50 | A8 |
| **BFW20S/LK40CFX** | M20SCFX | DPR20SCFX | OR26X2.5X | M6X22 | M6X45 | A6 |
| **BFW25S/LK55CFX** | M25SCFX | DPR25SCFX | OR33X2.5X | M8X25 | M8X55 | A8 |
| **BFW30S/LK55CFX** | M30SCFX | DPR20SCFX | OR33X2.5X | M8X25 | M8X55 | A8 |
| **BFW10L/LK35CFX** | M10LCFX | DRP10LCFX | OR20X2.5X | M6X22 | M6X35 | A6 |
| **BFW12L/LK35CFX** | M12LCFX | DPR12LCFX | OR20X2.5X | M6X22 | M6X35 | A6 |
| **BFW16S/LK35CFX** | M16SCFX | DPR16SCFX | OR20X2.5X | M6X22 | M6X40 | A6 |
| **BFW20S/LK35CFX** | M20SCFX | DPR20SCFX | OR20X2.5X | M6X22 | M6X45 | A6 |

**EO-2 Part Number example: BFW15ZL/LK40CF**

Temperature range without pressure reductions for fittings with O-ring sealing of NBR (e.g., buna N series) -35°C up to +100°C, FPM (e.g., fluorocarbon on request) -25°C up to +120°C.

Tightening torques for socket head cap screws see Table S6.

Dimensions and pressures for reference only, subject to change.



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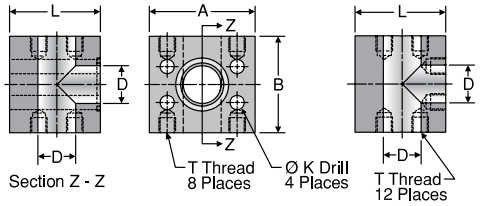
L

# QPQPJQ

Block Junction Tee
Code 61 or 62 Block Pads / Block Flange or Pad

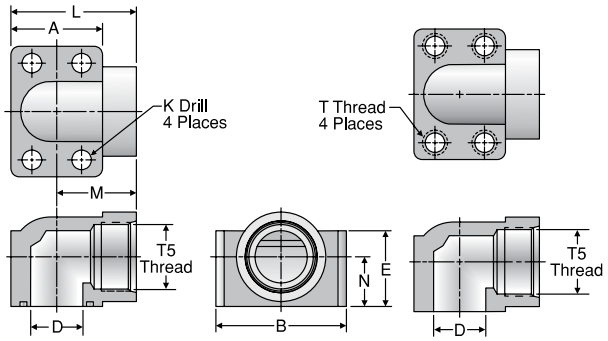



O-ring Face Flat Face

| TUBE FITTING PART # | | FLANGE SIZE | A | B | D | K DRILL DIA. | L | T THREAD | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | -SX | -SS |
| **CODE 61 BLOCK PADS / BLOCK FLANGE OR PAD** | | | | | | | | | | |
| 12Q1PQ1PJQ1B | 12Q1PQ1PJQ1P | 0.75 | 2.62 | 2.75 | 0.75 | 0.406 | 2.25 | 3/8-16 | 5.0 | |
| 16Q1PQ1PJQ1B | 16Q1PQ1PJQ1P | 1.00 | 2.82 | 3.00 | 1.00 | 0.406 | 2.50 | 3/8-16 | 5.0 | |
| 20Q1PQ1PJQ1B | 20Q1PQ1PJQ1P | 1.25 | 3.19 | 3.50 | 1.25 | 0.469 | 3.00 | 7/16-14 | 4.0 | |
| 24Q1PQ1PJQ1B | 24Q1PQ1PJQ1P | 1.50 | 3.75 | 4.00 | 1.50 | 0.531 | 3.50 | 1/2-13 | 3.0 | |
| 32Q1PQ1PJQ1B | 32Q1PQ1PJQ1P | 2.00 | 4.00 | 4.25 | 2.00 | 0.531 | 4.00 | 1/2-13 | 3.0 | |
| **CODE 62 BLOCK PADS / BLOCK FLANGE OR PAD** | | | | | | | | | | |
| 12Q2PQ2PJQ2B | 12Q2PQ2PJQ2P | 0.75 | 2.81 | 3.00 | 0.75 | 0.406 | 2.50 | 3/8-16 | 6.0 | |
| 16Q2PQ2PJQ2B | 16Q2PQ2PJQ2P | 1.00 | 3.19 | 3.50 | 1.00 | 0.469 | 3.00 | 7/16-14 | 6.0 | |
| 20Q2PQ2PJQ2B | 20Q2PQ2PJQ2P | 1.25 | 3.75 | 4.00 | 1.25 | 0.531 | 3.50 | 1/2-13 | 6.0 | |
| 24Q2PQ2PJQ2B | 24Q2PQ2PJQ2P | 1.50 | 4.50 | 4.50 | 1.50 | 0.656 | 4.00 | 5/8-11 | 6.0 | |
| 32Q2PQ2PJQ2B | 32Q2PQ2PJQ2P | 2.00 | 5.25 | 5.00 | 1.94 | 0.781 | 5.00 | 3/4-10 | 6.0 | |

# G5EQ

SAE Port Block Elbow
SAE Port / Code 61 or 62 Block Flange or Pad




O-ring Face Flat Face

| TUBE FITTING PART # | | T5 STRAIGHT THREAD | SAE PORT DASH | FLANGE SIZE | A | B | D | E | K DRILL DIA. | L | M | N | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | UN-2B | SIZE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SX | -SS |
| **SAE PORT / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | | |
| 12G5EQ1B | 12G5EQ1P | 1-1/16-12 | 12 | 0.75 | 1.69 | 2.56 | 0.75 | 1.25 | 0.406 | 2.28 | 1.440 | 0.875 | 3/8-16 | 3/8-16 x 2.00 | 4.0 | |
| 16G5EQ1B | 16G5EQ1P | 1-5/16-12 | 16 | 1.00 | 1.94 | 2.75 | 1.00 | 1.50 | 0.406 | 2.62 | 1.660 | 1.062 | 3/8-16 | 3/8-16 x 2.25 | 3.0 | |
| 20G5EQ1B | 20G5EQ1P | 1-5/8-12 | 20 | 1.25 | 2.19 | 3.12 | 1.25 | 1.81 | 0.469 | 3.00 | 1.910 | 1.188 | 7/16-14 | 7/16-14 x 2.75 | 2.5 | |
| 24G5EQ1B | 24G5EQ1P | 1-7/8-12 | 24 | 1.50 | 2.56 | 3.69 | 1.50 | 2.00 | 0.531 | 3.33 | 2.050 | 1.312 | 1/2-13 | 1/2-13 x 3.00 | 2.0 | |
| 32G5EQ1B | 32G5EQ1P | 2-1/2-12 | 32 | 2.00 | 3.06 | 4.33 | 2.00 | 2.50 | 0.531 | 3.81 | 2.280 | 1.656 | 1/2-13 | 1/2-13 x 3.50 | 1.5 | |
| **SAE PORT / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | | |
| 12G5EQ2B | 12G5EQ2P | 1-1/16-12 | 12 | 0.75 | 1.94 | 2.75 | 0.75 | 1.50 | 0.406 | 2.62 | 1.660 | 1.062 | 3/8-16 | 3/8-16 x 2.25 | 5.0 | |
| 16G5EQ2B | 16G5EQ2P | 1-5/16-12 | 16 | 1.00 | 2.19 | 3.12 | 1.00 | 1.81 | 0.469 | 3.00 | 1.910 | 1.188 | 7/16-14 | 7/16-14 x 2.50 | 4.0 | |
| 20G5EQ2B | 20G5EQ2P | 1-5/8-12 | 20 | 1.25 | 2.56 | 3.69 | 1.25 | 2.00 | 0.531 | 3.32 | 2.050 | 1.312 | 1/2-13 | 1/2-13 x 3.00 | 3.5 | |
| 24G5EQ2B | 24G5EQ2P | 1-7/8-12 | 24 | 1.50 | 3.06 | 4.33 | 1.50 | 2.50 | 0.656 | 3.81 | 2.280 | 1.656 | 5/8-11 | 5/8-11 x 3.50 | 3.5 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

Dimensions and pressures for reference only, subject to change.



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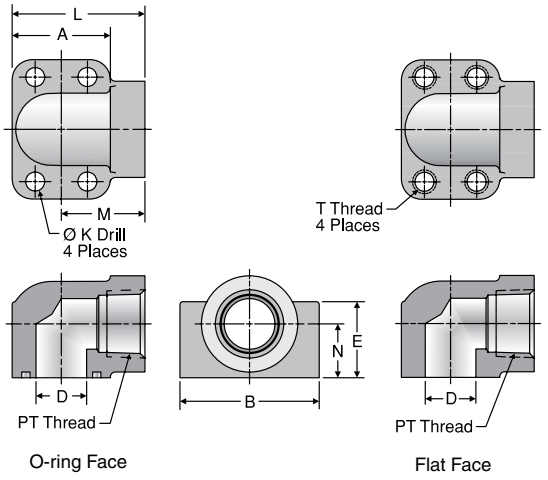
# GEQ

NPTF Port Block Elbow Adapter
NPTF / Code 61 or 62 Block Flange or Pad




| TUBE FITTING PART # | | PT THREAD | FLANGE SIZE | A | B | D | E | K DRILL DIA. | L | M | N | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | NPTF | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SX | -SS |
| **NPTF PORT / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | |
| **12GEQ1B** | **12GEQ1P** | 3/4 - 14 | 0.75 | 1.69 | 2.56 | 0.75 | 1.25 | 0.406 | 2.28 | 1.440 | 0.875 | 3/8-16 | 3/8-16 x 2.00 | 4.0 | |
| **16GEQ1B** | **16GEQ1P** | 1 - 11 1/2 | 1.00 | 1.94 | 2.75 | 1.00 | 1.50 | 0.406 | 2.62 | 1.660 | 1.062 | 3/8-16 | 3/8-16 x 2.25 | 4.0 | |
| **20GEQ1B** | **20GEQ1P** | 1 1/4 - 11 1/2 | 1.25 | 2.19 | 3.12 | 1.25 | 1.81 | 0.469 | 3.00 | 1.910 | 1.188 | 7/16-14 | 7/16-14 x 2.75 | 2.7 | |
| **24GEQ1B** | **24GEQ1P** | 1 1/2 - 11 1/2 | 1.50 | 2.56 | 3.69 | 1.50 | 2.00 | 0.531 | 3.33 | 2.050 | 1.312 | 1/2-13 | 1/2-13 x 3.00 | 2.5 | |
| **32GEQ1B** | **32GEQ1P** | 2 - 11 1/2 | 2.00 | 3.06 | 4.33 | 2.00 | 2.50 | 0.531 | 3.81 | 2.280 | 1.656 | 1/2-13 | 1/2-13 x 3.50 | 1.7 | |
| **NPTF PORT / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | |
| **12GEQ2B** | **12GEQ2P** | 3/4 - 14 | 0.75 | 1.94 | 2.75 | 0.75 | 1.50 | 0.406 | 2.62 | 1.660 | 1.062 | 3/8-16 | 3/8-16 x 2.25 | 5.5 | |
| **16GEQ2B** | **16GEQ2P** | 1 - 11 1/2 | 1.00 | 2.19 | 3.12 | 1.00 | 1.81 | 0.469 | 3.00 | 1.910 | 1.188 | 7/16-14 | 7/16-14 x 2.50 | 5.0 | |
| **20GEQ2B** | **20GEQ2P** | 1 1/4 - 11 1/2 | 1.25 | 2.56 | 3.69 | 1.25 | 2.00 | 0.531 | 3.32 | 2.050 | 1.312 | 1/2-13 | 1/2-13 x 3.00 | 3.5 | |
| **24GEQ2B** | **24GEQ2P** | 1 1/2 - 11 1/2 | 1.50 | 3.06 | 4.33 | 1.50 | 2.50 | 0.656 | 3.81 | 2.280 | 1.656 | 5/8-11 | 5/8-11 x 3.50 | 3.0 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

Dimensions and pressures for reference only, subject to change.



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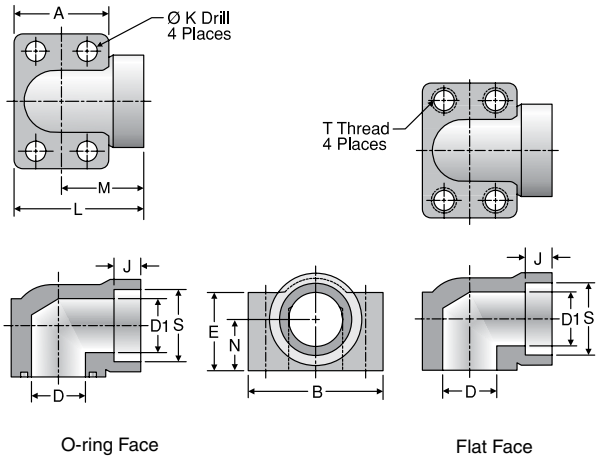
# W6EQ

Weld Socket Block Elbow Connector, Tube
Weld Socket, Tube / Code 61 or 62 Block Flange or Pad




O-ring Face

Flat Face

| TUBE FITTING PART # | | TUBE O.D. | FLANGE SIZE | A | B | D | D1 | E | J | K DRILL DIA. | L | M | N | S | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI ) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SX | -SS |
| **WELD SOCKET, TUBE / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | | | | |
| **12W6EQ1B** | **12W6EQ1P** | 3/4 | 0.75 | 1.69 | 2.56 | 0.75 | 0.63 | 1.25 | 0.312 | 0.406 | 2.280 | 1.44 | 0.875 | 0.752 | 3/8-16 | 3/8-16 x 2.00 | 5.0 | |
| **16-12W6EQ1B** | **16-12W6EQ1P** | 1 | 0.75 | 1.69 | 2.56 | 0.75 | 0.75 | 1.25 | 0.438 | 0.406 | 2.280 | 1.44 | 0.875 | 1.002 | 3/8-16 | 3/8-16 x 2.00 | 5.0 | |
| **16W6EQ1B** | **16W6EQ1P** | 1 | 1.00 | 1.94 | 2.75 | 1.00 | 0.88 | 1.50 | 0.438 | 0.406 | 2.620 | 1.66 | 1.062 | 1.002 | 3/8-16 | 3/8-16 x 2.25 | 5.0 | |
| **20-16W6EQ1B** | **20-16W6EQ1P** | 1 1/4 | 1.00 | 1.94 | 2.75 | 1.00 | 1.00 | 1.50 | 0.500 | 0.406 | 2.620 | 1.66 | 1.062 | 1.252 | 3/8-16 | 3/8-16 x 2.25 | 5.0 | |
| **20W6EQ1B** | **20W6EQ1P** | 1 1/4 | 1.25 | 2.19 | 3.12 | 1.25 | 1.13 | 1.81 | 0.500 | 0.469 | 3.000 | 1.91 | 1.188 | 1.252 | 7/16-14 | 7/16-14 x 2.75 | 4.0 | |
| **24-20W6EQ1B** | **24-20W6EQ1P** | 1 1/2 | 1.25 | 2.19 | 3.12 | 1.25 | 1.25 | 1.81 | 0.562 | 0.469 | 3.000 | 1.91 | 1.188 | 1.502 | 7/16-14 | 7/16-14 x 2.75 | 4.0 | |
| **24W6EQ1B** | **24W6EQ1P** | 1 1/2 | 1.50 | 2.56 | 3.69 | 1.50 | 1.38 | 2.00 | 0.562 | 0.531 | 3.328 | 2.05 | 1.312 | 1.502 | 1/2-13 | 1/2-13 x 3.00 | 3.0 | |
| **28-24W6EQ1B** | **28-24W6EQ1P** | 1 3/4 | 1.50 | 2.56 | 3.69 | 1.50 | 1.50 | 2.00 | 0.562 | 0.531 | 3.328 | 2.05 | 1.312 | 1.752 | 1/2-13 | 1/2-13 x 3.00 | 3.0 | |
| **32W6EQ1B** | **32W6EQ1P** | 2 | 2.00 | 3.06 | 4.33 | 2.00 | 1.88 | 2.50 | 0.625 | 0.531 | 3.812 | 2.28 | 1.656 | 2.002 | 1/2-13 | 1/2-13 x 3.50 | 3.0 | |
| **36-32W6EQ1B** | **36-32W6EQ1P** | 2 1/4 | 2.00 | 3.06 | 4.33 | 2.00 | 2.00 | 2.50 | 0.625 | 0.531 | 3.812 | 2.28 | 1.656 | 2.252 | 1/2-13 | 1/2-13 x 3.50 | 3.0 | |
| **WELD SOCKET, TUBE / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | | | | | | |
| **12W6EQ2B** | **12W6EQ2P** | 3/4 | 0.75 | 1.94 | 2.75 | 0.75 | 0.63 | 1.50 | 0.560 | 0.406 | 2.620 | 1.66 | 1.062 | 0.752 | 3/8-16 | 3/8-16 x 2.25 | 6.0 | |
| **16-12W6EQ2B** | **16-12W6EQ2P** | 1 | 0.75 | 1.94 | 2.75 | 0.75 | 0.75 | 1.50 | 0.620 | 0.406 | 2.620 | 1.66 | 1.062 | 1.002 | 3/8-16 | 3/8-16 x 2.25 | 6.0 | |
| **16W6EQ2B** | **16W6EQ2P** | 1 | 1.00 | 2.19 | 3.12 | 1.00 | 0.88 | 1.81 | 0.620 | 0.469 | 3.000 | 1.91 | 1.188 | 1.002 | 7/16-14 | 7/16-14 x 2.50 | 6.0 | |
| **20-16W6EQ2B** | **20-16W6EQ2P** | 1 1/4 | 1.00 | 2.19 | 3.12 | 1.00 | 1.00 | 1.81 | 0.690 | 0.469 | 3.000 | 1.91 | 1.188 | 1.252 | 7/16-14 | 7/16-14 x 2.50 | 6.0 | |
| **20W6EQ2B** | **20W6EQ2P** | 1 1/4 | 1.25 | 2.56 | 3.69 | 1.25 | 1.13 | 2.00 | 0.690 | 0.531 | 3.320 | 2.05 | 1.312 | 1.252 | 1/2-13 | 1/2-13 x 3.00 | 6.0 | |
| **24-20W6EQ2B** | **24-20W6EQ2P** | 1 1/2 | 1.25 | 2.56 | 3.69 | 1.25 | 1.25 | 2.00 | 0.750 | 0.531 | 3.320 | 2.05 | 1.312 | 1.502 | 1/2-13 | 1/2-13 x 3.00 | 6.0 | |
| **24W6EQ2B** | **24W6EQ2P** | 1 1/2 | 1.50 | 3.06 | 4.33 | 1.50 | 1.38 | 2.50 | 0.750 | 0.656 | 3.810 | 2.28 | 1.656 | 1.502 | 5/8-11 | 5/8-11 x 3.50 | 6.0 | |
| **28-24W6EQ2B** | **28-24W6EQ2P** | 1 3/4 | 1.50 | 3.06 | 4.33 | 1.50 | 1.50 | 2.50 | 0.750 | 0.656 | 3.810 | 2.28 | 1.656 | 1.752 | 5/8-11 | 5/8-11 x 3.50 | 6.0 | |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

Dimensions and pressures for reference only, subject to change.



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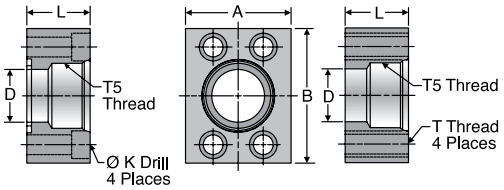
# G5Q – Stainless Steel

SAE Port Block Flange Adapter
SAE Port / Code 61 or 62 Block Flange




O-ring Face Flat Face

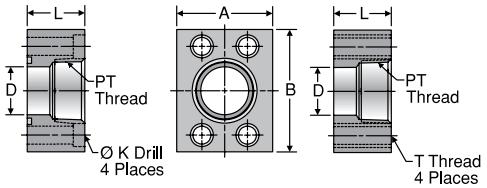
| TUBE FITTING PART # | | SAE PORT DASH SIZE | FLANGE SIZE | A | B | D | K DRILL DIA. | L | T5 STRAIGHT THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UN-2B | SHCS | -SS |
| **SAE PORT / CODE 61 FLANGE BLOCK** | | | | | | | | | | | |
| 8G5Q1B | * | 8 | 0.50 | 1.50 | 2.12 | 0.50 | 0.344 | 1.20 | 3/4-16 | 5/16-18 x 1.25 | 5.0 |
| 12G5Q1B | * | 12 | 0.75 | 1.75 | 2.62 | 0.75 | 0.406 | 1.20 | 1 1/16-12 | 3/8-16 x 1.50 | 5.0 |
| 16G5Q1B | * | 16 | 1.00 | 2.00 | 2.82 | 1.00 | 0.406 | 1.45 | 1 5/16-12 | 3/8-16 x 1.50 | 5.0 |
| 20G5Q1B | * | 20 | 1.25 | 2.50 | 3.19 | 1.25 | 0.469 | 1.45 | 1 5/8-12 | 7/16-14 x 1.75 | 4.0 |
| 24G5Q1B | * | 24 | 1.50 | 2.75 | 3.75 | 1.50 | 0.531 | 1.70 | 1 7/8-12 | 1/2-13 x 2.00 | 3.0 |
| 32G5Q1B | * | 32 | 2.00 | 3.25 | 4.00 | 2.00 | 0.531 | 1.70 | 2 1/2-12 | 1/2-13 x 2.00 | |
| **SAE PORT / CODE 62 FLANGE BLOCK** | | | | | | | | | | | |
| 8G5Q2B | * | 8 | 0.50 | 1.75 | 2.22 | 0.50 | 0.344 | 0.95 | 3/4-16 | 5/16-18 x 1.25 | 6.0 |
| 12G5Q2B | * | 12 | 0.75 | 2.00 | 2.81 | 0.75 | 0.406 | 1.20 | 1 1/16-12 | 3/8-16 x 1.50 | 6.0 |
| 16G5Q2B | * | 16 | 1.00 | 2.25 | 3.19 | 1.00 | 0.469 | 1.45 | 1 5/16-12 | 7/16-14 x 1.75 | 6.0 |
| 20G5Q2B | * | 20 | 1.25 | 2.75 | 3.75 | 1.25 | 0.531 | 1.45 | 1 5/8-12 | 1/2-13 x 1.75 | 6.0 |
| 24G5Q2B | * | 24 | 1.50 | 3.25 | 4.50 | 1.50 | 0.656 | 1.70 | 1 7/8-12 | 5/8-11 x 2.00 | 5.0 |
| 32G5Q2B | * | 32 | 2.00 | 4.00 | 5.25 | 2.00 | 0.781 | 1.70 | 2 1/2-12 | 3/4-10 x 2.25 | 3.0 |

* Consult factory.

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

# GQ – Stainless Steel

NPTF Port Block Flange Adapter
NPTF Port / Code 61 or 62 Block Flange




O-ring Face Flat Face

| TUBE FITTING PART # | | PT THREAD | FLANGE SIZE | A | B | D | K DRILL DIA. | L | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) |
|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | NPTF | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | SHCS | -SS |
| **NPTF PORT / CODE 61 BLOCK FLANGE** | | | | | | | | | | |
| 8GQ1B | * | 1/2-14 | 0.50 | 1.50 | 2.12 | 0.50 | 0.344 | 1.25 | 5/16-18 x 1.75 | 5.0 |
| 12GQ1B | * | 3/4-14 | 0.75 | 1.75 | 2.62 | 0.75 | 0.406 | 1.25 | 3/8-16 x 2.00 | 5.0 |
| 16GQ1B | * | 1-11 1/2 | 1.00 | 2.00 | 2.82 | 1.00 | 0.406 | 1.50 | 3/8-16 x 2.25 | 5.0 |
| 20GQ1B | * | 1 1/4-11 1/2 | 1.25 | 2.50 | 3.19 | 1.25 | 0.469 | 1.50 | 7/16-14 x 2.25 | 4.0 |
| 24GQ1B | * | 1 1/2-11 1/2 | 1.50 | 2.75 | 3.75 | 1.50 | 0.531 | 1.75 | 1/2-13 x 2.50 | 3.0 |
| 32GQ1B | * | 2-11 1/2 | 2.00 | 3.25 | 4.00 | 2.00 | 0.531 | 1.75 | 1/2-13 x 2.50 | 2.7 |
| 40GQ1B | * | 2 1/2-8 | 2.50 | 4.00 | 4.50 | 2.50 | 0.531 | 2.00 | 1/2-13 x 2.75 | 2.5 |
| 48GQ1B | * | 3-8 | 3.00 | 4.50 | 5.31 | 3.00 | 0.656 | 2.25 | 5/8-11 x 3.00 | 1.2 |
| **NPTF PORT / CODE 62 BLOCK FLANGE** | | | | | | | | | | |
| 12GQ2B | * | 3/4-14 | 0.75 | 2.00 | 2.81 | 0.75 | 0.406 | 1.20 | 3/8-16 x 2.00 | 6.0 |
| 16GQ2B | * | 1-11 1/2 | 1.00 | 2.25 | 3.19 | 1.00 | 0.469 | 1.45 | 7/16-14 x 2.50 | 5.0 |
| 20GQ2B | * | 1 1/4-11 1/2 | 1.25 | 2.75 | 3.75 | 1.25 | 0.531 | 1.45 | 1/2-13 x 2.50 | 4.0 |
| 24GQ2B | * | 1 1/2-11 1/2 | 1.50 | 3.25 | 4.50 | 1.50 | 0.656 | 1.70 | 5/8-11 x 2.75 | 3.5 |
| 32GQ2B | * | 2-11 1/2 | 2.00 | 4.00 | 5.25 | 2.00 | 0.781 | 1.70 | 3/4-10 x 3.00 | 3.0 |

* Consult factory.

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

Dimensions and pressures for reference only, subject to change.



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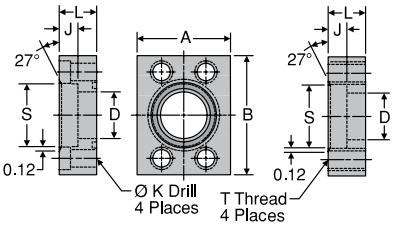
# W5Q – Stainless Steel

Flat Weld Socket Block Flange Connector, Pipe
Flat Weld Socket, Pipe / Code 61 or 62
Block Flange or Pad




O-ring Face Flat Face

| TUBE FITTING PART # | | PIPE SIZE | FLANGE SIZE | A | B | D | J | K DRILL DIA. | L | S | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SS |
| **FLAT WELD SOCKET, PIPE / CODE 61 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | |
| **8W5Q1B** | **8W5Q1P** | 1/2 | 0.50 | 1.50 | 2.12 | 0.500 | 0.380 | 0.344 | 0.69 | 0.860 | 5/16-18 | 5/16-18 x 1.25 | 5.0 |
| **12W5Q1B** | **12W5Q1P** | 3/4 | 0.75 | 1.75 | 2.62 | 0.750 | 0.500 | 0.406 | 0.94 | 1.070 | 3/8-16 | 3/8-16 x 1.75 | 5.0 |
| **16W5Q1B** | **16W5Q1P** | 1 | 1.00 | 2.00 | 2.82 | 1.000 | 0.500 | 0.406 | 0.94 | 1.335 | 3/8-16 | 3/8-16 x 1.75 | 5.0 |
| **20W5Q1B** | **20W5Q1P** | 1 1/4 | 1.25 | 2.50 | 3.19 | 1.250 | 0.500 | 0.469 | 0.94 | 1.680 | 7/16-14 | 7/16-14 x 1.75 | 4.0 |
| **24W5Q1B** | **24W5Q1P** | 1 1/2 | 1.50 | 2.75 | 3.75 | 1.500 | 0.500 | 0.531 | 1.19 | 1.920 | 1/2-13 | 1/2-13 x 2.25 | 3.0 |
| **32W5Q1B** | **32W5Q1P** | 2 | 2.00 | 3.25 | 4.00 | 2.000 | 0.620 | 0.531 | 1.44 | 2.411 | 1/2-13 | 1/2-13 x 2.50 | 3.0 |
| **40W5Q1B** | **40W5Q1P** | 2 1/2 | 2.50 | 4.00 | 4.50 | 2.500 | 0.750 | 0.531 | 1.69 | 2.911 | 1/2-13 | 1/2-13 x 2.75 | 2.5 |
| **48W5Q1B** | **48W5Q1P** | 3 | 3.00 | 4.50 | 5.31 | 3.000 | 1.240 | 0.656 | 2.12 | 3.540 | 5/8-11 | 5/8-11 x 3.50 | 2.0 |
| **FLAT WELD SOCKET, PIPE / CODE 62 BLOCK FLANGE OR PAD** | | | | | | | | | | | | | |
| **8W5Q2B** | **8W5Q2P** | 1/2 | 0.50 | 1.75 | 2.22 | 0.500 | 0.500 | 0.344 | 0.94 | 0.860 | 5/16-18 | 5/16-18 x 1.50 | 6.0 |
| **12W5Q2B** | **12W5Q2P** | 3/4 | 0.75 | 2.00 | 2.81 | 0.750 | 0.500 | 0.406 | 0.94 | 1.070 | 3/8-16 | 3/8-16 x 1.75 | 6.0 |
| **16W5Q2B** | **16W5Q2P** | 1 | 1.00 | 2.25 | 3.19 | 1.000 | 0.500 | 0.469 | 0.94 | 1.335 | 7/16-14 | 7/16-14 x 1.75 | 6.0 |
| **20W5Q2B** | **20W5Q2P** | 1 1/4 | 1.25 | 2.75 | 3.75 | 1.250 | 0.500 | 0.531 | 1.19 | 1.672 | 1/2-13 | 1/2-13 x 2.25 | 6.0 |
| **24W5Q2B** | **24W5Q2P** | 1 1/2 | 1.50 | 3.25 | 4.50 | 1.500 | 0.500 | 0.656 | 1.44 | 1.920 | 5/8-11 | 5/8-11 x 2.75 | 6.0 |
| **32W5Q2B** | **32W5Q2P** | 2 | 2.00 | 4.00 | 5.25 | 2.000 | 0.620 | 0.781 | 1.69 | 2.411 | 3/4-10 | 3/4-10 x 3.00 | 6.0 |
| **40W5Q2B** | **40W5Q2P** | 2 1/2 | 2.50 | 5.00 | 6.88 | 2.500 | 0.620 | 0.906 | 1.94 | 2.911 | 7/8-9 | 7/8-9 x 3.50 | 6.0 |
| **48W5Q2B** | **48W5Q2P** | 3 | 3.00 | 6.00 | 8.50 | 3.000 | 0.620 | 1.156 | 2.44 | 3.540 | 1 1/8-7 | 1 1/8-7 x 4.50 | 6.0 |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.



Dimensions and pressures for reference only, subject to change.



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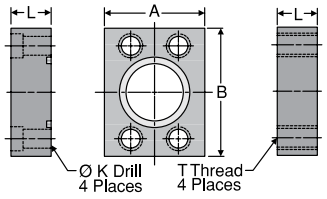
# PQ – Stainless Steel

Block Plug
Code 61/62 Block Flange or Pad Plug




O-ring Face Flat Face

| TUBE FITTING PART # | | FLANGE SIZE | A | B | K DRILL DIA. | L | T THREAD | MOUNTING HARDWARE | Dynamic Pressure (x 1,000 PSI) |
|---|---|---|---|---|---|---|---|---|---|
| O-RING FACE | FLAT FACE | (in.) | (in.) | (in.) | (in.) | (in.) | UNC-2B | SHCS | -SS |
| **CODE 61 BLOCK FLANGE OR PAD PLUG** | | | | | | | | | |
| **8PQ1B** | **8PQ1P** | 0.50 | 1.500 | 2.120 | 0.344 | 1.20 | 5/16-18 | 5/16-18 x 2.00 | 5.0 |
| **12PQ1B** | **12PQ1P** | 0.75 | 1.750 | 2.620 | 0.406 | 1.20 | 3/8-16 | 3/8-16 x 2.00 | 5.0 |
| **16PQ1B** | **16PQ1P** | 1.00 | 2.000 | 2.820 | 0.406 | 1.45 | 3/8-16 | 3/8-16 x 2.25 | 5.0 |
| **20PQ1B** | **20PQ1P** | 1.25 | 2.500 | 3.190 | 0.469 | 1.45 | 7/16-14 | 7/16-14 x 2.25 | 4.0 |
| **24PQ1B** | **24PQ1P** | 1.50 | 2.750 | 3.750 | 0.531 | 1.70 | 1/2-13 | 1/2-13 x 2.50 | 3.0 |
| **32PQ1B** | **32PQ1P** | 2.00 | 3.250 | 4.000 | 0.531 | 1.70 | 1/2-13 | 1/2-13 x 2.50 | 3.0 |
| **40PQ1B** | **40PQ1P** | 2.50 | 4.000 | 4.500 | 0.531 | 1.95 | 1/2-13 | 1/2-13 x 2.75 | 2.5 |
| **48PQ1B** | **48PQ1P** | 3.00 | 4.500 | 5.310 | 0.656 | 2.20 | 5/8-11 | 5/8-11 x 3.00 | 2.0 |
| **CODE 62 BLOCK FLANGE OR PAD PLUG** | | | | | | | | | |
| **8PQ2B** | **8PQ2P** | 0.50 | 1.750 | 2.220 | 0.344 | 0.94 | 5/16-18 | 5/16-18 x 1.50 | 6.0 |
| **12PQ2B** | **12PQ2P** | 0.75 | 2.000 | 2.810 | 0.406 | 1.19 | 3/8-16 | 3/8-16 x 2.00 | 6.0 |
| **16PQ2B** | **16PQ2P** | 1.00 | 2.250 | 3.190 | 0.492 | 1.44 | 7/16-14 | 7/16-14 x 2.25 | 6.0 |
| **20PQ2B** | **20PQ2P** | 1.25 | 2.750 | 3.750 | 0.531 | 1.44 | 1/2-13 | 1/2-13 x 2.50 | 6.0 |
| **24PQ2B** | **24PQ2P** | 1.50 | 3.250 | 4.500 | 0.656 | 1.69 | 5/8-11 | 5/8-11 x 2.75 | 6.0 |
| **32PQ2B** | **32PQ2P** | 2.00 | 4.000 | 5.250 | 0.781 | 1.69 | 3/4-10 | 3/4-10 x 3.00 | 6.0 |
| **40PQ2B** | **40PQ2P** | 2.50 | 5.000 | 6.880 | 0.906 | 1.94 | 7/8-9 | 7/8-9 x 3.50 | 6.0 |
| **48PQ2B** | **48PQ2P** | 3.00 | 6.000 | 8.500 | 1.190 | 2.44 | 1 1/8-7 | 1 1/8-7 x 3.75 | 6.0 |

To receive mounting hardware with flange, insert a “K” after the material designator. Mounting hardware kits are available for O-ring Face part numbers and include 4 bolts, 4 lock washers and an O-ring.

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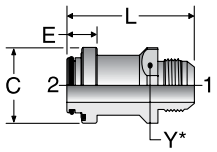
# XHQ4O

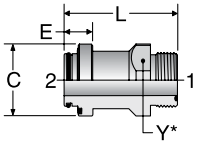
Dual Seal Flange Connector
Dual Seal / 37° Flare




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 DUAL SEAL | C (in.) | D1 DRILL (in.) | D2 DRILL (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|
| **8 XHQ4O** | 1/2 | 1/2 | 1.25 | 0.391 | 0.391 | 0.69 | 2.98 | 1.00 | 7.2 |
| **16 XHQ4O** | 1 | 1 | 1.88 | 0.844 | 0.844 | 0.75 | 3.18 | 1.63 | 4.8 |
| **24 XHQ4O** | 1 1/2 | 1 1/2 | 2.50 | 1.310 | 1.310 | 1.00 | 4.00 | 2.13 | 3.6 |

# LOHQ4O

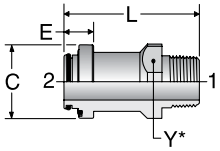
Dual Seal Flange Connector
Dual Seal / ORFS




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 DUAL SEAL | C (in.) | D1 DRILL (in.) | D2 DRILL (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|
| **8 LOHQ4O** | 1/2 | 1/2 | 1.25 | 0.374 | 0.374 | 0.69 | 2.83 | 1.00 | 7.5 |
| **16 LOHQ4O** | 1 | 1 | 1.88 | 0.807 | 0.807 | 0.75 | 2.96 | 1.63 | 6.0 |
| **24 LOXHQ4O** | 1 1/2 | 1 1/2 | 2.50 | 1.260 | 1.260 | 1.00 | 3.61 | 2.13 | 5.0 |

# FHQ4O

Dual Seal Flange Connector
Dual Seal / Male NPTF




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 DUAL SEAL | C (in.) | D1 DRILL (in.) | D2 DRILL (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|
| **8 FHQ4O** | 1/2 | 1/2 | 1.25 | 0.500 | 0.500 | 0.69 | 3.18 | 1.00 | 7.2 |
| **16 FHQ4O** | 1 | 1 | 1.88 | 0.938 | 0.938 | 0.75 | 3.45 | 1.63 | 5.4 |
| **24 FHQ4O** | 1 1/2 | 1 1/2 | 2.50 | 1.312 | 1.312 | 1.00 | 4.10 | 2.13 | 3.6 |



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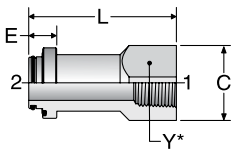
# GHQ4O

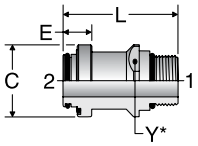
Dual Seal Flange Connector
Dual Seal / Female NPTF




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 DUAL SEAL | C (in.) | D1 DRILL (in.) | D2 DRILL (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|
| **8 GHQ4O** | 1/2 | 1/2 | 1.25 | 0.500 | 0.500 | 0.69 | 2.96 | 1.00 | 6.0 |
| **16 GHQ4O** | 1 | 1 | 1.88 | 0.938 | 0.938 | 0.75 | 3.94 | 1.63 | 3.6 |
| **24 GHQ4O** | 1 1/2 | 1 1/2 | 2.50 | 1.312 | 1.312 | 1.00 | 4.81 | 2.25 | 3.0 |

# F5OHQ4O

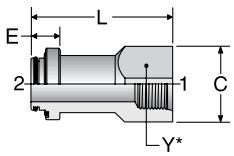
Dual Seal Flange Connector
Dual Seal / Male SAE-ORB




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 DUAL SEAL | C (in.) | D1 DRILL (in.) | D2 DRILL (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|
| **8 F5OHQ4O** | 1/2 | 1/2 | 1.25 | 0.394 | 0.394 | 0.69 | 2.87 | 1.00 | 6.0 |
| **16 F5OHQ4O** | 1 | 1 | 1.88 | 0.844 | 0.844 | 0.75 | 3.00 | 1.63 | 4.0 |
| **24 F5OHQ4O** | 1 1/2 | 1 1/2 | 2.50 | 1.312 | 1.312 | 1.00 | 3.65 | 2.17 | 3.0 |

# G5HQ4O

Dual Seal Flange Connector
Dual Seal / Female SAE-ORB




| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 DUAL SEAL | C (in.) | D1 DRILL (in.) | D2 DRILL (in.) | E (in.) | L (in.) | Y (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|---|
| **8 G5HQ4O** | 1/2 | 1/2 | 1.25 | 0.406 | 0.406 | 0.69 | 2.77 | 1.00 | 5.0 |
| **16 G5HQ4O** | 1 | 1 | 1.88 | 0.938 | 0.938 | 0.75 | 3.72 | 1.63 | 3.5 |
| **24 G5HQ4O** | 1 1/2 | 1 1/2 | 2.50 | 1.312 | 1.312 | 1.00 | 4.59 | 2.25 | 2.5 |

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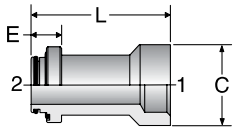
# W7HQ4O

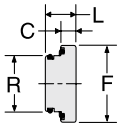
Dual Seal Flange Connector
Dual Seal / Socket Weld Pipe




| TUBE FITTING PART # | END SIZE 1 PIPE | END SIZE 2 DUAL SEAL | C (in.) | D1 DRILL (in.) | D2 DRILL (in.) | E (in.) | L (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|---|---|
| **8 W7HQ4O** | 1/2 | 1/2 | 1.25 | 0.406 | 0.406 | 0.69 | 2.64 | 7.5 |
| **16 W7HQ4O** | 1 | 1 | 1.88 | 0.938 | 0.938 | 0.75 | 3.44 | 7.5 |
| **24 W7HQ4O** | 1 1/2 | 1 1/2 | 2.50 | 1.312 | 1.312 | 1.00 | 4.43 | 7.5 |

# PQ4O

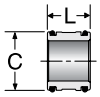
Dual Seal Flange Connector
Dual Seal Plug




| TUBE FITTING PART # | END SIZE 2 DUAL SEAL | F (in.) | C (in.) | L (in.) | R (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|---|---|
| **8 PQ4O** | 1/2 | 1.25 | 0.31 | 0.69 | 0.75 | 7.5 |
| **16 PQ4O** | 1 | 1.88 | 0.38 | 0.75 | 1.37 | 7.5 |
| **24 PQ4O** | 1 1/2 | 2.50 | 0.50 | 1.00 | 1.75 | 7.5 |

# Q4 Insert

Dual Seal Flange Insert




| TUBE FITTING PART # | END SIZE 2 DUAL SEAL | L (in.) | C (in.) | Dynamic Pressure (x 1,000 PSI) -SS |
|---|---|---|---|---|
| **8 Q4 INSERT** | 1/2 | 1.00 | 0.75 | 7.5 |
| **16 Q4 INSERT** | 1 | 1.00 | 1.37 | 7.5 |
| **24 Q4 INSERT** | 1 1/2 | 1.00 | 1.74 | 7.5 |

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# Diagnostic, Orifice, Bleed Adapters and Specialty Fittings

M

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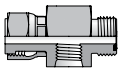
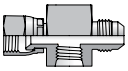
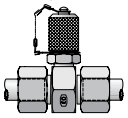
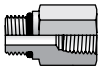
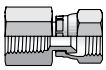
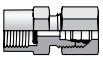
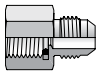
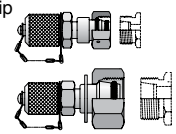
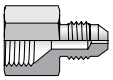
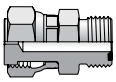
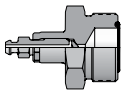
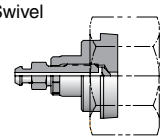
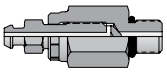
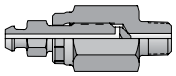
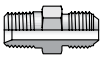
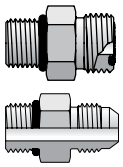
|---|---|---|---|---|---|
| **Diagnostic Tees** | **LOHL6G5TP**<br>ORFS Swivel / ORFS / SAE-ORB<br>  <br>M5 | **XHX6G5TP**<br>37° Swivel / 37° Flare / SAE-ORB<br>  <br>M5 | **GMA3**<br>EO Tube / EO Tube / EMA-3 Diagnostic Tip<br>  <br>M5 | **Diagnostic Tee Port Adapters and Plugs** | **F5OG**<br>SAE-ORB / NPTF<br>  <br>F13 |
| **P5ON**<br>Hex Head Plug<br> <br>F25 | **HP5ON**<br>Hollow Hex Plug<br> <br>F26 | **NPT / SAE-ORB Pressure Gauge Adapters** | **G5L**<br>SAE-ORB Gauge / ORFS<br> <br>M7 | **G65L**<br>SAE-ORB Gauge / ORFS Swivel<br> <br>M7 | **GLO**<br>NPT Gauge / ORFS<br> <br>M7 |
| **G6L**<br>NPT Gauge / ORFS Swivel<br> <br>M7 | **GTX**<br>NPT Gauge / 37° Flare<br> <br>M7 | **G6X**<br>NPT Gauge / 37° Swivel<br>  <br>M7 | **BSP Pressure Gauge Adapters** | **MAVE**<br>BSPP Gauge / EO Swivel<br> <br>M6 | **MAV**<br>BSPP Gauge / EO<br>  <br>M6 |
| **G4MXSMO**<br>BSPP Gauge / 37° Flare<br>  <br>M6 | **G4MLOSMO**<br>BSPP Gauge / ORFS<br> <br>M6 | **Swivel Tube Adapters** | **VKA3**<br>EO Swivel / Diagnostic Tip<br>  <br>M8 | **Orifice Fittings** | **XHX7**<br>37° Seat / 37° Flare with Orifice<br>  <br>M9 |
| **LOHL6**<br>ORFS Swivel with Orifice / ORFS<br>  <br>M9 | **ORFS / Port Bleed Adapters** | **PNLOBA**<br>Bleed Screw / ORFS<br>  <br>M10 | **FNLBA**<br>Bleed Screw / ORFS Swivel<br>  <br>M10 | **P5ONBA**<br>Bleed Screw / SAE-ORB<br>  <br>M10 | **HPBA**<br>Bleed Screw / NPT<br>  <br>M10 |
| **Parker Triple Thread Fitting** | **0109**<br>NPTF / PTT 30° Flare<br>  <br>M11 | **Screen Fittings** | Screen Fittings<br>  <br>M12 | | |



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# Introduction

Parker offers a line of specialty-type adapters specifically designed for diagnostic, fixed flow control and bleeding applications.

Diagnostic products consist of a line of in-line diagnostic tees, pressure gauge connectors and diagnostic tips. These products have been developed to work in conjunction with electronic diagnostic products available from Parker's Quick Coupling Division and other mechanical pressure and temperature sensing equipment. Some products can be used for fluid sampling and bleeding purposes as well.

Parker offers a standard and custom line of fixed flow control orifice fittings. These products are available as standard in two Parker product series — ORFS and 37° flare, and as a custom option in virtually any orifice size, fitting series, size, material and configuration.

Parker's bleed adapters are designed to remove entrapped air from a hydraulic system. A common problem in hydraulic systems is trapped air and the subsequent spillage of hydraulic oil while removing components to bleed air from lines under pressure. Parker's bleed adapters provide a quick, clean, and simple method of bleeding entrapped air from hydraulic systems.

Parker offers a limited line of PTT (Parker Triple Thread) 30° flare adapters for transportation markets. Lastly, Parker offers a line of screen fittings as a final measure of protection.

**Fig. M1 — Parker offers a full line of diagnostic, orifice, bleed adapters and specialty fittings**

# Diagnostic Fittings and Adapters

## In-Line Diagnostic Tees

**Features**

- Designed around the two most common hydraulic tube/hose interfaces: ORFS (Seal-Lok) and 37° flare (JIC / Triple-Lok) (see A)
- ORFS and 37° flare swivel feature offers unlimited positioning without displacing port adapter (see B)
- Uses elastomeric sealing: SAE –4 (7/16-20 UNF) port as universal diagnostic port per SAE J1926-1 / ISO 11926 (see C)
- Enlarged and lengthened body hex ensures that diagnostic port offers full thread engagement and pressure capability (see D)
- Adaptable to Parker's line of diagnostic and fluid sampling tips including: EMA3, PD and PDFS, as well as various direct connecting electronic/mechanical pressure gauges*
- Designed to complement Parker's line of Senso-Control® electronic diagnostic equipment

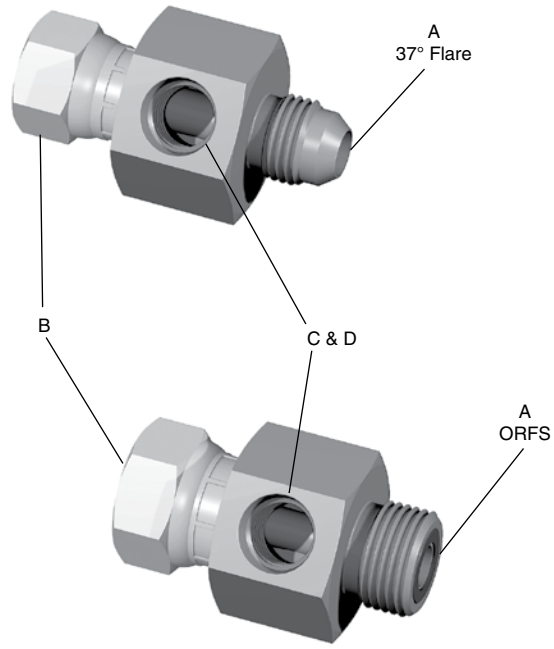


**Fig. M2 — Parker's XHX6G5TP (top) and LOHL6G5TP (bottom) in-line diagnostic tees**

***Diagnostic and sampling tips EMA3, PD and PDFS series are available from Parker's Quick Coupling Division (tel. 763-544-7781 and/or www.parker.com/quickcouplings**



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**Applications**

- In-line pressure and temperature measurements
- In-line oil sampling to evaluate hydraulic contamination, caused by problems with filtration or internal components
- In-field diagnostics without removal of port adapters. Simply remove hose swivel and insert in-line tee.
- Permanent or temporary OEM and MRO diagnostic applications:
  - Where traditional in-port diagnostic tips cannot be located or easily accessed
  - Where OEM diagnostic tips have not been installed
  - Non-traditional diagnostic locations (portable)
  - Where port threads are not compatible with standard diagnostic tips
- To eliminate reducer bushings and couplings typically required to neck down from larger size connections to smaller connections; e.g. reductions required for a gauge, diagnostic tip, bleed adapter, or tube/hose connection.

## Assembly Instructions

The body of the diagnostic tee can be used repeatedly for 10-20 remakes at full rated pressure and assembly torque. See Tables M1 and M2 for recommended swivel nut assembly torques.

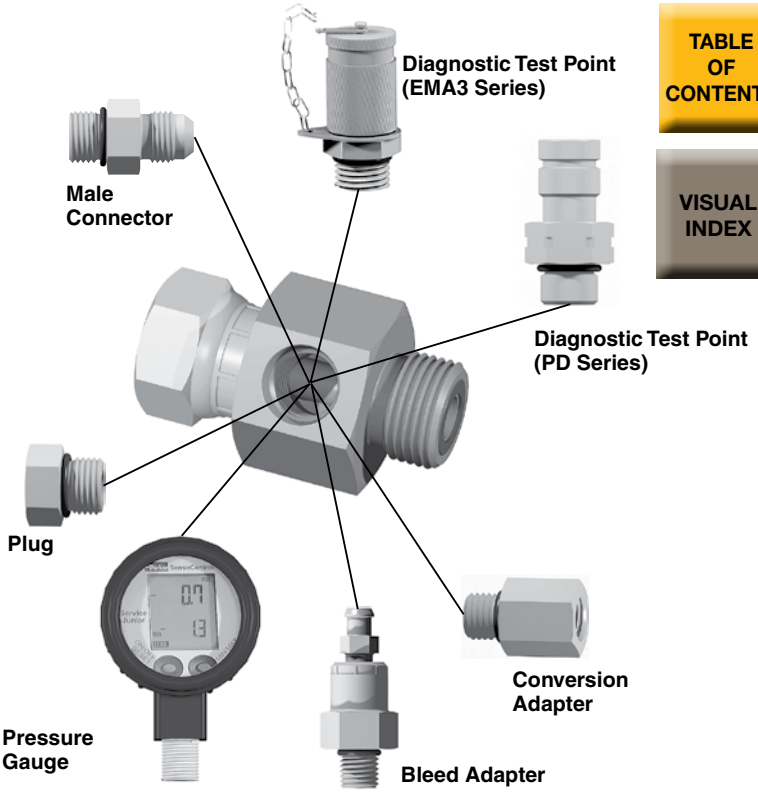


**Fig. M3 — Illustration showing the versatility of Parker's diagnostic tee product line**

| Part Number | Assembly Torque (+10%-0) | |
|---|---|---|
| | in.-lb. | ft.-lb. |
| **4-4 XHX6G5TP** | 130 | 11 |
| **6-4 XHX6G5TP** | 235 | 20 |
| **8-4 XHX6G5TP** | 525 | 43 |
| **10-4 XHX6G5TP** | — | 55 |
| **12-4 XHX6G5TP** | — | 80 |
| **16-4 XHX6G5TP** | — | 115 |
| **20-4 XHX6G5TP** | — | 160 |
| **24-4 XHX6G5TP** | — | 185 |

**Note:** Assembly values are for dry, unlubricated swivel nut connections

**Table M1 — Assembly Torques (Swivel nut) for Diagnostic Tees**

| Part Number | Assembly Torque (+10%-0) | |
|---|---|---|
| | in.-lb. | ft.-lb. |
| **4-4 LHL6G5TP** | 220 | 18 |
| **6-4 LHL6G5TP** | 360 | 30 |
| **8-4 LHL6G5TP** | 480 | 40 |
| **10-4 LHL6G5TP** | — | 60 |
| **12-4 LHL6G5TP** | — | 85 |
| **14-4 LHL6G5TP** | — | 100 |
| **16-4 LHL6G5TP** | — | 110 |
| **20-4 LHL6G5TP** | — | 150 |
| **24-4 LHL6G5TP** | — | 230 |
| **32-4 LHL6G5TP** | — | 360 |

**Table M2 — Assembly Torques (Swivel nut) for Diagnostic Tees**

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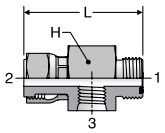
# LOHL6G5TP

Gauge Port Tee
ORFS / ORFS Swivel /
SAE-ORB

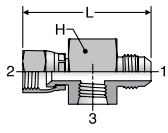



| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 UN/UNF | H (in.) | L (in.) | Pressure (x 1,000 PSI) Static -S | Dynamic -S |
|---|---|---|---|---|---|---|---|
| **4-4 LOHL6G5TP** | 1/4 | 1/4 | 7/16-20 | 1-1/16 | 1.83 | 10.0 | 6.0 |
| **6-4 LOHL6G5TP** | 3/8 | 3/8 | 7/16-20 | 1-1/16 | 1.95 | 10.0 | 6.0 |
| **8-4 LOHL6G5TP** | 1/2 | 1/2 | 7/16-20 | 1-1/16 | 2.18 | 10.0 | 6.0 |
| **10-4 LOHL6G5TP** | 5/8 | 5/8 | 7/16-20 | 1-1/8 | 2.40 | 10.0 | 6.0 |
| **12-4 LOHL6G5TP** | 3/4 | 3/4 | 7/16-20 | 1-1/4 | 2.59 | 10.0 | 6.0 |
| **16-4 LOHL6G5TP** | 1 | 1 | 7/16-20 | 1-1/2 | 2.85 | 9.5 | 6.0 |
| **20-4 LOHL6G5TP** | 1 1/4 | 1 1/4 | 7/16-20 | 1-3/4 | 3.07 | 6.5 | 5.0 |
| **24-4 LOHL6G5TP** | 1 1/2 | 1 1/2 | 7/16-20 | 2-1/8 | 3.22 | 5.0 | 4.0 |

**Note:** Fluorocarbon O-rings are available upon request.

# XHX6G5TP

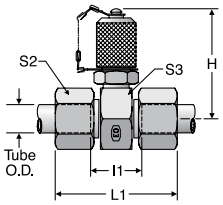
Gauge Port Tee
37° Flare / 37° Swivel /
SAE-ORB




| TUBE FITTING PART # | END SIZE 1 (in.) | 2 (in.) | 3 UN/UNF | H (in.) | L (in.) | Pressure (x 1,000 PSI) Static -S | Dynamic -S |
|---|---|---|---|---|---|---|---|
| **4-4 XHX6G5TP** | 1/4 | 1/4 | 7/16-20 | 1-1/16 | 1.99 | 10.0 | 6.0 |
| **6-4 XHX6G5TP** | 3/8 | 3/8 | 7/16-20 | 1-1/16 | 2.08 | 6.5 | 5.0 |
| **8-4 XHX6G5TP** | 1/2 | 1/2 | 7/16-20 | 1-1/16 | 2.30 | 6.5 | 5.0 |
| **10-4 XHX6G5TP** | 5/8 | 5/8 | 7/16-20 | 1-1/8 | 2.49 | 6.5 | 5.0 |
| **12-4 XHX6G5TP** | 3/4 | 3/4 | 7/16-20 | 1-1/4 | 2.66 | 6.5 | 5.0 |
| **16-4 XHX6G5TP** | 1 | 1 | 7/16-20 | 1-1/2 | 2.99 | 6.0 | 4.5 |
| **20-4 XHX6G5TP** | 1 1/4 | 1 1/4 | 7/16-20 | 1-3/4 | 3.33 | 6.0 | 4.5 |
| **24-4 XHX6G5TP** | 1 1/2 | 1 1/2 | 7/16-20 | 2 | 3.71 | 5.5 | 4.0 |

# GMA3

Diagnostic Tip
EO Tube / EO Tube /
M16 x 2.0 Integrated Tip




| TUBE FITTING PART # | END SIZE (mm) | H (mm) | l 1 (mm) | L1 (mm) | S2 (mm) | S3 (mm) | Pressure (x 1,000 PSI) Static CF | Dynamic CF |
|---|---|---|---|---|---|---|---|---|
| **GMA3/06L** | 6 | 49 | 21 | 51 | 14 | 24 | 7.2 | 4.5 |
| **GMA3/08L** | 8 | 49 | 21 | 51 | 17 | 24 | 7.2 | 4.5 |
| **GMA3/10L** | 10 | 49 | 23 | 53 | 19 | 24 | 7.2 | 4.5 |
| **GMA3/12L** | 12 | 50 | 23 | 53 | 22 | 27 | 5.8 | 4.5 |
| **GMA3/15L** | 15 | 52 | 25 | 55 | 27 | 30 | 5.8 | 4.5 |
| **GMA3/18L** | 18 | 53 | 24 | 57 | 32 | 32 | 5.8 | 4.5 |
| **GMA3/22L** | 22 | 55 | 28 | 61 | 36 | 36 | 3.6 | 2.3 |
| **GMA3/28L** | 28 | 57 | 28 | 61 | 41 | 41 | 3.6 | 2.3 |
| **GMA3/35L** | 35 | 60 | 26 | 69 | 50 | 46 | 3.6 | 2.3 |
| **GMA3/42L** | 42 | 64 | 25 | 71 | 60 | 55 | 3.6 | 2.3 |
| **GMA3/06S** | 6 | 49 | 25 | 55 | 17 | 24 | 10.1 | 9.1 |
| **GMA3/08S** | 8 | 49 | 25 | 55 | 19 | 24 | 10.1 | 9.1 |
| **GMA3/10S** | 10 | 49 | 24 | 57 | 22 | 24 | 10.1 | 9.1 |
| **GMA3/12S** | 12 | 49 | 24 | 57 | 24 | 24 | 10.1 | 9.1 |
| **GMA3/14S** | 14 | 50 | 27 | 63 | 27 | 27 | 10.1 | 9.1 |
| **GMA3/16S** | 16 | 52 | 26 | 63 | 30 | 30 | 9.1 | 5.8 |
| **GMA3/20S** | 20 | 55 | 26 | 69 | 36 | 36 | 9.1 | 5.8 |
| **GMA3/25S** | 25 | 57 | 27 | 75 | 46 | 41 | 9.1 | 5.8 |
| **GMA3/30S** | 30 | 60 | 28 | 81 | 50 | 46 | 6.1 | 5.8 |
| **GMA3/38S** | 38 | 64 | 29 | 91 | 60 | 55 | 6.1 | 4.5 |

**To specify EO-2, add "Z" between tube size and series.**
**Example: GMA3/28ZLA3C**



Dimensions and pressures for reference only, subject to change.



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# BSPP Diagnostic Pressure Gauge Adapters

Parker's BSPP direct-connect pressure gauge adapters are available in the most common tube/hose connections — ORFS, 37° Flare (JIC) and 24° Metric Flareless (DIN 2353). European pressure gauges often utilize BSPP threads on the pressure gauges (manometers). Sealing is achieved at the bottom of the port with a sealing washer as shown in the illustration on the right.

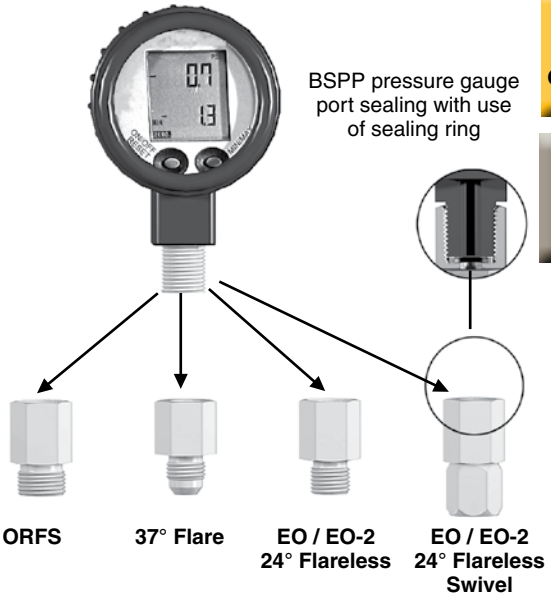
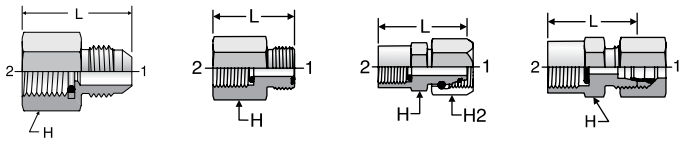



**Fig. M4 — BSPP pressure gauge connections**

## BSPP Pressure Gauge Adapters




**G4MXSMO** (Type A) | **G4MLOSMO** (Type B) | **MAVE** (Type C) | **MAV** (Type D)

| TUBE FITTING PART # | TYPE | END SIZE 1 (in.) | END SIZE 2 BSPP | L (mm) | H BODY HEX (mm) | H2 NUT HEX (mm) | Pressure (x 1,000 PSI) Static S | Pressure (x 1,000 PSI) Dynamic S |
|---|---|---|---|---|---|---|---|---|
| **4-4G4MXSMO** | A | 1/4 | 1/4-19 | 31.0 | 17 | — | 5.0 | 5.0 |
| **6G4MXSMO** | A | 3/8 | 1/4-19 | 28.0 | 17 | — | 5.0 | 5.0 |
| **8-4G4MXSMO** | A | 1/2 | 1/4-19 | 31.0 | 19 | — | 5.0 | 5.0 |
| **4-4G4MLOSMO** | B | 1/4 | 1/4-19 | 26.8 | 17 | — | 5.0 | 5.0 |
| **6G4MLOSMO** | B | 3/8 | 1/4-19 | 28.2 | 19 | — | 5.0 | 5.0 |
| **8-4G4MLOSMO** | B | 1/2 | 1/4-19 | 29.8 | 22 | — | 5.0 | 5.0 |
| | | **1** (mm) | **2** BSPP | | | | **Static** CF | **Dynamic** CF |
| **MAVE06LR** | C | 6 | 1/4-19 | 35.5 | 19 | 14 | 4.6 | 4.6 |
| **MAVE08LR** | C | 8 | 1/4-19 | 35.5 | 19 | 17 | 4.6 | 4.6 |
| **MAVE10LR** | C | 10 | 1/4-19 | 36.0 | 19 | 19 | 4.6 | 4.6 |
| **MAVE06SR** | C | 6 | 1/2-14 | 42.5 | 27 | 17 | 9.1 | 9.1 |
| **MAVE08SR** | C | 8 | 1/2-14 | 43.0 | 27 | 19 | 9.1 | 9.1 |
| **MAVE10SR** | C | 10 | 1/2-14 | 43.5 | 27 | 22 | 9.1 | 9.1 |
| **MAVE12SR** | C | 12 | 1/2-14 | 45.0 | 27 | 24 | 9.1 | 9.1 |
| **MAVE06SR1/4** | C | 6 | 1/4-19 | 35.5 | 19 | 17 | 9.1 | 9.1 |
| **MAVE08SR1/4** | C | 8 | 1/4-19 | 35.5 | 19 | 19 | 9.1 | 9.1 |
| **MAVE10SR1/4** | C | 10 | 1/4-19 | 39.0 | 19 | 22 | 9.1 | 9.1 |
| **MAVE12SR1/4** | C | 12 | 1/4-19 | 39.0 | 19 | 24 | 9.1 | 9.1 |
| **MAV04LLR** | D | 4 | 1/4-19 | 33.0 | 19 | 10 | 1.4 | 1.4 |
| **MAV06LR** | D | 6 | 1/4-19 | 37.0 | 19 | 14 | 4.5 | 4.5 |
| **MAV08LR** | D | 8 | 1/4-19 | 37.0 | 19 | 17 | 4.5 | 4.5 |
| **MAV10LR** | D | 10 | 1/4-19 | 38.0 | 19 | 19 | 4.5 | 4.5 |
| **MAV12LR** | D | 12 | 1/4-19 | 38.0 | 19 | 22 | 4.5 | 4.5 |
| **MAV06SR** | D | 6 | 1/2-14 | 46.0 | 27 | 17 | 9.1 | 9.1 |
| **MAV08SR** | D | 8 | 1/2-14 | 46.0 | 27 | 19 | 9.1 | 9.1 |
| **MAV10SR** | D | 10 | 1/2-14 | 47.0 | 27 | 22 | 9.1 | 9.1 |
| **MAV12SR** | D | 12 | 1/2-14 | 47.0 | 27 | 24 | 9.1 | 9.1 |

**Note:** MAV supplied as standard with PSR +M nut (EO assembled)

* BSPP Pressure Gauge Connection requires seal. 1/4" replacement seal P/N: M25180.

** BSPP Pressure Gauge Connection requires seal. 1/4" replacement seal P/N: DKI1/4CFX, 1/2" replacement seal P/N: DKI1/2CFX.

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# NPT and SAE-ORB Diagnostic Pressure Gauge Adapters

Parker's NPT and SAE-ORB direct-connect pressure gauge adapters are available in the most common North American tube/hose connections — ORFS and 37° Flare (JIC). North American pressure gauge manufacturers offer gauges primarily with NPT and some with SAE-ORB port stud options. These 37° flare and ORFS connectors are designed to attach pressure gauges to hose swivel ends or directly to run / branch tees for in-line diagnostic applications as shown on the right.

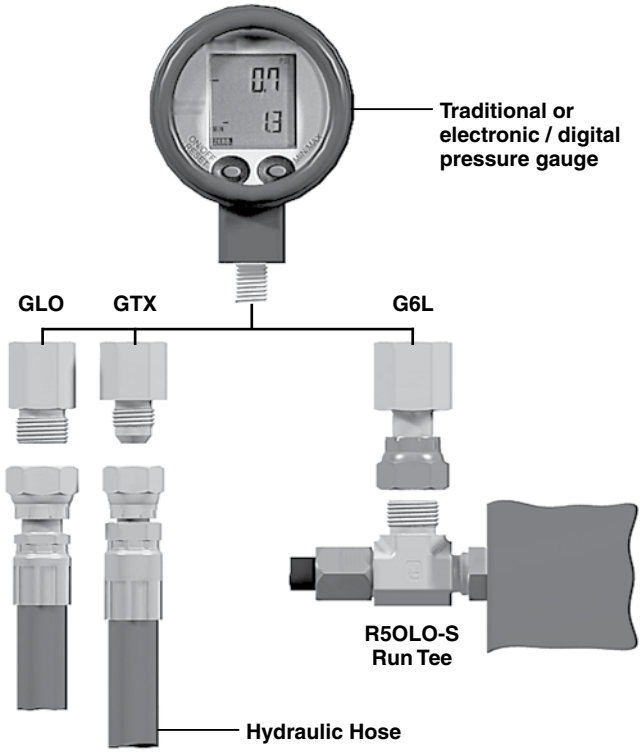
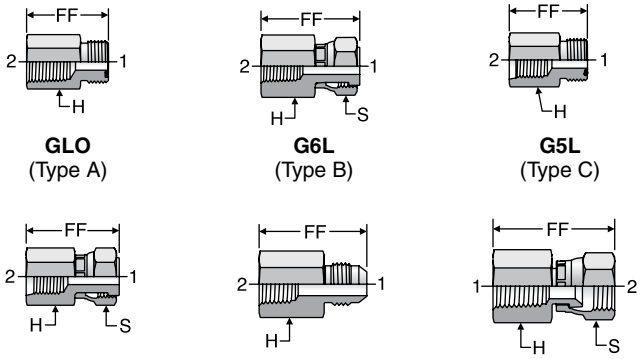



**Fig. M5 — Typical applications for NPT pressure gauge adapters. Illustrations show direct hose connections and Run Tee connection.**

## NPT / SAE Pressure Gauge Adapters




**GLO** (Type A) — **G6L** (Type B) — **G5L** (Type C)

**G65L** (Type D) — **GTX** (Type E) — **G6X** (Type F)

| TUBE FITTING PART # | TYPE | END SIZE 1 (in.) | END SIZE 2 NPT | FF (in.) | H BODY HEX (in.) | S SWIVEL NUT HEX (in.) | Pressure (x 1,000 PSI) Static -S | Pressure (x 1,000 PSI) Dynamic -S |
|---|---|---|---|---|---|---|---|---|
| **4-4 GLO** | A | 1/4 | 1/4-18 | 1.25 | 3/4 | — | 9.5 | 6.0 |
| **6 GLO** | A | 3/8 | 1/4-18 | 1.30 | 3/4 | — | 8.0 | 6.0 |
| **8-4 GLO** | A | 1/2 | 1/4-18 | 1.20 | 7/8 | — | 9.5 | 6.0 |
| **4-4 G6L** | B | 1/4 | 1/4-18 | 1.48 | 3/4 | 11/16 | 9.5 | 6.0 |
| **6 G6L** | B | 3/8 | 1/4-18 | 1.60 | 7/8 | 13/16 | 8.0 | 6.0 |
| **8-4 G6L** | B | 1/2 | 1/4-18 | 1.75 | 7/8 | 15/16 | 9.5 | 6.0 |
| | | | **UN/UNF** | | | | | |
| **4 G5LO** | C | 1/4 | 7/16-20 | 1.10 | 3/4 | — | 6.0 | 5.0 |
| **6-4 G5LO** | C | 3/8 | 7/16-20 | 1.08 | 3/4 | — | 6.0 | 5.0 |
| **8-4 G5LO** | C | 1/2 | 7/16-20 | 0.78 | 7/8 | — | 6.0 | 5.0 |
| **4 G65L** | D | 1/4 | 7/16-20 | 1.38 | 11/16 | 11/16 | 6.0 | 5.0 |
| **6-4 G65L** | D | 3/8 | 7/16-20 | 1.51 | 3/4 | 13/16 | 6.0 | 5.0 |
| **8-4 G65L** | D | 1/2 | 7/16-20 | 1.57 | 7/8 | 15/16 | 6.0 | 5.0 |
| | | | **NPT** | | | | | |
| **2 GTX** | E | 1/8 | 1/8-27 | 1.13 | 9/16 | — | 10.0 | 5.0 |
| **3 GTX** | E | 3/16 | 1/8-27 | 1.13 | 9/16 | — | 10.0 | 5.0 |
| **4-4 GTX** | E | 1/4 | 1/4-18 | 1.39 | 3/4 | — | 10.0 | 5.0 |
| **4 GTX** | E | 1/4 | 1/8-27 | 1.19 | 9/16 | — | 10.0 | 5.0 |
| **6-2 GTX** | E | 3/8 | 1/8-27 | 1.13 | 5/8 | — | 10.0 | 5.0 |
| **6 GTX** | E | 3/8 | 1/4-18 | 1.41 | 3/4 | — | 10.0 | 5.0 |
| **8-4 GTX** | E | 1/2 | 1/4-18 | 1.41 | 13/16 | — | 8.0 | 5.0 |
| **4-4 G6X** | F | 1/4 | 1/4-18 | 9/16 | 3/4 | 9/16 | 9.5 | 6.0 |
| **4 G6X** | F | 1/4 | 1/8-27 | 9/16 | 9/16 | 9/16 | 10.0 | 7.5 |
| **6 G6X** | F | 3/8 | 1/4-18 | 11/16 | 3/4 | 11/16 | 6.0 | 5.0 |

Dimensions and pressures for reference only, subject to change.



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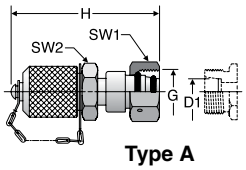
# EO Diagnostic Swivels

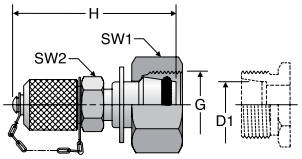
EO Diagnostic Swivels are commonly used on EO tees (24˚ flareless - DIN 2353) where periodic pressure and temperature checks are required. The M16 x 2 diagnostic tip mates with the SMA3 diagnostic nose offered by Parker's Quick Coupling Division.

## VKA3

M16 x 2.0 Diagnostic
Tip / EO Swivel




Type A




Type B

| TUBE FITTING PART # STEEL | TYPE | D1 TUBE O.D. (mm) | G Metric | H REF. (mm) | SW1 (mm) | SW2 (mm) | Pressure (x 1,000 PSI) Static CF | Pressure (x 1,000 PSI) Dynamic CF |
|---|---|---|---|---|---|---|---|---|
| **VKA3/06L** | A | 6 | M12 x 1.5 | 55 | 17 | 17 | 7.2 | 4.5 |
| **VKA3/08L** | A | 8 | M14 x 1.5 | 51 | 17 | 17 | 7.2 | 4.5 |
| **VKA3/10L** | A | 10 | M16 x 1.5 | 53 | 17 | 19 | 7.2 | 4.5 |
| **VKA3/12L** | A | 12 | M18 x 1.5 | 53 | 17 | 22 | 5.8 | 4.5 |
| **VKA3/15L** | B | 15 | M22 x 1.5 | 59 | 17 | 27 | 5.8 | 4.5 |
| **VKA3/18L** | B | 18 | M26 x 1.5 | 59 | 17 | 32 | 5.8 | 4.5 |
| **VKA3/22L** | B | 22 | M30 x 2 | 60 | 17 | 39 | 3.6 | 2.3 |
| **VKA3/28L** | B | 28 | M36 x 2 | 64 | 17 | 41 | 3.6 | 2.3 |
| **VKA3/35L** | B | 35 | M45 x 2 | 71 | 17 | 50 | 3.6 | 2.3 |
| **VKA3/42L** | B | 42 | M52 x 2 | 72 | 17 | 60 | 3.6 | 2.3 |
| **VKA3/06S** | A | 6 | M14 x 1.5 | 50 | 17 | 17 | 10.1 | 9.1 |
| **VKA3/08S** | A | 8 | M16 x 1.5 | 52 | 17 | 19 | 10.1 | 9.1 |
| **VKA3/10S** | A | 10 | M18 x 1.5 | 53 | 17 | 22 | 10.1 | 9.1 |
| **VKA3/12S** | A | 12 | M20 x 1.5 | 54 | 19 | 24 | 10.1 | 9.1 |
| **VKA3/14S** | B | 14 | M22 x 1.5 | 59 | 17 | 27 | 10.1 | 9.1 |
| **VKA3/16S** | B | 16 | M24 x 1.5 | 58 | 17 | 30 | 9.1 | 5.8 |
| **VKA3/20S** | B | 20 | M30 x 2 | 65 | 17 | 36 | 9.1 | 5.8 |
| **VKA3/25S** | B | 25 | M36 x 2 | 68 | 17 | 46 | 9.1 | 5.8 |
| **VKA3/30S** | B | 30 | M42 x 2 | 74 | 17 | 50 | 6.0 | 5.8 |
| **VKA3/38S** | B | 38 | M52 x 2 | 81 | 17 | 60 | 6.0 | 4.5 |

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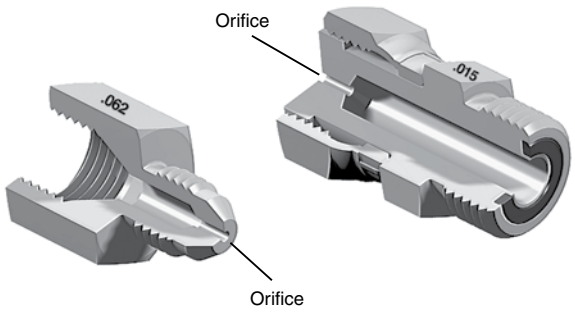
# Orifice Fittings

These compact and cost effective orifice adapters allow OEMs to pre-set, at the factory, a specified orifice in specific hydraulic tube or hose lines. Costly flow control valves can be eliminated or minimized in a system by selecting the proper orifice sizes at the factory. OEMs can also be assured that end users are not adjusting the factory established flow and speed characteristics of the hydraulic system.




# The Parker Advantage

- 37° flare and ORFS configurations as standard
- Three standard body sizes available: 1/4” 3/8”, and 1/2”
- Available in commonly accepted pre-set orifice sizes as shown on accompanying tables
- Designed for permanent or temporary installation
- Can be installed in-line into hydraulic system by simply connecting between hose swivel and adapter
- Orifice size is permanently stamped on body
- Can eliminate costly flow control valves

**Applications:**

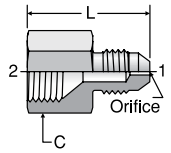
- Fixed rotation speed for hydraulic motors
- Fixed speed on cylinder extend or retract

**Direct Port Orifice Fittings:**

Available as a custom product, Parker also offers a line of orifice adapters that will replace a traditional port adapter.

# XHX7 Orifice

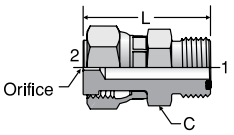
In-Line Orifice Connector
37° Flare / Female 37° Seat




| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | C HEX (in.) | ORIFICE (in.) | L (in.) | Pressure (x 1,000 PSI) Static -S | Pressure (x 1,000 PSI) Dynamic -S |
|---|---|---|---|---|---|---|
| **4 XHX7-S .015 Orifice** | 1/4 | 9/16 | .015 | 1.10 | 10.0 | 5.0 |
| **4 XHX7-S .031 Orifice** | 1/4 | 9/16 | .031 | 1.10 | 10.0 | 5.0 |
| **4 XHX7-S .047 Orifice** | 1/4 | 9/16 | .047 | 1.10 | 10.0 | 5.0 |
| **4 XHX7-S .062 Orifice** | 1/4 | 9/16 | .062 | 1.10 | 10.0 | 5.0 |
| **4 XHX7-S .078 Orifice** | 1/4 | 9/16 | .078 | 1.10 | 10.0 | 5.0 |
| **4 XHX7-S .094 Orifice** | 1/4 | 9/16 | .094 | 1.10 | 10.0 | 5.0 |
| **6 XHX7-S .015 Orifice** | 3/8 | 11/16 | .015 | 1.18 | 10.0 | 5.0 |
| **6 XHX7-S .031 Orifice** | 3/8 | 11/16 | .031 | 1.18 | 10.0 | 5.0 |
| **6 XHX7-S .047 Orifice** | 3/8 | 11/16 | .047 | 1.18 | 10.0 | 5.0 |
| **6 XHX7-S .062 Orifice** | 3/8 | 11/16 | .062 | 1.18 | 10.0 | 5.0 |
| **6 XHX7-S .078 Orifice** | 3/8 | 11/16 | .078 | 1.18 | 10.0 | 5.0 |
| **6 XHX7-S .094 Orifice** | 3/8 | 11/16 | .094 | 1.18 | 10.0 | 5.0 |
| **8 XHX7-S .015 Orifice** | 1/2 | 7/8 | .015 | 1.32 | 8.5 | 5.0 |
| **8 XHX7-S .031 Orifice** | 1/2 | 7/8 | .031 | 1.32 | 8.5 | 5.0 |
| **8 XHX7-S .047 Orifice** | 1/2 | 7/8 | .047 | 1.32 | 8.5 | 5.0 |
| **8 XHX7-S .062 Orifice** | 1/2 | 7/8 | .062 | 1.32 | 8.5 | 5.0 |
| **8 XHX7-S .078 Orifice** | 1/2 | 7/8 | .078 | 1.32 | 8.5 | 5.0 |
| **8 XHX7-S .094 Orifice** | 1/2 | 7/8 | .094 | 1.32 | 8.5 | 5.0 |

# LOHL6 Orifice

In-Line Orifice Connector
ORFS Swivel / ORFS




| TUBE FITTING PART # | END SIZE 1 & 2 (in.) | C HEX (in.) | ORIFICE (in.) | L (in.) | Pressure (x 1,000 PSI) Static -S | Pressure (x 1,000 PSI) Dynamic -S |
|---|---|---|---|---|---|---|
| **4 LOHL6-S .015 Orifice** | 1/4 | 5/8 | .015 | 1.33 | 12.0 | 9.2 |
| **4 LOHL6-S .031 Orifice** | 1/4 | 5/8 | .031 | 1.33 | 12.0 | 9.2 |
| **4 LOHL6-S .047 Orifice** | 1/4 | 5/8 | .047 | 1.33 | 12.0 | 9.2 |
| **4 LOHL6-S .062 Orifice** | 1/4 | 5/8 | .062 | 1.33 | 12.0 | 9.2 |
| **4 LOHL6-S .078 Orifice** | 1/4 | 5/8 | .078 | 1.33 | 12.0 | 9.2 |
| **4 LOHL6-S .094 Orifice** | 1/4 | 5/8 | .094 | 1.33 | 12.0 | 9.2 |
| **6 LOHL6-S .015 Orifice** | 3/8 | 3/4 | .015 | 1.44 | 12.0 | 9.2 |
| **6 LOHL6-S .031 Orifice** | 3/8 | 3/4 | .031 | 1.44 | 12.0 | 9.2 |
| **6 LOHL6-S .047 Orifice** | 3/8 | 3/4 | .047 | 1.44 | 12.0 | 9.2 |
| **6 LOHL6-S .062 Orifice** | 3/8 | 3/4 | .062 | 1.44 | 12.0 | 9.2 |
| **6 LOHL6-S .078 Orifice** | 3/8 | 3/4 | .078 | 1.44 | 12.0 | 9.2 |
| **6 LOHL6-S .094 Orifice** | 3/8 | 3/4 | .094 | 1.44 | 12.0 | 9.2 |
| **8 LOHL6-S .015 Orifice** | 1/2 | 7/8 | .015 | 1.67 | 12.0 | 9.2 |
| **8 LOHL6-S .031 Orifice** | 1/2 | 7/8 | .031 | 1.67 | 12.0 | 9.2 |
| **8 LOHL6-S .047 Orifice** | 1/2 | 7/8 | .047 | 1.67 | 12.0 | 9.2 |
| **8 LOHL6-S .062 Orifice** | 1/2 | 7/8 | .062 | 1.67 | 12.0 | 9.2 |
| **8 LOHL6-S .078 Orifice** | 1/2 | 7/8 | .078 | 1.67 | 12.0 | 9.2 |
| **8 LOHL6-S .094 Orifice** | 1/2 | 7/8 | .094 | 1.67 | 12.0 | 9.2 |

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# Bleed Adapters

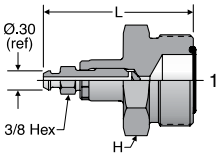
Entrapped air is a major contributor to inefficient operation. Typically, bleeding hydraulic systems is done by "cracking" a connection to "bleed off" the entrapped air. This practice is not recommended, especially in larger size fittings where high forces can exist. Parker's bleed adapters are especially beneficial in applications where elastomeric seals (O-rings) can be extruded and/or damaged during bleeding such as with Parker's Seal-Lok fittings.

Parker's bleed adapters are designed specifically for installation directly to ORFS (O-Ring Face Seal) type fittings or into SAE/NPT manifolds and valves where bleeding is often required.

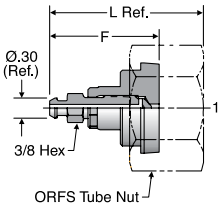
**Product Characteristics**

- Bleed hydraulic systems without "cracking" hydraulic connections
- Uses standard automotive bleed screw design
- Bleed screw is permanently crimped into body housing, for blowout prevention
- In-port options with SAE and NPT male studs
- Tube/hose connection options to male and female ORFS

## ORFS Bleed Adapters




**PNLOBA**




**FNLBA**
ORFS Tube Nut sold separately

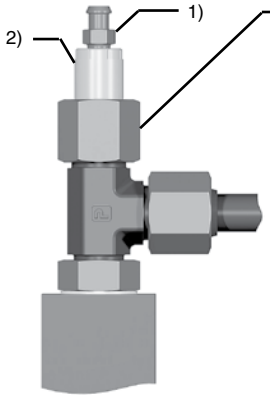
| TUBE FITTING PART # | END SIZE 1 (in.) | F (in.) | H (in.) | L (in.) | Pressure (x 1,000 PSI) Static -S | Pressure (x 1,000 PSI) Dynamic -S |
|---|---|---|---|---|---|---|
| **4 PNLOBA** | 1/4 | - | 11/16 | 1.90 | 12.0 | 9.2 |
| **6 PNLOBA** | 3/8 | - | 3/4 | 1.97 | 12.0 | 9.2 |
| **8 PNLOBA** | 1/2 | - | 7/8 | 2.07 | 12.0 | 9.2 |
| **10 PNLOBA** | 5/8 | - | 1 1/16 | 2.19 | 11.0 | 6.0 |
| **12 PNLOBA** | 3/4 | - | 1 1/4 | 2.27 | 11.0 | 6.0 |
| **16 PNLOBA** | 1 | - | 1 1/2 | 2.35 | 9.5 | 6.0 |
| **20 PNLOBA** | 1 1/4 | - | 1 3/4 | 2.41 | 8.0 | 6.0 |
| **24 PNLOBA** | 1 1/2 | - | 2 1/8 | 2.48 | 6.5 | 5.0 |
| **8 FNLBA** | 1/2 | 1.63 | 15/16 | 2.07 | 12.0 | 9.2 |
| **10 FNLBA** | 5/8 | 1.63 | 1 1/8 | 2.17 | 11.0 | 6.0 |
| **12 FNLBA** | 3/4 | 1.63 | 1 3/8 | 2.21 | 11.0 | 6.0 |
| **16 FNLBA** | 1 | 1.63 | 1 5/8 | 2.21 | 9.5 | 6.0 |
| **20 FNLBA** | 1 1/4 | 1.63 | 1 7/8 | 2.21 | 8.0 | 6.0 |
| **24 FNLBA** | 1 1/2 | 1.63 | 2 1/4 | 2.21 | 6.5 | 5.0 |

## Bleeding Hydraulic Systems with Parker Bleed Adapters

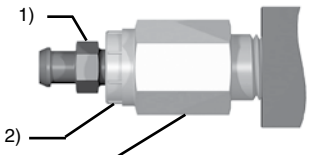
Whenever possible, the bleed adapter should be mounted at the highest point within the hydraulic system. The trapped air can be relieved while the system is running at low pressure. To bleed, loosen the bleed screw 1/2 turn counterclockwise. After the hydraulic fluid begins to run freely from the bleed screw, the bleed screw should be re-tightened.

**Bleed Screw Tightening Torque:** 35-40 in.-lbs.

**Warning:** When bleeding hydraulic fluid, operate the system below 500 psi. To avoid injury, ensure that all persons are clear of the path of discharge. Another recommended practice is to attach a section of hose over the bleed screw/adapter to direct oil away from the area and to reduce oil spillage.

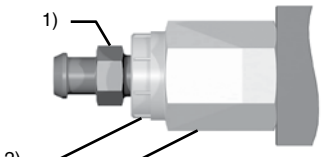



Seal-Lok Bleed Adapter
(Sizes -8 thru -24)
For use with
Seal-Lok Fittings



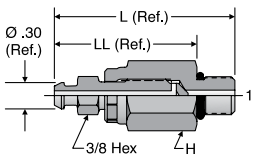

Pipe Thread Bleed Adapter
1/4 NPT
For use with Pipe Thread
Ports

Notes:
1) Standard automotive bleedscrew.
2) Locking crimp prevents screw from being completely unthreaded.

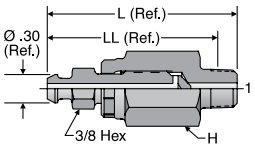



Straight Thread Bleed Adapter
Size 4 (7/16-20 UNF)
For use with SAE Straight
Thread Ports

## Port Bleed Adapters




**4 P5ONBA**




**1/4 HPBA**

| TUBE FITTING PART # | END SIZE 1 | BODY HEX (in.) | H (in.) | L REF. (in.) | LL REF. (in.) | Pressure (x 1,000 PSI) Static -S | Pressure (x 1,000 PSI) Dynamic -S |
|---|---|---|---|---|---|---|---|
| **4 P5ONBA** | 7/16-20 UN/UNF-2A | 11/16 | 11/16 | 2.05 | 1.62 | 10.0 | 6.0 |
| **1/4 HPBA** | 1/4-18 NPTF | 11/16 | 11/16 | 2.20 | 1.86 | 10.0 | 6.0 |

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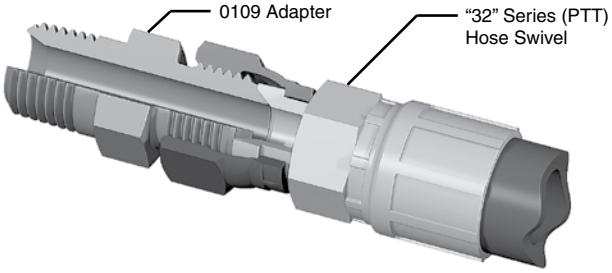
# Parker Triple Thread (PTT) Adapters



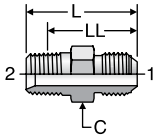

Parker Triple Thread (PTT) adapters are considered the original three-piece hydraulic flared fittings. As an improved fitting design over traditional two-piece flared fittings. Its use was widespread as a primary hydraulic connection for various aircraft, industrial and mobile applications. The PTT 30° flare three-piece design paved the progress towards the standardized 37° connection (through the Joint Industrial Council – JIC) and later to current standardization initiatives of SAE and ISO. Its popularity has been diminished by the more common and standardized 37° flare connection, but even today certain transportation customers utilize PTT hose adapters for OEM and MRO applications.

**Applications:**

- Diesel engine manufacturers
- Transportation air conditioning lines

## 0109

Parker Triple Thread Fitting
NPTF / PTT




Mates with 32 style hose fittings.

| TUBE FITTING PART # | END SIZE 1 (in.) | END SIZE 2 NPTF | C HEX (in.) | L (in.) | LL AFTER ASSY (in.) | Dynamic Pressure (x 1,000 PSI) -S | -SS | -B |
|---|---|---|---|---|---|---|---|---|
| **0109-12-16** | 1 (1 5/16-14) | 3/4-14 | 1 3/8 | 1.84 | 1.36 | 3.0 | | |
| **0109-16-16** | 1 (1 5/16-14) | 1-11 1/2 | 1 3/8 | 2.03 | 1.46 | 3.0 | | |
| **0109-20-20** | 1 1/4 (1 5/8-14) | 1 1/4-11 1/2 | 1 3/4 | 2.22 | 1.63 | 3.0 | | |
| **0109-24-24** | 1 1/2 (1 7/8-14) | 1 1/2-11 1/2 | 2 | 2.50 | 1.91 | 3.0 | | |

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# Screen Fittings

## Introduction

Parker screen fittings ensure the final measure of protection against particles that find their way into a system (even a properly filtrated one) during installation, maintenance, failure of components or by other means. Screen fittings provide a vital safeguard for critical components against damage due to contamination. They are intended to work in conjunction with a good filtration system and are available with screens that retain particle sizes from 480 to 65 micron.

Parker screen fittings are ideal for protecting:

- Gauges and instrumentation
- Critical hydraulic components such as pump compensator load sensing controls, proportional valves, relief valves, etc.
- Precision orifices from clogging
- Expensive components in test bench circuits (against particle contamination created by failed components)

**Fig. M6 — Screen Fittings.**

## Design and Construction

**Fitting Body.** Parker screen fittings utilize standard Seal-Lok O-ring face seal and Triple-Lok 37° fitting bodies located in Section B and C respectively in this catalog. (Refer to the "How to Order" paragraph, later in this section, for a listing of configurations for screen fittings that are offered as standard). All screen fittings are manufactured with the micron rating stamped on the fitting body.

**Screen.** Screen fittings are constructed with stainless-steel screen elements. Sizes -6 through -12 fittings are manufactured with a dome-style screen, while size -4 fittings are made with a basket-style screen (see Fig. M7 and M8). Table M3 displays the various micron ratings for available screens. Additionally, Parker screen fittings have bi-directional flow capacity and can be installed in either the tube or port end of the fitting.

To prevent build up of debris, screens must be replaced or cleaned when filters are replaced or during flushing of hydraulic system.

**Fig. M7 — Six dome-style screens and one basket-style screen.**

| Square Mesh Number | Nominal Micron Rating |
|---|---|
| 40 | 480* |
| 60 | 320* |
| 80 | 230 |
| 100 | 165* |
| 150 | 125 |
| 200 | 100 |
| 325 | 65 |

**These micron ratings are not available as standard from stock*

**Table M3 — Micron Ratings for available screens**

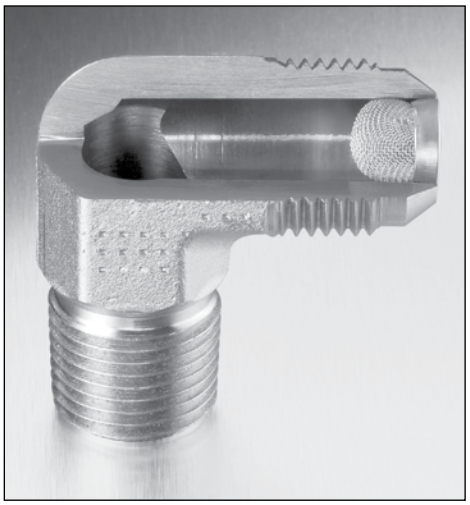

**Fig. M8 — Fitting cutaway with dome-style screen.**

### Pressure Ratings

Parker screen fittings have the same dynamic pressure ratings as the equivalent fitting body (without the screen). Refer to sections A and B for the pressure ratings for Seal-Lok O-ring face seal and Triple-Lok 37° flare fittings.

### How to Order:

Please call the Tube Fittings Division for part number and ordering - 614-279-7070.

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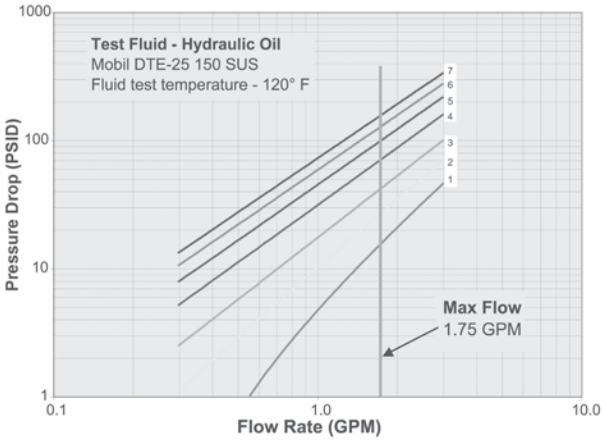
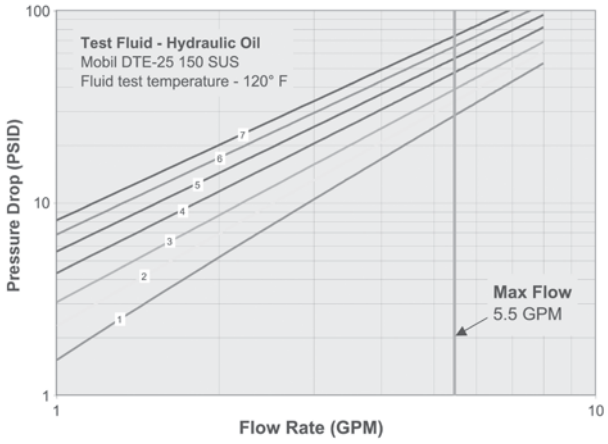
## Pressure Drop

All screen fittings have been tested to determine the maximum pressure drop and screen retention. The following "Pressure Drop vs. Flow" charts were derived from actual test data and may be used as a guide in determining pressure drop at various flow rates through screen fittings for the fluid indicated.

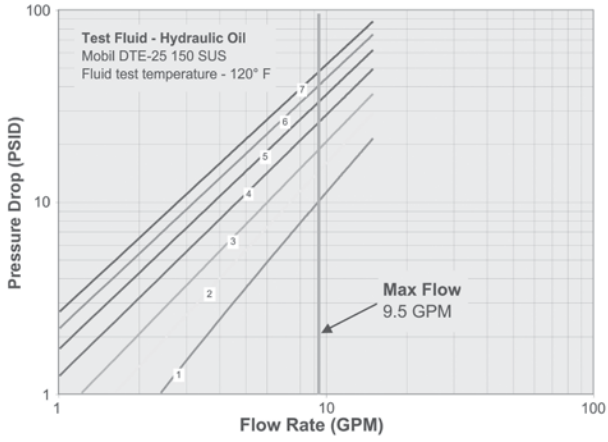
### 4 F5OX Screen Adapter Pressure Drop vs. Flow



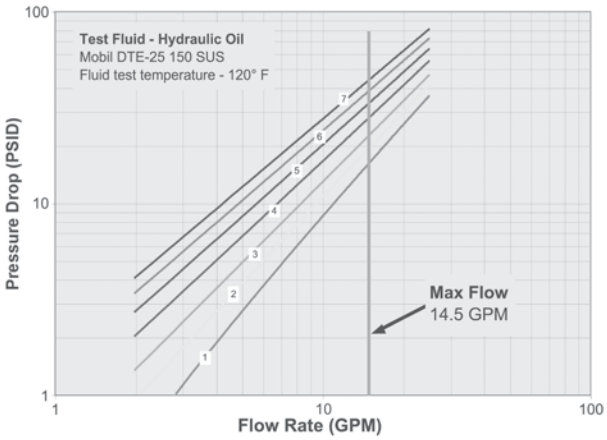

### 6 F5OX Screen Adapter Pressure Drop vs. Flow



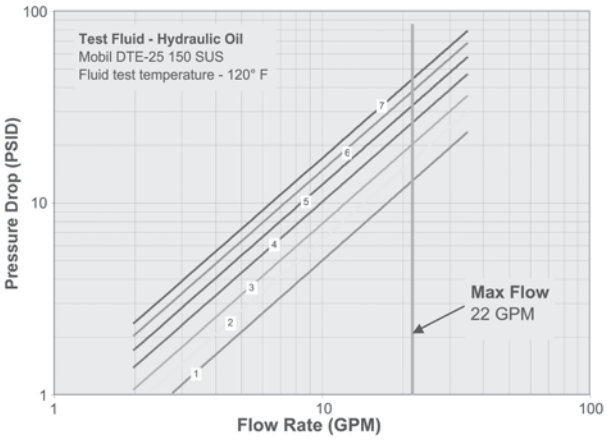

### 8 F5OX Screen Adapter Pressure Drop vs. Flow

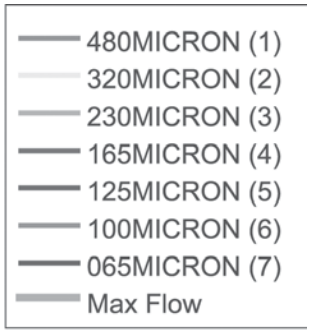



### 10 F5OX Screen Adapter Pressure Drop vs. Flow




### 12 F5OX Screen Adapter Pressure Drop vs. Flow




Refer to the General Technical Section for pressure drop data through standard fitting without screen.

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# O-Rings and Seals

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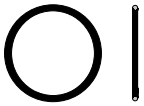
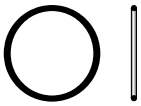
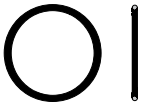
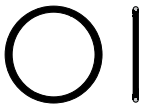
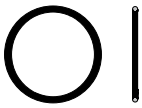
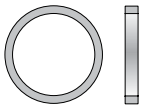
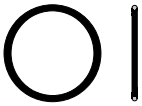
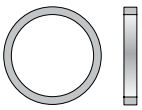
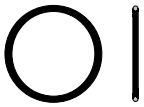
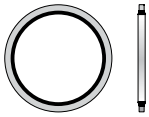
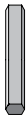
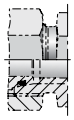
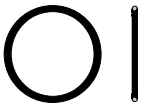
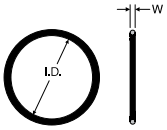
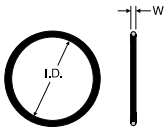
|---|---|---|---|---|---|
| **O-Ring Face Seal** | **ORFS O-Ring**  N4 | **XO O-Ring**  N4 | **Port Ends – SAE, Metric, BSPP, JIS, K4** | **SAE O-Ring**  N4 | **ISO 6149 O-Ring**  N5 |
| **Metric O-Ring**  N5 | **Metric Retaining Ring**  N5 | **BSPP O-Ring**  N6 | **BSPP Retaining Ring**  N6 | **EOlastic Seal Ring** N6 | **JIS B2351 O-Ring**  N7 |
| **BSPP Bonded Seal**  N7 | **EO/EO-2** | **EO-2 Sealing Ring** N7 | **Bonded Seal for Banjo Fittings** N8 | **Metal Seal for Banjo Fittings**  N8 | **Pressure Gauge Sealing Ring** N9 |
| **EO Swivel O-Ring**  N9 | **EO O-Ring** N10 | **4-Bolt Flanges** | **SAE 4-Bolt Flange O-Ring**  N10 | **Dual Seal Flanges** | **Radial Seal O-Ring**   N10 |
| **Flange Seal O-Ring**   N10 | | | | | |



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# O-Ring Material Selection

Standard O-rings supplied with Parker tube fittings and adapters are 90 durometer hard nitrile (Buna-N). These O-rings are well suited for most industrial hydraulic and pneumatic systems. They have high extrusion resistance making them suitable for very high pressure static applications. Optional high temperature fluorocarbon, Parker compound #V0894, is also available for higher temperature specifications.

O-rings for other than normal hydraulic media or higher temperature applications can be selected from the following chart. The chart should be used only as a general guide. Before making final selection for a given application, it is recommended that appropriate tests be conducted to assure compatibility with the fluid, temperature, pressure and other environmental conditions.

For fluids not shown in the chart, please contact the Tube Fittings Division.

| Polymer (Abbreviation) | Recommended for | Not Recommended for | Parker Compound No. | Color | SAE J515 Type | Hardness Shore "A" | Temperature Range (°F) | Comments |
|---|---|---|---|---|---|---|---|---|
| Nitrile-Butadiene (NBR) | Petroleum base oils and fluids, mineral oils, ethylene glycol base fluids, silicone and di-ester base lubricants, air, water under 150°F, and natural gas. | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenated hydrocarbons, and methanol. | NBR | Black | CH[2] | 90 | -30° to 250° F | Standard from stock |
| | | | N0674 | Black | – | 70 | -30° to 250° F | |
| | | | N0103 | Black | – | 70 | -65° to 225° F | |
| | | | N1059 | Black | CH[2] | 90 | -30° to 275° F | Low compression set |
| | | | N0507 | Black | – | 90 | -65° to 180° F | Orange identification dot |
| | | | N0304 | Black | – | 75 | -65° to 225° F | |
| | | | N0508 | Black | – | 75 | -35° to 250° F | Meets FDA requirements for food products |
| | | | N0756 | Black | – | 75 | -65° to 275° F | CNG applications. Standard from stock |
| Ethylene-Propylene (EPDM) | Phosphate ester base hydraulic fluids, hot water, steam to 400°F, silicone oils and greases, dilute acids and alkalis, ketones, alcohols and automotive brake fluids. | Petroleum base oils and di-ester base lubricants. | E0540 | Black | CA[3] | 80 | -65° to 275° F | |
| | | | E0893 | Purple[1] | CA[3] | 80 | -65° to 275° F | |
| | | | E0962 | Black | – | 90 | -65° to 275° F | CO2 climate control systems. H2 fuel cells. |
| Neoprene (CR) | Refrigerants (freons, ammonia), high aniline point petroleum oils, mild acids, and silicate ester lubricants. | Phosphate ester fluids and ketones. | C0873 | Black | – | 70 | -45° to 250° F | |
| | | | C0944 | Red[1] | – | 70 | -45° to 250° F | |
| Fluorocarbon (FKM[5] or FPM) | Petroleum base oils and fluids, some phosphate ester base fluids, silicone and silicate ester base lubricants, di-ester base lubricants, acids and halogenated hydrocarbons. | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, and hot hydrofluoric or chlorosulfonic acids. | V0747 | Black | – | 75 | -15° to 400° F | |
| | | | V0884 | Brown[1] | – | 75 | -15° to 400° F | |
| | | | V0894 | Brown[1] | HK[4] | 90 | -15° to 400° F | Standard from stock. |
| Silicone (Si) | Dry heat (air to 400°F) and high aniline point oils. | Most petroleum fluids, ketones, water and steam. | S0604 | Rust[1] | – | 70 | -65° to 450° F | |

**Table U6 — O-Ring Selection**

1) These Parker "Chromassure" color assurance O-rings are available from the Parker Hannifin O-Ring Division. They help eliminate assembly errors, reduce warranty costs and liability risks, and assure safety in aftermarket business.
2) Formerly SAE Type I.
3) Formerly SAE Type II.
4) Formerly SAE Type III.
5) "FKM" is the ASTM designation for fluorocarbon. Its ISO designation is "FPM".

Note: Use 90 durometer hard O-rings for applications with 1500 psi or higher pressures.

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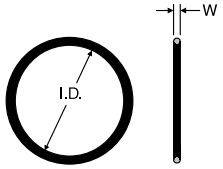
# ORFS O-Ring

ORFS Tube End O-ring

Specify size and compound
Example: 2-018 NBR (standard NBR)




| TUBE FITTING PART # | FITTING DASH SIZE | END SIZE (in.) | END SIZE (mm) | I.D. (in.) | I.D. (mm) | W (in.) | W (mm) | Material NBR* | Material FKM** | Material N0756*** |
|---|---|---|---|---|---|---|---|---|---|---|
| **2-011** | 4 | 1/4 | 6 | 0.30 | 7.7 | 0.07 | 1.78 | • | • | • |
| **2-012** | 6 | 3/8 | 8, 10 | 0.36 | 9.3 | 0.07 | 1.78 | • | • | • |
| **2-014** | 8 | 1/2 | 12 | 0.49 | 12.4 | 0.07 | 1.78 | • | • | • |
| **2-016** | 10 | 5/8 | 14, 15, 16 | 0.61 | 15.6 | 0.07 | 1.78 | • | • | |
| **2-018** | 12 | 3/4 | 18, 20 | 0.74 | 18.8 | 0.07 | 1.78 | • | • | |
| **2-020** | 14 | 7/8 | 22 | 0.86 | 21.8 | 0.07 | 1.78 | • | | |
| **2-021** | 16 | 1 | 25 | 0.93 | 23.5 | 0.07 | 1.78 | • | • | |
| **2-025** | 20 | 1 1/4 | 28, 30, 32 | 1.18 | 29.9 | 0.07 | 1.78 | • | • | |
| **2-029** | 24 | 1 1/2 | 35, 38 | 1.49 | 37.8 | 0.07 | 1.78 | • | • | |
| **2-135** | 32 | 2 | 50 | 1.93 | 49.0 | 0.10 | 2.54 | • | • | |

* NBR is the standard compound — 90-durometer Nitrile.

** FKM is an optional 90-durometer fluorocarbon compound.

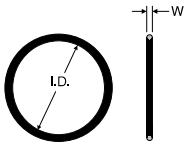
*** N0756 is an optional 75-durometer Nitrile compound for CNG applications.

See page N3 for O-ring Material Selection and data.

# XO O-Ring

Triple-Lok 2 O-Ring

Specify size and compound
Example: 2-019 NBR (standard NBR)

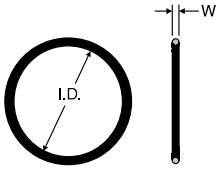



| TUBE FITTING PART # | TUBE O.D. (in.) | I.D. (in.) | W (in.) | Material NBR |
|---|---|---|---|---|
| **5-193** | 1/4 | 0.18 | 0.04 | • |
| **5-179** | 5/16 | 0.24 | 0.04 | • |
| **5-056** | 3/8 | 0.30 | 0.04 | • |
| **5-058** | 1/2 | 0.43 | 0.05 | • |
| **2-013** | 5/8 | 0.43 | 0.07 | • |
| **2-016** | 3/4 | 0.61 | 0.07 | • |
| **2-017** | 7/8 | 0.68 | 0.07 | • |
| **2-019** | 1 | 0.80 | 0.07 | • |
| **2-023** | 1 1/4 | 1.05 | 0.07 | • |
| **2-026** | 1 1/2 | 1.24 | 0.07 | • |
| **2-133** | 2 | 1.80 | 0.10 | • |

# SAE O-Ring

SAE Straight Thread Port O-Ring

Specify size and compound
Example: 3-906 NBR (standard NBR)




| TUBE FITTING PART # | FITTING DASH SIZE | I.D. (in.) | W (in.) | Material NBR* | Material FKM** | Material N0756*** |
|---|---|---|---|---|---|---|
| **3-902** | 2 | 0.24 | 0.06 | • | • | |
| **3-903** | 3 | 0.30 | 0.06 | • | • | |
| **3-904** | 4 | 0.35 | 0.07 | • | • | • |
| **3-905** | 5 | 0.41 | 0.07 | • | • | |
| **3-906** | 6 | 0.47 | 0.08 | • | • | • |
| **3-908** | 8 | 0.64 | 0.09 | • | • | • |
| **3-910** | 10 | 0.76 | 0.10 | • | • | |
| **3-912** | 12 | 0.92 | 0.12 | • | • | |
| **3-914** | 14 | 1.05 | 0.12 | • | • | |
| **3-916** | 16 | 1.17 | 0.12 | • | • | |
| **3-920** | 20 | 1.48 | 0.12 | • | • | |
| **3-924** | 24 | 1.72 | 0.12 | • | • | |
| **3-932** | 32 | 2.34 | 0.12 | • | • | |

* NBR is the standard compound — 90-durometer Nitrile.

** FKM is an optional 90-durometer fluorocarbon compound.

*** N0756 is an optional 75-durometer Nitrile compound for CNG applications.

See page N3 for O-ring Material Selection and data.

Dimensions for reference only, subject to change.



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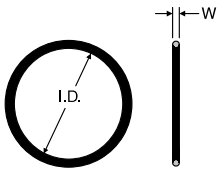
# ISO 6149 O-Ring

Metric Straight Thread
Port O-Ring




Specify size and compound (for option compound only)
Example: M-12 ISO O-RING (standard NBR)
M-12 ISO VITON O-RING (optional FKM)

| TUBE FITTING PART # | PORT THREAD | I.D. (mm) | W (mm) | Material NBR** | Material FKM*** |
|---|---|---|---|---|---|
| **M-8 ISO O-Ring** | M8 x 1 | 6.1 | 1.6 | • | |
| **M-10 ISO O-Ring** | M10 x 1 | 8.1 | 1.6 | • | |
| **M-12 ISO O-Ring** | M12 x 1.5 | 9.3 | 2.2 | • | • |
| **M-14 ISO O-Ring** | M14 x 1.5 | 11.3 | 2.2 | • | • |
| **M-16 ISO O-Ring** | M16 x 1.5 | 13.3 | 2.2 | • | • |
| **M-18 ISO O-Ring** | M18 x 1.5 | 15.3 | 2.2 | • | • |
| **M-22 ISO O-Ring** | M22 x 1.5 | 19.3 | 2.2 | • | • |
| **M-27 ISO O-Ring** | M27 x 2 | 23.6 | 2.9 | • | • |
| ***M-30 ISO O-Ring** | M30 x 2 | 26.6 | 2.9 | • | |
| **M-33 ISO O-Ring** | M33 x 2 | 29.6 | 2.9 | • | • |
| **M-38 ISO O-Ring** | M38 x 2 | 34.6 | 2.9 | • | |
| **M-42 ISO O-Ring** | M42 x 2 | 38.6 | 2.9 | • | • |
| **M-48 ISO O-Ring** | M48 x 2 | 44.6 | 2.9 | • | • |
| **M-60 ISO O-Ring** | M60 x 2 | 56.6 | 2.9 | • | |

* M30X2 is not a standard ISO 6149 size.

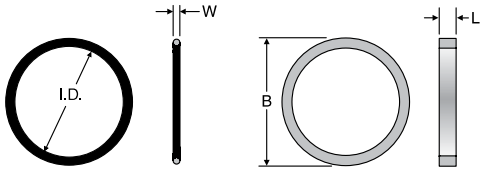
** NBR is the standard compound — 90-durometer peroxide-cured Nitrile.

*** FKM is an optional 90-durometer fluorocarbon compound (for part number, VITON is used eg. M-8 ISO VITON O-RING ).

See page N3 for O-ring Material Selection and data.

# Metric O-Ring & Retaining Ring

For ISO 9974-1 / DIN 3852-1Port




Specify size and compound
Example: 2-012 NBR (standard NBR O-ring)
M12RRCF (standard steel retaining ring)

| TUBE FITTING PART # | METRIC THREAD SIZE | I.D. (mm) | W (mm) | From Stock NBR* | From Stock FKM** | TUBE FITTING PART # | B (mm) | L (mm) | Material CF | Material 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| **3-902** | M8 x 1 | 6.07 | 1.63 | • | • | **M8RR** | 13.15 | 1.00 | • | |
| **6-074** | M10 x 1 | 8.00 | 1.50 | • | • | **M10RR** | 14.75 | 1.00 | • | |
| **2-012** | M12 x 1.5 | 9.25 | 1.78 | • | • | **M12RR** | 17.75 | 1.30 | • | |
| **2-013** | M14 x 1.5 | 10.82 | 1.78 | • | • | **M14RR** | 19.75 | 1.30 | • | |
| **3-907** | M16 x 1.5 | 13.46 | 2.08 | • | • | **M16RR** | 21.75 | 1.50 | • | |
| **2-114** | M18 x 1.5 | 15.54 | 2.62 | • | • | **M18RR** | 23.75 | 2.00 | • | |
| **2-017** | M20 x 1.5 | 17.17 | 1.78 | • | | **M20RR** | 25.75 | 1.30 | • | |
| **2-018** | M22 x 1.5 | 18.77 | 1.78 | • | • | **M22RR** | 27.75 | 1.30 | • | |
| **2-019** | M24 x 1.5 | 20.35 | 1.78 | • | | **M24RR** | 29.75 | 1.30 | • | |
| **2-118** | M26 x 1.5 | 21.89 | 2.62 | • | | **M26RR** | 31.75 | 2.00 | • | |
| **2-119** | M27 x 2 | 23.47 | 2.62 | • | • | **M27RR** | 32.75 | 2.00 | • | |
| **2-121** | M30 x 2 | 26.64 | 2.62 | • | | **M30RR** | 36.32 | 2.00 | • | |
| **2-122** | M33 x 2 | 28.24 | 2.62 | • | | **M33RR** | 39.75 | 2.00 | • | |
| **2-124** | M36 x 2 | 31.42 | 2.62 | • | | **M36RR** | 42.75 | 2.00 | • | |
| **2-128** | M42 x 2 | 37.77 | 2.62 | • | | **M42RR** | 49.75 | 2.00 | • | |
| **2-130** | M45 x 2 | 40.94 | 2.62 | • | | **M45RR** | 52.75 | 2.00 | • | |
| **2-132** | M48 x 2 | 44.12 | 2.62 | • | | **M48RR** | 54.95 | 2.00 | • | |
| **2-133** | M50 x 2 | 45.69 | 2.62 | • | | **M50RR** | 56.31 | 2.00 | • | |

* NBR is the standard compound — 90-durometer Nitrile.

** FKM is an optional 90-durometer fluorocarbon compound.

See page N3 for O-ring Material Selection and data.

Dimensions for reference only, subject to change.



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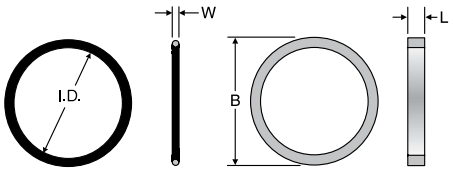
# BSPP O-Ring & Retaining Ring

For ISO 1179-1 / DIN 3852-2 Port




Specify size and compound (for O-ring only)
Example: 2-113 NBR (standard NBR O-ring)
3/8 RETAINING RING (standard steel retaining ring)

| TUBE FITTING PART # | BSPP THREAD SIZE | I.D. (mm) | W (mm) | Material | | TUBE FITTING PART # | B (mm) | L (mm) | Material | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | NBR* | FKM** | | | | S | SS |
| **OR8X2X** | 1/8-28 | 8 | 2 | • | • | **1/8 Retaining Ring** | 15.0 | 1.4 | • | |
| **2-111** | 1/4-19 | 10.77 | 2.62 | • | • | **1/4 Retaining Ring** | 19.5 | 1.9 | • | |
| **2-113** | 3/8-19 | 13.94 | 2.62 | • | • | **3/8 Retaining Ring** | 23.5 | 1.9 | • | |
| **5-256** | 1/2-14 | 17.96 | 2.62 | • | • | **1/2 Retaining Ring** | 28.5 | 1.9 | • | |
| **2-119** | 3/4-14 | 23.47 | 2.62 | • | • | **3/4 Retaining Ring** | 34.5 | 2.6 | • | |
| **2-217** | 1-11 | 29.74 | 3.53 | • | • | **1 Retaining Ring** | 43.5 | 2.6 | • | |
| **2-222** | 1 1/4-11 | 37.69 | 3.53 | • | | **1 1/4 Retaining Ring** | 52.5 | 2.6 | • | |
| **2-224** | 1 1/2-11 | 44.04 | 3.53 | • | | **1 1/2 Retaining Ring** | 60.0 | 2.6 | • | |
| **2-227** | 2-11 | 53.57 | 3.53 | | | **2 Retaining Ring** | 75.0 | 2.6 | | |

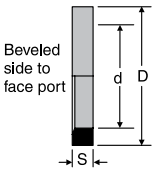
* NBR is the standard compound — 90-durometer Nitrile.

** FKM is an optional 90-durometer fluorocarbon compound.

See page N3 for O-ring Material Selection and data.

# EOlastic Seal Ring

EOlastic Soft Seal for
BSPP & Metric Threads (“ED Seal”)
DIN 3869




Specify size and compound
(for optional compound only)
Example: ED8X1X (standard NBR)
ED8X1VITX (optional FPM)

| TUBE FITTING PART # | For Male Metric Thread | For Male Thread BSPP | D (mm) | d (mm) | S (mm) | Material | |
|---|---|---|---|---|---|---|---|
| | | | | | | NBR* | FKM** |
| **ED8X1X** | M8 x 1 | | 9.9 | 6.5 | 1.0 | • | • |
| **ED10X1X** | M10 x 1 | G 1/8 A | 11.9 | 8.4 | 1.0 | • | • |
| **ED12X1.5X** | M12 x 1.5 | | 14.4 | 9.8 | 1.5 | • | • |
| **ED14X1.5X** | M14 x 1.5 | G 1/4 A | 16.5 | 11.6 | 1.5 | • | • |
| **ED16X1.5X** | M16 x 1.5 | | 18.9 | 13.8 | 1.5 | • | • |
| **ED3/8X** | | G 3/8 A | 18.9 | 14.7 | 1.5 | • | • |
| **ED18X1.5X** | M18 x 1.5 | | 20.9 | 15.7 | 1.5 | • | • |
| **ED20X1.5X** | M20 x 1.5 | | 22.9 | 17.8 | 1.5 | • | • |
| **ED1/2X** | | G 1/2 A | 23.9 | 18.5 | 1.5 | • | • |
| **ED22X1.5X** | M22 x 1.5 | | 24.3 | 19.6 | 1.5 | • | • |
| **ED26X1.5X** | M26 x 1.5 | G 3/4 A | 29.2 | 23.9 | 1.5 | • | • |
| **ED26X1.5X** | M27 x 2 | G 3/4 A | 29.2 | 23.9 | 1.5 | • | • |
| **ED33X2X** | M33 x 2 | G 1 A | 35.7 | 29.7 | 2.0 | • | • |
| **ED42X2X** | M42 x 2 | G 1 1/4 A | 45.8 | 38.8 | 2.0 | • | • |
| **ED48X2X** | M48 x 2 | G 1 1/2 A | 50.7 | 44.7 | 2.0 | • | • |

* NBR is the standard compound — 85-durometer Nitrile.

** FKM is an optional 85-durometer fluorocarbon compound (for part number VIT is used as suffix). Example: ED8X1VITX

Dimensions for reference only, subject to change.



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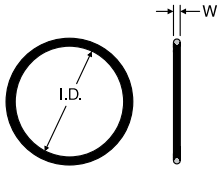
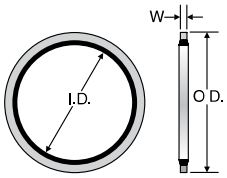
# JIS B2351 O-Ring




| TUBE FITTING PART # | JIS DASH SIZE | T4 THREAD BSPP | I.D. (mm) | W (mm) | JIS B 2401 Description |
|---|---|---|---|---|---|
| **P8 O-RING** | 2 | 1/8-28 | 7.8 | 1.9 | O-RING CLASS 1 B P 8 |
| **P11 O-RING** | 4 | 1/4-19 | 10.8 | 2.4 | O-RING CLASS 1 B P 11 |
| **P14 O-RING** | 6 | 3/8-19 | 13.8 | 2.4 | O-RING CLASS 1 B P 14 |
| **P18 O-RING** | 8 | 1/2-14 | 17.8 | 2.4 | O-RING CLASS 1 B P 18 |
| **P24 O-RING** | 12 | 3/4-14 | 23.7 | 3.5 | O-RING CLASS 1 B P 24 |
| **P29 O-RING** | 16 | 1-11 | 28.7 | 3.5 | O-RING CLASS 1 B P 29 |

* NBR is the standard compound — 90-durometer Nitrile.

# BSPP Bonded Seal

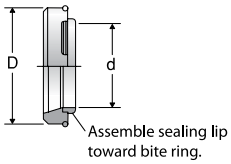



Used on K4 Style Straight Fittings
as a Port Seal
For use with ISO 1179 / DIN 3852-2 port

| TUBE FITTING PART # | BSPP THREAD SIZE | O.D. (mm) | I.D. (mm) | W (mm) | Material S* | Material SS | Material B |
|---|---|---|---|---|---|---|---|
| **D9DT-2** | 1/8-28 | 15.9 | 10.4 | 2.0 | • | | |
| **D9DT-4** | 1/4-19 | 20.6 | 13.7 | 2.0 | • | | |
| **D9DT-6** | 3/8-19 | 23.8 | 17.3 | 2.0 | • | | |
| **D9DT-8** | 1/2-14 | 28.6 | 21.5 | 2.3 | • | | |
| **D9DT-10** | 5/8-14 | 31.8 | 23.5 | 2.3 | • | | |
| **D9DT-12** | 3/4-14 | 34.9 | 27.1 | 2.3 | • | | |
| **D9DT-16** | 1-11 | 42.8 | 33.9 | 2.3 | • | | |
| **D9DT-20** | 1 1/4-11 | 52.4 | 42.9 | 3.3 | • | | |
| **D9DT-24** | 1 1/2-11 | 58.6 | 48.4 | 3.3 | • | | |

* NBR is the standard elastomer compound — 90-durometer Nitrile
Zinc plated steel ring

# EO-2 Sealing Ring




Specify size and material
Examples:
DOZ10S (standard steel with NBR)
DOZ10SVIT (standard steel with FKM)
DOZ10S71 (standard stainless steel with FKM)

| TUBE FITTING PART # | SERIES | TUBE O.D. (mm) | D (mm) | d (mm) | Material S NBR* | Material S FKM** | Material SS FKM*** |
|---|---|---|---|---|---|---|---|
| **DOZ04LL** | LL | 4 | 6.8 | 4 | • | | |
| **DOZ06LL** | very light | 6 | 8.8 | 6 | • | | |
| **DOZ06L** | L | 6 | 10.3 | 6 | • | • | • |
| **DOZ08L** | light | 8 | 12.3 | 8 | • | • | • |
| **DOZ10L** | | 10 | 14.3 | 10 | • | • | • |
| **DOZ12L** | | 12 | 16.3 | 12 | • | • | • |
| **DOZ15L** | | 15 | 20.3 | 15 | • | • | • |
| **DOZ18L** | | 18 | 24.3 | 18 | • | • | • |
| **DOZ22L** | | 22 | 27.7 | 22 | • | • | • |
| **DOZ28L** | | 28 | 33.7 | 38 | • | • | • |
| **DOZ35L** | | 35 | 42.7 | 35 | • | • | • |
| **DOZ42L** | | 42 | 49.7 | 42 | • | • | • |
| **DOZ06S** | S | 6 | 12.3 | 6 | • | • | • |
| **DOZ08S** | heavy | 8 | 14.3 | 8 | • | • | • |
| **DOZ10S** | | 10 | 16.3 | 10 | • | • | • |
| **DOZ12S** | | 12 | 18.3 | 12 | • | • | • |
| **DOZ14S** | | 14 | 20.3 | 14 | • | • | • |
| **DOZ16S** | | 16 | 22.3 | 16 | • | • | • |
| **DOZ20S** | | 20 | 27.7 | 20 | • | • | • |
| **DOZ25S** | | 25 | 33.7 | 25 | • | • | • |
| **DOZ30S** | | 30 | 39.7 | 30 | • | • | • |
| **DOZ38S** | | 38 | 49.7 | 38 | • | • | • |

* Steel black zinc plated with NBR 90-durometer Nitrile compound.
** Steel black zinc plated with FKM 90-durometer fluorocarbon compound.
*** Stainless steel with FKM 90-durometer fluorocarbon compound.

Dimensions for reference only, subject to change.



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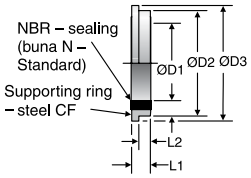
# Bonded Seal for Banjo Fittings

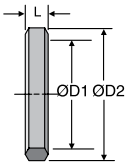



Specify size and material

Examples: KDS 12X (standard steel with NBR)
KDS 12VITX (standard steel with FKM)
KDS 1271 (standard stainless steel with PTFE)

| TUBE FITTING PART # | FOR USE WITH WH & TH BANJOS | THREAD | D1 (mm) | D2 (mm) | D3 (mm) | L1 (mm) | L2 (mm) | Material CF | Material 71 |
|---|---|---|---|---|---|---|---|---|---|
| **KDS10** | 6-LM/LR | M10 x 1/G1/8A | 10.3 | 14.9 | 16.0 | 2.5 | 1.1 | • | |
| **KDS12** | 6-SM/8-LM | M12 x 1.5 | 12.3 | 17.0 | 18.0 | 3.0 | 1.6 | • | |
| **KDS14** | 6-SR, 8-LR/SM/SR, 10-LM/LR | M14 x 1.5/G1/4A | 14.3 | 18.9 | 20.0 | 3.0 | 1.6 | • | |
| **KDS16** | 10-SM/SR, 12-LM/LR/SR | M16 x 1.5/G3/8A | 17 | 21.9 | 24.0 | 3.0 | 2.1 | • | |
| **KDS18** | 12-SM/15-LM | M18 x 1.5 | 18.3 | 23.9 | 23.9 | 3.0 | — | • | |
| **KDS22** | 15-LR, 16-SM/SR, 18-LM/LR | M22 x 1.5/G1/2A | 22.3 | 26.9 | 30.0 | 4.5 | 2.6 | • | |
| **KDS26** | 22-LM | M26 x 1.5 | 26.3 | 31.9 | 35.0 | 3.5 | 2.6 | • | |
| **KDS27** | 20-SM/SR, 22-LR | M27 x 2/G3/4A | 27.3 | 32.9 | 38.0 | 3.5 | 2.6 | • | |
| **KDS33** | 25-SM/SR, 28-LM/LR | M33 x 2/G1A | 33.6 | 39.9 | 42.0 | 3.5 | 2.6 | • | |
| **KDS42** | 30-SM/SR, 35-LM/LR | M42 x 2/G1 1/4A | 42.4 | 49.9 | 49.9 | 3.5 | — | • | |
| **KDS48** | 38-SM/SR, 42-LM/LR | M48 x 2/G1 1/2A | 48.4 | 55.9 | 60.0 | 3.5 | 2.6 | • | |

# Metal Seal for Banjo Fittings




Specify size and material

Examples: DKA1/8CFX (steel)
DKA1/871X (stainless steel)

| TUBE FITTING PART # | FOR APPLICATION IN BANJOS: WH / TH | | SWVE | | THREAD | D1 (mm) | D2 (mm) | L (mm) | Material CFX | Material 71X |
|---|---|---|---|---|---|---|---|---|---|---|
| **BSPP** | | | | | | | | | | |
| **DKA1/8** | 6LR | | 4/6/8 LLR | 6LR | G 1/8 A | 9.8 | 14 | 2.5 | • | • |
| **DKA1/4** | 8LR | 6SR | 8LR | 6SR | G 1/4 A | 13.3 | 18 | 3.0 | • | • |
| **DKA1/4** | 10LR | 8SR | 10LR | 8SR | G 1/4 A | 13.3 | 18 | 3.0 | • | • |
| **DKA3/8** | 12LR | 10SR | 12LR | 10SR | G 3/8 A | 16.8 | 22 | 3.0 | • | • |
| **DKA3/8** | | 12SR | | 12SR | G 3/8 A | 16.8 | 22 | 3.0 | • | • |
| **DKA1/2** | | | 15/18LR | 14/16SR | G 1/2 A | 21.1 | 26 | 3.0 | • | |
| **DKA1/2X4.5** | 15LR | 14SR | | | G 1/2 A | 21.1 | 26 | 4.5 | • | • |
| **DKA1/2X4.5** | 18LR | 16SR | | | G 1/2 A | 21.1 | 26 | 4.5 | • | • |
| **DKA3/4** | 22LR | 20SR | 22LR | 20SR | G 3/4 A | 26.6 | 32 | 3.5 | • | • |
| **DKA1** | 28LR | 25SR | | | G 1 A | 33.4 | 39 | 3.5 | • | • |
| **DKA11/4** | 35LR | 30SR | | | G 11/4 A | 42.1 | 49 | 3.5 | • | • |
| **DKA11/2** | 42LR | 38SR | | | G 11/2 A | 48.1 | 55 | 3.5 | • | • |
| **Metric** | | | | | | | | | | |
| **DKA10** | 6LM | | 6/8LLM | 6LM | M10 x 1 | 10.1 | 14 | 2.5 | • | • |
| **DKA12** | 8LM | 6SM | 8LM | 6SM | M12 x 1.5 | 12.1 | 17 | 3.0 | • | • |
| **DKA14** | 10LM | 8SM | 10LM | 8SM | M14 x 1.5 | 14.1 | 19 | 3.0 | • | • |
| **DKA16** | 12LM | 10SM | 12LM | 10SM | M16 x 1.5 | 16.1 | 21 | 3.0 | • | • |
| **DKA18** | 15LM | 12SM | 15LM | 12SM | M18 x 1.5 | 18.1 | 23 | 3.0 | • | • |
| **DKA20** | | 14SM | | 14SM | M20 x 1.5 | 20.1 | 25 | 3.0 | • | • |
| **DKA22** | | | 18LM | 16SM | M22 x 1.5 | 22.1 | 27 | 3.0 | • | • |
| **DKA22X4.5** | 18LM | 16SM | | | M22 x 1.5 | 22.1 | 27 | 4.5 | • | |
| **DKA26** | | | 22LM | | M26 x 1.5 | 26.1 | 31 | 3.0 | • | |
| **DKA26X3.5** | 22LM | | | | M26 x 1.5 | 26.1 | 31 | 3.5 | • | • |
| **DKA27** | | 20SM | | 20SM | M27 x 2 | 27.1 | 32 | 3.5 | • | • |
| **DKA33** | 28LM | 25SM | | | M33 x 2 | 33.1 | 39 | 3.5 | • | • |
| **DKA11/4** | 35LM | 30SM | | | M42 x 2 | 42.1 | 49 | 3.5 | • | • |
| **DKA11/2** | 42LM | 38SM | | | M48 x 2 | 48.1 | 55 | 3.5 | • | • |

Dimensions for reference only, subject to change.



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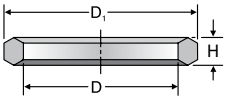
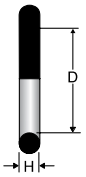
# Pressure Gauge Sealing Ring




Specify size and material
Examples: DKI1/2CFX (steel)
DKI1/271X (stainless steel)

| TUBE FITTING PART # | FOR INTERNAL BSPP THREAD | D (mm) | D1 (mm) | H (mm) | Material | | |
|---|---|---|---|---|---|---|---|
| | | | | | CFX | 71 | COPPER |
| **DKI1/4** | G 1/4 - 19 | 6.0 | 11.3 | 4.5 | • | | |
| **DKI1/2** | G 1/2 - 19 | 12.0 | 18.5 | 5.0 | • | • | |
| **M25180** | G 1/4 | 6.4 | 11.0 | 1.6 | | | • |

# EO Swivel O-Ring




O-ring for EO Swivel Nuts, Weld Nipples, and Caps
Part Numbers: RED, DA, GZ, GZR, EGE, EGEO, SKA, EW, ET, EL, VKA, MAVE

| EO SIZE/SERIES | O-RING NBR* | D | H | O-RING FKM[2] | D | H |
|---|---|---|---|---|---|---|
| 6L | **OR4.5X1.5X** | 4.5 | 1.5 | **OR4.5X1.5VITX** | 4.5 | 1.5 |
| 8L | **OR6.5X1.5X** | 6.5 | 1.5 | **OR6.5X1.5VITX** | 6.5 | 1.5 |
| 10L | **OR8.5X1.5X** | 8.5 | 1.5 | **OR8X1.5VITX** | 8.0 | 1.5 |
| 12L | **OR10.5X1.5X** | 10.5 | 1.5 | **OR10X1.5VITX** | 10.0 | 1.5 |
| 15L | **OR12.5X2X** | 12.5 | 2.0 | **OR12X2VITX** | 12.0 | 2.0 |
| 18L | **OR16X2X** | 16.0 | 2.0 | **OR15X2VITX** | 15.0 | 2.0 |
| 22L | **OR20X2X** | 20.0 | 2.0 | **OR20X2VITX** | 20.0 | 2.0 |
| 28L | **OR26X2X** | 26.0 | 2.0 | **OR26X2VITX** | 26.0 | 2.0 |
| 35L | **OR32X2.5X** | 32.0 | 2.5 | **OR32X2.5VITX** | 32.0 | 2.5 |
| 42L | **OR39X2.5X** | 39.0 | 2.5 | **OR38X2.5VITX** | 38.0 | 2.5 |
| 6S | **OR4.5X1.5X** | 4.5 | 1.5 | **OR4.5X1.5VITX** | 4.5 | 1.5 |
| 8S | **OR6.5X1.5X** | 6.5 | 1.5 | **OR6.5X1.5VITX** | 6.5 | 1.5 |
| 10S | **OR8.5X1.5X** | 8.5 | 1.5 | **OR8X1.5VITX** | 8.0 | 1.5 |
| 12S | **OR10.5X1.5X** | 10.5 | 1.5 | **OR10X1.5VITX** | 10.0 | 1.5 |
| 14S | **OR12X2X** | 12.0 | 2.0 | **OR12X2VITX** | 12.0 | 2.0 |
| 16S | **OR14X2X** | 14.0 | 2.0 | **OR13X2VITX** | 13.0 | 2.0 |
| 20S | **OR17X2.5X** | 17.0 | 2.5 | **OR16.3X2.4VITX** | 16.3 | 2.4 |
| 25S | **OR22X2.5X** | 22.0 | 2.5 | **OR20.3X2.4VITX** | 20.3 | 2.4 |
| 30S | **OR27X2.5X** | 27.0 | 2.5 | **OR25.3X2.4VITX** | 25.3 | 2.4 |
| 38S | **OR35X2.5X** | 35.0 | 2.5 | **OR33.3X2.4VITX** | 33.3 | 2.4 |

[1]NBR is standard compound — 90-durometer Nitrile.
[2]FKM is optional 85-durometer Fluorocarbon compound.

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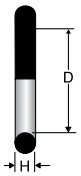
# EO O-Ring

O-ring for EO Banjo Fitting Bolts
Part Numbers: WH/TH



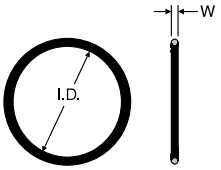

| BANJO BOLT METRIC THREAD | BANJO BOLT BSPP THREAD | D | H | O-RING NBR* | O-RING FKM** |
|---|---|---|---|---|---|
| M10 | G 1/8 | 9.3 | 1.5 | **OR9.3X1.5X** | **OR9.3X1.5VITX** |
| M12, M14 | G 1/4 | 12.5 | 1.5 | **OR12.5X1.5X** | **OR12.5X1.5VITX** |
| M16 | G 3/8 | 16.0 | 1.5 | **OR16X1.5X** | **OR16X1.5VITX** |
| M18 | | 18.0 | 1.5 | **OR18X1.5X** | **OR18X1.5VITX** |
| M20, M22 | G 1/2 | 20.0 | 1.5 | **OR20X1.5X** | **OR20X1.5VITX** |
| M26, M27 | G 3/4 | 25.0 | 2.0 | **OR25X2X** | **OR25X2VITX** |
| M33 | G 1 | 33.0 | 2.5 | **OR33X2.5X** | **OR33X2.5VITX** |
| M42 | G 1 1/4 | 41.0 | 2.5 | **OR41X2.5X** | **OR41X2.5VITX** |
| M48 | G 1 1/2 | 46.0 | 3.0 | **OR46X3X** | **OR46X3VITX** |

*NBR is standard compound — 90-durometer Nitrile.

**FKM is optional 85-durometer Fluorocarbon compound.

# SAE 4-Bolt Flange O-Ring

Code 61 and Code 62 Flanges




Specify size and compound
Example: 2-210 NBR

| TUBE FITTING PART # | HOSE PRODUCTS DIVISION PART # 1) | FITTING DASH SIZE | W (in.) | I.D. (in.) | Material NBR* |
|---|---|---|---|---|---|
| **2-210** | 711510-6 | 8 | 0.139 | 0.734 | • |
| **2-214** | 711510-5 | 12 | 0.139 | 0.984 | • |
| **2-219** | 711510-4 | 16 | 0.139 | 1.296 | • |
| **2-222** | 711510-3 | 20 | 0.139 | 1.484 | • |
| **2-225** | 711510-2 | 24 | 0.139 | 1.859 | • |
| **2-228** | 711510-1 | 32 | 0.139 | 2.234 | • |
| **2-232** | 711510-7 | 40 | 0.139 | 2.734 | • |
| **2-237** | 711510-8 | 48 | 0.139 | 3.359 | • |
| **2-241** | | 56 | 0.139 | 3.859 | • |
| **2-245** | | 64 | 0.139 | 4.359 | • |
| **2-253** | | 80 | 0.139 | 5.359 | • |

* NBR is the standard compound — 90-durometer Nitrile.

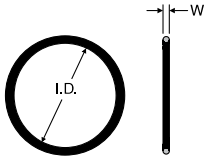
O-ring for DIN 2353 EO Gear Pump Flange Adapters
Part Numbers: BFG/BFW

| FLANGE SERIES "LK" | D | H | O-RING NBR* |
|---|---|---|---|
| LK35 | 20.0 | 2.5 | **OR20X2.5X** |
| LK40 | 26.0 | 2.5 | **OR26X2.5X** |
| LK55 | 33.0 | 2.5 | **OR33X2.5X** |

*NBR is standard compound — 90-durometer Nitrile.

# Radial Seal O-Ring

Dual Seal Port O-Ring

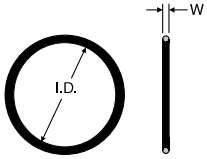



| TUBE FITTING PART # | END SIZE 2 DUAL SEAL | W (in.) | I.D. (in.) |
|---|---|---|---|
| **2-113** | 1/2 | 0.103 | 0.549 |
| **2-123** | 1 | 0.103 | 1.174 |
| **2-129** | 1 1/2 | 0.103 | 1.549 |

Standard O-ring compound - 90 durometer NBR. Ordering example with material: 2-113 NBR.

# Flange Seal O-Ring

Dual Seal Flange Head O-Ring




| TUBE FITTING PART # | END SIZE 2 DUAL SEAL | W (in.) | I.D. (in.) |
|---|---|---|---|
| **2-022** | 1/2 | 0.070 | 0.989 |
| **2-129** | 1 | 0.103 | 1.549 |
| **2-136** | 1 1/2 | 0.103 | 1.987 |

Standard O-ring compound - 90 durometer NBR.

Dimensions for reference only, subject to change.



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# ParKlamp Inch Tube Clamps

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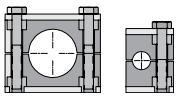
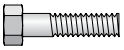
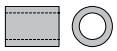
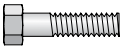
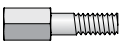
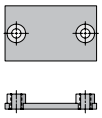
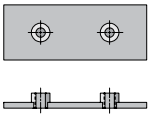
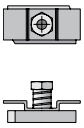
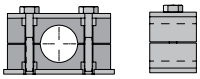
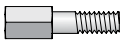
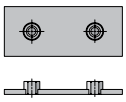
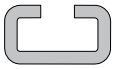
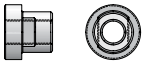
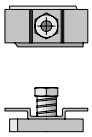
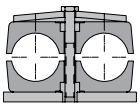
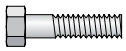
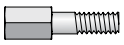
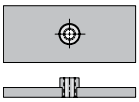
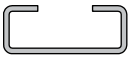
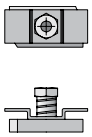
| **Standard Series** | **Clamp Halves**<br>  <br>O7 | **CP**<br>Cover Plate<br> <br>O8 | **BCP**<br>Hexagon Head Bolt for Cover Plate<br>  <br>O8 | **IPS**<br>Insert<br>  <br>O8 | **BIP**<br>Hexagon Head Bolt for Insert<br>  <br>O8 |
| **LP**<br>Locking Plate<br> <br>O8 | **SB**<br>Stacking Bolt<br>  <br>O8 | **WP**<br>Weld Plate<br>  <br>O9 | **WPE**<br>Weld Plate Elongated<br>  <br>O9 | **R**<br>Mounting Rail<br> <br>O9 | **HRN**<br>Hexagon Rail Nut<br> <br>O9 |
| **CRA**<br>Channel Rail Adapter<br>  <br>O9 | **Heavy Series** | **Clamp Halves**<br>Heavy<br>  <br>O10 | **CPH**<br>Cover Plate Heavy<br> <br>O11 | **BCPH**<br>Hexagon Head Bolt for Cover Plate<br> <br>O11 | **LPH**<br>Locking Plate Heavy<br> <br>O11 |
| **SBH**<br>Stacking Bolt Heavy<br>  <br>O11 | **WPH**<br>Weld Plate Heavy<br>  <br>O11 | **RH**<br>Mounting Rail Heavy<br>  <br>O12 | **RNH**<br>Mounting Rail Nut Heavy<br>  <br>O12 | **CRA**<br>Channel Rail Adatper<br>  <br>O12 | |
| **Twin Series** | **Clamp Halves**<br>  <br>O13 | **CPT**<br>Cover Plate<br> <br>O14 | **BCPT**<br>Hexagon Head Bolt for Cover Plate<br>  <br>O14 | **LPT**<br>Locking Plate<br> <br>O14 | **SBT**<br>Stacking Bolt<br>  <br>O14 |
| **WPT**<br>Weld Plate Twin<br>  <br>O15 | **R**<br>Mounting Rail<br>  <br>O15 | **RNT**<br>Mounting Rail Nut Twin<br> <br>O15 | **CRA**<br>Channel Rail Adapter<br>  <br>O15 | | |



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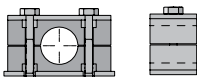
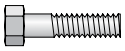
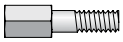
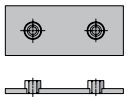
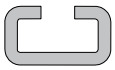
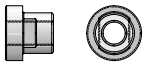
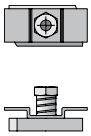
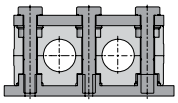
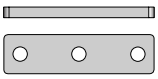
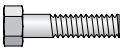
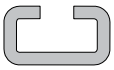
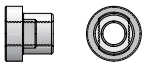
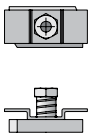
| **Compact Spiral Hose Heavy Series** | **Clamp Halves**<br>Heavy<br>  <br>O16 | **CPH**<br>Cover Plate Heavy<br> <br>O17 | **BCPH**<br>Hexagon Head Bolt for Cover Plate<br>  <br>O17 | **LPH**<br>Locking Plate Heavy<br> <br>O17 | **SBH**<br>Stacking Bolt Heavy<br>  <br>O17 |
| **WPH**<br>Weld Plate Heavy<br>  <br>O17 | **RH**<br>Mounting Rail Heavy<br>  <br>O18 | **RNH**<br>Mounting Rail Nut Heavy<br>  <br>O18 | **CRA**<br>Channel Rail Adatper<br>  <br>O18 | **Compact Spiral Hose Heavy Twin** | **Clamp Halves**<br>Heavy Twin<br>  <br>O19 |
| **CPHT**<br>Cover Plate<br>  <br>O20 | **BCPH**<br>Hexagon Head Bolt for Cover Plate<br>  <br>O20 | **WPHT**<br>Weld Plate<br> <br>O20 | **RH**<br>Mounting Rail Heavy<br>  <br>O20 | **RNH**<br>Mounting Rail Nut Heavy<br>  <br>O20 | **CRA**<br>Channel Rail Adatper<br>  <br>O20 |

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Dimensions and pressures for reference only, subject to change.



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# Introduction

The ParKlamp system is designed for restraining tube, pipe and hose assemblies against unwanted and potentially harmful effects of mechanical shock and vibration forces that are common in fluid power systems.

The clamping system is the most commonly overlooked aspect of fluid power system design. Failure to properly restrain the fluid conductors can result in leakage, downtime and system malfunction, as well as significantly reduce the life of tube, pipe and hose assemblies. With the ParKlamp system, the risk of problems resulting from mechanical shock and vibration can be significantly reduced.

# Design and Construction

Designed to meet the basic envelope dimensions of DIN 3015, Part 1, the ParKlamp plastic clamp halves are interchangeable with the Parker metric clamp system. The primary difference between these two clamping systems is the utilization of inch, as opposed to metric, thread hardware in the ParKlamp system. All plastic clamp halves in the ParKlamp system are manufactured from Polypropylene material. The hardware portion of the ParKlamp system is available in plated steel and stainless steel.

For convenience, the ParKlamp system is divided into three different series: Standard, Heavy and Twin. Each series has corresponding components, physical dimensions and mechanical properties. Within each series, there are a number of groups, each with specific envelope dimensions. Components from different series and/or groups can not be intermixed. However, the standard and twin series can be mounting on the same mounting rail.

# How It Works

The ParKlamp system has two primary methods for mounting: weld plates and mounting rails.

**Clamps should be mounted to a rigid structure for optimum performance. Clamping tube, pipe or hose assemblies together without mounting them to a rigid structure, often called "floating clamps," does not provide adequate support.**

**Proper design of a clamping system requires that the clamps be positioned appropriately on the tube, pipe or hose assemblies. See the Assembly and Installation section of this catalog for more information on clamp location and spacing.**

**Weld Plate Mounting** (Fig. O1)

The weld plate mounting system allows the user to attach a single clamp assembly to a structure of similar material (steel to steel, etc) by welding the components together. Once the weld plate is attached to a structure, one clamp halve can be placed onto the weld plate, followed by the tube, pipe or hose assembly. Next, the second plastic clamp halve can be placed on the tube, pipe or hose assembly, followed by the cover plate (or Insert). To complete the assembly, the Hex Head attachment bolts are inserted into the assembly and tightened to the torque shown in the Assembly section of this catalog.

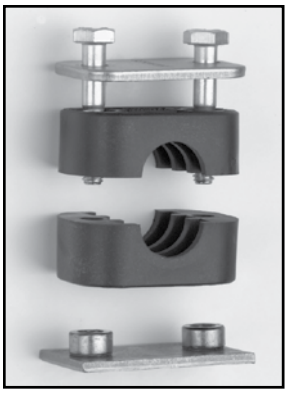

**Fig. O1 – Weld Plate Assembly**

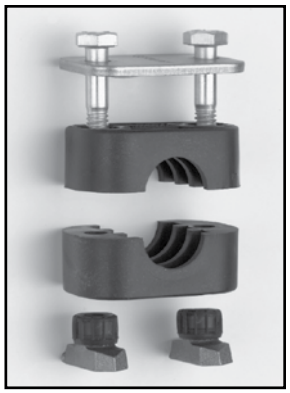

**Fig. O2 – Mounting Rail Assembly**

# Assembly and Installation

Please refer to Section S for the assembly and installation instructions for ParKlamp Inch Tube Clamps.

**Mounting Rail Mounting** (Fig. O2)

Use of a mounting rail is another way to assemble the clamping system components onto a support structure. Using a mounting rail allows multiple clamps to be mounted side-by-side for restraining a group of tube, pipe, or hose assemblies. The mounting rail also provides the ability to move the location of the clamps in one direction for easier alignment. The rail can be attached to a support structure by welding or bolting. Once the mounting rail is in place, rail nuts can be slid into the rail. The first clamp halve, followed by the tube, pipe or hose assembly, can then be installed over the corresponding rail nuts. After this, the second clamp half, the cover plate (or Insert) and the hex head attachment bolts can be installed to complete the assembly.

**Stacking** (Fig. O3)

A primary feature of the ParKlamp system is its ability to accommodate stacking of a series of clamps to various heights, thus requiring a smaller footprint for mounting. To do this, simply use the stacking bolts to mount the first clamp assembly, then install a stacking plate over the first clamp and stacking bolts. The second clamp assembly can then be placed over the first clamp assembly. Complete the mounting by assembling a cover plate and using the hex head bolts to tighten the upper clamp assembly. **Note: When stacking, the clamps must be from the same series and group.**

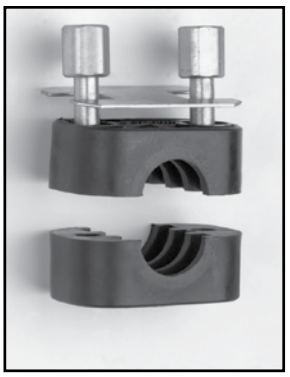

**Fig. O3 – Stacked Assembly**

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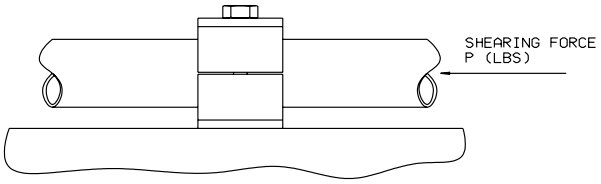
# Shearing Force Diagram

The forces shown in these diagrams represent the resistance to sliding provided by the clamps in the axial direction.

The sliding starts when the shown values are reached.

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| STANDARD SERIES | | | | | |
|---|---|---|---|---|---|
| Clamp Group | Hexagon Head Bolt | Polypropylene Tightening torque [Nm] Ft/lb | | Polypropylene Max. load in pipe direction F [kN] lbf | |
| 1 | | 8 | 6 | 0,6 | 135 |
| 1A | | 8 | 6 | 1,1 | 247 |
| 2 | M6 / 1/4"-20 | 8 | 6 | 1,3 | 292 |
| 3 | UNC | 8 | 6 | 1,4 | 315 |
| 4 | | 8 | 6 | 1,5 | 337 |
| 5 | | 8 | 6 | 1,9 | 427 |
| 6 | | 8 | 6 | 2,0 | 450 |

| HEAVY SERIES | | | | | |
|---|---|---|---|---|---|
| Clamp Group | Hexagon Head Bolt | Polypropylene Tightening torque [Nm] Ft/lb | | Polypropylene Max. load in pipe direction F [kN] lbf | |
| 3S | M10 / 3/8"- | 12 | 9 | 1,6 | 360 |
| 4S | 16 UNC | 12 | 9 | 2,9 | 652 |
| 5S | M12 / 7/16" - | 15 | 11 | 3,3 | 742 |
| 6S | 14 UNC | 30 | 12 | 8,2 | 1.843 |

# Clamp Body Material Properties

| | Polypropylene PP |
|---|---|
| **MECHANICAL PROPERTIES** | |
| Density | .901g/cc |
| Tensile Strength | 25 MPa |
| | (4,000 psi) |
| Flexural Modulus | 1073 MPa |
| Compressive | |
| Strength | 90MPa |
| (Resistance) | (23,050 psi) |
| Notched | |
| IZOD Impact Strength | 3.1 KJ/mm$^2$ |

| | Polypropylene PP |
|---|---|
| **THERMAL PROPERTIES** | |
| Max. Temperature | -30° to +90° C |
| Resistance | -22° to +194°F |
| **ELECTRICAL PROPERTIES** | |
| Specific Volume | |
| Resistivity Ohm x Inch | 3.9 x $10^{17}$ |
| **CHEMICAL PROPERTIES** | |
| Light Acids, Solvents | Stable |
| Fuels, Mineral Oils | Stable |
| Alcohol, Paints, Saltwater | Stable |



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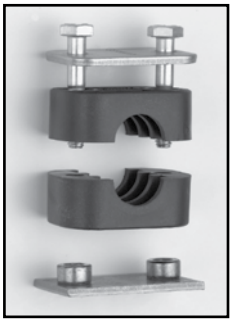
# How to Order ParKlamp Kits

Select a symbol from Box 1 and pair it with a symbol from Box 2 to create a part number for the kit.

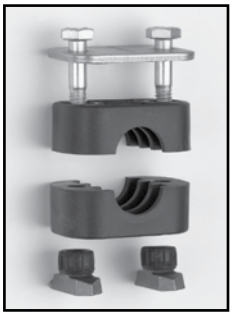
**Example:** Weld Plate Kit – Twin Series for 3/4" tube.

| Box 1 | Box 2 |
|---|---|
| WPT | 3190 |

| Box 1 : Mounting – Assembly Type | |
|---|---|
| **Symbol** | **Description** |
| WP | Weld Plate Kit – Standard Series |
| WPH | Weld Plate Kit – Heavy Series |
| WPE | Elongated Weld Plate Kit – Standard Series |
| WPT | Weld Plate Kit – Twin Series |
| RN | Rail Nut Kit – Standard Series |
| RNH | Rail Nut Kit – Heavy Series |
| RNT | Rail Nut Kit – Twin Series |
| SA | Stacked Assembly Kit – Standard Series |
| SAH | Stacked Assembly Kit – Heavy Series |
| SAT | Stacked Assembly Kit – Twin Series |



**Weld Plate Kit**



**Mounting Rail Kit**

**Stacked Assembly Kit**

| Box 2: Clamp Half – Size/Type Designation | | | |
|---|---|---|---|
| **Symbol** | **Size** | **Type** | **Series** |
| 1064 | 1/4" | Tube | Standard – Twin |
| 1064A | 1/4" | Tube | Standard |
| 3134H | 1/4" | 100R1 Hose | Standard |
| 4150H | 1/4" | 100R2 Hose | Heavy |
| 1095 | 3/8" | Tube | Standard – Twin |
| 3095 | 3/8" | Tube | Heavy |
| 1095A | 3/8" | Tube | Standard |
| 3174H | 3/8" | 100R1 Hose | Standard |
| 4198H | 3/8" | 100R2 Hose | Heavy |
| 2127 | 1/2" | Tube | Standard |
| 3127 | 1/2" | Tube | Heavy |
| 3205H | 1/2" | 100R1 Hose | Standard |
| 4221H | 1/2" | 100R2 Hose | Heavy |
| 3213 | 1/2" | Pipe | Standard |
| 4213 | 1/2" | Pipe | Heavy |
| 2160 | 5/8" | Tube | Standard – Twin |
| 3160 | 5/8" | Tube | Heavy |
| 3239H | 5/8" | 100R1 Hose | Standard |
| 4251H | 5/8" | 100R2 Hose | Heavy |
| 3190 | 3/4" | Tube | Standard – Twin |
| 4190 | 3/4" | Tube | Heavy |
| 5278H | 3/4" | 100R1 Hose | Standard |
| 4292H | 3/4" | 100R2 Hose | Heavy |
| 4266 | 3/4" | Pipe | Standard – Twin |
| 4267 | 3/4" | Pipe | Heavy |
| 3254 | 1" | Tube | Standard – Twin |
| 4254 | 1" | Tube | Heavy |
| 5357H | 1" | 100R1 Hose | Standard |
| 6378H | 1" | 100R2 Hose | Heavy |
| 5334 | 1" | Pipe | Standard – Heavy – Twin |
| 5320 | 1 1/4" | Tube | Standard – Heavy – Twin |
| 5438H | 1 1/4" | 100R1 Hose | Standard |
| 6484H | 1 1/4" | 100R2 Hose | Heavy |
| 5422 | 1 1/4" | Pipe | Heavy |
| 5381 | 1 1/2" | Tube | Standard – Heavy – Twin |
| 6498H | 1 1/2" | 100R1 Hose | Standard |
| 6544H | 1 1/2" | 100R2 Hose | Heavy |
| 6483 | 1 1/2" | Pipe | Standard – Heavy |
| 6508 | 2" | Tube | Standard – Heavy |
| 6603 | 2" | Pipe | Heavy |
| 6635 | 2 1/2" | Tube | Heavy |
| 7762 | 3" | Tube | Heavy |

Dimensions and pressures for reference only, subject to change.



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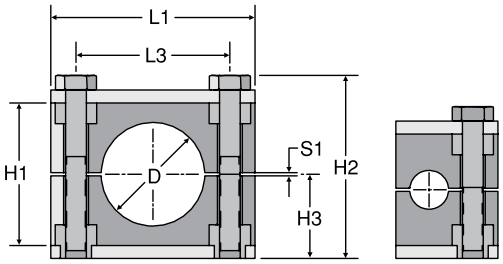
# Clamp Halves

Standard Series




Groups 1A, 2, 3, 4, 5 and 6 Group 1

See note below

| TUBE CLAMP HALVES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PART # | TUBE SIZE | GROUP # | D | | H1 | H2 | H3 | L1 | L3 | S1 | STANDARD FROM STOCK |
| | | | in. | mm | in. | in. | in. | in. | in. | in. | |
| **1064-PP** | 1/4 | 1 | 0.25 | 6.4 | 1.06 | 1.45 | 0.65 | 1.02 | NA | 0.01 | • |
| **1095-PP** | 3/8 | 1 | 0.38 | 9.5 | 1.06 | 1.45 | 0.65 | 1.02 | NA | 0.01 | • |
| **1064A-PP** | 1/4 | 1A | 0.25 | 6.4 | 1.06 | 1.45 | 0.65 | 1.45 | 0.78 | 0.01 | • |
| **1095A-PP** | 3/8 | 1A | 0.38 | 9.5 | 1.06 | 1.45 | 0.65 | 1.45 | 0.78 | 0.01 | • |
| **2127-PP** | 1/2 | 2 | 0.50 | 12.7 | 1.29 | 1.69 | 0.77 | 1.65 | 1.02 | 0.01 | • |
| **2160-PP** | 5/8 | 2 | 0.63 | 16.0 | 1.29 | 1.69 | 0.77 | 1.65 | 1.02 | 0.01 | • |
| **3190-PP** | 3/4 | 3 | 0.75 | 19.0 | 1.41 | 1.77 | 0.80 | 1.96 | 1.29 | 0.01 | • |
| **3254-PP** | 1 | 3 | 1.00 | 25.4 | 1.41 | 1.77 | 0.80 | 1.96 | 1.29 | 0.01 | • |
| **5320-PP** | 1 1/4 | 5 | 1.25 | 32.0 | 2.28 | 2.72 | 1.28 | 2.79 | 2.04 | 0.03 | • |
| **5381-PP** | 1 1/2 | 5 | 1.50 | 38.1 | 2.28 | 2.72 | 1.28 | 2.79 | 2.04 | 0.03 | • |
| **6508-PP** | 2 | 6 | 2.00 | 50.8 | 2.59 | 3.00 | 1.42 | 3.38 | 2.59 | 0.03 | • |

| PIPE CLAMP HALVES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PART # | PIPE SIZE | GROUP # | D | | H1 | H2 | H3 | L1 | L3 | S1 | STANDARD FROM STOCK |
| | | | in. | mm | in. | in. | in. | in. | in. | in. | |
| **3213-PP** | 1/2 | 3 | 0.84 | 21.3 | 1.41 | 1.77 | 0.80 | 1.96 | 1.29 | 0.01 | • |
| **4266-PP** | 3/4 | 4 | 1.05 | 26.6 | 1.65 | 2.09 | 0.96 | 2.32 | 1.57 | 0.01 | • |
| **5334-PP** | 1 | 5 | 1.31 | 33.4 | 2.28 | 2.72 | 1.28 | 2.79 | 2.04 | 0.03 | • |
| **6483-PP** | 1 1/2 | 6 | 1.90 | 48.3 | 2.59 | 3.00 | 1.42 | 3.38 | 2.59 | 0.03 | • |

| 100R1 HOSE CLAMP HALVES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PART # | HOSE SIZE | GROUP # | D | | H1 | H2 | H3 | L1 | L3 | S1 | STANDARD FROM STOCK |
| | | | in. | mm | in. | in. | in. | in. | in. | in. | |
| **H3134PP** | 1/4 | 3 | 0.53 | 13.4 | 1.41 | 1.77 | 0.80 | 1.96 | 1.29 | 0.01 | • |
| **H3174PP** | 3/8 | 3 | 0.69 | 17.4 | 1.41 | 1.77 | 0.80 | 1.96 | 1.29 | 0.01 | • |
| **H3205PP** | 1/2 | 3 | 0.81 | 20.5 | 1.41 | 1.77 | 0.80 | 1.96 | 1.29 | 0.01 | • |
| **H3239PP** | 5/8 | 3 | 0.94 | 23.9 | 1.41 | 1.77 | 0.80 | 1.96 | 1.29 | 0.01 | • |
| **H5278PP** | 3/4 | 5 | 1.09 | 27.8 | 2.28 | 2.72 | 1.28 | 2.79 | 2.04 | 0.03 | • |
| **H5357PP** | 1 | 5 | 1.41 | 35.7 | 2.28 | 2.72 | 1.28 | 2.79 | 2.04 | 0.03 | • |
| **H5438PP** | 1 1/4 | 5 | 1.72 | 43.8 | 2.28 | 2.72 | 1.28 | 2.79 | 2.04 | 0.03 | • |
| **H6498PP** | 1 1/2 | 6 | 1.96 | 49.8 | 2.59 | 3.00 | 1.42 | 3.38 | 2.59 | 0.03 | • |

**Note:** One clamp set includes two identical halves of polypropylene. Tube and pipe clamp halves are black in color. Hose clamp halves are green in color. Hardware shown in the illustrations above is **not** included.

Other sizes available. Please contact TFD for a quote.

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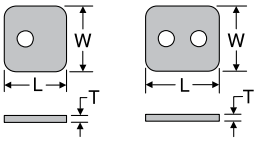
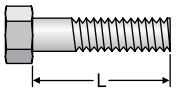
# CP
Cover Plate




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | W WIDTH (in.) | T THICKNESS (in.) | STANDARD FROM STOCK -S | -SS |
|---|---|---|---|---|---|---|
| **CP-1** | 1 | 1.10 | 1.18 | 0.11 | • | • |
| **CP-1A** | 1A | 1.33 | 1.18 | 0.11 | • | • |
| **CP-2** | 2 | 1.59 | 1.18 | 0.11 | • | • |
| **CP-3** | 3 | 1.88 | 1.18 | 0.11 | • | • |
| **CP-4** | 4 | 2.24 | 1.18 | 0.11 | • | • |
| **CP-5** | 5 | 2.75 | 1.18 | 0.11 | • | • |
| **CP-6** | 6 | 3.38 | 1.18 | 0.11 | • | • |

**Material:** Steel: Zinc nickel plated
SS: 316 stainless steel

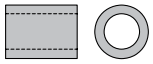
# BCP
Hexagon Head Bolt for Cover Plate
(2 required for Groups 1A-6)




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | STANDARD FROM STOCK -S | -SS |
|---|---|---|---|---|
| **BCP-1** | 1 | 1.25 | • | • |
| **BCP-1A** | 1A | 1.25 | • | • |
| **BCP-2** | 2 | 1.38 | • | • |
| **BCP-3** | 3 | 1.50 | • | • |
| **BCP-4** | 4 | 1.88 | • | • |
| **BCP-5** | 5 | 2.38 | • | • |
| **BCP-6** | 6 | 2.75 | • | • |

**Note:** Bolt threads are 1/4 - 20 UNC, Grade 5, zinc clear chromate plated
**Material:** SS: 316 stainless steel

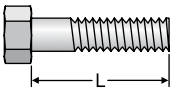
# IPS
Insert



| TUBE FITTING PART # | STANDARD FROM STOCK |
|---|---|
| **IPS** | • |

**Material:** Plastic
One size fits all groups (2 required for Groups 1A - 6).
(Use when not using a cover plate.)

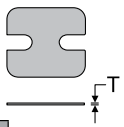
# BIP
Hexagon Head Bolt for Insert




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | STANDARD FROM STOCK |
|---|---|---|---|
| **BIP-1** | 1 | 1.13 | • |
| **BIP-1A** | 1A | 1.13 | • |
| **BIP-2** | 2 | 1.38 | • |
| **BIP-3** | 3 | 1.38 | • |
| **BIP-4** | 4 | 1.63 | • |
| **BIP-5** | 5 | 2.38 | • |
| **BIP-6** | 6 | 2.75 | • |

**Note:** Bolt threads are 1/4 - 20 UNC, Grade 5, zinc clear chromate plated

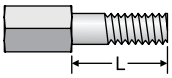
# LP
Locking Plate




| TUBE FITTING PART # | GROUP # | T THICKNESS (in.) | STANDARD FROM STOCK |
|---|---|---|---|
| **LP-1** | 1 | 0.03 | • |
| **LP-1A** | 1A | 0.03 | • |
| **LP-2** | 2 | 0.03 | • |
| **LP-3** | 3 | 0.03 | • |
| **LP-4** | 4 | 0.03 | • |
| **LP-5** | 5 | 0.03 | • |
| **LP-6** | 6 | 0.03 | • |

**Material:** Steel, zinc nickel plated

# SB
Stacking Bolt
(2 required for Groups 1A-6)




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | STANDARD FROM STOCK |
|---|---|---|---|
| **SB-1** | 1 | 0.78 | • |
| **SB-1A** | 1A | 0.78 | • |
| **SB-2** | 2 | 1.00 | • |
| **SB-3** | 3 | 1.18 | • |
| **SB-4** | 4 | 1.38 | • |
| **SB-5** | 5 | 1.96 | • |
| **SB-6** | 6 | 2.36 | • |

**Note:** Bolt threads are 1/4 - 20 UNC, 1010 steel, zinc nickel plated

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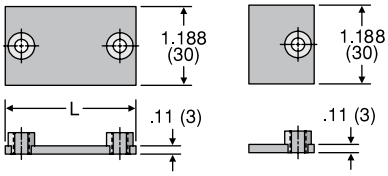
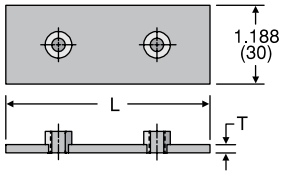
# WP
## Weld Plate




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | L LENGTH (mm) | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|
| WP-1 | 1 | 1.25 | 31.5 | • | • |
| WP-1A | 1A | 1.41 | 36 | • | • |
| WP-2 | 2 | 1.65 | 42 | • | • |
| WP-3 | 3 | 1.96 | 50 | • | • |
| WP-4 | 4 | 2.36 | 60 | • | • |
| WP-5 | 5 | 2.79 | 71 | • | • |
| WP-6 | 6 | 3.46 | 88 | • | • |

**Material:** Steel: 1020 steel, zinc-phosphate plated
SS: 316 stainless steel

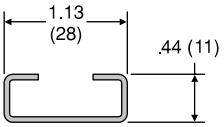
# WPE
## Weld Plate Elongated




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | L LENGTH (mm) | T THICKNESS (in.) | STANDARD FROM STOCK |
|---|---|---|---|---|---|
| WPE-1 | 1 | 2.28 | 58 | 0.11 | • |
| WPE-1A | 1A | 2.51 | 64 | 0.11 | • |
| WPE-2 | 2 | 2.75 | 70 | 0.11 | • |
| WPE-3 | 3 | 3.07 | 78 | 0.11 | • |
| WPE-4 | 4 | 3.42 | 87 | 0.11 | • |
| WPE-5 | 5 | 3.93 | 100 | 0.11 | • |
| WPE-6 | 6 | 4.52 | 115 | 0.11 | • |

**Material:** 1020 steel, zinc-phosphate plated

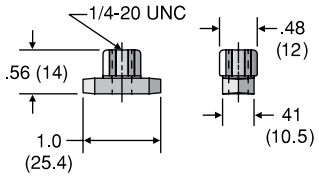
# R
## Mounting Rail




| TUBE FITTING PART # | LENGTH | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|
| R-1 | 3.28 ft. (1 meter) | • | • |
| R-2 | 6.56 ft. (2 meters) | • | • |

**Material:** Steel: Unplated
SS: 316 stainless steel

# HRN
## Hexagon Rail Nut

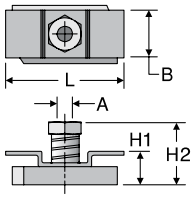



| TUBE FITTING PART # | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|
| HRN | • | • |

**Material:** Steel: Zinc nickel plated
SS: 316 stainless steel

Note: To be used with mounting rail (R)

# CRA
## Channel Rail Adapter




| TUBE FITTING PART # | THREAD "A" UNC | L in. (mm) | B in. (mm) | H1 in. (mm) | H2 in. (mm) | STANDARD FROM STOCK |
|---|---|---|---|---|---|---|
| CRA 1-8 | 1/4-20 | 1.37 (35) | 0.74 (19) | 0.51 (13) | 0.77 (19.5) | • |

**Material:** Steel, zinc nickel plated



Dimensions and pressures for reference only, subject to change.



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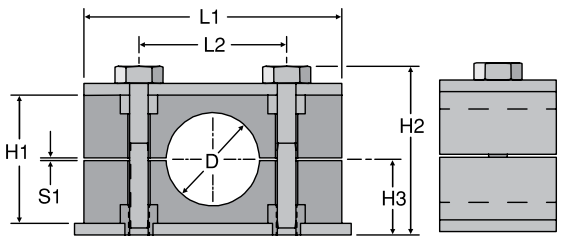
# Clamp Halves

Heavy Series




See note below

| TUBE CLAMP HALVES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PART # | TUBE SIZE | GROUP # | D (in.) | D (mm) | H1 (in.) | H2 (in.) | H3 (in.) | L1 (in.) | L2 (in.) | S1 (in.) | STANDARD FROM STOCK |
| **3095-HPP** | 3/8 | H3 | 0.37 | 9.5 | 1.25 | 2.17 | 0.94 | 2.16 | 1.29 | 0.02 | • |
| **3127-HPP** | 1/2 | H3 | 0.50 | 12.7 | 1.25 | 2.17 | 0.94 | 2.16 | 1.29 | 0.02 | • |
| **3160-HPP** | 5/8 | H3 | 0.63 | 16.0 | 1.25 | 2.17 | 0.94 | 2.16 | 1.29 | 0.02 | • |
| **4190-HPP** | 3/4 | H4 | 0.75 | 19.0 | 1.88 | 2.80 | 1.26 | 2.75 | 1.77 | 0.02 | • |
| **4254-HPP** | 1 | H4 | 1.00 | 25.4 | 1.88 | 2.80 | 1.26 | 2.75 | 1.77 | 0.02 | • |
| **5320-HPP** | 1 1/4 | H5 | 1.25 | 32.0 | 2.36 | 3.27 | 1.50 | 3.34 | 2.36 | 0.02 | • |
| **5381-HPP** | 1 1/2 | H5 | 1.50 | 38.1 | 2.36 | 3.27 | 1.50 | 3.34 | 2.36 | 0.02 | • |
| **6508-HPP** | 2 | H6 | 2.00 | 50.8 | 3.50 | 4.61 | 2.17 | 4.52 | 3.54 | 0.07 | • |
| **6635-HPP** | 2 1/2 | H6 | 2.50 | 63.5 | 3.50 | 4.61 | 2.17 | 4.52 | 3.54 | 0.07 | • |
| **7762-HPP** | 3 | H7 | 3.00 | 76.2 | 4.72 | 5.74 | 2.75 | 5.98 | 4.80 | 0.07 | • |

| PIPE CLAMP HALVES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PART # | PIPE SIZE | GROUP # | D (in.) | D (mm) | H1 (in.) | H2 (in.) | H3 (in.) | L1 (in.) | L2 (in.) | S1 (in.) | STANDARD FROM STOCK |
| **4213-HPP** | 1/2 | H4 | 0.84 | 21.3 | 1.88 | 2.80 | 1.26 | 2.75 | 1.77 | 0.02 | • |
| **4267-HPP** | 3/4 | H4 | 1.05 | 26.7 | 1.88 | 2.80 | 1.26 | 2.75 | 1.77 | 0.02 | • |
| **5334-HPP** | 1 | H5 | 1.31 | 33.4 | 2.36 | 3.27 | 1.50 | 3.34 | 2.36 | 0.02 | • |
| **5422-HPP** | 1 1/4 | H5 | 1.66 | 42.2 | 2.36 | 3.27 | 1.50 | 3.34 | 2.36 | 0.02 | • |
| **6483-HPP** | 1 1/2 | H6 | 1.90 | 48.3 | 3.50 | 4.61 | 2.17 | 4.52 | 3.54 | 0.07 | • |
| **6603-HPP** | 2 | H6 | 2.37 | 60.3 | 3.50 | 4.61 | 2.17 | 4.52 | 3.54 | 0.07 | • |

| 100R2 HOSE CLAMP HALVES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PART # | HOSE SIZE | GROUP # | D (in.) | D (mm) | H1 (in.) | H2 (in.) | H3 (in.) | L1 (in.) | L2 (in.) | S1 (in.) | STANDARD FROM STOCK |
| **H4150HPP** | 1/4 | H4 | 0.59 | 15.0 | 1.83 | 2.80 | 1.26 | 2.75 | 1.77 | 0.02 | • |
| **H4198HPP** | 3/8 | H4 | 0.78 | 19.8 | 1.83 | 2.80 | 1.26 | 2.75 | 1.77 | 0.02 | • |
| **H4221HPP** | 1/2 | H4 | 0.87 | 22.1 | 1.83 | 2.80 | 1.26 | 2.75 | 1.77 | 0.02 | • |
| **H4251HPP** | 5/8 | H4 | 0.99 | 25.1 | 1.83 | 2.80 | 1.26 | 2.75 | 1.77 | 0.02 | • |
| **H4292HPP** | 3/4 | H4 | 1.15 | 29.2 | 1.83 | 2.80 | 1.26 | 2.75 | 1.77 | 0.02 | • |
| **H6378HPP** | 1 | H6 | 1.49 | 37.8 | 3.42 | 4.61 | 2.17 | 4.52 | 3.54 | 0.07 | • |
| **H6484HPP** | 1 1/4 | H6 | 1.91 | 48.4 | 3.42 | 4.61 | 2.17 | 4.52 | 3.54 | 0.07 | • |
| **H6544HPP** | 1 1/2 | H6 | 2.14 | 54.4 | 3.42 | 4.61 | 2.17 | 4.52 | 3.54 | 0.07 | • |

**Note:** One clamp set includes two identical halves of polypropylene. Tube and pipe clamps are black in color. Hose clamp halves are green in color. Hardware shown in the illustration above is **not** included.

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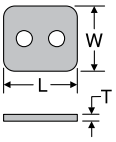
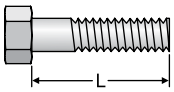
# CPH
Cover Plate Heavy




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | W WIDTH (in.) | T THICKNESS (in.) | T THICKNESS (mm) | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|---|---|
| CPH-3 | H3 | 2.16 | 1.18 | 0.31 | 8 | • | • |
| CPH-4 | H4 | 2.75 | 1.18 | 0.31 | 8 | • | • |
| CPH-5 | H5 | 3.34 | 1.18 | 0.31 | 8 | • | • |
| CPH-6 | H6 | 4.52 | 1.77 | 0.39 | 10 | • | • |
| CPH-7 | H7 | 5.98 | 2.36 | 0.39 | 10 | • | • |

**Material:** Steel: Zinc phosphate plated
SS: 316 stainless steel

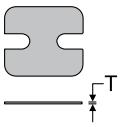
# BCPH
Hexagon Head Bolt for Cover Plate
(2 required per clamp set)




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | UNC THREAD | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|
| BCPH-3 | H3 | 1.75 | 3/8 - 16 | • | • |
| BCPH-4 | H4 | 2.25 | 3/8 - 16 | • | • |
| BCPH-5 | H5 | 2.75 | 3/8 - 16 | • | • |
| BCPH-6 | H6 | 4.00 | 7/16 - 14 | • | • |
| BCPH-7 | H7 | 5.25 | 5/8 - 11 | • | • |

**Material:** Steel: Zinc clear chromate plated, Grade 5 bolt
SS: 316 stainless steel

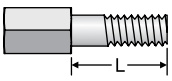
# LPH
Locking Plate Heavy




| TUBE FITTING PART # | GROUP # | T THICKNESS (in.) | STANDARD FROM STOCK |
|---|---|---|---|
| LPH-3 | H3 | 0.31 | • |
| LPH-4 | H4 | 0.31 | • |
| LPH-5 | H5 | 0.31 | • |
| LPH-6 | H6 | 0.39 | • |
| LPH-7 | H7 | 0.39 | • |

**Material:** Steel, zinc phosphate plated

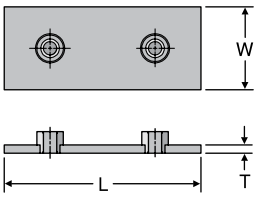
# SBH
Stacking Bolt Heavy
(2 required per clamp set)




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | STANDARD FROM STOCK |
|---|---|---|---|
| SBH-3 | H3 | 1.02 | • |
| SBH-4 | H4 | 1.61 | • |
| SBH-5 | H5 | 2.01 | • |
| SBH-6 | H6 | 3.27 | • |
| SBH-7 | H7 | 4.33 | • |

**Material:** 1010 steel, zinc nickel plated

# WPH
Weld Plate Heavy




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | L LENGTH (mm) | W WIDTH (in.) | W WIDTH (mm) | T THICKNESS (in.) | T THICKNESS (mm) | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|---|---|---|---|
| WPH-3 | H3 | 2.88 | 73 | 1.18 | 30 | 0.31 | 8 | • | • |
| WPH-4 | H4 | 3.34 | 85 | 1.18 | 30 | 0.31 | 8 | • | • |
| WPH-5 | H5 | 3.94 | 100 | 1.18 | 30 | 0.31 | 8 | • | • |
| WPH-6 | H6 | 5.51 | 140 | 1.79 | 45 | 0.39 | 10 | • | • |
| WPH-7 | H7 | 7.09 | 180 | 2.36 | 60 | 0.39 | 10 | • | • |

**Material:** Steel: 1020 steel, zinc-phosphate plated
SS: 316 stainless steel

Dimensions and pressures for reference only, subject to change.



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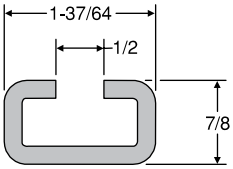
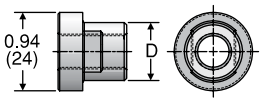
# RH
Mounting Rail Heavy




| TUBE FITTING PART # | LENGTH | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|
| **R1H** | 3.28 ft. (1 meter) | • | • |
| **R2H** | 6.56 ft. (2 meters) | • | • |

**Material:** Steel: Unplated
SS: 316 stainless steel

# RNH
Mounting Rail Nut Heavy

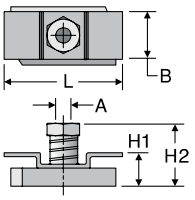



| TUBE FITTING PART # | GROUP # | D DIAMETER (in.) | D DIAMETER (mm) | THREAD | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|---|
| **RNH-10** | H3, H4, H5 | 0.70 | 18 | 3/8 - 16 UNC | • | • |
| **RNH-12** | H6 | 0.78 | 20 | 7/16 - 14 UNC | • | • |

**Material:** Steel: Zinc-phosphate plated
SS: 316 stainless steel

Note: To be used with mounting rail heavy (RH)

# CRA
Channel Rail Adapter




| TUBE FITTING PART # | THREAD "A" UNC | L in. (mm) | B in. (mm) | H1 in. (mm) | H2 in. (mm) | STANDARD FROM STOCK |
|---|---|---|---|---|---|---|
| **CRA 3-5** | 3/8-16 | 1.37 (35) | 0.86 (22) | 0.73 (18.5) | 1.08 (27.5) | • |
| **CRA 6** | 7/16-14 | 1.77 (45) | 0.98 (25) | 0.67 (17) | 1.08 (27.5) | • |

**Material:** Steel, zinc plated, blue chromate

Note: To be used with channel rails (Parker does not supply these).



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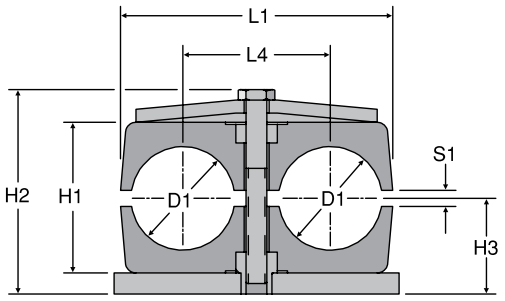
# Clamp Halves

Twin Series




See note below

| TUBE CLAMP HALVES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PART # | TUBE SIZE | GROUP # | D1 | | H1 | H2 | H3 | L1 | L4 | S1 | STANDARD FROM STOCK |
| | | | in. | mm | in. | in. | in. | in. | in. | in. | |
| **1064/64-PP** | 1/4 | T1 | 0.25 | 6.4 | 0.79 | 1.18 | 0.59 | 1.41 | 0.78 | 0.02 | • |
| **1095/95-PP** | 3/8 | T1 | 0.38 | 9.5 | 0.79 | 1.18 | 0.59 | 1.41 | 0.78 | 0.02 | • |
| **2127/127-PP** | 1/2 | T2 | 0.50 | 12.7 | 1.06 | 1.73 | 0.71 | 2.08 | 1.14 | 0.03 | • |
| **2160/160-PP** | 5/8 | T2 | 0.63 | 16.0 | 1.06 | 1.73 | 0.71 | 2.08 | 1.14 | 0.03 | • |
| **3190/190-PP** | 3/4 | T3 | 0.75 | 19.0 | 1.45 | 2.17 | 0.93 | 2.63 | 1.41 | 0.03 | • |
| **3254/254-PP** | 1 | T3 | 1.00 | 25.4 | 1.45 | 2.17 | 0.93 | 2.63 | 1.41 | 0.03 | • |
| **5320/320-PP** | 1 1/4 | T5 | 1.25 | 32.0 | 2.09 | 2.83 | 1.26 | 4.17 | 2.20 | 0.03 | • |
| **5381/381-PP** | 1 1/2 | T5 | 1.50 | 38.1 | 2.09 | 2.83 | 1.26 | 4.17 | 2.20 | 0.03 | • |

| PIPE CLAMP HALVES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| PART # | PIPE SIZE | GROUP # | D1 | | H1 | H2 | H3 | L1 | L4 | S1 | STANDARD FROM STOCK |
| | | | in. | mm | in. | in. | in. | in. | in. | in. | |
| **4266/266-PP** | 3/4 | T4 | 1.05 | 26.6 | 1.77 | 2.36 | 1.02 | 3.14 | 1.77 | 0.03 | • |
| **5334/334-PP** | 1 | T5 | 1.31 | 33.4 | 2.08 | 2.83 | 1.26 | 4.17 | 2.20 | 0.03 | • |

| FOR USE WITH 100R1 HOSE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PART # | HOSE SIZE | GROUP # | D1 | | H1 | H2 | H3 | L1 | L2 | S1 | STANDARD FROM STOCK |
| | | | in. | mm | in. | in. | in. | in. | in. | in. | |
| **H3206/206-PP** | 1/2 | T3 | 0.81 | 20.6 | 1.45 | 2.17 | 0.93 | 2.63 | 1.41 | 0.03 | • |
| **H5205/205-PP** | 1/2 | T5 | 0.81 | 20.5 | 2.09 | 2.83 | 1.26 | 4.17 | 2.20 | 0.03 | • |
| **H5230/230-PP** | 5/8 | T5 | 0.91 | 23.0 | 2.09 | 2.83 | 1.26 | 4.17 | 2.20 | 0.03 | • |
| **H5280/280-PP** | 3/4 | T5 | 1.10 | 28.0 | 2.09 | 2.83 | 1.26 | 4.17 | 2.20 | 0.03 | • |

| FOR USE WITH 100R2 HOSE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PART # | HOSE SIZE | GROUP # | D 1 | | H1 | H2 | H3 | L1 | L2 | S1 | STANDARD FROM STOCK |
| | | | in. | mm | in. | in. | in. | in. | in. | in. | |
| **H3190/190-PP** | 3/8 | T3 | 0.75 | 19.0 | 1.45 | 2.17 | 0.93 | 2.63 | 1.41 | 0.03 | • |
| **H3222/222-PP** | 1/2 | T3 | 0.87 | 22.2 | 1.45 | 2.17 | 0.93 | 2.63 | 1.41 | 0.03 | • |
| **H3250/250-PP** | 5/8 | T3 | 0.98 | 25.0 | 1.45 | 2.17 | 0.93 | 2.63 | 1.41 | 0.03 | • |
| **H5295/295-PP** | 3/4 | T5 | 1.16 | 29.5 | 2.09 | 2.83 | 1.26 | 4.17 | 2.20 | 0.03 | • |
| **H5372/372-PP** | 1 | T5 | 1.46 | 37.2 | 2.09 | 2.83 | 1.26 | 4.17 | 2.20 | 0.03 | • |

**Note:** One clamp set includes two identical halves of polypropylene. Tube and pipe clamp halves are black in color. Hose clamp halves are green. Hardware shown in the illustration above is **not** included.

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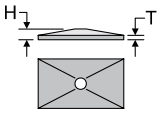
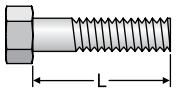
## CPT
Cover Plate




| TUBE FITTING PART # | GROUP # | T THICKNESS (in.) | T THICKNESS (mm) | H HEIGHT (in.) | H HEIGHT (mm) | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|---|---|
| CPT-1 | T1 | 0.06 | 1.5 | — | – | • | • |
| CPT-2 | T2 | 0.13 | 3.0 | 0.28 | 7.0 | • | • |
| CPT-3 | T3 | 0.13 | 3.0 | 0.28 | 7.0 | • | • |
| CPT-4 | T4 | 0.13 | 3.0 | 0.31 | 8.0 | • | • |
| CPT-5 | T5 | 0.13 | 3.0 | 0.31 | 8.0 | • | • |

**Material:** Steel: Zinc nickel plated
SS: 316 stainless steel

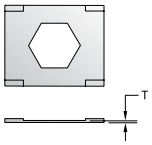
## BCPT
Hexagon Head Bolt for Cover Plate




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | UNC THREAD | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|
| BCPT-1 | T1 | 1.38 | 1/4 - 20 | • | • |
| BCPT-2 | T2 | 1.38 | 5/16 - 18 | • | • |
| BCPT-3 | T3 | 1.75 | 5/16 - 18 | • | • |
| BCPT-4 | T4 | 2.00 | 5/16 - 18 | • | • |
| BCPT-5 | T5 | 2.50 | 5/16 - 18 | • | • |

**Material:** Steel: Zinc clear chromate plated, Grade 10 material
SS: 316 stainless steel

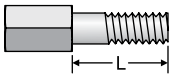
## LPT
Locking Plate




| TUBE FITTING PART # | GROUP # | T THICKNESS (in.) | STANDARD FROM STOCK |
|---|---|---|---|
| LPT-1 | T1 | 0.02 | • |
| LPT-2 | T2 | 0.02 | • |
| LPT-3 | T3 | 0.02 | • |
| LPT-4 | T4 | 0.02 | • |
| LPT-5 | T5 | 0.02 | • |

**Material:** Steel, zinc nickel plated

## SBT
Stacking Bolt




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | UNC THREAD | STANDARD FROM STOCK |
|---|---|---|---|---|
| SBT-1 | T1 | 0.59 | 1/4 - 20 | • |
| SBT-2 | T2 | 0.78 | 5/16 - 18 | • |
| SBT-3 | T3 | 1.13 | 5/16 - 18 | • |
| SBT-4 | T4 | 1.69 | 5/16 - 18 | • |
| SBT-5 | T5 | 1.78 | 5/16 - 18 | • |

**Material:** Zinc nickel plated, 1010 steel

Dimensions and pressures for reference only, subject to change.



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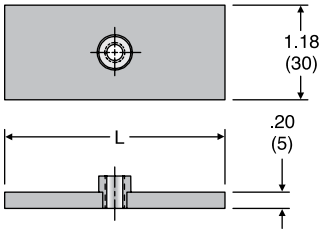
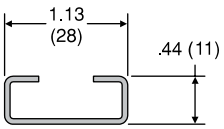
Weld Plate Twin




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | L LENGTH (mm) | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|
| **WPT-1** | T1 | 1.47 | 37 | • | • |
| **WPT-2** | T2 | 2.31 | 55 | • | • |
| **WPT-3** | T3 | 2.75 | 70 | • | • |
| **WPT-4** | T4 | 3.34 | 85 | • | • |
| **WPT-5** | T5 | 4.34 | 110 | • | • |

**Material:** Steel: Zinc-phosphate plated
SS: 316 stainless steel

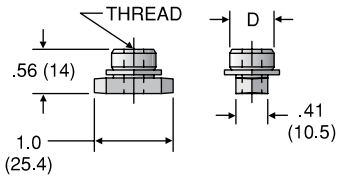
# R
Mounting Rail




| TUBE FITTING PART # | LENGTH | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|
| **R-1** | 3.28 ft. (1 meter) | • | • |
| **R-2** | 6.56 ft. (2 meters) | • | • |

**Material:** Steel: Unplated
SS: 316 stainless steel

# RNT
Mounting Rail Nut Twin

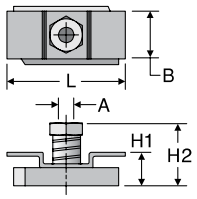



| TUBE FITTING PART # | GROUP # | D DIAMETER (in.) | D DIAMETER (mm) | THREAD | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|---|
| **RNT-1** | T1 | 0.39 | 10 | 1/4 - 20 UNC | • | • |
| **RNT-2-5** | T2-T5 | 0.56 | 14 | 5/16 - 18 UNC | • | • |

**Material:** Steel: Zinc nickel plated
SS: 316 stainless steel

Note: to be used with mounting rail (R)

# CRA
Channel Rail Adapter




| TUBE FITTING PART # | THREAD "A" UNC | L in. (mm) | B in. (mm) | H1 in. (mm) | H2 in. (mm) | STANDARD FROM STOCK |
|---|---|---|---|---|---|---|
| **CRA 2-3D** | 5/16-18 | 1.49 (38) | 2.55 (65) | 0.73 (18.5) | 1.08 (27.5) | • |

**Material:** Steel, zinc plated, blue chromate

O

Dimensions and pressures for reference only, subject to change.



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# Clamp Halves

Compact Spiral Hose Heavy Series

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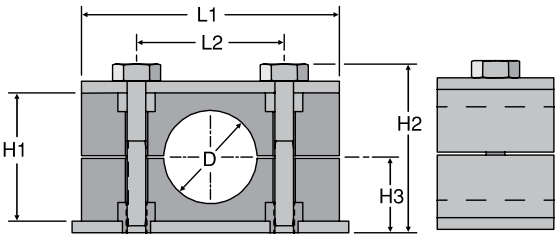


See note below

| COMPACT SPIRAL HOSE CLAMP HALVES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| PART # | HOSE SIZE | GROUP # | D (in.) | D (mm) | H1 (in.) | H2 (in.) | H3 (in.) | L1 (in.) | L2 (in.) | STANDARD FROM STOCK |
| **H4213-HPP** | -8 | H4 | 0.84 | 21.3 | 1.83 | 2.80 | 1.26 | 2.75 | 1.77 | • |
| **H4250-HPP** | -10 | H4 | 0.98 | 25.0 | 1.83 | 2.80 | 1.26 | 2.75 | 1.77 | • |
| **H4280-HPP** | -12 | H4 | 1.10 | 28.0 | 1.83 | 2.80 | 1.26 | 2.75 | 1.77 | • |
| **H6354-HPP** | -16 | H6 | 1.39 | 35.4 | 3.42 | 4.61 | 2.17 | 4.52 | 3.54 | • |
| **H6445-HPP** | -20 | H6 | 1.75 | 44.5 | 3.42 | 4.61 | 2.17 | 4.52 | 3.54 | • |
| **H6530-HPP** | -24 | H6 | 2.09 | 53.0 | 3.42 | 4.61 | 2.17 | 4.52 | 3.54 | • |
| **H6680-HPP** | -32 | H6 | 2.68 | 68.0 | 3.42 | 4.61 | 2.17 | 4.52 | 3.54 | • |

**Note:** One clamp set includes two identical halves of polypropylene. Hardware shown in the illustration above is **not** included.

Dimensions and pressures for reference only, subject to change.



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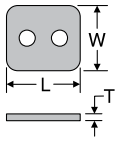
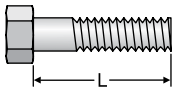
## CPH
Cover Plate Heavy




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | W WIDTH (in.) | T THICKNESS (in.) | T THICKNESS (mm) | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|---|---|
| CPH-4 | H4 | 2.75 | 1.18 | 0.31 | 8 | • | • |
| CPH-6 | H6 | 4.52 | 1.77 | 0.39 | 10 | • | • |

**Material:** Steel: Zinc nickel plated

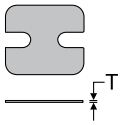
## BCPH
Hexagon Head Bolt for Cover Plate
(2 required per clamp set)




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | UNC THREAD | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|
| BCPH-4 | H4 | 2.25 | 3/8 - 16 | • | • |
| BCPH-6 | H6 | 4.00 | 7/16 - 14 | • | • |

**Material:** Steel: Zinc clear chromate plated, Grade 5 bolt
SS: 316 stainless steel

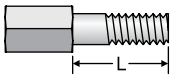
## LPH
Locking Plate Heavy




| TUBE FITTING PART # | GROUP # | T THICKNESS (in.) | STANDARD FROM STOCK |
|---|---|---|---|
| LPH-4 | H4 | 0.31 | • |
| LPH-6 | H6 | 0.39 | • |

**Material:** Steel: Zinc nickel plated

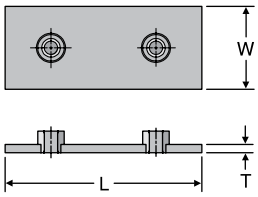
## SBH
Stacking Bolt Heavy
(2 required per clamp set)




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | STANDARD FROM STOCK |
|---|---|---|---|
| SBH-4 | H4 | 1.61 | • |
| SBH-6 | H6 | 3.27 | • |

**Material:** Steel: Zinc nickel plated

## WPH
Weld Plate Heavy




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | L LENGTH (mm) | W WIDTH (in.) | W WIDTH (mm) | T THICKNESS (in.) | T THICKNESS (mm) | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|---|---|---|---|
| WPH-4 | H4 | 3.34 | 85 | 1.18 | 30 | 0.31 | 8 | • | • |
| WPH-6 | H6 | 5.51 | 140 | 1.79 | 45 | 0.39 | 10 | • | • |

**Material:** Steel: Zinc-phosphate plated
SS: 316 stainless steel



Dimensions and pressures for reference only, subject to change.



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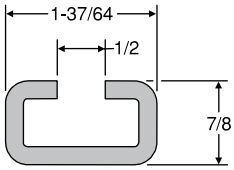
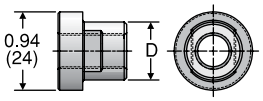
# RH
Mounting Rail Heavy




| TUBE FITTING PART # | LENGTH | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|
| R1H | 3.28 ft. (1 meter) | • | • |
| R2H | 6.56 ft. (2 meters) | • | • |

**Material:** Steel: Unplated
SS: 316 stainless steel

# RNH
Mounting Rail Nut Heavy

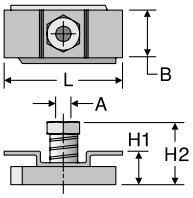



| TUBE FITTING PART # | GROUP # | D DIAMETER (in.) | D DIAMETER (mm) | THREAD | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|---|
| RNH-10 | H4 | 0.70 | 18 | 3/8 - 16 UNC | • | • |
| RNH-12 | H6 | 0.78 | 20 | 7/16 - 14 UNC | • | • |

**Material:** Steel: Zinc nickel plated
SS: 316 stainless steel

Note: To be used with mounting rail heavy (RH)

# CRA
Channel Rail Adapter




| TUBE FITTING PART # | GROUP # | THREAD "A" UNC | L in. (mm) | B in. (mm) | H1 in. (mm) | H2 in. (mm) | STANDARD FROM STOCK |
|---|---|---|---|---|---|---|---|
| CRA 3-5 | H4 | 3/8-16 | 1.37 (35) | 0.86 (22) | 0.73 (18.5) | 1.08 (27.5) | • |
| CRA 6 | H6 | 7/16-14 | 1.77 (45) | 0.98 (25) | 0.67 (17) | 1.08 (27.5) | • |

**Material:** Steel: Zinc nickel plated

# Clamp Halves

Compact Spiral Hose Heavy Twin Series

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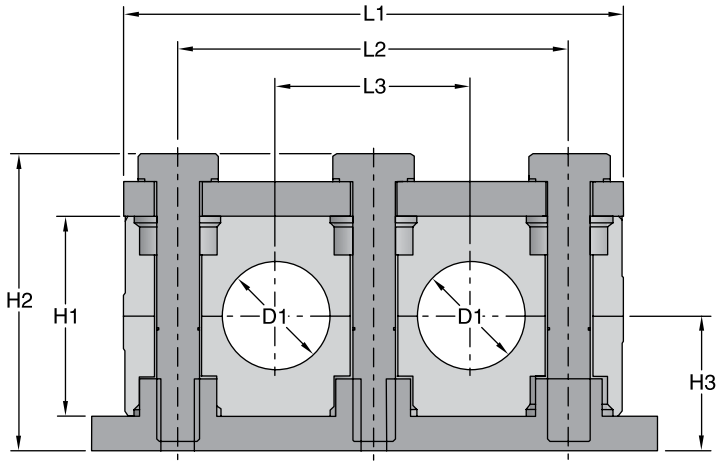


See note below

| COMPACT SPIRAL HOSE CLAMP HALVES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PART # | HOSE SIZE | GROUP # | D1 | | H1 | H2 | H3 | L1 | L2 | L3 | STANDARD FROM STOCK |
| | | | (in.) | (mm) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | |
| **H4213/213-HPP** | -8 | HT4 | 0.84 | 21.3 | 1.89 | 2.77 | 1.26 | 4.53 | 3.54 | 1.77 | • |
| **H4250/250-HPP** | -10 | HT4 | 0.98 | 25.0 | 1.89 | 2.77 | 1.26 | 4.53 | 3.54 | 1.77 | • |
| **H4280/280-HPP** | -12 | HT4 | 1.10 | 28.0 | 1.89 | 2.77 | 1.26 | 4.53 | 3.54 | 1.77 | • |
| **H5354/354-HPP** | -16 | HT5 | 1.39 | 35.4 | 2.36 | 3.24 | 1.50 | 5.71 | 4.72 | 2.36 | • |

**Note:** One clamp set includes two identical halves of polypropylene. Hardware shown in the illustration above is **not** included.





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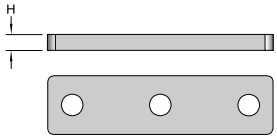
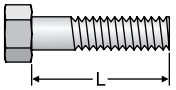
## CPHT
Cover Plate




| TUBE FITTING PART # | GROUP # | H HEIGHT (in.) | H HEIGHT (mm) | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|
| CPHT-4 | HT4 | 0.31 | 8.0 | • | • |
| CPHT-5 | HT5 | 0.31 | 8.0 | • | • |

**Material:** Steel: Zinc nickel plated

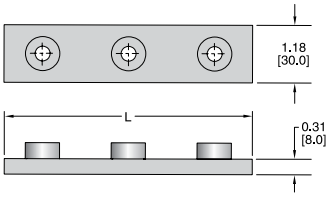
## BCPH
Hexagon Head Bolt for Cover Plate
(2 required per clamp set)




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | UNC THREAD | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|
| BCPH-4 | HT4 | 2.25 | 3/8 - 16 | • | • |
| BCPH-5 | HT5 | 2.75 | 3/8 - 16 | • | • |

**Material:** Steel: Zinc clear chromate plated, Grade 5 bolt
SS: 316 stainless steel

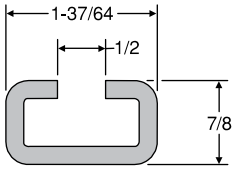
## WPHT
Weld Plate




| TUBE FITTING PART # | GROUP # | L LENGTH (in.) | L LENGTH (mm) | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|
| LPHT-4 | HT4 | 5.12 | 130.0 | • | • |
| LPHT-5 | HT5 | 6.30 | 160.0 | • | • |

**Material:** Steel: Zinc-phosphate plated

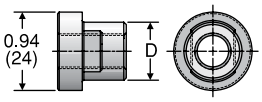
## RH
Mounting Rail Heavy




| TUBE FITTING PART # | LENGTH | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|
| R1H | 3.28 ft. (1 meter) | • | • |
| R2H | 6.56 ft. (2 meters) | • | • |

**Material:** Steel: Unplated
SS: 316 stainless steel

## RNH
Mounting Rail Nut Heavy

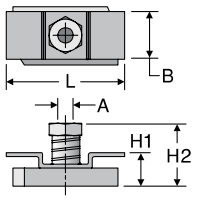



| TUBE FITTING PART # | GROUP # | D DIAMETER (in.) | D DIAMETER (mm) | THREAD | STANDARD FROM STOCK -S | STANDARD FROM STOCK -SS |
|---|---|---|---|---|---|---|
| RNH-10 | HT4, HT5 | 0.70 | 18 | 3/8 - 16 UNC | • | • |

**Material:** Steel: Zinc nickel plated

Note: To be used with mounting rail heavy (RH)

## CRA
Channel Rail Adapter




| TUBE FITTING PART # | GROUP # | THREAD "A" UNC | L in. (mm) | B in. (mm) | H1 in. (mm) | H2 in. (mm) | STANDARD FROM STOCK |
|---|---|---|---|---|---|---|---|
| CRA 3-5 | HT4 | 3/8-16 | 1.37 (35) | 0.86 (22) | 0.73 (18.5) | 1.08 (27.5) | • |

**Material:** Steel: Zinc nickel plated

Dimensions and pressures for reference only, subject to change.



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# Metric Clamps

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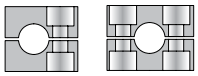
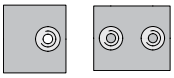
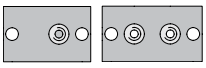
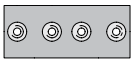
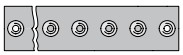
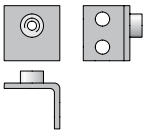
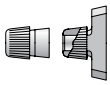
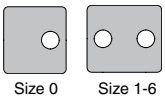
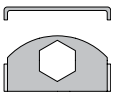
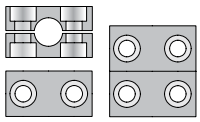
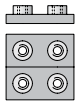
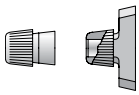
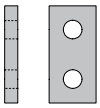
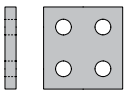
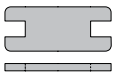
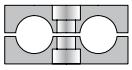
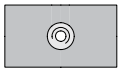
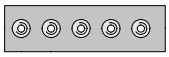
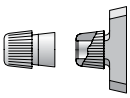
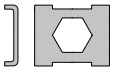
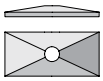
| **Standard Series Normal Mechanical Stress** | **RAP/RAN/RAA**<br>Clamp Halves<br>  <br>Size 0 Size 1-6<br>P4 | **SLA**<br>Slotted Screws<br> <br>P5 | **SSLA**<br>Hex Head Bolt<br> <br>P5 | **ISA**<br>Cap Screws<br> <br>P5 | **ASA**<br>Stacking Bolts<br> <br>P6 |
| **APKA**<br>Weld Plate-Short<br>  <br>Size 0 Size 1-6<br>P5 | **APLA**<br>Weld Plate-Long<br>  <br>Size 0 Size 1-6<br>P5 | **APDA**<br>Double Weld Plate<br>  <br>P5 | **APRA**<br>Weld Plate-Strip<br>  <br>P6 | **APWA**<br>Weld Plate Angled<br>  <br>P6 | **TS**<br>Mounting Rail<br> <br>P6 |
| **TMA**<br>Lock Nut<br>  <br>P6 | **DPA**<br>Top Plate<br>  <br>Size 0 Size 1-6<br>P6 | **SBA**<br>Locking Plate<br>  <br>P6 | **USA**<br>Locking Washer<br> <br>P6 | **Heavy Series High Mechanical Stress** | **RCP/RCN/RCA/RCPD**<br>Clamp Halves<br>  <br>P7 |
| **SSC**<br>Hex Head Bolts<br> <br>P8 | **ASC**<br>Stacking Bolts<br> <br>P8 | **ISC**<br>Cap Screws<br> <br>P8 | **APC**<br>Weld Plate<br> <br>P8 | **APDC**<br>Double Weld Plate<br>  <br>P8 | **APLC**<br>Weld/Screw Plate<br> <br>P8 |
| **TSC**<br>Mounting Rail<br> <br>P9 | **TMC**<br>Lock Nut<br>  <br>P9 | **DPC**<br>Top Plate<br>  <br>P9 | **DPDC**<br>Double Top Plate<br>  <br>P9 | **SPC**<br>Locking Plate<br>  <br>P9 | **USC**<br>Locking Washer<br> <br>P9 |
| **Twin Series Normal Mechanical Stress** | **RBP/RBN**<br>Clamp Halves<br>  <br>P10 | **SSB**<br>Hex Head Bolt<br> <br>P10 | **ISB**<br>Cap Screws<br> <br>P10 | **ASB**<br>Stacking Bolts<br> <br>P11 | **APB**<br>Weld Plate<br>  <br>P11 |
| **APRB**<br>Strip Weld Plate<br>  <br>P11 | **TS**<br>Mounting Rail<br> <br>P11 | **TMB**<br>Lock Nut<br>  <br>P11 | **SBB**<br>Locking Plate<br>  <br>P11 | **DPB**<br>Top Plate<br>  <br>P11 | **US**<br>Locking Washer<br> <br>P11 |



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# Metric Clamps

The Parker Metric Clamp system is designed for restraining tube, pipe and hose assemblies against unwanted, and potentially harmful effects of mechanical shock and vibration forces that are common in fluid power systems.

The clamping system is the most commonly overlooked aspect of fluid power system design. Failure to properly restrain the fluid conducting system can result in leakage, downtime and system malfunction, as well as significantly reduced life of tube, pipe and hose assemblies. With the Parker Metric Clamp system, the risk of problems resulting from mechanical shock and vibration can be significantly reduced.

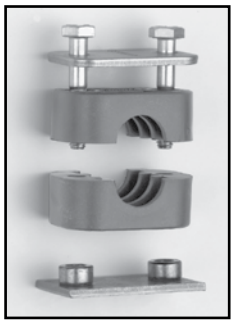

**Fig. P1 – Weld Plate Assembly**

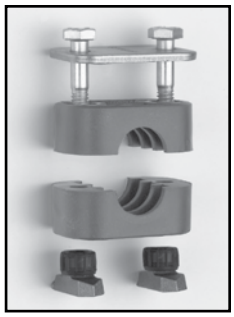

**Fig. P2 – Mounting Rail Assembly**

# How Metric Clamps Work

The Metric Clamp system has two primary methods for mounting: weld plates and mounting rails. Clamps may be mounted to secure a single layer of tube or stacked for securing multiple layers.

Clamps should be mounted to a rigid structure for optimum performance. Clamping tube, pipe or hose assemblies together without mounting them to a rigid structure, often called “floating clamps,” does not provide adequate support.

Proper design of a clamping system requires that the clamps be positioned appropriately on the tube, pipe or hose assemblies. See the Assembly and Installation section of the catalog for more information on clamp location and spacing.

**Weld Plate Mounting** (Fig. P1)

The weld plate mounting system allows the user to attach a single clamp assembly to a structure of similar material (steel to steel, etc) by welding the components together. Once the weld plate is attached to a structure, one clamp half can be placed onto the weld plate, followed by the tube, pipe or hose assembly. Next, the second plastic clamp half can be placed on the tube, pipe or hose assembly, followed by the cover plate. To complete the assembly, the Hex Head attachment bolts are inserted into the assembly and tightened.

**Mounting Rail Mounting** (Fig. P2)

Use of a mounting rail is another way to assemble the clamping system components onto a support structure. Using a mounting rail allows multiple clamps to be mounted side-by-side for restraining a group of tube, pipe, or hose assemblies. The mounting rail also provides the ability to move the location of the clamps in one direction for easier alignment. The rail can be attached to a support structure by welding or bolting. Once the mounting rail is in place, rail nuts can be slid into the rail. The first clamp half, followed by the tube, pipe or hose assembly, can then be installed over the corresponding rail nuts. After this, the second clamp half, the cover plate and the hex head attachment bolts can be installed to complete the assembly.

**Stacking** (Fig. P3)

A primary feature of the Metric Clamp system is its ability to accommodate stacking of a series of clamps to various heights, thus requiring a smaller footprint for mounting. To do this, simply use the stacking bolts to mount the first clamp assembly, then install a stacking plate over the first clamp and stacking bolts. The second clamp assembly can then be placed over the first clamp assembly. Complete the mounting by assembling a cover plate and using the hex head bolts to tighten the upper clamp assembly. **Note: When stacking, the clamps must be from the same series and group.**

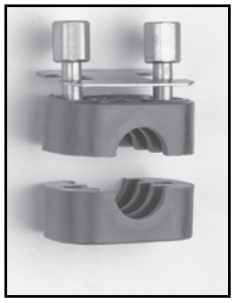

**Fig. P3 – Stacked Assembly**



# Reference Locations

**Assembly and Installation:** Please refer to Section S for the assembly and installation instructions for Metric Clamps.



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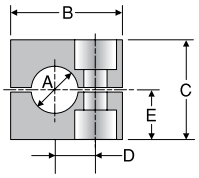
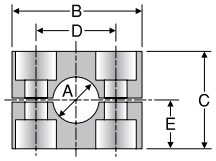
# RAP / RAN / RAA

Clamp Halves

| TUBE FITTING PART # | GROUP # | A Metric Tube Size | A Inch Pipe Size | A Inch Tube Size | B (mm) | C (mm) | D (mm) | E (mm) |
|---|---|---|---|---|---|---|---|---|
| **RAP006X** | | 6 | | | | | | |
| **RAP006.4X** | | 6.4 | | 1/4 | | | | |
| **RAP008X** | | 8 | | 5/16 | | | | |
| **RAP009.5X** | | 9.5 | | 3/8 | | | | |
| **RAP010X** | | 10 | 1/8 | | | | | |
| **RAP012X** | 0 | 12 | | | 28 | 27 | 12.5 | 13.5 |
| **RAP106X** | | 6 | | | | | | |
| **RAP106.4X** | | 6.4 | | 1/4 | | | | |
| **RAP108X** | | 8 | | 5/16 | | | | |
| **RAP109.5X** | | 9.5 | | 3/8 | | | | |
| **RAP110X** | | 10 | 1/8 | | | | | |
| **RAP112X** | 1 | 12 | | | 34 | 27 | 20 | 13.5 |
| **RAP212.7X** | | 12.7 | | 1/2 | | | | |
| **RAP213.5X** | | 13.5 | 1/4 | | | | | |
| **RAP214X** | | 14 | | | | | | |
| **RAP215X** | | 15 | | | | | | |
| **RAP216X** | | 16 | | 5/8 | | | | |
| **RAP217.2X** | | 17.2 | 3/8 | | | | | |
| **RAP218X** | 2 | 18 | | | 40 | 33 | 26 | 16.5 |
| **RAP319X** | | 19 | | 3/4 | | | | |
| **RAP320X** | | 20 | | | | | | |
| **RAP321.3X** | | 21.3 | 1/2 | | | | | |
| **RAP322X** | | 22 | | | | | | |
| **RAP323X** | | 23 | | | | | | |
| **RAP325X** | 3 | 25 | | 1 | 48 | 35 | 33 | 17.5 |
| **RAP426.9X** | | 26.9 | 3/4 | | | | | |
| **RAP428X** | | 28 | | | | | | |
| **RAP430X** | 4 | 30 | | | 57 | 42 | 40 | 21 |
| **RAP532X** | | 32 | | 1 1/4 | | | | |
| **RAP533.7X** | | 33.7 | 1 | | | | | |
| **RAP535X** | | 35 | | | | | | |
| **RAP538X** | | 38 | | 1 1/2 | | | | |
| **RAP540X** | | 40 | | | | | | |
| **RAP542X** | 5 | 42 | 1 1/4 | | 70 | 58 | 52 | 29 |
| **RAP644.5X** | | 44.5 | | 1 3/4 | | | | |
| **RAP645X** | | 45 | | | | | | |
| **RAP648X** | | 48 | 1 1/2 | | | | | |
| **RAP650X** | | 50 | | | | | | |
| **RAP650.8X** | | 50.8 | | 2 | | | | |
| **RAP652X** | | 52 | | | | | | |
| **RAP655X** | 6 | 55 | | | 86 | 66 | 66 | 33 |
| **RAP657X** | | 57 | | 2 1/4 | | | | |




Group 0




Groups 1-6

**Material codes for clamp halves:**

Polypropylene - **RAP**
inside plain - **RAPG (for hose)**
Polyamide 6 - **RAN (Nylon)**
inside plain - **RANG (Nylon) (for hose)**
Aluminum - **RAA (Group 1 to 6 only)**

Dimensions and pressures for reference only, subject to change.



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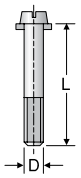
# SLA
Slotted Screws

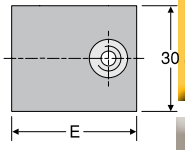



| TUBE FITTING PART # | GROUP # | D (mm) | L (mm) |
|---|---|---|---|
| SLA0X | 0,1 | M6 x 1 | 20 |
| SLA2X | 2 | M6 x 1 | 25 |
| SLA3X | 3 | M6 x 1 | 30 |
| SLA4X | 4 | M6 x 1 | 35 |
| SLA5X | 5 | M6 x 1 | 50 |
| SLA6X | 6 | M6 x 1 | 60 |

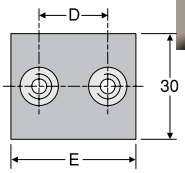
# APKA
Weld Plate – Short

| TUBE FITTING PART # | GROUP # | D (mm) | E (mm) |
|---|---|---|---|
| APKA0X | 0 | — | 30 |
| APKA1X | 1 | 20 | 36 |
| APKA2X | 2 | 26 | 42 |
| APKA3X | 3 | 33 | 50 |
| APKA4X | 4 | 40 | 59 |
| APKA5X | 5 | 52 | 72 |
| APKA6X | 6 | 66 | 88 |

Thickness 3 mm

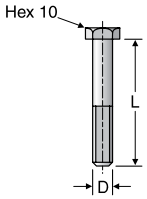



Group 0




Groups 1-6

# SSLA
Hex Head Bolt

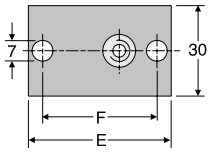



| TUBE FITTING PART # | GROUP # | D (mm) | L (mm) |
|---|---|---|---|
| SSLA0X | 0,1 | M6 x 1 | 30 |
| SSLA2/SSB1X | 2 | M6 x 1 | 35 |
| SSLA3X | 3 | M6 x 1 | 40 |
| SSLA4X | 4 | M6 x 1 | 45 |
| SSLA5X | 5 | M6 x 1 | 60 |
| SSLA6X | 6 | M6 x 1 | 70 |

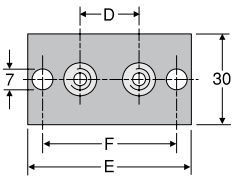
# APLA
Weld Plate – Long

| TUBE FITTING PART # | GROUP # | D (mm) | E (mm) | F (mm) |
|---|---|---|---|---|
| APLA0X | 0 | — | 58 | 44 |
| APLA1X | 1 | 20 | 64 | 50 |
| APLA2X | 2 | 26 | 70 | 56 |
| APLA3X | 3 | 33 | 78 | 64 |
| APLA4X | 4 | 40 | 87 | 73 |
| APLA5X | 5 | 52 | 100 | 86 |
| APLA6X | 6 | 66 | 116 | 100 |

Thickness 3 mm



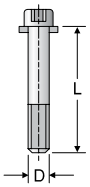

Group 0




Groups 1-6

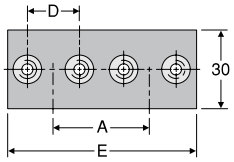
P

# ISA
Cap Screws




| TUBE FITTING PART # | GROUP # | D (mm) | L (mm) |
|---|---|---|---|
| ISA0X | 0,1 | M6 x 1 | 20 |
| ISA2X | 2 | M6 x 1 | 25 |
| ISA3X | 3 | M6 x 1 | 30 |
| ISA4X | 4 | M6 x 1 | 35 |
| ISA5X | 5 | M6 x 1 | 50 |
| ISA6X | 6 | M6 x 1 | 60 |

# APDA
Double Weld Plate




| TUBE FITTING PART # | GROUP # | A (mm) | D (mm) | E (mm) |
|---|---|---|---|---|
| APDA0X | 0 | 30 | — | 61 |
| APDA1X | 1 | 35 | 20 | 69 |
| APDA2X | 2 | 43 | 26 | 86 |
| APDA3X | 3 | 52 | 33 | 104 |
| APDA4X | 4 | 60 | 40 | 117 |
| APDA5X | 5 | 75 | 52 | 145 |
| APDA6X | 6 | 90 | 66 | 176 |

Thickness 3 mm

Dimensions and pressures for reference only, subject to change.



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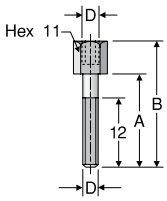
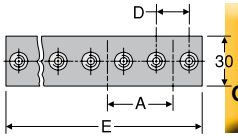
# ASA
Stacking Bolts




| TUBE FITTING PART # | GROUP # | A (mm) | B (mm) | D (mm) |
|---|---|---|---|---|
| **ASA0X** | 0,1 | 20 | 34 | M6 x 1 |
| **ASA2X** | 2 | 25 | 39 | M6 x 1 |
| **ASA3X** | 3 | 30 | 44 | M6 x 1 |
| **ASA4X** | 4 | 35 | 49 | M6 x 1 |
| **ASA5X** | 5 | 50 | 64 | M6 x 1 |
| **ASA6X** | 6 | 60 | 74 | M6 x 1 |

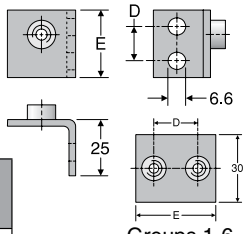
# APRA
Weld Plate – Strip




| TUBE FITTING PART # | GROUP # | D (mm) | A (mm) | E (mm) | NUMBER OF CLAMPS |
|---|---|---|---|---|---|
| **APRA0X** | 0 | — | 30 | 298 | 10 |
| **APRA1X** | 1 | 20 | 35 | 349 | 10 |
| **APRA2X** | 2 | 26 | 43 | 427 | 10 |
| **APRA3X** | 3 | 33 | 52 | 516 | 10 |
| **APRA4X** | 4 | 40 | 60 | 297 | 5 |
| **APRA5X** | 5 | 52 | 75 | 370 | 5 |
| **APRA6X** | 6 | 66 | 90 | 446 | 5 |

Thickness 3 mm

# APWA
Weld Plate – Angled

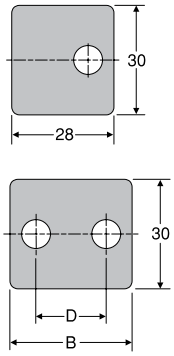



Groups 1-6

| TUBE FITTING PART # | GROUP # | D (mm) | E (mm) |
|---|---|---|---|
| **APWA0X** | 0 | 14 | 30 |
| **APWA1X** | 1 | 20 | 36 |
| **APWA2X** | 2 | 26 | 42 |
| **APWA3X** | 3 | 33 | 50 |
| **APWA4X** | 4 | 40 | 59 |
| **APWA5X** | 5 | 52 | 72 |
| **APWA6X** | 6 | 66 | 88 |

Thickness 3 mm

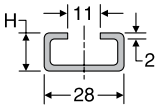
# DPA
Top Plate




| TUBE FITTING PART # | GROUP # | B (mm) | D (mm) |
|---|---|---|---|
| **DPA0X** | 0 | 0 | — |
| **DPA1X** | 1 | 34 | 20 |
| **DPA2X** | 2 | 40 | 26 |
| **DPA3X** | 3 | 48 | 33 |
| **DPA4X** | 4 | 57 | 40 |
| **DPA5X** | 5 | 70 | 52 |
| **DPA6X** | 6 | 86 | 66 |

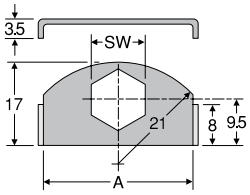
Thickness 3 mm

# TS
Mounting Rail



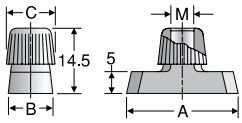

| TUBE FITTING PART # | GROUP # | H (mm) | LENGTH (meter) |
|---|---|---|---|
| **TS11A/B1X** | ALL | 11 | 1 |
| **TS14A/B1X** | ALL | 14 | 1 |
| **TS30A/B1X** | ALL | 30 | 1 |
| **TS11A/B2X** | ALL | 11 | 2 |
| **TS14A/B2X** | ALL | 14 | 2 |
| **TS30A/B2X** | ALL | 30 | 2 |

# SBA
Locking Plate



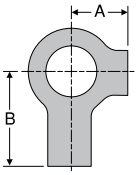

| TUBE FITTING PART # | GROUP # | A (mm) | SW (mm) |
|---|---|---|---|
| **SBAX** | ALL | 30 | 11 |

# TMA
Lock Nut




| TUBE FITTING PART # | GROUP # | A (mm) | B (mm) | C (mm) | M (mm) |
|---|---|---|---|---|---|
| **TMA/TMB1VERZX** | ALL | 25.4 | 10.4 | 12 | M6 X 1 |

# USA
Locking Washer




| TUBE FITTING PART # | GROUP # | A (mm) | B (mm) |
|---|---|---|---|
| **USA/USB1X** | ALL | 9 | 18 |

Dimensions and pressures for reference only, subject to change.



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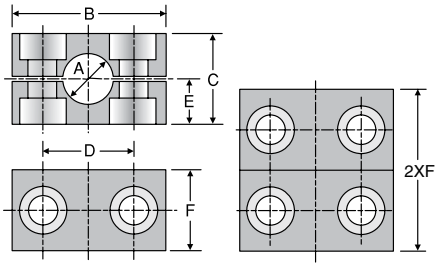
# RCP / RCN / RCA / RCPG

Clamp Halves

| TUBE FITTING PART # | GROUP # | A Metric Tube Size | A Inch Pipe Size | A Inch Tube Size | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) |
|---|---|---|---|---|---|---|---|---|---|
| **RCP108X** | | 8 | | 5/16 | | | | | |
| **RCP110X** | | 10 | 1/8 | | | | | | |
| **RCP112X** | | 12 | | | | | | | |
| **RCP113.5X** | | 13.5 | 1/4 | | | | | | |
| **RCP114X** | 1 | 14 | | | 55 | 32 | 33 | 16 | 30 |
| **RCP115X** | | 15 | | | | | | | |
| **RCP116X** | | 16 | | 5/8 | | | | | |
| **RCP117.2X** | | 17.2 | 3/8 | | | | | | |
| **RCP118X** | | 18 | | | | | | | |
| **RCP220X** | | 20 | | | | | | | |
| **RCP221.3X** | | 21.3 | 1/2 | | | | | | |
| **RCP222X** | | 22 | | | | | | | |
| **RCP223X** | 2 | 23 | | | 70 | 48 | 45 | 24 | 30 |
| **RCP225X** | | 25 | | 1 | | | | | |
| **RCP226.9X** | | 26.9 | 3/4 | | | | | | |
| **RCP228X** | | 28 | | | | | | | |
| **RCP330X** | | 30 | | | | | | | |
| **RCP332X** | | 32 | | 1 1/4 | | | | | |
| **RCP333.7X** | | 33.7 | 1 | | | | | | |
| **RCP335X** | 3 | 35 | | | 85 | 60 | 60 | 30 | 30 |
| **RCP338X** | | 38 | | 1 1/2 | | | | | |
| **RCP340X** | | 40 | | | | | | | |
| **RCP342X** | | 42 | 1 1/4 | | | | | | |
| **RCP438X** | | 38 | | 1 1/2 | | | | | |
| **RCP440X** | | 40 | | | | | | | |
| **RCP442X** | | 42 | 1 1/4 | | | | | | |
| **RCP445X** | | 45 | | | | | | | |
| **RCP448.3X** | | 48.3 | 1 1/2 | | | | | | |
| **RCP450X** | 4 | 50 | | | 115 | 90 | 90 | 45 | 45 |
| **RCP451X** | | 51 | | 2 | | | | | |
| **RCP452X** | | 52 | | | | | | | |
| **RCP455X** | | 55 | | | | | | | |
| **RCP457X** | | 57 | | 2 1/4 | | | | | |
| **RCP460.3X** | | 60.3 | 2 | | | | | | |
| **RCP463X** | | 63 | | 2 1/2 | | | | | |
| **RCP465X** | | 65 | | | | | | | |
| **RCP470X** | | 70 | | | | | | | |
| **RCP570X** | | 70 | | | | | | | |
| **RCP576.1X** | | 76.1 | 2 1/2 | 3 | | | | | |
| **RCP580X** | 5 | 80 | | | 152 | 120 | 122 | 60 | 60 |
| **RCP582.5X** | | 82.5 | | 3 1/4 | | | | | |
| **RCP588.9X** | | 88.9 | 3 | 3 1/2 | | | | | |
| **RCP690X** | | 90 | | | | | | | |
| **RCP6101.6X** | | 101.6 | 3 1/2 | 4 | | | | | |
| **RCP6108X** | 6 | 108 | | 4 1/4 | 205 | 170 | 168 | 85 | 80 |
| **RCP6114.3X** | | 114.3 | 4 | 4 1/2 | | | | | |
| **RCP6127X** | | 127 | | 5 | | | | | |
| **RCP7127X** | | 127 | | 5 | | | | | |
| **RCP7133X** | | 133 | | 5 1/4 | | | | | |
| **RCP7140X** | | 140 | 5 | 5 1/2 | | | | | |
| **RCP7152.4X** | 7 | 152.4 | 5 1/2 | 6 | 250 | 200 | 205 | 100 | 90 |
| **RCP7159X** | | 159 | | 6 1/4 | | | | | |
| **RCP7165.1X** | | 165.1 | 6 | 6 1/2 | | | | | |
| **RCP7168.3X** | | 168.3 | | 6 5/8 | | | | | |
| **RCP8168.3X** | | 168.3 | | 6 5/8 | | | | | |
| **RCP8177.8X** | 8 | 177.8 | | 7 | 320 | 270 | 265 | 135 | 120 |
| **RCP8193.7X** | | 193.7 | | 7 5/8 | | | | | |
| **RCP8219.1X** | | 219.1 | 8 | 8 5/8 | | | | | |




RCP

RCPD
(2 pairs of RCP)

**Material codes for clamp halves:**

Polypropylene - **RCP**
inside plain - **RCPG (for hose)**
Polyamide 6 - **RCN**
Aluminum - **RCA**

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Dimensions and pressures for reference only, subject to change.



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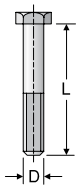
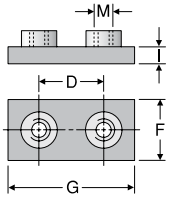
# SSC
Hex Head Bolts



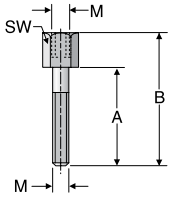

| TUBE FITTING PART # | GROUP # | D (mm) | L (mm) |
|---|---|---|---|
| SSC1X | 1 | M10 x 1.5 | 45 |
| SSC2X | 2 | M10 x 1.5 | 60 |
| SSC3X | 3 | M10 x 1.5 | 70 |
| SSC4X | 4 | M12 x 1.5 | 100 |
| SSC5X | 5 | M16 x 2 | 130 |
| SSC6X | 6 | M20 x 2 | 190 |
| SSC7X | 7 | M24 x 2 | 220 |
| SSC8X | 8 | M30 x 2 | 300 |

# APC
Weld Plate



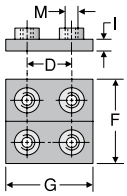

| TUBE FITTING PART # | GROUP # | D (mm) | F (mm) | G (mm) | I (mm) | M (mm) |
|---|---|---|---|---|---|---|
| APC1X | 1 | 33 | 30 | 73 | 8 | M10 x 1.5 |
| APC2X | 2 | 45 | 30 | 85 | 8 | M10 x 1.5 |
| APC3X | 3 | 60 | 30 | 100 | 8 | M10 x 1.5 |
| APC4X | 4 | 90 | 45 | 140 | 10 | M12 x 1.5 |
| APC5X | 5 | 122 | 60 | 180 | 10 | M16 x 2 |
| APC6X | 6 | 168 | 80 | 225 | 15 | M20 x 2 |
| APC7X | 7 | 205 | 90 | 270 | 15 | M24 x 2 |
| APC8X | 8 | 265 | 120 | 340 | 25 | M30 x 2 |

# ASC
Stacking Bolts



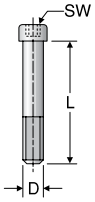

| TUBE FITTING PART # | GROUP # | M (mm) | SW (mm) | A (mm) | B (mm) |
|---|---|---|---|---|---|
| ASC1X | 1 | M10 x 1.5 | 15 | 25 | 51 |
| ASC2X | 2 | M10 x 1.5 | 15 | 40 | 66 |
| ASC3X | 3 | M10 x 1.5 | 15 | 50 | 76 |
| ASC4X | 4 | M12 x 1.5 | 17 | 85 | 112 |
| ASC5X | 5 | M16 x 2 | 21 | 110 | 146 |
| ASC6X | 6 | M20 x 2 | 27 | 155 | 206 |
| ASC7X | 7 | M24 x 2 | 30 | 185 | 245 |
| ASC8X | 8 | M30 x 2 | 36 | 250 | 330 |

# APDC
Double Weld Plate



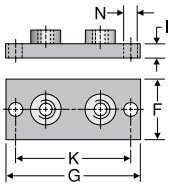

| TUBE FITTING PART # | GROUP # | D (mm) | F (mm) | G (mm) | I (mm) | M (mm) |
|---|---|---|---|---|---|---|
| APDC1X | 1 | 33 | 60 | 73 | 8 | M10 x 1.5 |
| APDC2X | 2 | 45 | 60 | 85 | 8 | M10 x 1.5 |
| APDC3X | 3 | 60 | 60 | 100 | 8 | M10 x 1.5 |
| APDC4X | 4 | 90 | 90 | 140 | 10 | M12 x 1.5 |
| APDC5X | 5 | 122 | 120 | 180 | 10 | M16 x 2 |
| APDC6X | 6 | 168 | 160 | 225 | 15 | M20 x 2 |
| APDC7X | 7 | 205 | 180 | 270 | 15 | M24 x 2 |
| APDC8X | 8 | 265 | 240 | 340 | 25 | M30 x 2 |

# ISC
Cap Screws




| TUBE FITTING PART # | GROUP # | D (mm) | L (mm) | SW (mm) |
|---|---|---|---|---|
| ISC1X | 1 | M10 x 1.5 | 45 | 8 |
| ISC2X | 2 | M10 x 1.5 | 60 | 8 |
| ISC3X | 3 | M10 x 1.5 | 70 | 8 |
| ISC4X | 4 | M12 x 1.5 | 100 | 10 |
| ISC5X | 5 | M16 x 2 | 130 | 14 |
| ISC6X | 6 | M20 x 2 | 190 | 17 |
| ISC7X | 7 | M24 x 2 | 220 | 19 |
| ISC8X | 8 | M30 x 2 | 300 | 22 |

# APLC
Weld / Screw Plate




| TUBE FITTING PART # | GROUP # | F (mm) | G (mm) | I (mm) | K (mm) | N (mm) |
|---|---|---|---|---|---|---|
| APLC1X | 1 | 30 | 113 | 8 | 85 | 11 |
| APLC2X | 2 | 30 | 125 | 8 | 97 | 11 |
| APLC3X | 3 | 30 | 140 | 8 | 112 | 11 |
| APLC4X | 4 | 45 | 190 | 10 | 160 | 14 |
| APLC5X | 5 | 60 | 240 | 10 | 205 | 18 |
| APLC6X | 6 | 80 | 310 | 15 | 270 | 22 |
| APLC7X | 7 | 90 | 370 | 15 | 320 | 26 |
| APLC8X | 8 | 120 | 450 | 25 | 390 | 33 |

Dimensions and pressures for reference only, subject to change.



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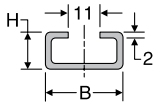
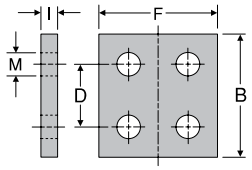
## TSC
Mounting Rail



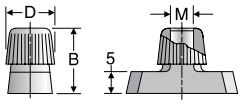

| TUBE FITTING PART # | GROUP # | B (mm) | H (mm) | LENGTH (meter) |
|---|---|---|---|---|
| **TSC1X** | ALL | 40 | 22 | 1 |
| **TSC2X** | ALL | 40 | 22 | 2 |

## DPDC
Double Top Plate



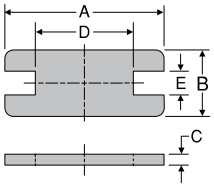

| TUBE FITTING PART # | GROUP # | B (mm) | D (mm) | F (mm) | I (mm) | M (mm) |
|---|---|---|---|---|---|---|
| **DPDC1X** | 1 | 55 | 33 | 60 | 8 | 11 |
| **DPDC2X** | 2 | 70 | 45 | 60 | 8 | 11 |
| **DPDC3X** | 3 | 85 | 60 | 60 | 8 | 11 |
| **DPDC4X** | 4 | 115 | 90 | 90 | 10 | 14 |
| **DPDC5X** | 5 | 152 | 122 | 120 | 10 | 18 |
| **DPDC6X** | 6 | 205 | 168 | 160 | 15 | 22 |
| **DPDC7X** | 7 | 250 | 205 | 180 | 15 | 26 |
| **DPDC8X** | 8 | 320 | 265 | 240 | 25 | 33 |

## TMC
Lock Nut




| TUBE FITTING PART # | GROUP # | B (mm) | D (mm) | M (mm) |
|---|---|---|---|---|
| **TMC1X** | 1-3 | 20 | 17.8 | M10 x 1.5 |
| **TMC4X** | 4 | 23 | 19.8 | M12 x 1.5 |

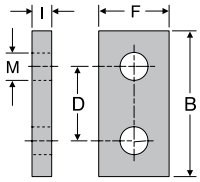
## SPC
Locking Plate




| TUBE FITTING PART # | GROUP # | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) |
|---|---|---|---|---|---|---|
| **SPC1X** | 1 | 55 | 30 | 8 | 14 | 15.5 |
| **SPC2X** | 2 | 70 | 30 | 8 | 26 | 15.5 |
| **SPC3X** | 3 | 85 | 30 | 8 | 41 | 15.5 |
| **SPC4X** | 4 | 115 | 45 | 10 | 69 | 17.5 |
| **SPC5X** | 5 | 152 | 60 | 10 | 97 | 21.5 |
| **SPC6X** | 6 | 205 | 80 | 15 | 137 | 27.5 |
| **SPC7X** | 7 | 250 | 90 | 15 | 169 | 30.5 |
| **SPC8X** | 8 | 320 | 120 | 25 | 219 | 36.5 |

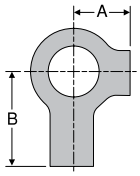
P

## DPC
Top Plate




| TUBE FITTING PART # | GROUP # | B (mm) | D (mm) | F (mm) | I (mm) | M (mm) |
|---|---|---|---|---|---|---|
| **DPC1X** | 1 | 55 | 33 | 30 | 8 | 11 |
| **DPC2X** | 2 | 70 | 45 | 30 | 8 | 11 |
| **DPC3X** | 3 | 85 | 60 | 30 | 8 | 11 |
| **DPC4X** | 4 | 115 | 90 | 45 | 10 | 14 |
| **DPC5X** | 5 | 152 | 122 | 60 | 10 | 18 |
| **DPC6X** | 6 | 205 | 168 | 80 | 15 | 22 |
| **DPC7X** | 7 | 250 | 205 | 90 | 15 | 26 |
| **DPC8X** | 8 | 320 | 265 | 120 | 25 | 33 |

## USC
Locking Washer




| TUBE FITTING PART # | GROUP # | A (mm) | B (mm) |
|---|---|---|---|
| **USC1X** | 1,2,3 | 13 | 22 |
| **USC4X** | 4 | 15 | 28 |
| **USC5X** | 5 | 18 | 32 |
| **USC6X** | 6 | 21 | 36 |
| **USC7X** | 7 | 25 | 42 |
| **USC8X** | 8 | 32 | 52 |

Dimensions and pressures for reference only, subject to change.



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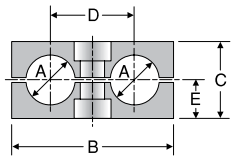
# RBP / RBN

Clamp Halves

| TUBE FITTING PART # | GROUP # | A Metric Tube Size | A Inch Pipe Size | A Inch Tube Size | B (mm) | C (mm) | D (mm) | E (mm) |
|---|---|---|---|---|---|---|---|---|
| **RBP106X** | | 6 | | | | | | |
| **RBP106.4X** | | 6.4 | | 1/4 | | | | |
| **RBP108X** | 1 | 8 | | 5/16 | 36 | 27 | 20 | 13.5 |
| **RBP109.5X** | | 9.5 | | 3/8 | | | | |
| **RBP110X** | | 10 | 1/8 | | | | | |
| **RBP112X** | | 12 | | | | | | |
| **RBP212.7X** | | 12.7 | | 1/2 | | | | |
| **RBP213.5X** | | 13.5 | 1/4 | | | | | |
| **RBP214X** | | 14 | | | | | | |
| **RBP215X** | 2 | 15 | | 5/8 | 53 | 26 | 29 | 13 |
| **RBP216X** | | 16 | | | | | | |
| **RBP217.2X** | | 17.2 | 3/8 | | | | | |
| **RBP218X** | | 18 | | | | | | |
| **RBP319X** | | 19 | | 3/4 | | | | |
| **RBP320X** | | 20 | | | | | | |
| **RBP321.3X** | 3 | 21.3 | 1/2 | | 67 | 37 | 36 | 18.5 |
| **RBP322X** | | 22 | | | | | | |
| **RBP325X** | | 25 | | 1 | | | | |
| **RBP426.9X** | | 26.9 | 3/4 | | | | | |
| **RBP428X** | 4 | 28 | | | 82 | 42 | 45 | 21 |
| **RBP430X** | | 30 | | | | | | |
| **RBP532X** | | 32 | | 1 1/4 | | | | |
| **RBP533.7X** | | 33.7 | 1 | | | | | |
| **RBP535X** | 5 | 35 | | | 106 | 54 | 56 | 27 |
| **RBP538X** | | 38 | | 1 1/2 | | | | |
| **RBP542X** | | 42 | 1 1/4 | | | | | |

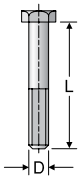



**Material codes for clamp halves:**
Polypropylene - **RBP**
inside plain - **RBPG (for hose)**
Polyamide 6 - **RBN**
Width 30 mm

# SSB

Hex Head Bolt

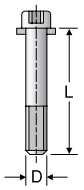
| TUBE FITTING PART # | GROUP # | D (mm) | L (mm) | MATERIAL |
|---|---|---|---|---|
| **SSLA2/SSB1X** | 1 | M6 x 1 | 35 | • |
| **SSB2X** | 2 | M8 x 1 | 35 | • |
| **SSB3X** | 3 | M8 x 1 | 45 | • |
| **SSB4X** | 4 | M8 x 1 | 50 | • |
| **SSB5X** | 5 | M8 x 1 | 60 | • |




# ISB

Cap Screws

| TUBE FITTING PART # | GROUP # | D (mm) | L (mm) | MATERIAL |
|---|---|---|---|---|
| **ISB1X** | 1 | M6 x 1 | 35 | • |
| **ISB2X** | 2 | M8 x 1 | 35 | • |
| **ISB3X** | 3 | M8 x 1 | 45 | • |
| **ISB4X** | 4 | M8 x 1 | 50 | • |
| **ISB5X** | 5 | M8 x 1 | 60 | • |




Dimensions and pressures for reference only, subject to change.



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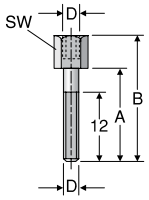
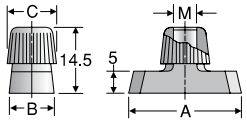
## ASB
Stacking Bolts



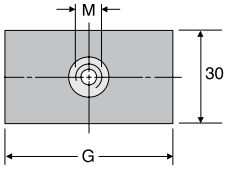

| TUBE FITTING PART # | GROUP # | D (mm) | A (mm) | B (mm) | SW (mm) |
|---|---|---|---|---|---|
| ASB1X | 1 | M6 x 1 | 20 | 34 | 11 |
| ASB2X | 2 | M8 x 1 | 20 | 33 | 12 |
| ASB3X | 3 | M8 x 1 | 29 | 44 | 12 |
| ASB4X | 4 | M8 x 1 | 34 | 49 | 12 |
| ASB5X | 5 | M8 x 1 | 47 | 62 | 12 |

## TMB
Lock Nut



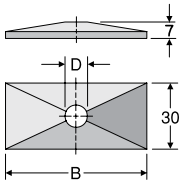

| TUBE FITTING PART # | GROUP # | A (mm) | B (mm) | C (mm) | M (mm) |
|---|---|---|---|---|---|
| TMA/TMB1VERZX | 1 | 25.4 | 10.4 | 12 | M6 x 1 |
| TMB2X | 2-5 | 25.4 | 10.4 | 12 | M8 x 1 |

## APB
Weld Plate



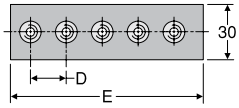

| THICKNESS | TUBE FITTING PART # | GROUP # | G (mm) | M (mm) |
|---|---|---|---|---|
| 3 | APB1X | 1 | 37 | M6 x 1 |
| 5 | APB2X | 2 | 55 | M8 x 1 |
| 5 | APB3X | 3 | 70 | M8 x 1 |
| 5 | APB4X | 4 | 85 | M8 x 1 |
| 5 | APB5X | 5 | 110 | M8 x 1 |

## DPB
Top Plate



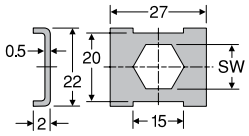

| TUBE FITTING PART # | GROUP # | B (mm) | D (mm) |
|---|---|---|---|
| DPB1X | 1 | 34 | 6.6 |
| DPB2X | 2 | 51 | 8.6 |
| DPB3X | 3 | 64 | 8.6 |
| DPB4X | 4 | 78 | 8.6 |
| DPB5X | 5 | 102 | 8.6 |

## APRB
Weld Plate – Strip



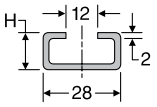

| THICKNESS | TUBE FITTING PART # | GROUP # | D (mm) | E (mm) |
|---|---|---|---|---|
| 3 | APRB1X | 1 | 40 | 196 |
| 5 | APRB2X | 2 | 58 | 288 |
| 5 | APRB3X | 3 | 72 | 358 |
| 5 | APRB4X | 4 | 90 | 446 |
| 5 | APRB5X | 5 | 112 | 558 |

## SBB
Locking Plate



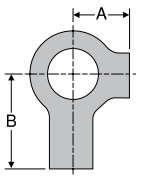

| TUBE FITTING PART # | GROUP # | SW (mm) |
|---|---|---|
| SBB1X | 1 | 11 |
| SBB2X | 2-5 | 12 |

## TS
Mounting Rail




| TUBE FITTING PART # | GROUP # | B (mm) | H (mm) | LENGTH (meter) |
|---|---|---|---|---|
| TS11A/B1X | ALL | 28 | 11 | 1 |
| TS14A/B1X | ALL | 28 | 14 | 1 |
| TS30A/B1X | ALL | 28 | 30 | 1 |
| TS11A/B2X | ALL | 28 | 11 | 2 |
| TS14A/B2X | ALL | 28 | 14 | 2 |
| TS30A/B2X | ALL | 28 | 30 | 2 |

## US
Locking Washer




| TUBE FITTING PART # | GROUP # | A (mm) | B (mm) |
|---|---|---|---|
| USA/USB1X | 1 | 9 | 18 |
| USB2X | 2-5 | 11 | 20 |

P

Dimensions and pressures for reference only, subject to change.



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# Metric Tube

Q

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# Introduction

Parker offers three types of seamless metric tubes for hydraulic, pneumatic and instrumentation applications:

- Steel seamless cold drawn tube, phosphate and oil dipped for corrosion resistance
- Steel seamless cold drawn tube, zinc Chromium-6 free plating for corrosion resistance
- Stainless steel cold drawn tube

### Conformance and Material Specifications

### Tests and Certificates

All tubes are subjected to a non-destructive leak test and marked accordingly. This marking is used in lieu of a works certificate DIN EN 10204-2.2. Test Class 1 DIN EN 10216-5 Table 7 applies for tubes made of 1.4571 material.

### Materials and Mechanical Properties

Steel Types, mechanical properties and conditions are listed in Table Q1.

Welding Suitability and Weldability:

- Steel tubes of St. 37.4, R Series, are weldable according to usual techniques.
- Not recommended to weld St. 37.4, R-CF series, Zinc Chromium-6 Free plated tubes.

Stainless steel tubes of 1.4571 are suitable for arc welding. The welding filler should be selected in accordance with DIN EN1600 and DIN EN12072 Part 1 taking into account the type of application and the welding technique.

# Assembly and Installation

Please refer to Section S for the assembly and installation instructions for Metric Tube fittings.

### Applications

### Recommended Bend Radius

A bend radius of 3 times the tube O.D. or greater is recommended for cold bending of Parker tubes with hand, mechanical and power bending equipment.

### *Use of Tube Supports

The use of VH tube supports for EO and EO-2 fittings is required in certain thinner wall tubes to ensure proper assembly. Consult Fig. S45 & Fig. S46 on page S30.

### Temperature Range

- Parker steel (St. 37.4) metric seamless tube can be used at the full rated working pressures without pressure rating reductions within the following temperature range: -40°C to +120°C. Maximum allowable operating temperature of +250°C.
- Parker stainless steel (1.4571) metric seamless tube can be used at full rated working pressures with-out pressure reductions within the following temperature ranges: -60°C to +20°C. Maximum allowable operating temperature of +400°C. Elevated temperature pressure reductions are as listed in Table Q2.

### As Delivered Conditions:

Standard Tube Lengths: 6 meters (approx. 20 ft)

Surface Finish:

- Steel (St. 37.4): Phosphated and oiled
  - I.D. dimensions 1.5 – 5 mm, outside and inside oiled
  - I.D. dimensions 6 mm and higher, outside and inside phosphated and oiled
- Steel (St. 37.4) R-CF Series: Zinc Chromium-6 Free

| Parker Series | Material | Tensile Strength | Yield Strength | % Elongation | Condition |
|---|---|---|---|---|---|
| R Series | Steel, fine grain E235N acc. to EN10305-4 (St. 37.4 acc. to DIN1630 | 340 N/mm² min. 49,000 PSI | 235 N/mm² min. 34,000 PSI | 25% min. | Seamless, cold drawn normal annealed, DIN EN 10305-1 and -4 |
| R-71 Series | Stainless steel, 1.4571 X6CrNiMoTi17122 | 500 N/mm² min. 72,500 PSI | 245 N/mm² min. 35,500 PSI | 35% min. | Seamless, cold drawn free of scale, heat treated in accordance with DIN EN 10216-5 tab. 6 |

**Table Q1 — Parker Steel tubes mechanical properties and conditions**

| Temperature | Material | -60° up to +20° C | 50° C | 100° C | 200° C | 300° C | 400° C |
|---|---|---|---|---|---|---|---|
| Pressure reductions in % | 1.4571 | — | 5.5 | 11.5 | 21.5 | 29 | 34 |

**Note:** Interpolation is acceptable for intermediate temperature levels.

**Table Q2 — Parker stainless tube elevated temperature derating factors**





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# Seamless EO Steel Tubes Material E235N (St. 37.4)

Tolerances DIN EN 10305-4

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| Order code | | Tube O.D. (mm) | Tolerance | Wall thickness (mm) | Tube I.D. (mm) | Design pressure bar | | Burst pressure bar | Weight kg/m |
|---|---|---|---|---|---|---|---|---|---|
| Phosphated and oiled | Cr(VI)-free | | | | | DIN 2413 I Static | DIN 2413 III Dynamic | | |
| R04X0.5 | R04X0.5CF | 4 | | 0.50 | 3.0 | 313 | 273 | 1160 | 0.047 |
| | R04X0.75CF | 4 | ±0.08 | 0.75 | 2.5 | 470 | 391 | 1820 | 0.063 |
| R04X1 | R04X1CF | 4 | | 1.00 | 2.0 | 627 | 500 | 2700 | 0.074 |
| | R05X1CF | 5 | ±0.08 | 1.00 | 3.0 | 501 | 416 | 2120 | 0.099 |
| | R06X0.75CF | 6 | | 0.75 | 4.5 | 333 | 288 | 1150 | 0.103 |
| R06X1 | R06X1CF | 6 | | 1.00 | 4.0 | 444 | 372 | 1650 | 0.123 |
| R06X1.5 | R06X1.5CF | 6 | ±0.08 | 1.50 | 3.0 | 666 | 526 | 2550 | 0.166 |
| | R06X2CF | 6 | | 2.00 | 2.0 | 692 | 662 | >3500 | 0.197 |
| | R06X2.25CF | 6 | | 2.25 | 1.5 | 757 | 725 | >3500 | 0.208 |
| R08X1 | R08X1CF | 8 | | 1.00 | 6.0 | 333 | 288 | 1175 | 0.173 |
| R08X1.5 | R08X1.5CF | 8 | ±0.08 | 1.50 | 5.0 | 499 | 412 | 1925 | 0.240 |
| R08X2 | R08X2CF | 8 | | 2.00 | 4.0 | 666 | 526 | 2500 | 0.296 |
| | R08X2.5CF | 8 | | 2.50 | 3.0 | 658 | 630 | 2650 | 0.339 |
| R10X1 | R10X1CF | 10 | | 1.00 | 8.0 | 282 | 248 | 900 | 0.222 |
| R10X1.5 | R10X1.5CF | 10 | | 1.50 | 7.0 | 423 | 357 | 1450 | 0.314 |
| R10X2 | R10X2CF | 10 | ±0.08 | 2.00 | 6.0 | 564 | 458 | 2025 | 0.395 |
| | R10X2.5CF | 10 | | 2.50 | 5.0 | 705 | 551 | 2675 | 0.462 |
| | R10X3CF | 10 | | 3.00 | 4.0 | 666 | 638 | >3500 | 0.518 |
| R12X1 | R12X1CF | 12 | | 1.00 | 10.0 | 235 | 209 | 750 | 0.271 |
| R12X1.5 | R12X1.5CF | 12 | | 1.50 | 9.0 | 353 | 303 | 1150 | 0.388 |
| R12X2 | R12X2CF | 12 | ±0.08 | 2.00 | 8.0 | 470 | 391 | 1600 | 0.493 |
| | R12X2.5CF | 12 | | 2.50 | 7.0 | 588 | 474 | 2025 | 0.586 |
| | R12X3CF | 12 | | 3.00 | 6.0 | 705 | 551 | 2600 | 0.666 |
| | R12X3.5CF | 12 | | 3.50 | 5.0 | 651 | 624 | | 0.734 |
| | R14X1.5CF | 14 | | 1.50 | 11.0 | 302 | 264 | 975 | 0.462 |
| R14X2 | R14X2CF | 14 | | 2.00 | 10.0 | 403 | 342 | 1325 | 0.592 |
| | R14X2.5CF | 14 | ±0.08 | 2.50 | 9.0 | 504 | 415 | 1650 | 0.709 |
| R14X3 | R14X3CF | 14 | | 3.00 | 8.0 | 604 | 485 | 2200 | 0.814 |
| | | 14 | | 3.50 | 7.0 | 705 | 551 | 2625 | 0.906 |
| R15X1 | R15X1CF | 15 | | 1.00 | 13.0 | 188 | 170 | 575 | 0.345 |
| R15X1.5 | R15X1.5CF | 15 | | 1.50 | 12.0 | 282 | 248 | 950 | 0.499 |
| R15X2 | R15X2CF | 15 | ±0.08 | 2.00 | 11.0 | 376 | 321 | 1275 | 0.641 |
| | | 15 | | 3.00 | 9.0 | 564 | 458 | 2000 | 0.888 |
| R16X1.5 | R16X1.5CF | 16 | | 1.50 | 13.0 | 264 | 233 | 850 | 0.536 |
| R16X2 | R16X2CF | 16 | ±0.08 | 2.00 | 12.0 | 353 | 303 | 1175 | 0.691 |
| R16X2.5 | R16X2.5CF | 16 | | 2.50 | 11.0 | 441 | 370 | 1500 | 0.832 |
| R16X3 | R16X3CF | 16 | | 3.00 | 10.0 | 529 | 433 | 1850 | 0.962 |
| R18X1 | R18X1CF | 18 | | 1.00 | 16.0 | 157 | 143 | 450 | 0.419 |
| R18X1.5 | R18X1.5CF | 18 | | 1.50 | 15.0 | 235 | 209 | 700 | 0.610 |
| R18X2 | R18X2CF | 18 | ±0.08 | 2.00 | 14.0 | 313 | 273 | 975 | 0.789 |
| R18X2.5 | R18X2.5CF | 18 | | 2.50 | 13.0 | 392 | 333 | 1300 | 0.956 |
| | R18X3CF | 18 | | 3.00 | 12.0 | 470 | 391 | 1575 | 1.111 |

**Table Q3 — Seamless EO steel tubes**

**Pressure Calculations:**

Calculation pressures given are according to DIN 2413 Part 1 for **static stress**

$$P = \frac{20 \cdot K \cdot s \cdot c}{S \cdot da} \text{ (bar)}$$

Material characteristic value K=235 N/mm²

and

DIN 2413 part III for **dynamic stress**

$$P = \frac{20 \cdot K \cdot s \cdot c}{S \cdot (da + s \cdot c)} \text{ (bar)}$$

Material characteristic value K=226 N/mm² (permanent fatigue strength)

Design correction value S=1.5 for static and dynamic stress.

Factor “c” for consideration of wall thickness **divergence for static and dynamic stress** =0.8 for tube o.d. 4 and 5; 0.85 for tube o.d. 6 and 8; 0.9 for larger tube o.d.

da = Tube O.D. in mm

s = Wall thickness in mm

**Standard Tube Length:**

- 6 m (19.7 ft.)

**Conversion Factors:**

- Bar x 14.5 = psig
- kg/m x 0.672 = lbs/ft
- N/mm² x 145 = lb/in²

See Remarks on page Q5.

Dimensions and pressures for reference only, subject to change.



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# Seamless EO Steel Tubes Material E235N (St. 37.4) (continued)

Tolerances DIN EN 10305-4

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| Order code | | Tube O.D. (mm) | Tolerance | Wall thickness (mm) | Tube I.D. (mm) | Design pressure bar | | Burst pressure bar | Weight kg/m |
|---|---|---|---|---|---|---|---|---|---|
| Phosphated and oiled | Cr(VI)-free | | | | | DIN 2413 I Static | DIN 2413 III Dynamic | | |
| | **R20X1.5CF** | 20 | | 1.50 | 17.0 | 212 | 190 | 675 | 0.684 |
| **R20X2** | **R20X2CF** | 20 | | 2.00 | 16.0 | 282 | 248 | 900 | 0.888 |
| **R20X2.5** | **R20X2.5CF** | 20 | ±0.08 | 2.50 | 15.0 | 353 | 303 | 1100 | 1.079 |
| **R20X3** | **R20X3CF** | 20 | | 3.00 | 14.0 | 423 | 357 | 1400 | 1.258 |
| | **R20X3.5CF** | 20 | | 3.50 | 13.0 | 494 | 408 | 1650 | 1.424 |
| | **R20X4CF** | 20 | | 4.00 | 12.0 | 564 | 458 | 2000 | 1.578 |
| **R22X1.5** | **R22X1.5CF** | 22 | | 1.50 | 19.0 | 192 | 173 | 550 | 0.758 |
| **R22X2** | **R22X2CF** | 22 | ±0.08 | 2.00 | 18.0 | 256 | 227 | 775 | 0.986 |
| **R22X2.5** | **R22X2.5CF** | 22 | | 2.50 | 17.0 | 320 | 278 | 1025 | 1.202 |
| | **R22X3CF** | 22 | | 3.00 | 16.0 | 385 | 328 | 1175 | 1.406 |
| **R25X2** | **R25X2CF** | 25 | | 2.00 | 21.0 | 226 | 201 | 725 | 1.134 |
| **R25X2.5** | **R25X2.5CF** | 25 | | 2.50 | 20.0 | 282 | 248 | 850 | 1.387 |
| **R25X3** | **R25X3CF** | 25 | ±0.08 | 3.00 | 19.0 | 338 | 292 | 1025 | 1.628 |
| **R25X4** | **R25X4CF** | 25 | | 4.00 | 17.0 | 451 | 378 | 1500 | 2.072 |
| **R25X4.5** | **R25X4.5CF** | 25 | | 4.50 | 16.0 | 508 | 418 | 1625 | 2.275 |
| **R28X1.5** | **R28X1.5CF** | 28 | | 1.50 | 25.0 | 151 | 138 | 425 | 0.980 |
| **R28X2** | **R28X2CF** | 28 | | 2.00 | 24.0 | 201 | 181 | 600 | 1.282 |
| **R28X2.5** | **R28X2.5CF** | 28 | ±0.08 | 2.50 | 23.0 | 252 | 223 | 750 | 1.572 |
| **R28X3** | **R28X3CF** | 28 | | 3.00 | 22.0 | 302 | 264 | 900 | 1.850 |
| | **R30X2CF** | 30 | | 2.00 | 26.0 | 188 | 170 | 575 | 1.381 |
| **R30X2.5** | **R30X2.5CF** | 30 | | 2.50 | 25.0 | 235 | 209 | 725 | 1.695 |
| **R30X3** | **R30X3CF** | 30 | ±0.08 | 3.00 | 24.0 | 282 | 248 | 850 | 1.998 |
| **R30X4** | **R30X4CF** | 30 | | 4.00 | 22.0 | 376 | 321 | 1175 | 2.565 |
| **R30X5** | **R30X5CF** | 30 | | 5.00 | 20.0 | 470 | 391 | 1600 | 3.083 |
| **R35X2** | **R35X2CF** | 35 | ±0.15 | 2.00 | 31.0 | 161 | 147 | 450 | 1.628 |
| **R35X2.5** | **R35X2.5CF** | 35 | | 2.50 | 30.0 | 201 | 181 | 600 | 2.004 |
| **R35X3** | **R35X3CF** | 35 | | 3.00 | 29.0 | 242 | 215 | 700 | 2.367 |
| | **R35X4CF** | 35 | | 4.00 | 27.0 | 322 | 280 | 960 | 3.058 |
| | **R38X2.5CF** | 38 | | 2.50 | 33.0 | 186 | 168 | 550 | 2.189 |
| **R38X3** | **R38X3CF** | 38 | | 3.00 | 32.0 | 223 | 199 | 675 | 2.589 |
| **R38X4** | **R38X4CF** | 38 | ±0.15 | 4.00 | 30.0 | 297 | 260 | 900 | 3.354 |
| **R38X5** | **R38X5CF** | 38 | | 5.00 | 28.0 | 371 | 318 | 1150 | 4.069 |
| | **R38X6CF** | 38 | | 6.00 | 26.0 | 445 | 373 | 1425 | 4.735 |
| | **R38X7CF** | 38 | | 7.00 | 24.0 | 519 | 427 | 1700 | 5.352 |
| **R42X2** | **R42X2CF** | 42 | ±0.2 | 2.00 | 38.0 | 134 | 123 | 375 | 1.973 |
| **R42X3** | **R42X3CF** | 42 | | 3.00 | 36.0 | 201 | 181 | 575 | 2.885 |
| **R42X4** | **R42X4CF** | 42 | | 4.00 | 34.0 | 269 | 237 | 850 | 3.749 |
| **R50X6** | | 50 | ±0.2 | 6.00 | 38.0 | 338 | 292 | | 6.511 |
| **R65X8** | | 65 | ±0.3 | 8.00 | 49.0 | 347 | 299 | | 11.246 |

**Table Q3 — Seamless EO steel tubes (cont'd.)**

**Remarks:**

**Corrosion** — Additional allowances are not considered for the calculation of pressures

$$\frac{da\ (bar)}{dimax.} > 2$$

are calculated for static stress in accordance with DIN 2413 Part III, but with K = 235 N/mm²

When a specific design factor is required, calculations should be based upon the burst pressures shown in the above tables.

**Temperature range:** -40°C up to 120°C without pressure reductions.

**Surface finish:**

Tubes with I.D. 1.5 to 5 mm: outside and inside oiled.

Tubes from 6 mm I.D. and above: outside and inside phosphated and oiled.

**For increased temperatures:**

control calculation according to DIN 2413 required (static application above 120 °C).

$$P = \frac{20 \cdot K \cdot a \cdot c}{S \cdot (da + a \cdot c)}\ (bar)$$

Material strength K for increased temperatures:

| Temperature in °C | K (Nmm²) |
|---|---|
| up to 200 | 185 |
| up to 250 | 165 |

Q

Dimensions and pressures for reference only, subject to change.



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# Seamless EO Stainless Steel Tubes Material-No.: 1.4571

Tolerances EN 10305-1 / DIN 2391

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| Order code 1.4571 | Tube O.D. (mm) | Tolerance | Wall thickness (mm) | Tube I.D. (mm) | 1.4571 Design pressure bar DIN 2413 I Static | 1.4571 burst pressure bar | Weight kg/m |
|---|---|---|---|---|---|---|---|
| **R04X171** | 4 | ±0.08 | 1.0 | 2 | 735 | | 0.075 |
| **R06X171** | 6 | ±0.08 | 1.0 | 4 | 490 | 1850 | 0.125 |
| **R06X1.571** | 6 | ±0.08 | 1.5 | 3 | 735 | 2900 | 0.169 |
| **R08X171** | 8 | ±0.08 | 1.0 | 6 | 368 | 1300 | 0.175 |
| **R08X1.571** | 8 | | 1.5 | 5 | 551 | 2050 | 0.244 |
| **R10X171** | 10 | | 1.0 | 8 | 294 | 950 | 0.225 |
| **R10X1.571** | 10 | ±0.08 | 1.5 | 7 | 441 | 1750 | 0.319 |
| **R10X271** | 10 | | 2.0 | 6 | 588 | 2400 | 0.401 |
| **R12X171** | 12 | | 1.0 | 10 | 245 | 850 | 0.275 |
| **R12X1.571** | 12 | ±0.08 | 1.5 | 9 | 368 | 1400 | 0.394 |
| **R12X271** | 12 | | 2.0 | 8 | 490 | 1900 | 0.501 |
| **R14X1.571** | 14 | | 1.5 | 11 | 315 | 1200 | 0.469 |
| **R14X271** | 14 | ±0.08 | 2.0 | 10 | 420 | 1550 | 0.601 |
| **R14X2.571** | 14 | | 2.5 | 9 | 525 | 2100 | 0.720 |
| **R15X171** | 15 | | 1.0 | 13 | 196 | 675 | 0.351 |
| **R15X1.571** | 15 | ±0.08 | 1.5 | 12 | 294 | 1100 | 0.507 |
| **R15X271** | 15 | | 2.0 | 11 | 392 | 1400 | 0.651 |
| **R16X1.571** | 16 | ±0.08 | 1.5 | 13 | 276 | 950 | 0.545 |
| **R16X271** | 16 | | 2.0 | 12 | 368 | 1300 | 0.701 |
| **R16X2.571** | 16 | ±0.08 | 2.5 | 11 | 459 | 1850 | 0.845 |
| **R16X371** | 16 | | 3.0 | 10 | 551 | 2400 | 0.977 |
| **R18X1.571** | 18 | ±0.08 | 1.5 | 15 | 245 | 800 | 0.620 |
| **R18X271** | 18 | | 2.0 | 14 | 327 | 1150 | 0.801 |
| **R20X271** | 20 | | 2.0 | 16 | 294 | 1050 | 0.901 |
| **R20X2.571** | 20 | ±0.08 | 2.5 | 15 | 368 | 1400 | 1.095 |
| **R20X371** | 20 | | 3.0 | 14 | 441 | 1800 | 1.277 |
| **R22X1.571** | 22 | ±0.08 | 1.5 | 19 | 200 | 650 | 0.770 |
| **R22X271** | 22 | | 2.0 | 18 | 267 | 900 | 1.002 |
| **R25X2.571** | 25 | ±0.08 | 2.5 | 20 | 294 | 1050 | 1.408 |
| **R25X371** | 25 | | 3.0 | 19 | 353 | 1275 | 1.653 |
| **R28X1.571** | 28 | ±0.08 | 1.5 | 25 | 158 | 550 | 0.995 |
| **R28X271** | 28 | | 2.0 | 24 | 210 | 700 | 1.302 |
| **R30X2.571** | 30 | ±0.08 | 2.5 | 25 | 245 | 850 | 1.722 |
| **R30X371** | 30 | ±0.08 | 3.0 | 24 | 294 | 1150 | 2.028 |
| **R30X471** | 30 | | 4.0 | 22 | 392 | 1500 | 2.605 |
| **R35X271** | 35 | ±0.15 | 2.0 | 31 | 168 | 550 | 1.653 |
| **R38X471** | 38 | ±0.15 | 4.0 | 30 | 309 | 1150 | 3.405 |
| **R42X271** | 42 | ±0.2 | 2.0 | 38 | 140 | 475 | 2.003 |
| **R42X371** | 42 | | 3.0 | 36 | 210 | 750 | 2.930 |

**Table Q4 — Seamless EO stainless steel tubes**

**Pressure Calculation:**

Pressure calculation given are according to DIN 2413 part I for **static stress**

$$P = \frac{20 \cdot K \cdot s \cdot c}{S \cdot da} \text{ (bar)}$$

Material characteristic value K=245 N/mm² (1.4571), K=245 N/mm² (1.4571) (1% proof stress)

Design factor S = 1.5

Factor “c” for consideration of wall thickness divergence: 0.9

da = Tube O.D. in mm

s = Wall thickness in mm

**Remarks:**

**Corrosion** — Additional allowances are not considered for the calculation of pressures.

Tubes with a diameter ratio da/di ≥ 1.35 are calculated according to DIN 2413 part III (formula see page Q5) with above characteristic K value.

**Conversion Factors:**

- Bar x 14.5 = psig
- kg/m x 0.672 = lbs/ft
- N/mm² x 145 = lb/in²

Dimensions and pressures for reference only, subject to change.



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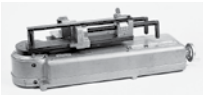
| **Bender Capacity Guides**<br>R7 | **Exactol Benders**<br>412 & 424<br> <br>R8-R11 | **HB632**<br>Hydraulic Bender<br>  <br>R12-R16 | **Mandrel Bending Components**<br> <br>R16-R18 | **CP432 Tube and Pipe Bender Kit**<br> <br>R19 | |
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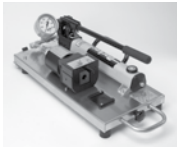
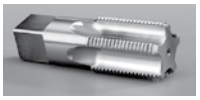
| **Vise Block and Flaring Pin**<br>(Sizes 4 to 24 and 6-38mm)<br> <br>R27-R28 | **Rolo-Flair Rotary, Manual**<br>(Sizes 2 to 12)<br> <br>R28 | **210A Combination Tool**<br>(Sizes 2 to 10)<br> <br>R28 | **Hydra-Tool**<br>Hydraulic Flaring & Pre-Setting Tool<br> <br>R29-R31 | **Karryflare**<br>  <br>R32 | **Flaring Tooling for Parflange 1025**<br> <br>R33 |
| **Flaring Tooling for Parflange ECO25**<br> <br>R34 | **Porting Tools** | **Straight Thread Port Tap**<br>(Sizes 2 to 32)<br> <br>R35 | **SAE Straight Thread Port Counterbore**<br>(Sizes 2 to 32)<br> <br>R35 | **BSPP Counterbores**<br> <br>R36 | **BSPP/BSPT Taps**<br>  <br>R36 |
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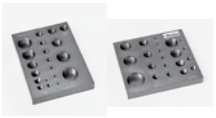
| **Tube Preparation Centers** | **Modular Preparation Centers**<br> <br>R52 | **Thread Identification** | **Thread Identification Kit**<br> <br>R53 | **Portboards**<br>  <br>R53 | **ITK**<br>International Thread Kit<br> <br>R53 |
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# Hand Tube Benders – Inch

These are sturdy, easy-to-use hand tools for fast and accurate bending without kinks or visible flattening. Twelve individual sizes from -2 (1/8" O.D.) to -16 (1" O.D.) are available.

## Medium Duty Inch Hand Tube Benders

*Designed and built for fast, accurate bends and long service life.*

These are individual benders for eight inch tube sizes (1/8", 3/16", 1/4", 5/16", 3/8", 1/2" 5/8", 3/4"). All of these benders will bend copper, aluminum, annealed steel and stainless steel. These can be used in hands or mounted in a bench vise.

**Fig. R1 — Medium Duty Inch Hand Tube Bender**

**HOW TO USE:** Simply align marks of the pressure arm and radius block, then bend to the desired angle (up to 180°) by pulling steadily on the slide block handle. Bend angles are indicated on the radius block, both front and back. (Detailed instructions are included with each bender.) See the table below for technical data and part numbers.

| Size | Tube O.D. (in.) | Radius to Tube Centerline (in.) | Min. Wall Without Flattening (in.) | Recommended Max. Wall Thickness Copper, Aluminum (in.) | Steel, Stainless Steel (in.) | Part No. |
|---|---|---|---|---|---|---|
| 3 | 3/16 | 5/8 | 0.020 | Any | 0.032..... | **3-2829** |
| 4 | 1/4 | 5/8 | 0.028 | Any | 0.083..... | **4-2829** |
| 5 | 5/16 | 15/16 | 0.032 | Any | 0.083..... | **5-2829** |
| 6 | 3/8 | 15/16 | 0.032 | Any | 0.083..... | **6-2829** |
| 8 | 1/2 | 1 1/2 | 0.042 | Any | 0.083..... | **8-2829** |

## Ratchet Hand Tube Benders

These are individual benders for three tube sizes, 5/8", 3/4" and 7/8", in copper, aluminum, annealed steel and stainless steel. They can be used in hands or mounted in a bench vise.

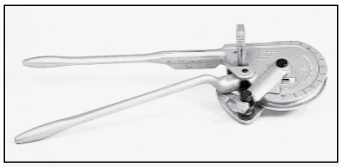

**Fig. R2 — Ratchet Hand Tube Bender**

**HOW TO USE:** Position the tube in the bender, close the latch and pull the ratchet handle away from radius block handle until the desired angle (up to 180°) is formed. Bend angles are indicated on the radius block. (Detailed instructions are included with each bender.) See the table below for technical data and part numbers.

| Size | Tube O.D. (in.) | Radius to Tube Centerline (in.) | Min. Wall Without Flattening (in.) | Recommended Max. Wall Thickness Copper, Aluminum (in.) | Steel, Stainless Steel (in.) | Part No. |
|---|---|---|---|---|---|---|
| 10 | 5/8 | 3 | 0.042 | Any | 0.049..... | **10-2829** |
| 12 | 3/4 | 3 3/4 | 0.049 | Any | 0.065..... | **12-2829** |
| 14 | 7/8 | 3 3/4 | 0.049 | Any | 0.065..... | **14-2829** |

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## 1" Hand Tube Bender
**Part No. 16-2829**

For 1" O.D. tube in soft copper and aluminum materials. This bender can be used in hands, but mounting in a bench vise is suggested, especially for heavier wall thickness tube.

**HOW TO USE:** Align marks and bend the tube to the desired angle (up to 180°) by pulling steadily on the operating handle. The handle may be re-positioned for maximum leverage. Bend angles are indicated on the radius block. (Detailed instructions are included with the bender.) See the table below for technical data and part numbers.

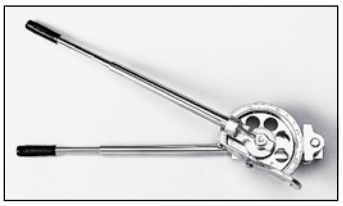

**Fig. R3 — 1" Hand Tube Bender**

| Size | Tube O.D. (in.) | Radius to Tube Centerline (in.) | Min. Wall Without Flattening (in.) | Recommended Max. Wall Thickness Copper, Aluminum (in.) | Steel, Stainless Steel (in.) | Part No. |
|---|---|---|---|---|---|---|
| 16 | 1 | 3 1/2 | 0.065 | Any | Not Recommended | **16-2829** |

# Hand Tube Benders – Metric

These are sturdy, easy-to-use hand tools for fast and accurate bending without kinks or visible flattening. Individual sizes in ten models from size 5mm to 25mm are available.

## Medium Duty Metric Hand Tube Benders

*Designed and built for fast, accurate bends and long service life.*

These are individual benders for six metric tube sizes (5mm, 6mm, 8mm, 10mm, 12mm and 14mm). All of these benders will bend copper, aluminum, annealed steel and stainless steel. These can be used in hands or mounted in a bench vise.

**HOW TO USE:** Simply align the marks on the slide block and radius block, then bend to the desired angle (up to 180°) by pulling steadily on the slide block handle. Bend angles are indicated on the radius block, both front and back. (Detailed instructions are included with each bender.) See the table below for technical data and part numbers.

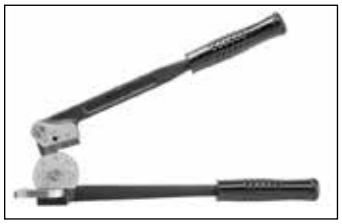

**Fig. R4 — Medium Duty Metric Hand Tube Bender**

| Tube O.D. (mm) | Radius to Tube Centerline (mm) | Min. Tube Wall Thickness (mm) | Recommended Max. Wall Thickness Copper, Aluminum (mm) | Steel, Stainless Steel (mm) | Part No. |
|---|---|---|---|---|---|
| 6 | 16 | 1.0 | Any | 1.5..... | **2829-6mm** |
| 8 | 24 | 1.0 | Any | 1.5..... | **2829-8mm** |
| 10 | 24 | 1.0 | Any | 2.0..... | **2829-10mm** |
| 12 | 38 | 1.0 | Any | 2.0..... | **2829-12mm** |



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## Bench Mount Metric Hand Bender and Cutting Guide

This bender combines a tube cutting guide with the bender for sizes 6mm, 8mm, 10mm, and 12mm. There are three bender rollers that cover all sizes. The bender mounts easily to a work bench or table.

| Part Description | Part No. |
|---|---|
| Bench Mount Tube Bender (6mm, 8mm, 10mm, 12mm) ..... | **BAV06/12KPLX** |

**Fig. R5 — BAV06/12KPLX**

# Vise Mount Metric Hand Benders

## Vise Mount Metric Bender – 6/18mm

This bender has six interchangeable rollers to cover tube sizes 6mm, 8mm, 10mm, 12mm, 14mm, 15mm, 16mm, and 18mm.

| Part Description | Part No. |
|---|---|
| Vise Mount Tube Bender (6mm, 8mm, 10mm, 12mm, 14mm, 15mm, 16mm, 18mm) ..... | **BV06/18KPLX** |

**Fig. R6 — BV06/18KPLX**

| Tube O.D. (mm) | Bend Radius (mm) | Max. Wall Thickness (mm) |
|---|---|---|
| 6 | 33 | 2.5 |
| 8 | 34 | 2.5 |
| 10 | 36 | 2.5 |
| 12 | 37 | 2.5 |
| 14 | 37 | 2.0 |
| 15 | 44 | 2.0 |
| 16 | 44 | 2.0 |
| 18 | 52 | 2.0 |

## Vise Mount Metric Bender – 20/25mm

This bender has three interchangeable rollers to cover tube sizes 20mm, 22mm, and 25mm. All bend radii are 86.5mm. Pressure arm is not included with the BV20/25KPLX, however it can be manufactured on site with a piece of tube, or it can be ordered separately with part number BV20/2510X. Maximum wall thickness for all sizes is 2.0mm.

| Part Description | Part No. |
|---|---|
| Vise Mount Tube Bender (20mm, 22mm, 25mm) ..... | **BV20/25KPLX** |
| Pressure Arm ..... | **BV20/2510X** |

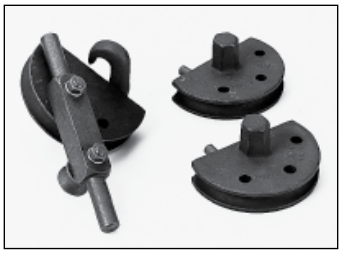

**Fig. R7 — BV20/25KPLX**

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# Hand Crank & Hydraulic Tube Bender Capacity Guides

All benders listed in Tables S1 through S3 are capable of bending 1/2" O.D. and under fully annealed steel and stainless steel tube with no limit on wall thickness. For HARD copper and HIGH STRENGTH aluminum, use the wall thickness shown for stainless steel. Observe that VERY HARD materials may not be ductile enough to bend without fracture.

## Inch Tube Sizes

| Tube O.D. | Material | Tube Wall Thickness (in.) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.035 | 0.049 | 0.058 | 0.065 | 0.072 | 0.083 | 0.095 | 0.109 | 0.120 | 0.134 | 0.156 | 0.188 |
| | | Bender Code* | | | | | | | | | | | |
| 3/4" | S | ABCD | ABCD | ABCD | ABCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD |
| | SS | ABCD | ABCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD |
| 1" | S | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD |
| | SS | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | BCD | CD | CD |
| 1 1/4" | S | BCD | BCD | BCD | BCD | BCD | BCD | CD | CD | CD | CD | CD | CD |
| | SS | BCD | BCD | BCD | BCD | BCD | CD | CD | CD | CD | CD | C | C |
| 1 1/2" | S | BCD | BCD | BCD | BCD | BCD | CD | CD | CD | CD | CD | CD | CD |
| | SS | BCD | BCD | CD | CD | CD | CD | CD | CD | CD | CD | C | C |
| 2" | S | CD | CD | CD | CD | CD | CD | CD | CD | CD | CD | CD | CD |
| | SS | CD | CD | CD | CD | CD | CD | CD | CD | CD | CD | — | — |

**Table R1 — Hand Crank and Hydraulic Tube Benders Maximum Capacity Guide – Inch Sizes**

## Inch Pipe Sizes

| Pipe Size | Material | Inch Pipe Schedule (IPS) | |
|---|---|---|---|
| | | 40 | 80 |
| | | Bender Code* | |
| 1/2" | S | CD | CD |
| | SS | CD | CD |
| 3/4" | S | CD | CD |
| | SS | CD | CD |
| 1" | S | CD | CD |
| | SS | CD | CD |
| 1 1/4" | S | CD | CD |
| | SS | CD | CD |
| 1 1/2" | S | CD | CD |
| | SS | CD | CD |
| 2" | S | D | D |
| | SS | D | — |

**Table R2 — Hand Crank and Hydraulic Benders Maximum Capacity Guide – Inch Pipe Sizes**

## Metric Tube Sizes

| Tube O.D. (mm) | Material | Tube Wall Thickness (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 | 5 |
| | | Bender Code* | | | | | | |
| 18 | S | ABCD | ABCD | ABCD | ABCD | BCD | BCD | CD |
| | SS | BCD | BCD | BCD | BCD | BCD | BCD | CD |
| 20 | S | ABCD | ABCD | ABCD | BCD | BCD | BCD | CD |
| | SS | BCD | BCD | BCD | BCD | BCD | BCD | CD |
| 22 | S | BCD | BCD | BCD | BCD | BCD | BCD | CD |
| | SS | BCD | BCD | BCD | BCD | BCD | CD | CD |
| 25 | S | BCD | BCD | BCD | BCD | BCD | CD | CD |
| | SS | BCD | BCD | BCD | BCD | CD | CD | CD |
| 28 | S | BCD | BCD | BCD | BCD | CD | CD | CD |
| | SS | BCD | BCD | CD | CD | CD | CD | CD |
| 30 | S | BCD | BCD | BCD | BCD | CD | CD | CD |
| | SS | BCD | BCD | CD | CD | CD | CD | CD |
| 32 | S | BCD | BCD | CD | CD | CD | CD | CD |
| | SS | BCD | BCD | CD | CD | CD | CD | CD |
| 35 | S | BCD | CD | CD | CD | CD | CD | CD |
| | SS | BCD | CD | CD | CD | CD | CD | CD |
| 38 | S | BCD | CD | CD | CD | CD | CD | CD |
| | SS | CD | CD | CD | CD | CD | CD | CD |
| 42 | S | CD | CD | CD | CD | CD | CD | CD |
| | SS | CD | CD | CD | CD | CD | CD | — |
| 50 | S | CD | CD | CD | CD | CD | CD | — |
| | SS | CD | CD | CD | CD | CD | — | — |

**Table R3 — Hand Crank and Hydraulic Tube Benders Maximum Capacity Guide – Metric Tube Sizes**

***Codes:**

(A) Model 412 — Tube (1/4" thru 3/4" and 6mm thru 20mm) — Worm & Gear
(B) Model 424 — Tube (1/4" thru 1 1/2" and 6mm thru 38mm) — Worm & Gear
(C) Model HB632 — Tubeg (3/8" thru 2" and 10mm thru 50mm) — Hydraulic
(D) Model CP432 — Tube (1/4" thru 2") — Hydraulic

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# Exactol® Crank-Operated Benders

**Models 412/424**

These portable benders are vise or bench mountable for easy action and fast accurate bending to 180°. Two models are available to bend tube sizes 4 (1/4") through 24 (1 1/2"). Exactol benders are designed with a worm-gear drive with a 60 to 1 gear ratio to allow accurate bending with minimum effort. They bend aluminum, copper, annealed steel and annealed stainless steel without kinks or wrinkles. Easy crank operation permits continuous production without excessive operator fatigue; for use in tube fabrication shops, in the field, or in factory maintenance departments.

A video (on DVD) is included to provide proper instructions for use.

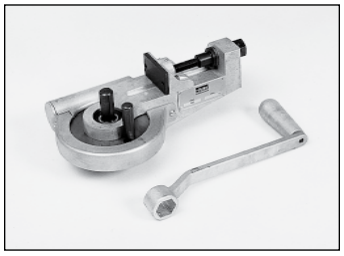

**Fig. R8 — 412 Bender**

# Exactol® Model 412

The Exactol Model 412 will bend tube from size 4 (1/4") through size 12 (3/4") and 6mm through 20mm inclusive and is completely portable. Accessories include a sturdy metal carrying case, which accommodates the 412 bender, slide block, and selected radius blocks. See page R7 for wall thickness capabilities. May be held in a vise or bench mounted using the bench mounting adapter. Bulletin 4391-B400S and DVD are included with bender, which describe the operation in detail.

**NOTE:** The 412 must be bench mounted if mandrels are used.

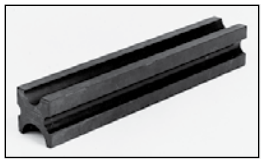

**Fig. R9 — Slide Block**

**COMPONENTS REQUIRED**

The minimum components required are a Model 412 Bender with a slide block and a radius block which match the tube O.D. to be bent.

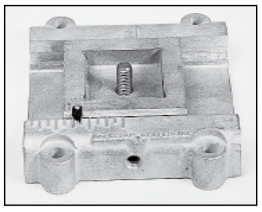

**Fig. R10 — Bench Mount Adapter**

| **Part Name** | **Part No.** |
|---|---|
| Exactol Model 412 Bender (for 1/4" through 3/4" O.D.) | **560569** |
| Slide Block (for sizes 4-5-6-8-10-12) | **550585** |
| Slide Block (for sizes 6mm-8mm-12mm-12mm-14mm) | **820091** |
| Slide Block (for sizes 15mm-16mm-18mm-20mm) | **820092** |
| Radius Blocks (for sizes 4-5-6-8-10-12 and 6mm thru 38mm) | See pages R10 – R11 |

**OPTIONAL ACCESSORIES**

| | |
|---|---|
| Carrying Case (for bender, slide block and selected radius blocks) | **550572** |
| Bench Mounting Adapter | **550570** |

**Mandrel Bending Components**

for 412 and 424 Benders ..... See pages R16 – R18

Dimensions and pressures for reference only, subject to change.



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# Exactol® Model 412 Kit

This 412 kit contains all the basic tool requirements for bending tube from 1/4” through 3/4”.

| | Part No. |
|---|---|
| | 412 KIT |

The following part numbers are included in the kit:

| Part Name | Part No. |
|---|---|
| Exactol Model 412 Bender | 560569 |
| Carrying Case | 550572 |
| Slide Block for 1/4” through 3/4” tube | 550585 |
| Radius Block – 1/4” O.D. tube | 550579 |
| Radius Block – 3/8” O.D. tube | 550581 |
| Radius Block – 1/2” O.D. tube | 550582 |
| Radius Block – 5/8” O.D. tube | 550583 |
| Radius Block – 3/4” O.D. tube | 550584 |

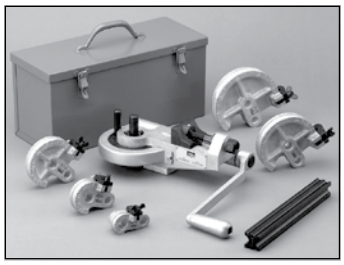

**Fig. R11 — 412 Kit**

# Exactol® Model 424

The Exactol Model 424 will bend tube from size 4 (1/4” O.D.) through size 24 (1 1/2” O.D.) and 6mm through 38mm inclusive. See page R7 for wall thickness capabilities. It is completely portable and may be vise or bench mounted. Bulletin 4391-B400S and video are included with the bender, which describe the operation in detail.

**NOTE:** The 424 must be bench mounted if mandrels are used.

A video (on DVD) is included to provide proper instructions for use.

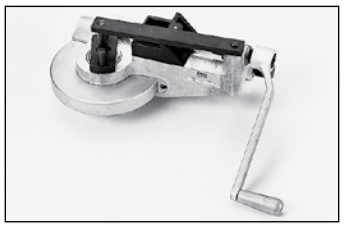

**Fig. R12 — 424 Bender**

**COMPONENTS REQUIRED**
The minimum components required are a Model 424 Bender with a slide block and a radius block that match the tube O.D. to be bent.

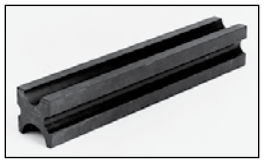

**Fig. R13 — Slide Block**

| Part Name | Part No. |
|---|---|
| Exactol Model 424 bender (for 1/4” through 1 1/2” O.D.) | 621044 |
| Slide Block (for sizes 4-5-6-8-10-12) | 550585 |
| Slide Block (for sizes 14-16-18-20) | 621045 |
| Slide Block (for size 24) | 870150 |
| Slide Block (for sizes 6mm-8mm-10mm-12mm-14mm) | 820091 |
| Slide Block (for sizes 15mm-16mm-18mm-20mm) | 820092 |
| Slide Block (for sizes 22mm-25mm-28mm-30mm) | 820093 |
| Slide Block (for size 35mm) | 820094 |
| Slide Block (for size 38mm) | 870150 |
| Radius Blocks (for sizes -4 thru -24 and 6mm thru 38mm) | See pages R10 – R11 |

**OPTIONAL ACCESSORIES**

| | |
|---|---|
| Bench Mounting Adapter | 631156 |
| Mandrel Bending Components for 412 and 424 Benders | See pages R16 – R18 |





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# Exactol® Model 424 Kit

**Part No. 424 Kit**

This 424 Kit contains all the basic tool requirements for bending tube from 1/4" through 1 1/2". The following part numbers are included in the kit:

| Part Name | Part No. |
|---|---|
| Exactol Model 424 bender (for 1/4" through 1 1/2" O.D.) | **621044** |
| Slide Block (for sizes 4-5-6-8-10-12) | **550585** |
| Slide Block (for sizes 14-16-18-20) | **621045** |
| Slide Block (for size 24)* | **870150** |
| Radius Blocks – 1/4" O.D. Tube* | **550579** |
| Radius Block – 3/8" O.D. Tube | **550581** |
| Radius Block – 1/2" O.D. Tube | **550582** |
| Radius Block – 5/8" O.D. Tube | **550583** |
| Radius Block – 3/4" O.D. Tube | **550584** |
| Radius Block – 1" O.D. Tube | **621047** |
| Radius Block – 1 1/4" O.D. Tube | **621049** |
| Radius Block – 1 1/2" O.D. Tube* | **870149** |

* Items not shown in the photo, but which are included in the 424 Kit.

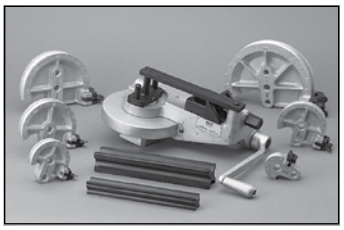

**Fig. R15 — 424 Kit**

# Radius Blocks

**For use with Exactol Models 412/424 benders.**

The 412 and 424 bender radius blocks have built in tube clamps, therefore separate clamp blocks are not required. The radius blocks are interchangeable within bender size ranges. Close bend radius blocks utilize the small bend radii, but also allow the bend to begin closer to the end connection.

## 412 and 424 Bender – Small Bend Radius Blocks

| Size | Tube O.D. (in.) | Bend Radius (in.) | Part No. |
|---|---|---|---|
| 4 | 1/4 | 9/16 | **550573** |
| 5 | 5/16 | 11/16 | **550574** |
| 6 | 3/8 | 15/16 | **550575** |
| 8 | 1/2 | 1 1/4 | **550576** |
| 10 | 5/8 | 1 1/2 | **550577** |
| 12 | 3/4 | 1 3/4 | **550578** |

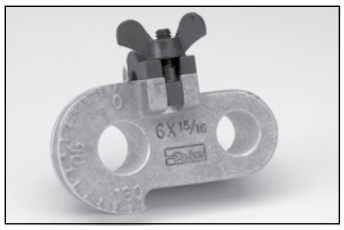

**Fig. R16 — Small Bend Radius Block**

## 412 and 424 Bender – Large Bend Radius Blocks

| Size | Tube O.D. (in.) | Bend Radius (in.) | Part No. |
|---|---|---|---|
| 4 | 1/4 | 3/4 | **550579** |
| 5 | 5/16 | 1 | **550580** |
| 6 | 3/8 | 1 1/4 | **550581** |
| 8 | 1/2 | 2 | **550582** |
| 10 | 5/8 | 2 1/2 | **550583** |
| 12 | 3/4 | 3 | **550584** |
| 14 | 7/8 | 3 1/2 | **621046** |
| 16 | 1 | 4 | **621047** |
| 18 | 1 1/8 | 4 1/2 | **621048** |
| 20 | 1 1/4 | 5 | **621049** |
| 24 | 1 1/2 | 5 | **870149** |

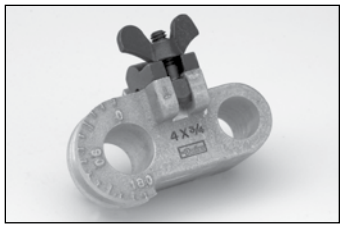

**Fig. R17 — Large Bend Radius Block**

Dimensions and pressures for reference only, subject to change.



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## 412 and 424 Bender – Close Bend Radius Blocks

These adapters are used when bends are needed close to the end of the tube after the flare has been made, ferrule has been pre-set, or flange has been made. For flared or Ferulok fittings, attach tube end by threading tube nut onto the radius block threaded pin. To use this block with Seal-Lok fittings, Close Bend Adapters for Seal-Lok must be used to attach the tube to the radius block.

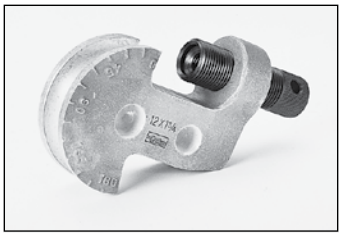

**Fig. R18 — Close Bend Radius Block**

| Size | Tube O.D. (in.) | Bend Radius (in.) | Part No. |
|---|---|---|---|
| 8 | 1/2 | 1 1/4 | **590533** |
| 10 | 5/8 | 1 1/2 | **590535** |
| 12 | 3/4 | 1 3/4 | **590537** |

## Close Bend Adapters for Seal-Lok

These adapters are used when bends are needed close to the end of the tube after the flange has been made or the sleeve has been brazed onto the end of the tube.

**HOW TO USE:** Screw the Seal-Lok adapter into the internal thread* of the threaded pin on the radius block. Then attach the flanged or brazed tube by threading the tube nut to the Seal-Lok adapter on the radius block threaded pin.

* If the threaded pin does not have an internal thread, a new threaded pin is required.

**Fig. R19 — Seal-Lok Close Bend Adapter**

| Tube O.D. (in.) | Description | Part No. |
|---|---|---|
| 1/2 | Seal-Lok Adapter | **930421-8** |
| 5/8 | Seal-Lok Adapter | **930421-10** |
| 3/4 | Seal-Lok Adapter | **930421-12** |
| 1/2 | Threaded Pin (for Close Bend Radius Blocks) | **930420-8** |
| 5/8 | Threaded Pin (for Close Bend Radius Blocks) | **930420-10** |
| 3/4 | Threaded Pin (for Close Bend Radius Blocks) | **930420-12** |

## 412 and 424 Bender – Metric Radius Blocks

| Tube O.D. (mm) | Bend Radius (mm) | Part No. |
|---|---|---|
| 6 | 14 | **820090-6mm** |
| 8 | 18 | **820090-8mm** |
| 10 | 24 | **820090-10mm** |
| 12 | 32 | **820090-12mm** |
| 14 | 38 | **820090-14mm** |
| 15 | 38 | **820090-15mm** |
| 16 | 38 | **820090-16mm** |
| 18 | 44 | **820090-18mm** |
| 20 | 44 | **820090-20mm** |
| 22 | 89 | **820090-22mm** |
| 25 | 102 | **820090-25mm** |
| 28 | 102 | **820090-28mm** |
| 30 | 127 | **820090-30mm** |
| 32 | 127 | **820090-32mm** |
| 35 | 127 | **820090-35mm** |
| 38 | 127 | **870149 (same as 1-1/2” Radius Block)** |

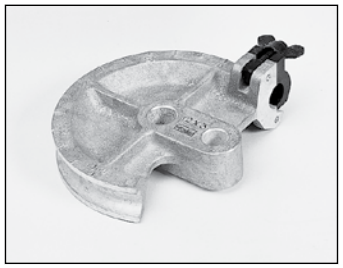

**Fig. R20 — Radius Block**

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# Hydraulic Tube Bender Model HB632

Hydraulic power does the work in bending tube of all materials in sizes from 6 (3/8" O.D.) through size 32 (2" O.D.), 10mm through 50mm, with wall thicknesses as great as .188 for annealed steel, and pipe sizes from 3/8" through 1-1/2". See page R7 for wall thickness capabilities. The radius block, around which the tube is bent, is driven by a roller chain and sprocket powered by a cylinder and a separate hydraulic power unit.

Maximum bend angle is 180° with radii from 1 1/4" to 8". Close second bends can be performed in either direction. An adjustable stop controls the degree of bend to a maximum of 180° and is graduated in 1° increments. After the bend is completed and pressure is released, a spring returns the clamp arm to the zero starting position.

The clamp vise arm features a quick release speed screw for positioning the required clamp block. Each size of tube requires the proper sized radius block, clamp block and slide block.

Written instructions, a DVD and Bulletin 4391-B26 are included with each bender.

HB632 radius blocks, slide blocks and clamp blocks will work with the following benders as well: 624, 824, 832 and 848.

**NOTE:** For size 28 (1 3/4" O.D. tube) through 32 (2" O.D. tube) radius blocks, an adapter plate is required.

**DIMENSIONS:** L – 40" W – 11" H – 12"

**COMPONENTS REQUIRED**
Minimum components required are a Model HB632 Bender, hose assembly, hydraulic pump and a radius, slide and clamp block which match the tube/pipe O.D. to be bent.

| Part Name | Part No. |
|---|---|
| Hydraulic Bender Model HB632 (without pump) | **631050** |
| Hydraulic Pump (10,000 psi, 110V AC) | **900085** |
| High Flow Hydraulic Pump (10,000 psi, 110V) | **974691** |
| Hose Assembly (3' long) | **910004** |

**One each of the following is required per tube O.D.:**
**Radius Block, Clamp Block, Slide Block.**

| | |
|---|---|
| Radius Block | See pages R13 – R15 |

**INCH TUBE SIZES**

| | |
|---|---|
| Clamp Block (for -6) | **864266** |
| Clamp Block (for -8, -12, -16, -24) | **631092** |
| Clamp Block (for -10, -14, -18, -20) | **631093** |
| Clamp Block (for -28) | **027418-28** |
| Clamp Block (for -32) | **027418-32** |
| Slide Block (for -6) | **864276** |
| Slide Block (for -8, -12, -16, -24) | **520516** |
| Slide Block (for -10, -14, -18, -20) | **520518** |
| Slide Block (for -28) | **631063** |
| Slide Block (for -32) | **631066** |

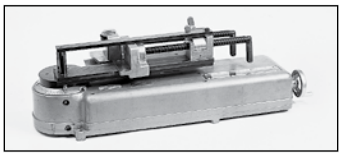

**Fig. R21 — HB632**

**Fig. R22 — 900085 Pump**

**Fig. R23 — High Flow Pump**

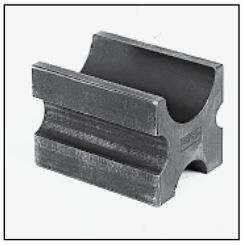

**Fig. R24 — Clamp Block**

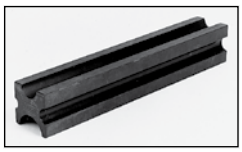

**Fig. R25 — Slide Block**

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| METRIC TUBE SIZES | Part No. |
|---|---|
| Clamp Block (for 10mm, 12mm, 14mm, 16mm) | **790017** |
| Clamp Block (for 15mm, 16mm, 18mm, 20mm) | **780195** |
| Clamp Block (for 22mm, 25mm, 30mm, 32mm) | **780196** |
| Clamp Block (for 35mm) | **974346** |
| Clamp Block (for 38mm) | **631092** |
| Clamp Block (for 42mm) | **974349** |
| Clamp Block (for 50mm) | **974352** |
| Slide Block (for 10mm, 12mm, 14mm, 16mm) | **790016** |
| Slide Block (for 15mm, 16mm, 18mm, 20mm) | **780192** |
| Slide Block (for 22mm, 25mm, 30mm, 32mm) | **780193** |
| Slide Block (for 35mm) | **820094** |
| Slide Block (for 38mm) | **520516** |
| Slide Block (for 42mm) | **974348** |
| Slide Block (for 50mm) | **974351** |

| INCH PIPE SIZES | |
|---|---|
| Clamp Block (for 3/8”, 1/2”, 3/4”) | **974332** |
| Clamp Block (for 1”) | **974338** |
| Clamp Block (for 1 1/4”) | **974341** |
| Clamp Block (for 1 1/2”) | **974343** |
| Slide Block (for 3/8”, 1/2”, 3/4”) | **974331** |
| Slide Block (for 1”) | **974336** |
| Slide Block (for 1 1/4”) | **974340** |
| Slide Block (for 1 1/2”) | **974342** |

**OPTIONAL ACCESSORIES**

Radius Block Adapter Plate
(for sizes 1 3/4”, 42mm, 1 1/2 IPS and larger) ..... **660221**

Mandrel Bending Components for HB632 ..... See pages R16 – R18

A video (on DVD) is included to provide proper instructions for use.

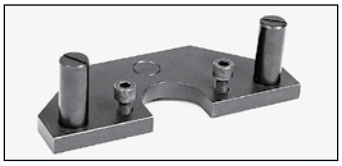

**Fig. R26 — Radius Block Adapter Plate**

## Radius Blocks

**For use with HB632 Bender**

Radius blocks for every standard tube size from size 6 (3/8” O.D.) to size 32 (2” O.D.), 10mm through 50mm, and inch pipe sizes 3/8” through 1-1/2” are available.

**Standard Radius Blocks – Inch Sizes**

| Size | Tube O.D. (in.) | Radius (in.) | Part No. |
|---|---|---|---|
| 6 | 3/8 | 1 1/8 | **590512-18** |
| 6 | 3/8 | 1 1/4 | **540502** |
| 8 | 1/2 | 1 1/4 | **530763** |
| 8 | 1/2 | 1 1/2 | **590515-24** |
| 10 | 5/8 | 1 1/2 | **530764** |
| 10 | 5/8 | 1 7/8 | **590518-30** |
| 12 | 3/4 | 1 3/4 | **530765** |
| 12 | 3/4 | 2 1/4 | **590521-36** |
| 14 | 7/8 | 2 | **530766** |
| 14 | 7/8 | 2 5/8 | **590523-42** |
| 16 | 1 | 3 | **590524-48** |
| 18 | 1 1/8 | 3 3/8 | **590526-54** |
| 18 | 1 1/8 | 3 1/2 | **530768** |
| 20 | 1 1/4 | 3 3/4 | **590527-60** |
| 24 | 1 1/2 | 4 1/2 | **590530-72** |
| 24 | 1 1/2 | 5 | **530770** |
| 28 | 1 3/4 | 7 | **631057-112*** |
| 32 | 2 | 8 | **631060-128*** |

**Fig. R27 — Radius Block for use with HB632 Bender**

* Requires the use of Radius Block Adapter Plate, Part No. 660221.



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## Radius Blocks – Metric Sizes

| Tube O.D./ Size (mm) | Radius (mm) | Part No. |
|---|---|---|
| 10 | 32 | **810023** |
| 12 | 32 | **780175** |
| 14 | 38 | **780176** |
| 15 | 38 | **780177** |
| 16 | 38 | **780178** |
| 18 | 44 | **780179** |
| 20 | 44 | **780180** |
| 22 | 89 | **780181** |
| 25 | 100 | **780182** |
| 30 | 128 | **780183** |
| 32 | 128 | **780184** |
| 35 | 105 | **974344** |
| 38 | 114 | **590530-72** |
| 42 | 128 | **974347*** |
| **50** | **150** | **974350*** |

**Fig. R28 — Radius Block for use with HB632 Bender**

## Radius Blocks – Inch Pipe Sizes

| Inch Pipe Size (in.) | Bend Radius (in.) | Part No. |
|---|---|---|
| 3/8 | 2 1/4 | **974325** |
| 1/2 | 2 5/8 | **974326** |
| 3/4 | 3 1/4 | **974327** |
| 1 | 4 | **974328** |
| 1 1/4 | 5 | **974329** |
| 1 1/2 | 6 | **974330*** |

* Requires the use of Radius Block Adapter Plate, Part No. 660221.



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## Close Bend Radius Blocks for HB632

These adapters are used when bends are needed close to the end of the tube after the flare has been made, ferrule has been pre-set, or flange has been made. For flared or Ferulok fittings, attach tube end by threading tube nut onto the radius block threaded pin. To use this block with Seal-Lok fittings, Close Bend Adapters for Seal-Lok must be used to attach the tube to the radius block.

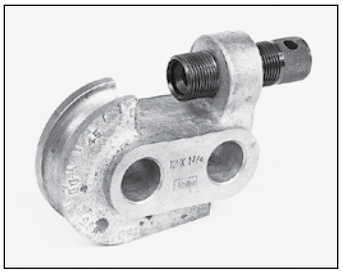

**Fig. R29 — Close Bend Radius Block**

## Close Bend Radius Blocks – Inch Sizes

| Size (in.) | Tube O.D. (in.) | Radius (in.) | Part No. |
|---|---|---|---|
| 8 | 1/2 | 1 1/4 | **530597** |
| 10 | 5/8 | 1 1/2 | **530601** |
| 12 | 3/4 | 1 3/4 | **530605** |
| 14 | 7/8 | 2 | **530609** |
| 16 | 1 | 3 | **530613** |
| 20 | 1 1/4 | 3 3/4 | **530621** |
| 24 | 1 1/2 | 5 | **530625** |

## Close Bend Adapters for Seal-Lok

These adapters are used when bends are needed close to the end of the tube after the flange has been made or the sleeve has been brazed onto the end of the tube.

**HOW TO USE:** Screw the Seal-Lok adapter into the internal thread* of the threaded pin on the radius block. Then attach the flanged or brazed tube by threading the tube nut to the Seal-Lok adapter on the radius block threaded pin.

* If the threaded pin does not have an internal thread, a new threaded pin is required.

| Tube O.D. (in.) | Description | Part No. |
|---|---|---|
| 1/2 | Seal-Lok Adapter | **930421-8** |
| 5/8 | Seal-Lok Adapter | **930421-10** |
| 3/4 | Seal-Lok Adapter | **930421-12** |
| 1 | Seal-Lok Adapter | **930421-16** |
| 1 1/4 | Seal-Lok Adapter | **930421-20** |
| 1 1/2 | Seal-Lok Adapter | **930421-24** |
| 1/2 | Threaded Pin (for Close Bend Radius Blocks) | **930420-8** |
| 5/8 | Threaded Pin (for Close Bend Radius Blocks) | **930420-10** |
| 3/4 | Threaded Pin (for Close Bend Radius Blocks) | **930420-12** |
| 1 | Threaded Pin (for Close Bend Radius Blocks) | **930420-16** |
| 1 1/4 | Threaded Pin (for Close Bend Radius Blocks) | **930420-20** |
| 1 1/2 | Threaded Pin (for Close Bend Radius Blocks) | **930420-24** |

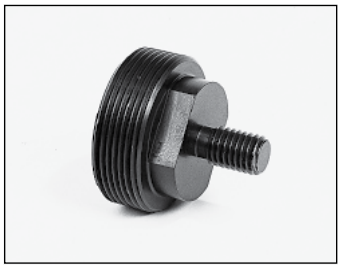

**Fig. R30 — Seal-Lok Close Bend Adapter**

## Close Bend Radius Blocks – Metric Sizes

| Tube O.D./ Size (mm) | Radius (mm) | Thread Size | Part No. |
|---|---|---|---|
| 12 | 32 | 3/4-16 | **780185** |
| 14 | 38 | 7/8-14 | **780186** |
| 15 | 38 | 7/8-14 | **780187** |
| 16 | 38 | 7/8-14 | **780188** |
| 18 | 44 | 1 1/16-12 | **780189** |
| 20 | 44 | 1 1/16-12 | **780190** |
| 38 | 127 | 1 7/8-12 | **530625** |

Dimensions and pressures for reference only, subject to change.



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## Bender Table (With Locking Casters) for HB632

Sturdy, heavy all steel construction, strongly braced to keep bender, mandrel rod, and mandrel rod stop assembly rigidly aligned. All holes are pre-drilled at factory to accommodate the HB632 bender and rod stop assembly.

**DIMENSION:** H – 36" W – 30" L – 10'

**NOTE:** Table is supplied with locking casters for ease of mobility.

**Fig. R31 — Bender Table (equipment not included)**

| Part Name | Part No. |
|---|---|
| Bender Table (with locking casters) for HB632 | **520515** |

# Mandrel Bending Components

When bending thin wall tube it may be necessary to insert a mandrel into the tube to prevent excessive distortion or flattening. To accomplish such bending, a Mandrel, Mandrel Rod, and a Mandrel Rod Stop Assembly are required. The Rod Stop Assembly holds the end of the Mandrel Rod in proper alignment with the tube while the Mandrel, which is threaded onto the other end of the Mandel Rod, supports the tube on its I.D., thus preventing tube kinking or flattening during bending.

The following parts are required for mandrel bending with the 412 and 424 bender:

| Part Name | Part No. |
|---|---|
| Mandrel Rod Stop Assembly | **550571** (See page R18) |
| Stop Assembly Adapter Riser (424 only) | **631154** (See page R18) |
| Mandrel Rods | See page R17 |
| Mandrel | See page R17 |

The following parts are required for mandrel bending with the 632 bender:

| Part Name | Part No. |
|---|---|
| Mandrel Rod Stop Assembly | **631141** (See page R18) |
| Mandrel Rods | See page R17 |
| Mandrel | See page R17 |

**Example:**
Tube O.D.: 2"
Wall Thickness: 0.095"
Centerline Radius: 8"

Vertical Axis = $\frac{8"}{2"} = 4$

Horizontal Axis = $\frac{2"}{.095"} \approx 21$

Answer: Plug Mandrel required

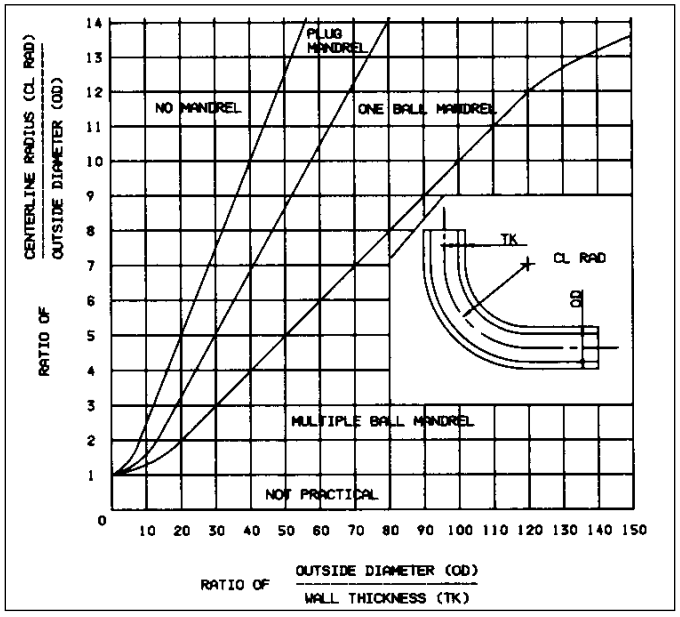


**Fig. R32 — Mandrel Graph Chart**

Dimensions and pressures for reference only, subject to change.



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## Mandrels (Plug Type)

For use with Exactol Models 412, 424 and the HB632 benders. Mandrels ensure smooth bends without kinking, or wrinkling when bending thin-walled tube, or when making short-radius bends. Mandrels support the tube wall from the inside to keep it fully open for a smooth bend.

A rule that is generally followed to determine whether or not a mandrel is necessary is as follows: When the wall thickness of the tube to be bent is 7 percent or more of the tube O.D., a mandrel is usually not necessary. On wall thicknesses that range between 4-6 percent of the tube O.D., it is necessary to use a mandrel to avoid wrinkling and flattening in the bend area. This rule is based on a bend radii of between three and four times the tube O.D.

**Part Number Example:** 924417-Size X Wall Thickness = **924417-12X058**

* See Fig. R32 for mandrel usage.

To order mandrel, specify tube O.D. and wall thickness.

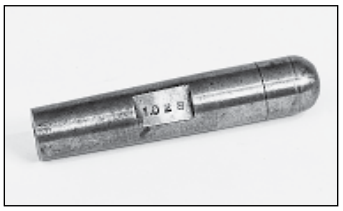

**Fig. R33 — Mandrel**

| Size | END SIZE (in.) | Wall Thickness (in.) | (in.) | (in.) | (in.) | (in.) |
|---|---|---|---|---|---|---|
| 6 | 3/8 | — | 0.035 | 0.042 | — | — |
| 8 | 1/2 | — | 0.035 | 0.042 | 0.049 | — |
| 10 | 5/8 | 0.035 | 0.042 | 0.049 | — | — |
| 12 | 3/4 | 0.035 | 0.042 | 0.049 | 0.058 | 0.065 |
| 14 | 7/8 | 0.035 | — | 0.049 | 0.058 | 0.065 |
| 16 | 1 | 0.035 | 0.042 | 0.049 | 0.058 | 0.065 |
| 18 | 1 1/8 | — | 0.042 | 0.049 | — | 0.065 |
| 20 | 1 1/4 | — | 0.049 | — | 0.065 | 0.095 |
| 24 | 1 1/2 | 0.049 | 0.058 | 0.065 | 0.083 | — |

**Table R4 — Mandrel Sizes**

## Mandrel Rods

For use with the HB632 Model Bender and Exactol Models 412/424 benders. Mandrel rods (as well as a mandrel rod stop assembly) are required when using mandrels. Mandrel rod diameters are determined by tube I.D.

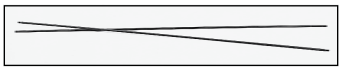

**Fig. R34 — Mandrel Rods**

## Mandrel Rod Sizes

| Mandrel Rod Dia. (in.) | Tube I.D. (in.) | Part No. |
|---|---|---|
| 1/4 | .283 to .362 | **520506** |
| 5/16 | .363 to .484 | **520507** |
| 13/32 | .485 to 1.489 | **520508** |
| 5/8 | 1.49 to 1.87 | **520509** |



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## Mandrel Rod Stop Assembly

**For use with Model HB632 bender.**

The Mandrel Rod Stop Assembly, when bolted to the end of a table opposite of the bender, keeps the mandrel rod in alignment with the tube when mandrel bending.

| Part Name | Part No. |
|---|---|
| Mandrel Rod Stop Assembly (for bender Model HB632) | **631141** |
| Mandrel Rod Stop Adapter for 5/16" Mandrel Rod | **522398** |
| Mandrel Rod Stop Adapter for 1/4" Mandrel Rod | **550501** |

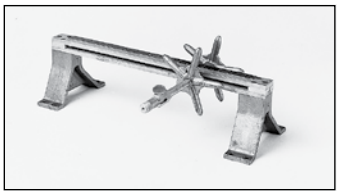

**Fig. R35 — Mandrel Rod Stop Assembly /632**

## Mandrel Rod Stop Assembly

**For use with Exactol 412/424 Model benders.**

| Part Name | Part No. |
|---|---|
| Mandrel Rod Stop Assembly | **550571** |
| Mandrel Rod Stop Adapter for 412/424 benders | **820029** |

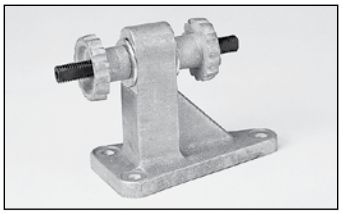

**Fig. R36 — Mandrel Rod Stop Assembly 412/424**

| Part Name | Part No. |
|---|---|
| Stop Assembly Adapter/Riser for 424 | **631154** |

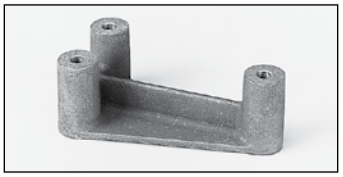

**Fig. R37 — Stop Assembly Adapter/Riser**

## Universal Side Angle Indicator

**For use with Model HB632 bender.**

Accurately determines angle between tube bends in different planes. Keeps out of plane angles accurate, when making repeated bends. Large, easy-to-read vernier dial. Maximum 3/4" O.D. tube can be used if the tube must be extended through the indicator. Maximum 1 1/2" O.D. tube can be used if end of tube is held in clamp jaw.

| Part Name | Part No. |
|---|---|
| Universal Side Angle Indicator | **520520** |

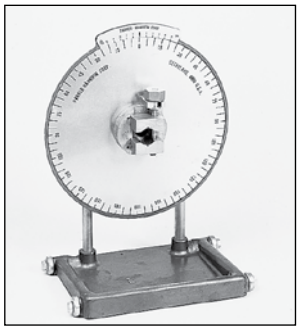

**Fig. R38 — Universal Side Angle Indicator**



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# CP432 Tube and Pipe Bender

A 90 psi air supply does all the work for bending steel and stainless steel tube and pipe. This bender utilizes a center push bending method which is easy to master. Offered in an all inclusive kit. See Bulletin 4391-CP432 for more information. A separate accessory kit of tooling for bending 10mm through 50mm tube is also available. See page R20 for part number information.

| Part Name | Part No. |
|---|---|
| CP432 Tube and Pipe Bender Kit | **CP432** |

Includes all tooling necessary for bending 1/4" thorugh 2" tube and 1/2 through 2" pipe.

**Fig. R39 — CP432 Bender Kit**

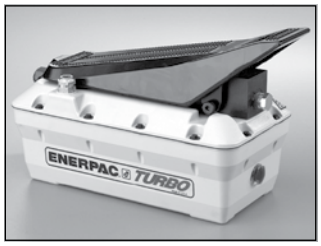


**Fig. R40 — Pump**

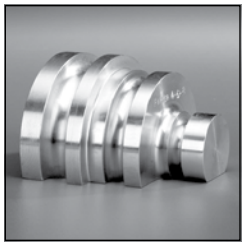

**Fig. R41 — Multi-Size Tube Radius Block**

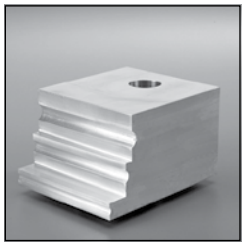

**Fig. R42 — Multi-Size Tube Slide Block**

### REPLACEMENT COMPONENTS

| Part Name | Part No. |
|---|---|
| Air/Hydraulic Pump | **PAT-1102N** |
| Hose Assembly | **975222** |
| Quick Coupler, Receptacle | **3050-3** |
| Quick Coupler, Nipple | **3010-3** |
| Hydraulic Cylinder | **RC-1010** |
| Radius Blocks | See below |
| Slide Blocks | See below |

## Radius Blocks for CP432 – Inch Tube Sizes

| Tube O.D. (in.) | Bend Radius (in.) | Part No. |
|---|---|---|
| 1/4 | 9/16 | **975179** |
| 3/8 | 1 1/4 | **975179** |
| 1/2 | 1 1/2 | **975179** |
| 5/8 | 1 7/8 | **975180** |
| 3/4 | 2 1/4 | **975180** |
| 1 | 3 | **975181** |
| 1 1/4 | 3 3/4 | **975182** |
| 1 1/2 | 4 1/2 | **975183** |
| 2 | 8 | **975184** |

## Slide Blocks for CP432 (2 required) – Inch Tube Sizes

| Tube O.D. (in.) | Part No. |
|---|---|
| 1/4 | **975185** |
| 3/8 | **975185** |
| 1/2 | **975185** |
| 5/8 | **975186** |
| 3/4 | **975186** |
| 1 | **975187** |
| 1 1/4 | **975187** |
| 1 1/2 | **975188** |
| 2 | **975188** |

*For inch pipe size radius blocks and slide blocks refer to Table R5 to right.

| Pipe Size | Bend Radius) | Radius Block Part # | Slide Block Part # (2 req.'d.) | Drive Pin |
|---|---|---|---|---|
| 1/2 | 3-3/16 | BZ-12011 | BZ-12071 | A-12 |
| 3/4 | 5 | BZ-12021 | | |
| 1 | 5-7/8 | BZ-12031 | | |
| 1-1/4 | 7-1/4 | BZ-12041 | | |
| 1-1/2 | 8 | BZ-12051 | | |
| 2 | 9-1/2 | BZ-12061 | | |

**Table R5 - Inch Pipe Sizes**



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## Radius Blocks for CP432 – Metric Tube Sizes

| Tube O.D. (mm) | Bend Radius (mm) | Part No. |
|---|---|---|
| 10 | 34 | **976503-Block** |
| 12 | 34 | **976503-Block** |
| 14 | 38 | **976503-Block** |
| 15 | 38 | **976505** |
| 16 | 38 | **976505** |
| 18 | 42 | **976508** |
| 20 | 42 | **976508** |
| 22 | 89 | **976510** |
| 25 | 100 | **976510** |
| 30 | 100 | **976512** |
| 32 | 100 | **976515** |
| 35 | 105 | **976516** |
| 38 | 114 | **976517** |
| 42 | 128 | **976518** |
| 50 | 200 | **976519** |

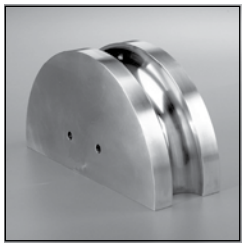

**Fig. R43 — Typical Radius Block**

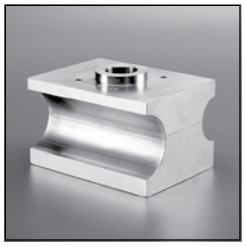

**Fig. R44 — Typical Slide Block**

## Slide Blocks for CP432 (2 required) – Metric Tube Sizes

| Tube O.D. (mm) | Part No. |
|---|---|
| 10 | **976504** |
| 12 | **976504** |
| 14 | **976504** |
| 15 | **976506** |
| 16 | **976506** |
| 18 | **976509** |
| 20 | **976509** |
| 22 | **976511** |
| 25 | **976511** |
| 30 | **976513** |
| 32 | **976513** |
| 35 | **976520** |
| 38 | **976520** |
| 42 | **976521** |
| 50 | **976521** |

### ACCESSORIES

| Part Name | Part No. |
|---|---|
| Metric Tooling Kit (10-50mm) | ***CP432-MM TOOL KIT** |

*Bender & pump is not included. CP432 is also needed.

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# Kloskut® Tube Cutters

These adjustable tube cutters are designed to produce square cut ends with no external burr and minimum internal burr when used on fully annealed copper, brass, aluminum, and steel tube. Both feature a hardened and burnished tool-steel cutting wheel, flare cut-off grooves in rollers for removal of old flares and a swing-away reamer for removing internal burrs. The handle feeds and adjusts the cutting wheel to uniformly cut tube as the cutter is rotated.

**NOTE:** Tube cutters are **not recommended** for use with stainless steel tube because of the work hardening effect. The use of a hacksaw with a "Tru-Kut" Sawing Vise or a rotary teeth saw is recommended for stainless steel.

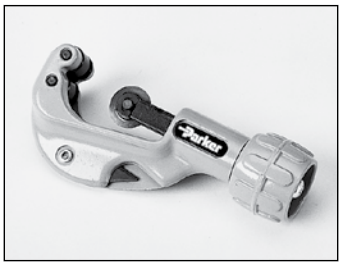

**Fig. R45 — 218B Medium Kloskut Tube Cutter**

## Medium Kloskut

| Part Description | Part No. |
|---|---|
| Tube cutter for 1/8" to 1 1/8" O.D. | **218B** |
| Cutter Wheel for 218B | **218B Wheel** |
| Cutter Shaft | **218B Shaft** |

**Fig. R46 — 1232 Large Kloskut Tube Cutter**

## Large Kloskut

| Part Description | Part No. |
|---|---|
| Tube Cutter for 3/4" to 2" O.D. | **1232** |
| Cutter Wheel for 1232 | **1232 Wheel** |

# Tru-Kut® Sawing Vise

This hacksaw guide will accommodate tube, pipe and hose from sizes 3 (3/16" O.D.) to 32 (2" O.D.), assuring square cut-offs within ± 1°. For use with a fine tooth hacksaw blade for smooth cuts.

**HOW TO USE:** Mount in a vise or bolt to a bench. Clamp tube, pipe or hose into the Tru-Kut vise and cut off; guide ensures accurate square cuts.

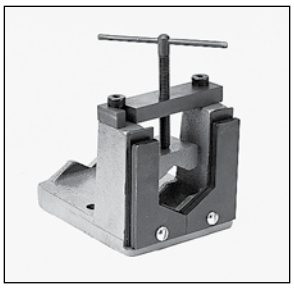

**Fig. R47 — Tru-Kut Sawing Vise**

| Part Description | Part No. |
|---|---|
| Tru-Kut Sawing Vise | **710439** |

# Cut-Off Saw

The 974250 Cut-Off Saw is designed to operate at low speed to prevent work hardening the tube end. The saw will assure a square cut on the tube with minimum burrs. The saw will cut 1/4" through 2 3/4" copper, brass, aluminum, steel and stainless steel tube. An adequate supply of cutting fluid is provided by an internal recirculating pump. The unit is designed for bench or stand mounting and operates on 110V, 15 amp power supply.

**Fig. R48 — Cut-Off Saw (shown on Saw Base)**

| Part Description | Part No. |
|---|---|
| Cut-Off Saw | **974250** |
| **Accessories** | |
| Saw Base | **AF160026** |
| **Replacement Parts** | |
| Cutting Lubricant (Approx. 1 gal. container) | **Saw Lube** |
| Saw Blade – 250 mm x 2.0 mm thick (all purpose) | **987036** |
| Saw Blade – 200 mm x 2.0 mm thick (all purpose) | **987037** |

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# In-Ex® Tube Deburring Tool 226A

A quick twist of the wrist will deburr either the O.D. or the I.D. of the tube end. Parker's In-Ex deburrer can be used on annealed steel, stainless steel, copper and aluminum, for tube sizes 1/8" to 1 5/8" O.D.

| Part Description | Part No. |
|---|---|
| In-Ex Deburring Tool | **226A** |
| Blade Set for 226A Tube Deburr Tool | **226A Blades** |

**Fig. R49 — 226A In-Ex Deburr Tool**

# Power Deburr Tool

The Parker Power Deburr Tool is designed for deburring the I.D. and O.D. of 1/4" through 2" steel, stainless steel, copper and aluminum tube. The lightweight unit incorporates a modular design which allows Parker's Cut-Off Saw, part number 974250, to be easily mounted on the top. The Power Deburr Tool requires 110V/10A power supply.

Dimensions: L – 20", W – 18", H – 9".

| Part Description | Part No. |
|---|---|
| Power Deburr Tool | **972125** |

**Replacement Parts**

| | |
|---|---|
| I.D. Deburr Cone | **971816** |
| O.D. Deburr Blades (six blade set) | **910485** |

**Fig. R50 — Power Deburr Tool**

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# Parflange® 1025

## Bench-Top 90° Flanging and 37° Flaring System

Tooling must be ordered separately

- Eliminates braze joint
- Compact, lightweight design
- Bench mountable
- Easy to operate
- Available in 110-volt single-phase or 440-volt 3-phase (please specify by ordering 1025/110 or 1025/440)
- Flanges or flares tube in less than 20 seconds
- For tube sizes 1/4" O.D. thru 1-1/2" O.D. (steel); and 1/4" O.D. thru 1" O.D. (stainless steel) – Flanging/flaring of tube sizes 1" & greater results in heavy machine vibration. Therefore, this machine is only recommended for occasional use for preparing tube ends 1" or larger.

  Tooling is also available for comparable metric tube sizes.

Electrical Power: 110V/20A single-phase, or 440V/3-phase/2.1A

Power Cable Length: 8 feet long (2.5 meters)

Dimensions: Height: 18 1/8 inches (460mm)
Width: 15 3/8 inches (390mm)
Depth: 26 3/8 inches (670mm)

Weight: Basic Unit: 175 lbs. (80 kg.)
Each Die (typical): 4 lbs. (1.8 kg.)

Flanging Pin Lubrication Fluid: **LB2000**

See Bulletin 4390-1025A or 4390-1025 for more details.

A DVD is included to provide instructions for proper use.

**Fig. R51 — Parflange® 1025 Machine**

**CAUTION:** Extension cords are ***not*** recommended and could cause damage to the machine due to a lack of power supply.

**Fig. R52 — Flanging Pin**

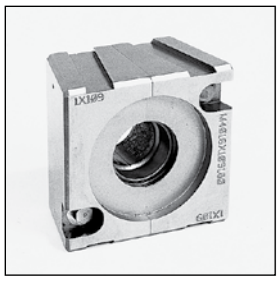

**Fig. R53 — Flanging Die Set**

**Fig. R54 — LB 2000**

### COMPONENTS REQUIRED

| Part Name | Part No. |
|---|---|
| Parflange 1025 (110 volt) | **1025/110** |
| Parflange 1025 (440 volt) | **1025/440** |
| Flanging Pin | See page R23 |
| Flanging Die Set | See page R23 |
| Flaring Pin | See page R33 |
| Flaring Die Set | See page R33 |
| Lubrication Fluid | **LB 2000** |
| Die Adjustment Shims (Old Style Dies Only) | **Shim Kit** |

### REPLACEMENT PART

| Part Name | Part No. |
|---|---|
| Tube Stop | **1025/0281014** |

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# Inch and Metric Flanging Tooling for 1025

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| Tube Size O.D. x Wall Thickness (in.) | Tooling for 90°/180° Tube Flanging | | | Available Flanging Tooling | |
|---|---|---|---|---|---|
| | Flange Pin and Die Set Part Number | Pin Part Number | Die Part Number | 1025 | |
| | | | | -S | -SS |
| 1/4 x .028 | 4004X028180 | B4004X028180 | M4004X028180 | • | |
| 1/4 x .035 | 4004X035180 | B4004X035180 | M4004X035180 | • | • |
| 1/4 x .049 | 4004X049180 | B4004X049180 | M4004X049180 | • | |
| 3/8 x .035 | 4006X035180 | B4006X035180 | M4006X035180 | • | • |
| 3/8 x .049 | 4006X049180 | B4006X049180 | M4006X049180 | • | • |
| 3/8 x .065 | 4006X065180 | B4006X065180 | M4006X065180 | • | • |
| 1/2 x .035 | 4008X035180 | B4008X035180 | M4008X035180 | • | • |
| 1/2 x .049 | 4008X049180 | B4008X049180 | M4008X049180 | • | • |
| 1/2 x .065 | 4008X065180 | B4008X065180 | M4008X065180 | • | • |
| 1/2 x .083 | 4008X083180 | B4008X083180 | M4008X083180 | • | • |
| 5/8 x .049 | 4010X049180 | B4010X049180 | M4010X049180 | • | • |
| 5/8 x .065 | 4010X065180 | B4010X065180 | M4010X065180 | • | • |
| 5/8 x .083 | 4010X083180 | B4010X083180 | M4010X083180 | • | • |
| 5/8 x .095 | 4010X095180 | B4010X095180 | M4010X095180 | • | • |
| 5/8 x .109 | 4010X109180 | B4010X109180 | M4010X109180 | • | |
| 5/8 x .120 | 4010X120180 | B4010X120180 | M4010X120180 | • | |
| 3/4 x .049 | 4012X049180 | B4012X049180 | M4012X049180 | • | • |
| 3/4 x .065 | 4012X065180 | B4012X065180 | M4012X065180 | • | • |
| 3/4 x .083 | 4012X083180 | B4012X083180 | M4012X083180 | • | • |
| 3/4 x .095 | 4012X095180 | B4012X095180 | M4012X095180 | • | • |
| 3/4 x .109 | 4012X109180 | B4012X109180 | M4012X109180 | • | • |
| 3/4 x .120 | 4012X120180 | B4012X120180 | M4012X120180 | • | |
| 1 x .065 | 4016X065180 | B4016X065180 | M4016X065180 | • | • |
| 1 x .083 | 4016X083180 | B4016X083180 | M4016X083180 | • | • |
| 1 x .095 | 4016X095180 | B4016X095180 | M4016X095180 | • | |
| 1 x .109 | 4016X109180 | B4016X109180 | M4016X109180 | • | |
| 1 x .120 | 4016X120180 | B4016X120180 | M4016X120180 | • | |
| 1 x .134 | 4016X134180 | B4016X134180 | M4016X134180 | • | |
| 1 x .148 | 4016X148180 | B4016X148180 | M4016X148180 | | |
| 1 x .156 | 4016X156180 | B4016X156180 | M4016X156180 | | |
| 1 x .188 | 4016X188180 | B4016X188180 | M4016X188180 | | |
| 1 1/4 x .065 | 4020X065180 | B4020X065180 | M4020X065180 | • | |
| 1 1/4 x .083 | 4020X083180 | B4020X083180 | M4020X083180 | • | |
| 1 1/4 x .095 | 4020X095180 | B4020X095180 | M4020X095180 | • | |
| 1 1/4 x .109 | 4020X109180 | B4020X109180 | M4020X109180 | • | |
| 1 1/4 x .120 | 4020X120180 | B4020X120180 | M4020X120180 | • | |
| 1 1/4 x .134 | 4020X134180 | B4020X134180 | M4020X134180 | | |
| 1 1/4 x .148 | 4020X148180 | B4020X148180 | M4020X148180 | | |
| 1 1/4 x .156 | 4020X156180 | B4020X156180 | M4020X156180 | | |
| 1 1/4 x .188 | 4020X188180 | B4020X188180 | M4020X188180 | | |
| 1 1/2 x .065 | 4024X065180 | B4024X065180 | M4024X065180 | • | |
| 1 1/2 x .083 | 4024X083180 | B4024X083180 | M4024X083180 | • | |
| 1 1/2 x .095 | 4024X095180 | B4024X095180 | M4024X095180 | • | |
| 1 1/2 x .109 | 4024X109180 | B4024X109180 | M4024X109180 | | |
| 1 1/2 x .120 | 4024X120180 | B4024X120180 | M4024X120180 | | |
| 1 1/2 x .134 | 4024X134180 | B4024X134180 | M4024X134180 | | |
| 1 1/2 x .148 | 4024X148180 | B4024X148180 | M4024X148180 | | |
| 1 1/2 x .156 | 4024X156180 | B4024X156180 | M4024X156180 | | |
| 1 1/2 x .188 | 4024X188180 | B4024X188180 | M4024X188180 | | |

**Note:** Use "-SS" suffix after part number for flanging tools for stainless steel tube. Contact the Tube Fittings Division for sizes and/or materials not listed, or for additional SS sizes released for limited use.

**Table R6 — Pin & Die Part Numbers for Inch Sizes**

| Tube Size O.D. x Wall Thickness (mm) | Tooling for 90°/180° Tube Flanging | | Available Flanging Tooling | |
|---|---|---|---|---|
| | Pin Part Number | Die Part Number | 1025 | |
| | | | S | SS |
| 6 x 1 | B4018006X1M | M4018006X1M | • | |
| 6 x 1.5 | B4018006X1.5M | M4018006X1.5M | • | |
| 8 x 1 | B4018008X1M | M4018008X1M | • | |
| 8 x 1.5 | B4018008X1.5M | M4018008X1.5M | • | |
| 10 x 1 | B4018010X1M | M4018010X1M | • | |
| 10 x 1.5 | B4018010X1.5M | M4018010X1.5M | • | |
| 10 x 2 | B4018010X2M | M4018010X2M | • | |
| 12 x 1 | B4018012X1M | M4018012X1M | • | |
| 12 x 1.5 | B4018012X1.5M | M4018012X1.5M | • | • |
| 12 x 2 | B4018012X2M | M4018012X2M | • | |
| 15 x 1.5 | B4018015X1.5M | M4018015X1.5M | • | |
| 15 x 2 | B4018015X2M | M4018015X2M | • | |
| 16 x 1 | B4018016X1M | M4018016X1M | • | |
| 16 x 1.5 | B4018016X1.5M | M4018016X1.5M | • | |
| 16 x 2 | B4018016X2M | M4018016X2M | • | • |
| 16 x 2.5 | B4018016X.5M | M4018016X2.5M | • | |
| 18 x 1 | B4018018X1M | M4018018X1M | • | |
| 18 x 1.5 | B4018018X1.5M | M4018018X1.5M | • | |
| 18 x 2 | B4018018X2M | M4018018X2M | • | |
| 20 x 2 | B4018020X2M | M4018020X2M | • | • |
| 20 x 2.5 | B4018020X2.5M | M4018020X2.5M | • | |
| 20 x 3 | B4018020X3M | M4018020X3M | • | |
| 22 x 1.5 | B4018022X1.5M | M4018022X1.5M | • | |
| 22 x 2 | B4018022X2M | M4018022X2M | • | |
| 22 x 2.5 | B4018022X2.5M | M4018022X2.5M | • | |
| 22 x 3 | B4018022X3M | M4018022X3M | • | |
| 25 x 2 | B4018025X2M | M4018025X2M | • | |
| 25 x 2.5 | B4018028X2.5M | M4018028X2.5M | • | |
| 25 x 3 | B4018030X2M | M4018030X2M | • | |
| 25 x 3.5 | B4018025X3.5M | M4018025X3.5M | • | |
| 25 x 4 | B4018025X4M | M4018025X4M | | |
| 28 x 2 | B4018028X2M | M4018028X2M | • | |
| 28 x 2.5 | B4018028X2.5M | M4018028X2.5M | • | |
| 30 x 2 | B4018030X2M | M4018030X2M | • | |
| 30 x 3 | B4018030X3M | M4018030X3M | • | |
| 30 x 3.5 | B4018030X3.5M | M4018030X3.5M | | |
| 30 x 4 | B4018030X4M | M4018030X4M | | |
| 32 x 3 | B4018032X3M | M4018032X3M | • | |
| 32 x 4 | B4018032X4M | M4018032X4M | | |
| 35 x 3 | B4018035X3M | M4018035X3M | • | |
| 38 x 3 | B4018038X3M | M4018038X3M | | |
| 38 x 4 | B4018038X4M | M4018038X4M | | |
| 38 x 5 | B4018038X5M | M4018038X5M | | |

Note: Flanging tools (90°/180°) listed are for carbon steel tube. Contact the Tube Fittings Division for metric flanging tools for tube materials other than carbon steel or for sizes not listed.

**Table R7 — Pin & Die Part Numbers for Metric Sizes**

Dimensions and pressures for reference only, subject to change.



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# Parflange® ECO 25

## Bench-Top 90° Flanging and 37° Flaring System

Tooling and Hydraulic Pump must be ordered separately

- Eliminates braze joints
- More efficient than traditional flaring methods
- Only requires one die per tube size for both flanging and flaring
- For tube sizes 1/4" O.D. through 1-1/2" O.D. in both Steel and Stainless Steel
- Dies not dependent on wall thickness or tube material
- Uses same Parflange pins as 1025 and PRO 50 models
- Utilizes proven Parflange orbital process for consistent flanges and flares
- Burnishes flanges and flares for superior surface finish
- Compact, lightweight design
- Easy to operate
- Used with hand hydraulic pump
- 110-volt single-phase power
- Tooling also available in comparable metric sizes

**Fig. R55 — Parflange ECO 25**

**CAUTION:** Extension cords are ***not*** recommended and could cause damage to the machine due to a lack of power supply.

Electrical Power: 110V/20A single-phase

Power Cable Length: 8 feet long (2.5 meters)

Dimensions: Height: 20.5 inches (520mm)
Width: 15 inches (381mm)
Depth: 20.5 (520mm)

Weight: 190 lbs. (86.4 kg.)

See Bulletin 4390-ECO 25 for more information and instructions for use.

**COMPONENTS REQUIRED**

| Part Name | Part No. |
|---|---|
| *ECO 25 Basic Unit | **ECO 25** |
| *Hand Hydraulic Pump | **900086** |
| Flanging Pin | See page R26 |
| Flaring Pin | See page R27 |
| Flanging/Flaring Dual Function Die Set | See page R26 & R34 |
| *Lubrication Fluid | **LB 2000** |
| *Hose Assembly (for hand pump) | **910133** |
| *Pressure gauge (0 - 10,000 psi) | **900044** |
| *Hydraulic Pump Adapter | **6-6 FLO-S** |
| *Hydraulic Pump Tee | **6 R6LO-S** |
| *Pressure Gauge Adapter | **6 G6L-S** |
| *Hose Conversion Adapter (#1) | **6 G6L-S** |
| *Hose Conversion Adapter (#2) | **6-6 G6L-S** |

**Fig. R56 — Hand Pump**

*Included in ECO 25 kit (Part Number ECO 25 KIT)

# ECO 25 Kit

| Part Name | Part No. |
|---|---|
| ECO 25 Kit (includes hand pump) | **ECO 25 KIT** |

(Kit includes basic unit, hand hydraulic pump, hose assembly, pressure gauge, hydraulic pump adapter, hydraulic pump tee, pressure gauge adapter, hose conversion adapters #1 & #2, Lubrication fluid, and operation manual.)

# Inch Flanging Tooling for ECO25

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| Tube O.D. (in.) | Die Set Part Number |
|---|---|
| 1/4 | M2504 |
| 3/8 | M2506 |
| 1/2 | M2508 |
| 5/8 | M2510 |
| 3/4 | M2512 |
| 1 | M2516 |
| 1 1/4 | M2520 |
| 1 1/2 | M2524 |

**Table R8 — Flanging Die Set, Inch Sizes**

| Tube O.D. (in.) | Wall Thickness (in.) | Flanging Pin Steel Tube | Flanging Pin Stainless Tube |
|---|---|---|---|
| 1/4 | 0.028 | B4004X028180 | - |
| 1/4 | 0.035 | B4004X035180 | B4004X035180SS |
| 1/4 | 0.049 | B4004X049180 | - |
| 3/8 | 0.035 | B4006X035180 | B4006X035180SS |
| 3/8 | 0.049 | B4006X049180 | B4006X049180SS |
| 3/8 | 0.065 | B4006X065180 | B4006X065180SS |
| 1/2 | 0.035 | B4008X035180 | B4008X035180SS |
| 1/2 | 0.049 | B4008X049180 | B4008X049180SS |
| 1/2 | 0.065 | B4008X065180 | B4008X065180SS |
| 1/2 | 0.083 | B4008X083180 | B4008X083180SS |
| 5/8 | 0.049 | B4010X049180 | B4010X049180SS |
| 5/8 | 0.065 | B4010X065180 | B4010X065180SS |
| 5/8 | 0.083 | B4010X083180 | B4010X083180SS |
| 5/8 | 0.095 | B4010X095180 | B4010X095180SS |
| 5/8 | 0.109 | B4010X109180 | - |
| 5/8 | 0.120 | B4010X120180 | - |
| 3/4 | 0.049 | B4012X049180 | B4012X049180SS |
| 3/4 | 0.065 | B4012X065180 | B4012X065180SS |
| 3/4 | 0.083 | B4012X083180 | B4012X083180SS |
| 3/4 | 0.095 | B4012X095180 | B4012X095180SS |
| 3/4 | 0.109 | B4012X109180 | B4012X109180SS |
| 3/4 | 0.120 | B4012X120180 | B4012X120180SS |
| 1 | 0.065 | B4016X065180 | B4016X065180SS |
| 1 | 0.083 | B4016X083180 | B4016X083180SS |
| 1 | 0.095 | B4016X095180 | B4016X095180SS |
| 1 | 0.109 | B4016X109180 | B4016X109180SS |
| 1 | 0.120 | B4016X120180 | B4016X120180SS |
| 1 1/4 | 0.065 | B4020X065180 | - |
| 1 1/4 | 0.083 | B4020X083180 | B4020X083180SS |
| 1 1/4 | 0.095 | B4020X095180 | B4020X095180SS |
| 1 1/4 | 0.109 | B4020X109180 | B4020X109180SS |
| 1 1/4 | 0.120 | B4020X120180 | B4020X120180SS |
| 1 1/2 | 0.065 | B4024X065180 | - |
| 1 1/2 | 0.083 | B4024X083180 | - |
| 1 1/2 | 0.095 | B4024X095180 | B4024X095180SS |
| 1 1/2 | 0.109 | B4024X109180 | B4024X109180SS |
| 1 1/2 | 0.120 | B4024X120180 | B4024X120180SS |

**Table R9 — Flanging Pin, Inch Sizes**

**Fig. R57 — Flanging Pin**

**Fig. R58 — Dual Function Die Set (Flaring and Flanging)**

Dimensions and pressures for reference only, subject to change.



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# Manual Flaring Tool Vise Block and Flaring Pin — Metric Tube

These 37° flaring tools are designed for use in a vise when flaring metric tube from 6mm O.D. to 38mm O.D.

From 20mm size tube and upward it is necessary to use a pre-flaring pin to start the flare.

- **Clamp tube flush in black halves**
- **Flare tube by hammering the flaring pin.**

A separate block and pin set is used for each tube size.

**Fig. R59 — Vise Block**

**Fig. R60 — Pre-Flaring Pins**

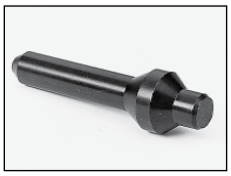

**Fig. R61 — Flaring Pin**

## Pre-Flaring Pins

| Tube O.D. (mm) | Part No. |
|---|---|
| 20 | P1E |
| 25 | P1E |
| 30 | P1E |
| 32 | P1E |
| 38 | P1E |

## Flaring Pins

| Tube O.D. (mm) | Part No. |
|---|---|
| 6 | P17408 |
| 8 | P17408 |
| 10 | P17408 |
| 12 | P17414 |
| 14 | P17414 |
| 15 | P17414 |
| 16 | P17414 |
| 18 | P17418 |
| 20 | P17418 |
| 25 | P17422 |
| 30 | P17432 |
| 32 | P17432 |
| 38 | P17438 |

## Vise Blocks

| Tube O.D. (mm) | Part No. |
|---|---|
| 6 | M27406 |
| 8 | M27408 |
| 10 | M27410 |
| 12 | M27412 |
| 14 | M27414 |
| 15 | M27415 |
| 16 | M27416 |
| 18 | M27418 |
| 20 | M27420 |
| 25 | M27425 |
| 30 | M27430 |
| 32 | M27432 |
| 38 | M27438 |

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# Vise Block with Flaring Pin

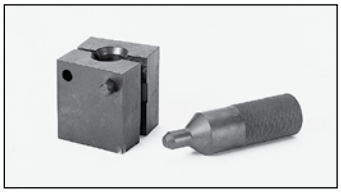

**Fig. R62 — Vise Block with Flaring Pin**

These impact 37° flaring tools are for use with copper, aluminum alloy, and thin wall steel or stainless steel. Separate tool-ing set for each tube size 4 (1/4" O.D.) through 24 (1 1/2" O.D.). Maximum wall thickness: 1/8" to 3/8" is 15% of tube O.D., 1/2" and larger is 10% of tube O.D.

**HOW TO USE:** Clamp tube flush in matching halves of block in a bench vise. Give hardened steel flaring pin a few **sharp** blows with a hammer to form the flare.

| Size | Tube O.D. (in.) | Part No. |
|---|---|---|
| 4 | 1/4 | **4-2866** |
| 5 | 5/16 | **5-2866** |
| 6 | 3/8 | **6-2866** |
| 8 | 1/2 | **8-2866** |
| 10 | 5/8 | **10-2866** |
| 12 | 3/4 | **12-2866** |
| 14 | 7/8 | **14-2866** |
| 16 | 1 | **16-2866** |
| 20 | 1 1/4 | **20-2866** |
| 24 | 1 1/2 | **24-2866** |

Order vise block with flaring pin using part numbers above. The block and pin may be ordered separately by suffixing the part number with either Pin or Block.

**Part Number Example:**
**4-2866 Block**

# Rolo-Flair®

## Manual Rotary Flaring Tool

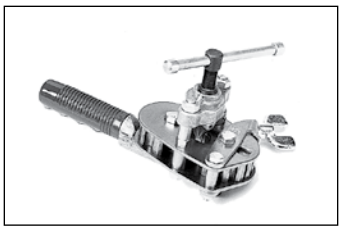

**Fig. R63 — Rolo-Flair**

(For soft metal tube)

Precision burnished 37° and 45° flares in tube sizes from 2 (1/8" O.D.) to 12 (3/4" O.D.) with an easy turn of the handle. For use with copper and aluminum alloys. A depth gauge allows proper positioning of tube for consistent flaring.

**HOWTO USE:** Open die, insert tube up to the gauge and clamp the tube in the die. Turn drive handle clockwise to flare, then counterclockwise for retracting flaring cone. Open clamping die by loosening wing nut and remove flared tube.

| Part Name | Part No. |
|---|---|
| Rolo-Flair for 37° flares (for 1/8", 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4", O.D.) | **212FB** |
| Rolo-Flair for 45° flares (for 1/8", 3/16", 1/4", 5/16", 3/8", 1/2",5/8", 3/4", O.D.) | **945TH** |

# Combination Flarer

**Part No.**
**210A**

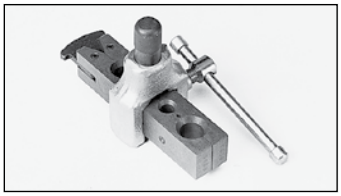

**Fig. R64 — 210A Combination Flarer**

For 1/8", 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", O.D. tube.

The combination flarer is a 7-in-1 impact tool for flaring (37°) soft copper, aluminum and fully annealed steel tube, sizes 2 (1/8" O.D.) through 10 (5/8" O.D.). Maximum wall thickness: 1/8" to 3/8" is 15% of tube O.D., 1/2" and larger is 10% of tube O.D.

**HOW TO USE:** Insert tube into proper flare hole and fasten with clamping screw. Set hardened-steel flaring punch in tube and form flare with a few **sharp** hammer blows. (Tube should not project more than 1/16" above top of block.)

Dimensions and pressures for reference only, subject to change.



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# Hydra-Tool

## Hydraulic Flaring and Pre-Setting Tool

### Flaring

An efficient dependable device for 37° and 45° flaring of steel, stainless steel and copper tube. This task is made easy through hydraulic power provided by a hand or electric pump. The equipment is portable and easy to use.

This tool accommodates dies for tubes ranging in inch sizes from 4 through 32 (1/4" through 2" outside diameters) with wall thicknesses as great as .134", and metric sizes from 6mm through 50mm. The hydraulic "push" of the Hydra-Tool flares the tube to a 37° flare angle. A gauge can be provided to enable the operator to determine the pressure required to adequately flare any given material and wall thickness of the tube. Complete instructions are included with the Hydra-Tool. See bulletin 4392-B10. See the following for Hydra-Tool basic unit or kit, and choice of power sources and necessary tooling.

**NOTE**: Flaring die sets and other tooling are available in non-standard sizes upon request from the factory.

See Appendix for flaring pressures.

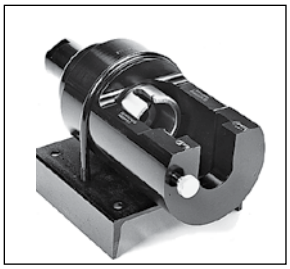

**Fig. R65 — Hydra-Tool**

**Fig. R66 — Electric Pump**

**Fig. R67 — Hand Pump**

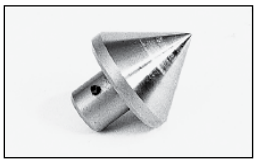

**Fig. R68 — Flaring Cone**

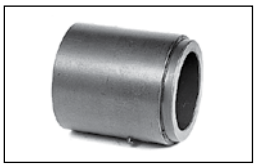

**Fig. R69 — Die Ring**

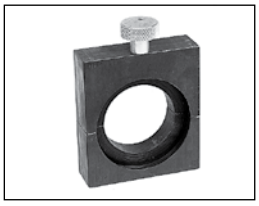

**Fig. R70 — Die Retainer**

**Fig. R71— Hydra-Tool Kit**

### COMPONENTS REQUIRED

| Part Name | Part No. |
|---|---|
| *Hydra-Tool (basic unit) | **710400B** |
| *Hydra-Tool Male Adapter | **6-8 F5OLO-S** |
| *"T" Adapter for Gauge | **6 R6LO-S** |
| *Hose Assembly (for hand or electric pumps) | **910004** |
| *Adapter for Gauge | **6 G6L-S** |
| *Pressure Gauge (0 - 10,000 psi) | **900044** |
| Electric Hydraulic Pump (10,000 psi; 1/2 hp; 40-125 volt) | **900085** |
| Hand Hydraulic Pump (10,000 psi; 2 speed) | **900086** |
| Die Ring (1/4" - 1 1/4") (6mm - 32mm) | **710416A** |
| Die Ring (1 1/2" - 2") (35mm - 50mm) | **710412** |
| 37° Flaring Cone (1/4" - 1 1/4") (6mm - 32mm) | **710419** |
| 37° Flaring Cone (1 1/2" - 2") (35mm - 50mm) | **710411** |
| Die Retainer Assembly (1/4" - 1 1/4") (6mm - 32mm) | **710424-1** |
| Die Retainer Assembly (1 1/2" - 2") (35mm - 50mm) | **710424-2** |
| Flaring Die Sets | See pages R30 – R31 |
| 45° Flaring Cone (1/4" - 1") | **910312** |

*Included in Hydra-tool kit (Part 720370B-3)

STP Lubricant is the only lubricant recommended for use with Hydra-Tool.

## Hydra-Tool Kit

| Part Name | Part No. |
|---|---|
| Hydra-Tool Kit (for use with electric or hand pump)<br>Includes basic unit, gauge adapter, Hydra-Tool connector, lubricant, "T" adapter, carrying case, hose assembly, pressure gauge, p/n 900044, operation manual and video. | **720370B-3** |



Dimensions and pressures for reference only, subject to change.



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## Hydra-Tool 37° Flaring Die Sets for Steel – Inch

**Fig. R72 — Flaring Die Set**

| Size | Tube O.D. (in.) | Part No. |
|---|---|---|
| 4 | 1/4 | **710417-4** |
| 5 | 5/16 | **710417-5** |
| 6 | 3/8 | **710417-6** |
| 8 | 1/2 | **710417-8** |
| 10 | 5/8 | **710417-10** |
| 12 | 3/4 | **710417-12** |
| 14 | 7/8 | **710417-14** |
| 16 | 1 | **710417-16** |
| 20 | 1 1/4 | **710417-20** |
| 24 | 1 1/2 | **710415-24** |
| 32 | 2 | **710415-32** |

## Hydra-Tool 37° Flaring Die Sets for Stainless Steel – Inch

| Size | Tube O.D. (in.) | Part No. |
|---|---|---|
| 4 | 1/4 | **710417-4 SS** |
| 5 | 5/16 | **710417-5 SS*** |
| 6 | 3/8 | **710417-6 SS** |
| 8 | 1/2 | **710417-8 SS** |
| 10 | 5/8 | **710417-10 SS** |
| 12 | 3/4 | **710417-12 SS** |
| 14 | 7/8 | **710417-14 SS*** |
| 16 | 1 | **710417-16 SS** |
| 20 | 1 1/4 | **710417-20 SS** |
| 24 | 1 1/2 | **710415-24 SS** |
| 32 | 2 | **710415-32 SS** |

* Non-standard.

## Hydra-Tool 37° Flaring Die Sets – Metric

| Tube O.D./ Size (mm) | Part No. |
|---|---|
| 6 | **770106-6** |
| 8 | **770106-8** |
| 10 | **770106-10** |
| 12 | **770106-12** |
| 14 | **770106-14** |
| 15 | **770106-15** |
| 16 | **770106-16** |
| 18 | **770106-18** |
| 20 | **770106-20** |
| 22 | **770106-22** |
| 25 | **770106-25** |
| 28 | **770106-28** |
| 30 | **770106-30** |
| 32 | **770106-32** |
| 35 | **770095-35** |
| 38 | **770095-38** |
| 42 | **770095-42** |
| 50 | **770095-50** |

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## Hydra-Tool 45° Flaring Die Sets – Inch

| Size | Tube O.D. (in.) | Part No. |
|---|---|---|
| 4 | 1/4 | **977420-4** |
| 6 | 3/8 | **977420-6** |
| 8 | 1/2 | **977420-8** |
| 10 | 5/8 | **977420-10** |
| 12 | 3/4 | **977420-12** |
| 14 | 7/8 | **977420-14** |
| 16 | 1 | **977420-16** |

### REPLACEMENT PART

| Part Name | Part No. |
|---|---|
| Tube Stop Assembly | **710420B** |

### OPTIONAL ACCESSORIES

| Part Name | Part No. |
|---|---|
| Hydra-Tool Carrying Case | **720377** |

Sturdy wood case for Hydra-Tool and tooling.
(Hydra-Tool Kit is shipped in this carrying case.)

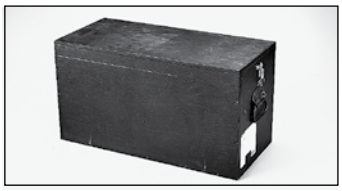

**Fig. R73 — Carrying Case**

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# Karryflare Portable Flaring Machine

The Karryfare is a portable flaring machine that is designed for fabricating 37 degree tube flares. It's lightweight, portable, and is capable of flaring 1/4" through 1-1/2" (6mm-38mm) steel & stainless steel tubing. It's telescopic handle and wheeled carrying case allows it to be easily transported from one work site location to another.

| Part Name | Part No. |
|---|---|
| Karry Flare | **KarryFlare** |

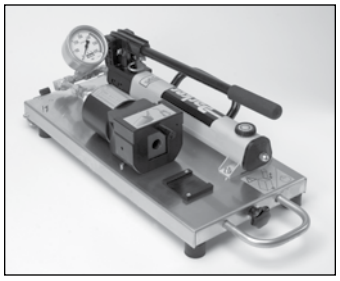

**Fig. R74 — KarryFlare**

Hydraulic power is generated by a hand operated pump. A pressure gauge is provided which enables the operator to review the necessary pressure requirements for proper flaring of their specific tubing requirements (operating pressures are specific to the tubes O.D. and wall thickness). The complete unit is mounted on a wheeled base plate, with telescopic handle, and includes 37° cone and case cover.

**Dimensions:** H – 10" W – 14" L – 30"

**Application range**

The Karryflare machine is capable of flaring tube from 1/4" O.D. to 1 1/2" O.D. or from 6mm O.D. to 38mm O.D.

**Fig. R75 — Flaring Die Set**

**FLARING COMPONENTS**

| Part Name | Part No. |
|---|---|
| Replacement 37° Flaring Cone | **Karryflare/FPIN** |
| 37° Flaring Die Sets | See below |

## Tube Die Sets – Inch

| Tube O.D. (in.) | Part No. |
|---|---|
| 1/4 | **M 047415-1** |
| 5/16 | **M 157408-1** |
| 3/8 | **M 067415-1** |
| 1/2 | **M 087415** |
| 5/8 | **M 107415** |
| 3/4 | **M 127415** |
| 1 | **M 167415** |
| 1 1/4 | **M 207415** |
| 1 1/2 | **M 157438** |

## Tube Die Sets – Metric

| Tube O.D. (mm) | Part No. |
|---|---|
| 6 | **M 157406-1** |
| 8 | **M 157408-1** |
| 10 | **M 157410-1** |
| 12 | **M 157412** |
| 14 | **M 157414** |
| 15 | **M 157415** |
| 16 | **M 157416** |
| 18 | **M 157418** |
| 20 | **M 157420** |
| 22 | **M 157422** |
| 25 | **M 157425** |
| 30 | **M 157430** |
| 32 | **M 157432** |
| 38 | **M 157438** |

Dimensions and pressures for reference only, subject to change.



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# Inch and Metric Flaring Tooling for 1025

## Parflange® 1025 37° Flaring and Flanging Systems

Parker's Parflange 1025 machine is designed to create 37° flared tube ends. For more detailed information on the machine and part numbers, refer to page R23.

**Fig. R76 — Parflange 1025**

| Tube Size O.D. x Wall Thickness (in.) | Tooling for 37°/74° Tube Flaring | | Available Flaring Tooling |
|---|---|---|---|
| | Pin Part Number | Die Part Number | 1025 |
| 1/4 x .020 | B4004X020074 | M4004074 | • |
| 1/4 x .028 | B4004X028074 | M4004074 | • |
| 1/4 x .035 | B4004X035074 | M4004074 | • |
| 1/4 x .049 | B4004X049074 | M4004074 | • |
| 1/4 x .065 | B4004X065074 | M4004074 | • |
| 3/8 x .020 | B4006X020074 | M4006074 | • |
| 3/8 x .028 | B4006X028074 | M4006074 | • |
| 3/8 x .035 | B4006X035074 | M4006074 | • |
| 3/8 x .049 | B4006X049074 | M4006074 | • |
| 3/8 x .065 | B4006X065074 | M4006074 | • |
| 1/2 x .028 | B4008X028074 | M4008074 | • |
| 1/2 x .035 | B4008X035074 | M4008074 | • |
| 1/2 x .049 | B4008X049074 | M4008074 | • |
| 1/2 x .065 | B4008X065074 | M4008074 | • |
| 1/2 x .083 | B4008X083074 | M4008074 | • |
| 5/8 x .035 | B4010X035074 | M4010074 | • |
| 5/8 x .049 | B4010X049074 | M4010074 | • |
| 5/8 x .065 | B4010X065074 | M4010074 | • |
| 5/8 x .083 | B4010X083074 | M4010074 | • |
| 5/8 x .095 | B4010X095074 | M4010074 | • |
| 3/4 x .035 | B4012X035074 | M4012074 | • |
| 3/4 x .049 | B4012X049074 | M4012074 | • |
| 3/4 x .065 | B4012X065074 | M4012074 | • |
| 3/4 x .083 | B4012X083074 | M4012074 | • |
| 3/4 x .095 | B4012X095074 | M4012074 | • |
| 3/4 x .109 | B4012X109074 | M4012074 | • |
| 1 x .035 | B4016X035074 | M4016074 | • |
| 1 x .049 | B4016X049074 | M4016074 | • |
| 1 x .065 | B4016X065074 | M4016074 | • |
| 1 x .083 | B4016X083074 | M4016074 | • |
| 1 x .095 | B4016X095074 | M4016074 | • |
| 1 x .109 | B4016X109074 | M4016074 | • |
| 1 x .120 | B4016X120074 | M4016074 | • |
| 1 1/4 x .049 | B4020X049074 | M4020074 | • |
| 1 1/4 x .065 | B4020X065074 | M4020074 | • |
| 1 1/4 x .083 | B4020X083074 | M4020074 | • |
| 1 1/4 x .095 | B4020X095074 | M4020074 | • |
| 1 1/4 x .109 | B4020X109074 | M4020074 | • |
| 1 1/4 x .120 | B4020X120074 | M4020074 | • |
| 1 1/2 x .065 | B4024X065074 | M4024074 | • |
| 1 1/2 x .083 | B4024X083074 | M4024074 | • |
| 1 1/2 x .095 | B4024X095074 | M4024074 | • |
| 1 1/2 x .109 | B4024X109074 | M4024074 | • |
| 1 1/2 x .120 | B4024X120074 | M4024074 | • |

**Table R10 — Parflange Flaring Tooling for Inch Sizes**

Tooling suitable for 37°/74° flaring of steel, stainless steel, aluminum, monel, copper, and cupro-nickel tube materials. For 37°/74° flaring, one die covers each tube O.D.; a different pin is required for each tube wall. Setscrews in flaring dies may require slight adjustment for different tube materials and/or tube walls.

| Tube Size O.D. x Wall Thickness (mm) | Tooling for 37°/74° Tube Flaring | | Available Flaring Tooling |
|---|---|---|---|
| | Pin Part Number | Die Part Number | 1025 |
| 6 x 1 | B4007406X1M | M4007406M | • |
| 6 x 1.5 | B4007406X1.5M | M4007406M | • |
| 8 x 1 | B4007408X1M | M4007408M | • |
| 8 x 1.5 | B4007408X1.5M | M4007408M | • |
| 10 x 1 | B4007410X1M | M4007410M | • |
| 10 x 1.5 | B4007410X1.5M | M4007410M | • |
| 12 x 1.5 | B4007412X1.5M | M4007412M | • |
| 12 x 2 | B4007412X2M | M4007412M | • |
| 15 x 1.5 | B4007415X1.5M | M4007415M | • |
| 15 x 2 | B4007415X2M | M4007415M | • |
| 16 x 1.5 | B4007416X1.5M | M4007416M | • |
| 16 x 2 | B4007416X2M | M4007416M | • |
| 18 x 2 | B4007418X2M | M4007418M | • |
| 20 x 2 | B4007420X2M | M4007420M | • |
| 20 x 2.5 | B4007420X2.5M | M4007420M | • |
| 25 x 2 | B4007425X2M | M4007425M | • |
| 25 x 2.5 | B4007425X2.5M | M4007425M | • |
| 25 x 3 | B4007425X3M | M4007425M | • |
| 30 x 2.5 | B4007430X2.5M | M4007430M | • |
| 30 x 3 | B4007430X3M | M4007430M | • |
| 32 x 3 | B4007432X3M | M4007432M | • |
| 38 x 3 | B4007438X3M | M4007438M | • |
| 38 x 4 | B4007438X4M | M4007438M | |

**Table R11 — Parflange Flaring Tooling for Metric Sizes**

Tooling suitable for 37°/74° flaring of steel, stainless steel, aluminum, monel, copper, and cupro-nickel tube materials. Apply LB 2000 lube to flaring pin. Setscrews in flaring dies may require slight adjustment for different tube materials and/or tube walls.

**Fig. R77 — Flaring Pin**

**Fig. R78 — Flaring Die**

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# Inch Flaring Tooling for ECO25

## Parflange® ECO25 37° Flaring and Flanging Systems

Parker's Parflange ECO25 machine is designed to create 37° flared tube ends. For more detailed information on the machine and part numbers, refer to page R25.

| Fitting Dash Size | Tube O.D. (in.) | Die Set Part Number |
|---|---|---|
| 4 | 1/4 | M2504 |
| 6 | 3/8 | M2506 |
| 8 | 1/2 | M2508 |
| 10 | 5/8 | M2510 |
| 12 | 3/4 | M2512 |
| 16 | 1 | M2516 |
| 20 | 1 1/4 | M2520 |
| 24 | 1 1/2 | M2524 |

**Table R12 — Flaring Die Set, Inch Sizes**

| Tube O.D. (in.) | Wall Thickness (in.) | Flaring Pin Part Number |
|---|---|---|
| 1/4 | 0.028 | B4004X028074 |
| 1/4 | 0.035 | B4004X035074 |
| 1/4 | 0.049 | B4004X049074 |
| 1/4 | 0.065 | B4004X065074 |
| 3/8 | 0.020 | B4006X020074 |
| 3/8 | 0.028 | B4006X028074 |
| 3/8 | 0.035 | B4006X035074 |
| 3/8 | 0.049 | B4006X049074 |
| 3/8 | 0.065 | B4006X065074 |
| 1/2 | 0.028 | B4008X028074 |
| 1/2 | 0.035 | B4008X035074 |
| 1/2 | 0.049 | B4008X049074 |
| 1/2 | 0.065 | B4008X065074 |
| 1/2 | 0.083 | B4008X083074 |
| 5/8 | 0.035 | B4010X035074 |
| 5/8 | 0.049 | B4010X049074 |
| 5/8 | 0.065 | B4010X065074 |
| 5/8 | 0.083 | B4010X083074 |
| 5/8 | 0.095 | B4010X095074 |
| 3/4 | 0.035 | B4012X035074 |
| 3/4 | 0.049 | B4012X049074 |
| 3/4 | 0.065 | B4012X065074 |
| 3/4 | 0.083 | B4012X083074 |
| 3/4 | 0.095 | B4012X095074 |
| 3/4 | 0.109 | B4012X109074 |
| 1 | 0.035 | B4016X035074 |
| 1 | 0.049 | B4016X049074 |
| 1 | 0.065 | B4016X065074 |
| 1 | 0.083 | B4016X083074 |
| 1 | 0.095 | B4016X095074 |
| 1 | 0.109 | B4016X109074 |
| 1 | 0.120 | B4016X120074 |
| 1 1/4 | 0.049 | B4020X049074 |
| 1 1/4 | 0.065 | B4020X065074 |
| 1 1/4 | 0.095 | B4020X095074 |
| 1 1/4 | 0.109 | B4020X109074 |
| 1 1/4 | 0.120 | B4020X120074 |
| 1 1/2 | 0.065 | B4024X065074 |
| 1 1/2 | 0.083 | B4024X083074 |
| 1 1/2 | 0.095 | B4024X095074 |
| 1 1/2 | 0.109 | B4024X109074 |
| 1 1/2 | 0.120 | B4024X120074 |

**Table R13 — Flaring Pin, Inch Sizes**

**Fig. R79 — Parflange ECO25**

**Fig. R80 — Flaring Pin**

**Fig. R81 — Dual Funtion Die Set (Flaring and Flanging)**

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## SAE Straight Thread Port Tapping Tools*

Taps are available for SAE J1926-1 female straight thread ports in sizes 2 through 32. Taps are bottoming type and made from high speed tool steel.

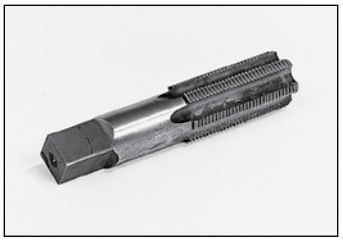

**Fig. R82 — SAE Straight Thread Port Tapping Tool**

| SAE Dash Size | Overall Length (in.) | Shank Dia. (in.) | Wrench Flat Size (in.) | Part No. |
|---|---|---|---|---|
| 2 | 2 23/32 | 0.318 | 0.238 | **5/16X24 UNF-2B** |
| 3 | 2 15/16 | 0.381 | 0.286 | **3/8X24 UNF-2B** |
| 4 | 3 5/16 | 0.323 | 0.242 | **7/16X20 UNF-2B** |
| 5 | 3 3/8 | 0.367 | 0.275 | **1/2X20 UNF-2B** |
| 6 | 3 19/32 | 0.429 | 0.322 | **9/16X18 UNF-2B** |
| 8 | 4 1/4 | 0.590 | 0.442 | **3/4X16 UNF-2B** |
| 10 | 4 11/16 | 0.697 | 0.523 | **7/8X14 UNF-2B** |
| 12 | 5 1/8 | 0.896 | 0.672 | **1 1/16X12 UNF-2B** |
| 14 | 5 7/16 | 1.021 | 0.766 | **1 3/16X12 UNF-2B** |
| 16 | 5 3/4 | 1.108 | 0.831 | **1 5/16X12 UNF-2B** |
| 20 | 6 11/16 | 1.305 | 0.979 | **1 5/8X12 UNF-2B** |
| 24 | 7 5/16 | 1.519 | 1.139 | **1 7/8X12 UNF-2B** |
| 32 | 8 3/4 | 2.100 | 1.575 | **2 1/2X12 UNF-2B** |

## SAE Straight Thread Port Counterboring Tools*

Parker offers counterboring tools for SAE J1926-1 female straight thread ports in sizes 2 through 32. Counterbores are 4-fluted high speed tool steel.

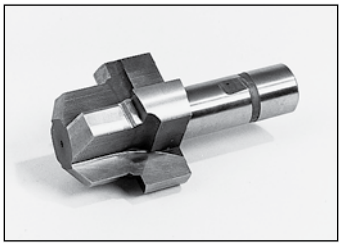

**Fig. R83 — SAE Straight Thread Port Counterboring Tool**

| SAE Dash Size | Shank Dia. (in.) | Shank Length (in.) | Overall Length (in.) | Recommended Pilot Drill or Bore Size (in.) | Part No. |
|---|---|---|---|---|---|
| 2 | 1/2 | 1 1/2 | 2 1/2 | 0.266 | **Y-34730** |
| 3 | 1/2 | 1 1/2 | 2 1/2 | 0.328 | **Y-34731** |
| 4 | 1/2 | 1 1/2 | 2 41/64 | 0.377 | **Y-34732** |
| 5 | 1/2 | 1 1/2 | 2 41/64 | 0.438 | **Y-34733** |
| 6 | 3/4 | 1 1/2 | 2 47/64 | 0.500 | **Y-34734** |
| 8 | 3/4 | 1 1/2 | 2 53/64 | 0.672 | **Y-34735** |
| 10 | 1 | 2 | 3 29/64 | 0.797 | **Y-34736** |
| 12 | 1 | 2 | 3 19/32 | 0.969 | **Y-34737** |
| 14 | 1 | 2 | 3 41/64 | 1.095 | **Y-34738** |
| 16 | 1 | 2 | 3 41/64 | 1.220 | **Y-34739** |
| 20 | 1 1/2 | 2 | 3 37/64 | 1.530 | **Y-34740** |
| 24 | 1 1/2 | 2 | 3 37/64 | 1.780 | **Y-34741** |
| 32 | 1 1/2 | 2 | 3 49/64 | 2.405 | **Y-34743** |

*** See Appendix for recommended use of port tools.**

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## BSPP Straight Thread Port Counterboring Tools*

Parker offers counterboring/spotfacing tools for DIN 3852-2 female straight thread port connections in sizes 1/8" through 1-1/2". Counterbores are carbide tipped.

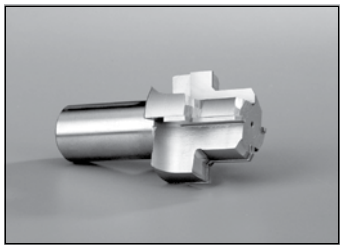

**Fig. R84 — BSPP Straight Thread Port Counterboring Tool**

| SAE Dash Size | Overall Length (in.) | Shank Dia. (in.) | Wrench Flat Size (in.) | Part No. |
|---|---|---|---|---|
| 2 | 2 23/32 | 0.318 | 0.238 | **5/16X24 UNF-2B** |
| 3 | 2 15/16 | 0.381 | 0.286 | **3/8X24 UNF-2B** |
| 4 | 3 5/16 | 0.323 | 0.242 | **7/16X20 UNF-2B** |
| 5 | 3 3/8 | 0.367 | 0.275 | **1/2X20 UNF-2B** |
| 6 | 3 19/32 | 0.429 | 0.322 | **9/16X18 UNF-2B** |
| 8 | 4 1/4 | 0.590 | 0.442 | **3/4X16 UNF-2B** |
| 10 | 4 11/16 | 0.697 | 0.523 | **7/8X14 UNF-2B** |
| 12 | 5 1/8 | 0.896 | 0.672 | **1 1/16X12 UNF-2B** |

## BSPP Straight Thread Tapping Tools*

BSPP taps are available for ISO 228-1 threaded connections in sizes 1/8" through 1 1/2". All taps are bottoming type manufactured from high speed steel.

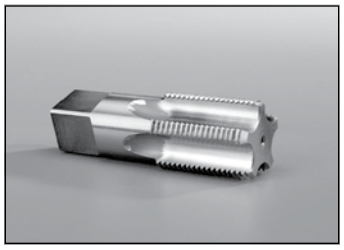

**Fig. R85 — BSPP Straight Thread Tapping Tool**

| | Shank Dia. (in.) | Shank Length (in.) | Overall Length (in.) | Recommended Pilot Drill or Bore Size (in.) | Part No. |
|---|---|---|---|---|---|
| G1/8 | 1/2 | 1 1/2 | 2 1/2 | 0.332 | **974094-G1/8** |
| G1/4 | 1/2 | 1 1/2 | 2 1/2 | 0.438 | **974094-G1/4** |
| G3/8 | 3/4 | 1 1/2 | 2 1/2 | 0.578 | **974094-G3/8** |
| G1/2 | 3/4 | 2 | 3 | 0.728 | **974094-G1/2** |
| G3/4 | 1 | 2 | 3 | 0.938 | **974094-G3/4** |
| G1 | 1 | 2 | 3 1/2 | 1.181 | **974094-G1** |
| G1-1/4 | 1 1/2 | 2 | 3 1/2 | 1.531 | **974094-G1-1/4** |
| G1-1/2 | 1 1/2 | 2 | 3 1/2 | 1.750 | **974094-G1-1/2** |

## BSPT Taper Pipe Thread Tapping Tools*

BSPT taps are available for ISO 7-1 taper thread connections in sizes 1/8" through 1 1/2". All taps are bottoming type manufactured from high speed steel.

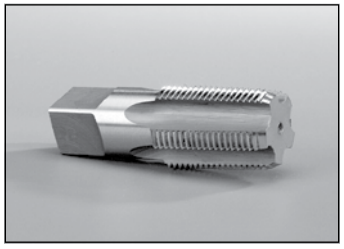

**Fig. R86 — BSPT Taper Pipe Thread Tapping Tool**

| Size | Shank Dia. (in.) | Overall Length (in.) | Thread Size | Part No. |
|---|---|---|---|---|
| R1/8 | 0.438 | 2 1/8 | 1/8-28 | **974243-R1/8** |
| R1/4 | 0.563 | 2 7/16 | 1/4-19 | **974243-R1/4** |
| R3/8 | 0.700 | 2 9/16 | 3/8-19 | **974243-R3/8** |
| R1/2 | 0.688 | 3 1/8 | 1/2-14 | **974243-R1/2** |
| R3/4 | 0.906 | 3 1/4 | 3/4-14 | **974243-R3/4** |
| R1 | 1.125 | 3 3/4 | 1-11 | **974243-R1** |
| R1-1/4 | 1.313 | 4 | 1 1/4-11 | **974243-R1-1/4** |
| R1-1/2 | 1.500 | 4 1/4 | 1 1/2-11 | **974243-R1-1/2** |

*** See Appendix for recommended use of port tools.**

Dimensions and pressures for reference only, subject to change.



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## NPTF Thread Tapping Tools*

NPTF taps are available for taper pipe thread connections in sizes 1/8" through 1 1/2". All taps are bottoming type manufactured from high speed steel.

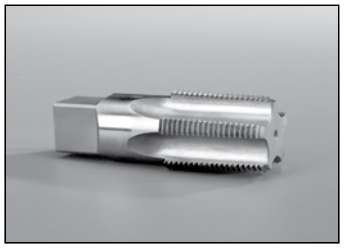

**Fig. R87 — NPTF Port Tap**

| Shank Dia. (in.) | Overall Length (in.) | Thread Size | Part No. |
|---|---|---|---|
| 0.438 | 2 1/8 | 1/8-27 | **974244-1/8** |
| 0.563 | 2 7/16 | 1/4-18 | **974244-1/4** |
| 0.700 | 2 9/16 | 3/8-18 | **974244-3/8** |
| 0.688 | 3 1/8 | 1/2-14 | **974244-1/2** |
| 0.906 | 3 1/4 | 3/4-14 | **974244-3/4** |
| 1.125 | 3 3/4 | 1-11 1/2 | **974244-1** |
| 1.313 | 4 | 1 1/4-11 1/2 | **974244-1-1/4** |
| 1.500 | 4 1/4 | 1 1/2-11 1/2 | **974244-1-1/2** |

## ISO 6149-1 Straight Thread Port Tapping Tools*

ISO 6149-1 female straight thread port taps are available for M8 to M48 port sizes. Taps are bottoming type and made from high speed steel.

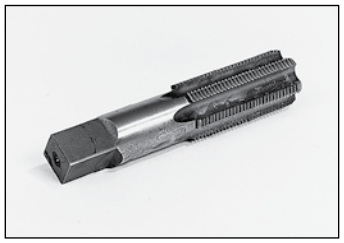

**Fig. R88 — ISO 6149-1 Straight Thread Port Tap**

| Overall Length (in.) | Shank Dia. (in.) | Wrench Flat Size (in.) | Thread Size | Part No. |
|---|---|---|---|---|
| 2 23/32 | 0.318 | 0.238 | M8x1 | **M8X1 D5 2FL** |
| 2 15/16 | 0.381 | 0.286 | M10x1 | **M10X1-6H** |
| 3 3/8 | 0.367 | 0.275 | M12x1.5 | **M12X1.5-6H TAP** |
| 3 19/32 | 0.429 | 0.322 | M14x1.5 | **M14X1.5-6H-TAP** |
| 3 13/16 | 0.400 | 0.360 | M16x1.5 | **M16X1.5-6H-TAP** |
| 4 1/32 | 0.542 | 0.406 | M18x1.5 | **M18X1.5-6H-TAP** |
| 4 11/16 | 0.697 | 0.523 | M22x1.5 | **M22X1.5-6H-TAP** |
| 5 1/8 | 0.896 | 0.672 | M27x2 | **M27X2-6H-TAP** |
| 5 3/4 | 1.108 | 0.831 | M33x2 | **M33X2-6H-TAP** |
| 7 | 1.430 | 1.072 | M42x2 | **M42X2-6H-TAP** |
| 7 5/8 | 1.644 | 1.233 | M48x2 | **M48X2-6H-TAP** |



*** See Appendix for recommended use of port tools.**

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## ISO 6149-1 Straight Thread Port Counterboring Tools — Small Spotface*

ISO 6149-1 female straight thread port counterboring tools are available with small spotface for M8 to M48 port sizes. Counterbores are 4-fluted*, carbide-tipped.

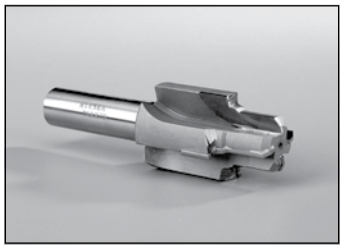

**Fig. R89 — ISO 6149-1 Straight Thread Port Counterboring Tool — Small Spotface**

| Shank Dia. (in.) | Shank Length (in.) | Overall Length (in.) | Recommended Pilot Drill or Bore Size (in.) | Use with Thread Size | Part No. |
|---|---|---|---|---|---|
| 1/2 | 2 | 4 1/8 | 0.272 | M8x1* | **R1449B** |
| 1/2 | 2 | 4 1/8 | 0.348 | M10x1* | **R1450B** |
| 1/2 | 2 | 4 1/8 | 0.406 | M12x1.5 | **R 1451B-S** |
| 1/2 | 2 | 4 1/8 | 0.484 | M14x1.5 | **R 1452B-S** |
| 1/2 | 2 | 4 1/8 | 0.563 | M16x1.5 | **R 1453B-S** |
| 1/2 | 2 | 4 1/8 | 0.641 | M18x1.5 | **R 1454B-S** |
| 1/2 | 2 | 4 1/8 | 0.797 | M22x1.5 | **R 1455B-S** |
| 3/4 | 2 1/2 | 5 | 0.969 | M27x2 | **R 1456B-S** |
| 3/4 | 2 1/2 | 5 | 1.210 | M33x2 | **R 1457B-S** |
| 3/4 | 2 1/2 | 5 | 1.565 | M42x2 | **R 1458B-S** |
| 3/4 | 2 1/2 | 5 | 1.801 | M48x2 | **R1459B** |

* M8 and M10 are 3-fluted

## ISO 6149-1 Straight Thread Port Counterboring Tools with ID Groove*

ISO 6149-1 female straight thread port counterboring tools are available with identification groove for M8 to M48 port sizes. Counterbores are 4-fluted*, carbide-tipped.

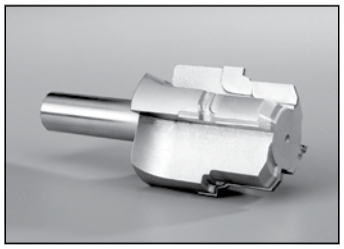

**Fig. R90 — ISO 6149-1 Straight Thread Port Counterboring Tool with ID Groove**

| Shank Dia. (in.) | Shank Length (in.) | Overall Length (in.) | Recommended Pilot Drill or Bore Size (in.) | Use with Thread Size | Part No. |
|---|---|---|---|---|---|
| 1/2 | 2 | 4 1/8 | 0.348 | M10x1* | **R1450A** |
| 1/2 | 2 | 4 1/8 | 0.406 | M12x1.5 | **R1451A** |
| 1/2 | 2 | 4 1/8 | 0.484 | M14x1.5 | **R1452A** |
| 1/2 | 2 | 4 1/8 | 0.563 | M16x1.5 | **R1453A** |
| 1/2 | 2 | 4 1/8 | 0.641 | M18x1.5 | **R1454A** |
| 1/2 | 2 | 4 1/8 | 0.797 | M22x1.5 | **R1455A** |
| 3/4 | 2 1/2 | 5 | 0.969 | M27x2 | **R1456A** |
| 3/4 | 2 1/2 | 5 | 1.210 | M33x2 | **R1457A** |

* M10 are 3-fluted

*** See Appendix for recommended use of port tools.**



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# Ferulset® Pre-Setting Tool

**For Ferulok® flareless tube fittings.**

Ferulset provides a fast and easy way to manually pre-set the ferrule onto steel and stainless steel tube with the famous Ferulok “bite.” Ferulset bodies are manufactured from hardened steel for withstanding repeated pre-sets. A separate tool is required for each size tube; size 2 (1/8” O.D.) through size 32 (2” O.D.).

**HOW TO USE**: Lubricate threads on tool, threads on nut, as well as tail and lead ends of ferrule with a suitable lubricant such as STP. Insert tube end with ferrule into tool until it bottoms against shoulder and thread the nut down until finger tight. Light wrenching may be required to get to a consistent starting position, especially with larger sizes. Hold tube steady against internal shoulder and tighten nut 1-3/4 turns. Loosen nut and inspect bite using inspection criteria outlined for Ferulok in the Assembly / Installation section.

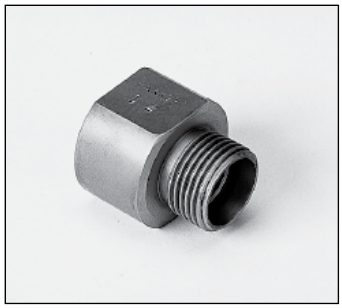

**Fig. R91 — Ferulset®**

| Size | Tube O.D. (in.) | Part No. |
|---|---|---|
| 2 | 1/8 | **560576** |
| 3 | 3/16 | **560577** |
| 4 | 1/4 | **560578** |
| 5 | 5/16 | **560579** |
| 6 | 3/8 | **560580** |
| 8 | 1/2 | **560581** |
| 10 | 5/8 | **560582** |
| 12 | 3/4 | **560583** |
| 14 | 7/8 | **560584** |
| 16 | 1 | **560585** |
| 20 | 1 1/4 | **560586** |
| 24 | 1 1/2 | **560587** |
| 32 | 2 | **560589** |

# VOMO Pre-Assembly Bodies

**For EO and EO-2 Flareless Metric Tube Fittings**

VOMO tools are made of hardened tool-steel, for standard assembly of steel fittings, stainless steel fittings and hose standpipes (BE).

Refer to the EO/EO2 Assembly and Installation section for use information (page S28).

**NOTE:** It is strongly recommended that a hydraulic tool be used to preset EO and EO-2 fittings in sizes 30S, 35L, 38S and 42L.

**Fig. R92 — VOMO Pre-Assembly Tool**

| Series | Tube O.D. (mm) | Part No. |
|---|---|---|
| LL | 4 | **VOMO04LLX** |
| LL | 6 | **VOMO06LLX** |
| LL | 8 | **VOMO08LLX** |
| LL | 10 | **VOMO10LLX** |
| LL | 12 | **VOMO12LLX** |
| L | 6 | **VOMO06LX** |
| L | 8 | **VOMO08LX** |
| L | 10 | **VOMO10LX** |
| L | 12 | **VOMO12LX** |
| L | 15 | **VOMO15LX** |
| L | 18 | **VOMO18LX** |
| L | 22 | **VOMO22LX** |
| L | 28 | **VOMO28LX** |
| L | 35 | **VOMO35LX** |
| L | 42 | **VOMO42LX** |
| S | 6 | **VOMO06SX** |
| S | 8 | **VOMO08SX** |
| S | 10 | **VOMO10SX** |
| S | 12 | **VOMO12SX** |
| S | 14 | **VOMO14SX** |
| S | 16 | **VOMO16SX** |
| S | 20 | **VOMO20SX** |
| S | 25 | **VOMO25SX** |
| S | 30 | **VOMO30SX** |
| S | 38 | **VOMO38SX** |

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# Hyferset

Parker Hydraulic Ferrule Pre-Setting Tool for Ferulok® Fittings and EO/EO-2 Metric Fittings

PORTABLE...EFFICIENT...EASY TO USE

The Hyferset is an efficient, dependable device for pre-setting Parker ferrules on tube of steel and stainless steel. This task is made easy through hydraulic power provided by a hand or electric pump. The equipment is portable, and has an optional sturdy wood carrying case.

In hydraulic pre-setting, little physical strength is required by the operator to set ferrules properly. Although the amount of force needed increases as the ferrule size increases, the pressure can be easily achieved.

This tool accommodates pre-setting dies for tubes ranging in size from 4 through 32 (1/4" through 2" outside diameter) and 6mm to 28mm O.D. metric sizes. The tube, with tube nut and ferrule, is positioned in the die. The hydraulic "push" of the Hyferset pre-sets the ferrule onto the tube — producing a visible ridge of metal, in front of the sleeve bite edge, that can be easily inspected.

**Positive Stop Body Dies (For Ferulok Fittings Only)**

The positive stop body die design eliminates the need for predetermined relief valve settings, pressure gauges or chart reading. Positive stop feature allows for uniform assemblies to be made on tube from 1/4" thru 2". One set of dies can be used on both steel and stainless steel tube. When used in conjunction with the Ferulok visible bite ferrules, the entire system is the most reliable method available for assembling a fitting to a piece of tube.

See Appendix for pre-setting pressures for EO and EO-2 steel fittings.

You will find instructions for proper use in the 4393-B1 user manual.

**Fig. R93 — Hyferset**

**Fig. R94 — Electric Pump**

**Fig. R95 — Hand Pump**

**COMPONENTS REQUIRED**

| Part Name | Part No. |
|---|---|
| *Hyferset (basic unit, no accessories) | **611011A** |
| *Hyferset Adapter | **6 FLO-S** |
| Gauge "T" Adapter | **6 R6LO-S** |
| *Hose Assembly | **910004** |
| Gauge Swivel Adapter | **6 G6L-S** |
| Pressure Gauge (0 - 10,000 psi) | **900044** |
| *Hand pump (10,000 psi, 2 speed) | **900086** |
| Electric pump (10,000 psi, 1/2 HP, 40-125 volt) | **900085** |
| Nut die set (1/4" to 2" O.D.) | See page R42 |
| Positive Stop body die (1/4" to 2" O.D.) | See page R42 |
| Nut Die Set (6mm to 28mm) | See page R43 |
| Body Die (6mm to 28mm) | See page R43 |

* Included in Hyferset Kit

| Part Name | Part No. |
|---|---|
| Hyferset Kit<br>Includes basic unit, hand hydraulic pump, hose assembly, 1 adapter (6 FLO-S), wooden carrying case, operation manual and video. | **611049C** |

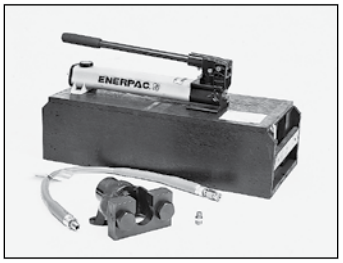


**Fig. R96 — Hyferset Kit**

Dimensions and pressures for reference only, subject to change.



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### OPTIONAL ACCESSORIES

| Part Name | Part No. |
|---|---|
| Wooden carrying case | 651085 |

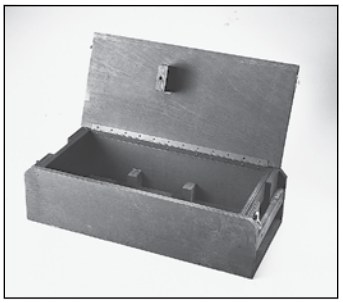

**Fig. R97 — Hyferset Wood Carrying Case**

## Hyferset Body Dies for Ferulok Fittings

| Size | Tube O.D. (in.) | Part No. |
|---|---|---|
| 4 | 1/4 | 720105-4 |
| 6 | 3/8 | 720105-6 |
| 8 | 1/2 | 720105-8 |
| 10 | 5/8 | 720105-10 |
| 12 | 3/4 | 720105-12 |
| 14 | 7/8 | 720105-14 |
| 16 | 1 | 720105-16 |
| 20 | 1 1/4 | 720105-20 |
| 24 | 1 1/2 | 720105-24 |
| 32 | 2 | 720105-32 |

**Fig. R98 — Body Die**

## Hyferset Nut Dies for Ferulok Fittings

| Size | Tube O.D. (in.) | Part No. |
|---|---|---|
| 4 | 1/4 | 680370-4 |
| 6 | 3/8 | 680370-6 |
| 8 | 1/2 | 680370-8 |
| 10 | 5/8 | 680370-10 |
| 12 | 3/4 | 680370-12 |
| 14 | 7/8 | 680370-14 |
| 16 | 1 | 680370-16 |
| 20 | 1 1/4 | 680370-20 |
| 24 | 1 1/2 | 680370-24 |
| 32 | 2 | 680370-32 |

**Fig. R99 — Nut Die**

Dimensions and pressures for reference only, subject to change.



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## Hyferset Body Dies for EO / EO-2 Fittings

| Series | Tube O.D. Size (mm) | Part No. |
|---|---|---|
| L | 6 | **910290-6L** |
| L | 8 | **910290-8L** |
| L | 10 | **910290-10L** |
| L | 12 | **910290-12L** |
| L | 15 | **910290-15L** |
| L | 18 | **910290-18L** |
| L | 22 | **910290-22L** |
| L | 28 | **910290-28L** |
| S | 6 | **910289-6S** |
| S | 8 | **910289-8S** |
| S | 10 | **910289-10S** |
| S | 12 | **910289-12S** |
| S | 14 | **910289-14S** |
| S | 16 | **910289-16S** |
| S | 20 | **910289-20S** |
| S | 25 | **910289-25S** |

**Fig. R100 — Body Die**

## Hyferset Nut Dies for EO / EO-2 Fittings

| Tube O.D. Size (mm) | Part No. |
|---|---|
| 6 | **910291-6 mm** |
| 8 | **910291-8 mm** |
| 10 | **910291-10 mm** |
| 12 | **910291-12 mm** |
| 14 | **910291-14 mm** |
| 15 | **910291-15 mm** |
| 16 | **910291-16 mm** |
| 18 | **910291-18 mm** |
| 20 | **910291-20 mm** |
| 22 | **910291-22 mm** |
| 25 | **910291-25 mm** |
| 28 | **910291-28 mm** |

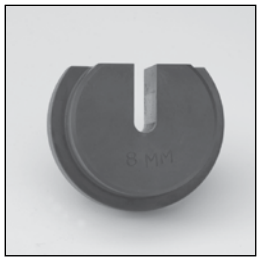


**Fig. R101 — Nut Die**

R

Dimensions and pressures for reference only, subject to change.



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# Hydra-Tool

## Pre-Setting Components

### COMPONENTS REQUIRED

| Part Name | Part No. |
|---|---|
| *Hydra-Tool (basic unit) (Fig. S98) | **710400B** |
| Hand pump (10,000 psi, 2 speed) | **900086** |
| Electric pump (10,000 PSI, 1/2 HP, 40-125 volt) | **900085** |
| *Hose Assembly | **910004** |
| Back-up Plate (sizes -4 to -32 and 6mm to 28mm) | **770102** |
| Back-up Plate (sizes 30 to 42mm) | See page R45 |
| Ram Insert (sizes -4 to -32) | **770101** |
| Small Ram Insert (EO & EO-2 only) | **971108** |
| Large Piston Stop Adapter (EO & EO-2 only) | **971107** |
| Nut die set (1/4" to 2" O.D.) | See below |
| Positive Stop body die (1/4" to 2" O.D.) | See below |
| Nut Die Set (6mm to 42mm) | See page R45 |
| Body Die (6mm to 42mm) | See page R45 |
| *Pressure Gauge (0 - 10,000 psi) | **900044** |
| *Male Adapter | **6-8 F5OLO-S** |
| *Adapter | **6 G6L-S** |
| *Hydra-Tool Gauge Adapter | **6 R6LO-S** |

* Included in Kit

STP lubricant is the only lubricant recommended for use with the Hydra-Tool.

See Appendix for pre-setting pressures.

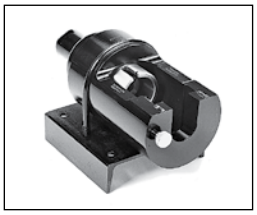

**Fig. R102 — Hydra Tool**

**Fig. R103 — Ram Insert (Ferulok Only)**

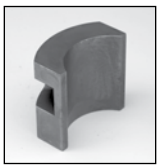

**Fig. R104 — Small Ram Insert and Stop Adapter (EO and EO-2 only)**

## Hydra-Tool Kit

| Part Name | Part No. |
|---|---|
| Hydra-Tool Kit (for use with electric or hand pump) Includes basic unit, gauge adapter, Hydra-Tool connector, lubricant, "T" adapter, carrying case, hose assembly, pressure gauge, p/n 900044, operation manual and video. | **720370B-3** |

**Fig. R105 — Hydra-Tool Kit**

## Hydra-Tool Body Dies for Ferulok Fittings

| Size | Tube O.D. (in.) | Part No. |
|---|---|---|
| 4 | 1/4 | **720105-4** |
| 6 | 3/8 | **720105-6** |
| 8 | 1/2 | **720105-8** |
| 10 | 5/8 | **720105-10** |
| 12 | 3/4 | **720105-12** |
| 14 | 7/8 | **720105-14** |
| 16 | 1 | **720105-16** |
| 20 | 1 1/4 | **720105-20** |
| 24 | 1 1/2 | **720105-24** |
| 32 | 2 | **720105-32** |

**Fig. R106 — Body Die**

## Hydra-Tool Nut Dies for Ferulok Fittings

| Size | Tube O.D. (in.) | Part No. |
|---|---|---|
| 4 | 1/4 | **680370-4** |
| 6 | 3/8 | **680370-6** |
| 8 | 1/2 | **680370-8** |
| 10 | 5/8 | **680370-10** |
| 12 | 3/4 | **680370-12** |
| 14 | 7/8 | **680370-14** |
| 16 | 1 | **680370-16** |
| 20 | 1 1/4 | **680370-20** |
| 24 | 1 1/2 | **680370-24** |
| 32 | 2 | **680370-32** |

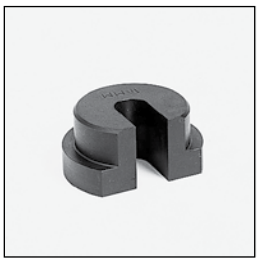

**Fig. R107— Nut Die**

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## Hydra-Tool Body Dies for EO / EO-2 Fittings

| Series | Tube O.D. Size (mm) | Part No. |
|---|---|---|
| L | 6 | 910290-6L |
| L | 8 | 910290-8L |
| L | 10 | 910290-10L |
| L | 12 | 910290-12L |
| L | 15 | 910290-15L |
| L | 18 | 910290-18L |
| L | 22 | 910290-22L |
| L | 28 | 910290-28L |
| L | 35 | 910290-35L |
| L | 42 | 910290-42L |
| S | 6 | 910289-6S |
| S | 8 | 910289-8S |
| S | 10 | 910289-10S |
| S | 12 | 910289-12S |
| S | 14 | 910289-14S |
| S | 16 | 910289-16S |
| S | 20 | 910289-20S |
| S | 25 | 910289-25S |
| S | 30 | 910289-30S |
| S | 38 | 910289-38S |

Fig. R108 — Body Die

Fig. R109 — Back up Plate

## Hydra-Tool Nut Die / Split Back-up Plate Sets for EO / EO-2 Fittings

| Tube O.D. Size (mm) | Part No. |
|---|---|
| 6 | 910291-6 mm |
| 8 | 910291-8 mm |
| 10 | 910291-10 mm |
| 12 | 910291-12 mm |
| 14 | 910291-14 mm |
| 15 | 910291-15 mm |
| 16 | 910291-16 mm |
| 18 | 910291-18 mm |
| 20 | 910291-20 mm |
| 22 | 910291-22 mm |
| 25 | 910291-25 mm |
| 28 | 910291-28 mm |
| 30 | 970135-30 mm |
| 35 | 970135-35 mm |
| 38 | 970135-38 mm |
| 42 | 970135-42 mm |

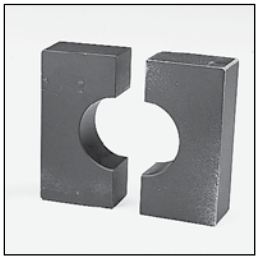

Fig. R110 — Split Nut Dies

Fig. R111 — Nut Die

R

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# EO-Karrymat

The EO-Karrymat is a dependable device for safe and efficient bite-type pre-setting. It allows pre-assembly of all sizes of EO, EO-2 and Ferulok fittings without the need for electric power.

The EO-Karrymat consists of a hydraulic drive, Handpump and pressure gauge, all firmly attached to a carrying case.

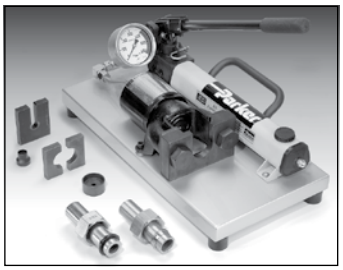

**Fig. R112 — EO-Karrymat**

| Part Name | Part No. |
|---|---|
| EO-Karrymat | **EOKarrymat** |

## EO-Karrymat Body Dies for EO / EO-2 Fittings

| Series | Tube O.D. (mm) | Part No. |
|---|---|---|
| LL | 4 | **MOK04LLX** |
| LL | 6 | **MOK06LLX** |
| LL | 8 | **MOK08LLX** |
| LL | 10 | **MOK10LLX** |
| LL | 12 | **MOK12LLX** |
| L | 6 | **MOK06LX** |
| L | 8 | **MOK08LX** |
| L | 10 | **MOK10LX** |
| L | 12 | **MOK12LX** |
| L | 15 | **MOK15LX** |
| L | 18 | **MOK18LX** |
| L | 22 | **MOK22LX** |
| L | 28 | **MOK28LX** |
| L | 35 | **MOK35LX** |
| L | 42 | **MOK42LX** |
| S | 6 | **MOK06SX** |
| S | 8 | **MOK08SX** |
| S | 10 | **MOK10SX** |
| S | 12 | **MOK12SX** |
| S | 14 | **MOK14SX** |
| S | 16 | **MOK16SX** |
| S | 20 | **MOK20SX** |
| S | 25 | **MOK25SX** |
| S | 30 | **MOK30SX** |
| S | 38 | **MOK38SX** |

**Fig. R113 — MOK Body Die**

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## EO-Karrymat Nut Dies for EO / EO-2 Fittings

| Series | Tube O.D. (mm) | Part No. |
|---|---|---|
| LL | 4 | GHP04X |
| LL | 6 | GHP06X* |
| LL | 8 | GHP08X* |
| LL | 10 | GHP10X* |
| LL | 12 | GHP12X* |
| L | 6 | GHP06X* |
| L | 8 | GHP08X* |
| L | 10 | GHP10X* |
| L | 12 | GHP12X* |
| L | 15 | GHP15X |
| L | 18 | GHP18X |
| L | 22 | GHP22X |
| L | 28 | GHP28X |
| L | 35 | GHP35X |
| L | 42 | GHP42X |
| S | 6 | GHP06X* |
| S | 8 | GHP08X* |
| S | 10 | GHP10X* |
| S | 12 | GHP12X* |
| S | 14 | GHP14X |
| S | 16 | GHP16X |
| S | 20 | GHP20X |
| S | 25 | GHP25X |
| S | 30 | GHP30X |
| S | 38 | GHP38X |

* Nut Dies for 6-12mm are identical in LL, L and S series.

**Fig. R114 — GHP Nut Die**

## EO-Karrymat Body Dies for Ferulok Fittings

| Tube Size (in.) | Part No. |
|---|---|
| 1/4 | 976521-4 |
| 3/8 | 976521-6 |
| 1/2 | 976521-8 |
| 5/8 | 976521-10 |
| 3/4 | 976521-12 |
| 7/8 | 976521-14 |
| 1 | 976521-16 |
| 1 1/4 | 976521-20 |
| 1 1/2 | 976521-24 |
| 2 | 976521-32 |

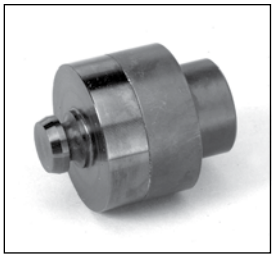

**Fig. R115 — EO-Karrymat Body Die for Ferulok**

## EO-Karrymat Back-up Plates for Ferulok Fittings

| Tube Size (in.) | Part No. |
|---|---|
| 1/4 | 975867-4 |
| 3/8 | 975867-6 |
| 1/2 | 975867-8 |
| 5/8 | 975867-10 |
| 3/4 | 975867-12 |
| 7/8 | 975867-14 |
| 1 | 975867-16 |
| 1 1/4 | 975867-20 |
| 1 1/2 | 975867-24 |
| 2 | 975867-32 |

**Fig. R116 — EO-Karrymat Back-up Plates for Ferulok**



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# O-Ring Pick

Plastic O-ring pick allows for easy removal of O-rings without causing damage to the fitting.

| Part Name | Part No. |
|---|---|
| O-Ring Pick | **O-Ring Pick** |

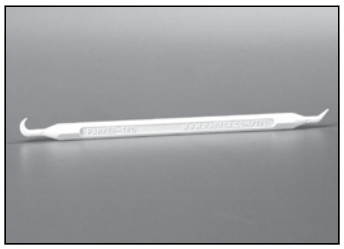

**Fig. R117 — O-Ring Pick**

# Captive O-Ring Assembly Tool

The captive O-ring (CORG) assembly tool utilizes a Parker patented method for inserting O-rings in ORFS fittings, such as Seal-Lok, without causing O-ring damage. These tools can be used both as a hand tool and a bench-mounted tool. All CORG tools have a #8-32 tapped hole to allow easy mounting.

| Fitting Size | L (in.) | D1 (in.) | D2 (in.) | O-Ring Size | Part No. |
|---|---|---|---|---|---|
| -4 | 1.4 | 0.8 | 0.6 | 2-011 | **CORG-4** |
| -6 | 1.5 | 0.9 | 0.6 | 2-012 | **CORG-6** |
| -8 | 1.5 | 1.1 | 0.8 | 2-014 | **CORG-8** |
| -10 | 1.6 | 1.3 | 0.9 | 2-016 | **CORG-10** |
| -12 | 1.9 | 1.4 | 1.1 | 2-018 | **CORG-12** |
| -16 | 1.9 | 1.7 | 1.3 | 2-021 | **CORG-16** |
| -20 | 2.1 | 1.9 | 1.6 | 2-025 | **CORG-20** |
| -24 | 2.1 | 2.3 | 1.9 | 2-029 | **CORG-24** |
| -32 | 2.2 | 2.8 | 2.4 | 2-135 | **CORG-32** |

**Fig. R118 — Captive O-Ring Assembly Tool**

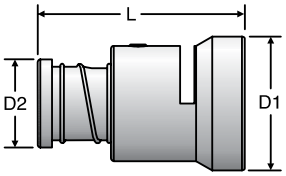


**Fig. R119 — Captive O-Ring Assembly Tool dimensions**

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# Braze Flux

Black braze flux can be used for brazing either steel or stainless steel components. When applied liberally this flux helps the flow of the silver braze alloy and prevents oxidation.

| Part Name | Part No. |
|---|---|
| Black Flux | **Black Flux 1/2 lb** |
| Black Flux | **Black Flux 1 lb** |

**Fig. R120 — Braze Flux**

# Post Braze Cleaner

This cleaner is used to clean the assembly after brazing. Once the silver braze alloy has solidified, immediately immerse the joint into the braze cleaner solution. The cleaner combined with the sudden change in temperature removes the flux from the assembly. Braze cleaner does not provide corrosion protection. See "Corrosion Protection After Brazing" in the Assembly / Installation section, page S17.

Available in sizes 2 1/2 lb. and 5 lb. jars. When ordering simply denote quantity after Braze Cleaner.

| Part Name | Part No. |
|---|---|
| Braze Cleaner | **Braze Cleaner 2 1/2 lb** |
| Braze Cleaner | **Braze Cleaner 5 lb** |

**Fig. R121 — Post Braze Cleaner**

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# Lubricants

Lubricants act as friction reducers to ease forming processes, fitting assembly and prevent galling, corrosion and seizing of components. The use of the correct lubricant for various purposes is critical to achieve maximum tool life during forming processes and performance of threaded connections.

## Parflange® Lubricants

Lubricants are used to maximize tool life during the flanging process. Selection of the appropriate lubricant for the type of Parflange machine is critical to its proper operation.

| Part Description | Part No. |
|---|---|
| Recommended for use with steel or stainless steel | **LB 2000** (8 oz.) |

**Fig. R122 — Parflange Lubricant, LB 2000**

## EO / EO-2 Fitting Lubricants

EO Niromont lubricants are specifically developed for lubrication of threads prior to assembly of EO and EO-2 fittings.

| Part Description | Part No. |
|---|---|
| EO Niromont – Liquid 250cc bottle | **Niromont Liquid** |
| EO Niromont – Paste 130 g. tin | **Niromont Paste** |

**Fig. R123 — EO Niromont**

# O-Ring Lubricants

## Parker O-Lube

O-Lube is an outstanding general-purpose grease intended for use with O-rings and other seals in hydraulic and pneumatic systems. The temperature range is from -29°C to +82°C (-20°F to +180°F).

| Part Description | Part No. |
|---|---|
| O-ring Lubricant 2 oz. | **OLUBE-884-2-TFD** |

**Fig. R124 — Parker O-Lube**

## Parker Super O-Lube

Super O-Lube is an all-purpose O-ring lubricant. It is not a grease, but rather a high-viscosity silicone oil. The temperature range is -54°C to +204°C (-65°F to +400°F).

| Part Description | Part No. |
|---|---|
| O-ring Lubricant | **SLUBE-884-2-TFD** |

**Fig. R125 — Parker Super O-Lube**

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# Thread Sealants

Thread sealants seal and secure metal pipes and fittings by filling the space between the threaded metal parts. Thread sealants harden to prevent leakage caused by vibration loosening, solvent evaporation, damaged threads and temperature cycling. Designed for low and high pressure applications, thread sealants seal quickly for on-line low pressure testing. When fully cured, they seal to the burst strength of most systems. Thread sealants are easily remove with basic hand tools. Thread sealants can be used on pipe thread fittings.

## Threadmate™ Sealant/Lubricant

Threadmate™ is an extreme-duty lubricant developed to reduce galling during the assembly of pipe thread fittings. Threadmate™ promotes reliable sealing of pipe threads, even at high pressure. Recommended for use on stainless steel pipe threads.

| **Size available** | **Part No.** |
|---|---|
| 4 oz. tube | **MTM04T-TFD** |

**Fig. R126 — Threadmate Sealant/Lubricant**

R

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# Tube Preparation Centers

Parker offers five different styles of tube preparation centers to meet various user's needs, from the basic TP-1 unit which includes a cabinet and deburr unit, to the TP1025 which offers the ability to cut, deburr, Parflange and flare tube.

Utilizing a sturdy steel cabinet with bins for fitting storage, tooling shelves and heavy duty casters to ease mobility, Parker Tube Preparation Centers cover almost every tube preparation need. All machines require 110V, 20A power supply.

**Fig. R127 — Tube Preparation Center TP1025**

| **Part Description** | **Part No.** |
|---|---|
| Tube Prep Center with Deburr Unit | **TP-1** |
| Tube Prep Center with Deburr and Saw | **TP-974250** |
| Tube Prep Center with Deburr, Saw and Hydratool | **TP432** |
| Tube Prep Center with Deburr, Saw and Hyferset | **TP-611011A** |
| Tube Prep Center with Deburr, Saw and Karryflare Tool | **TP-Karryflare** |
| Tube Prep Center with Deburr, Saw and 1025 Parflange | **TP1025** |

| **Replacement Parts** | **Part No.** |
|---|---|
| I.D. Deburr Cone | **971816** |
| O.D. Deburr Blades (set of 6) | **910485** |
| Cutting Lubricant | **Saw Lube** |
| Saw Blade – 250 mm x 2.0 mm thick (all purpose) | **987036** |
| Saw Blade – 200 mm x 2.0 mm thick (all purpose) | **987037** |
| Flaring tooling for TP432 | See page R29 – R31 |
| Presetting tooling for TP432 and TP-611011A | See page R41 – R43 |
| Karryflare Flaring tooling | See page R32 |
| Flanging tooling for TP1025 | See page R24 |
| Flaring tooling for TP1025 | See page R33 |
| Lubricant for TP1025 | **LB 2000** |

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# Thread Identification Kit

The Thread Identification Kit can be used to identify metric, BSP, SAE and NPT threads, as well as SAE flanges. It contains thread gauges, calipers, thread profiles, and an instruction booklet that details most thread forms and connection styles found in fluidpower systems worldwide.

| Part Name | Part No. |
|---|---|
| Thread Identification Kit | **MIK-1** |

**Fig. R128 — Thread Identification Kit**

# Portboards

The Portboards can be used for identification of ISO, SAE, BSP and NPT ports and port threads. They are machined with female threads for quick and easy identification by screwing in the male port end.

Portboard A (SAE Straight Thread -2 through -32 and NPT 1/8 through 1 1/2).

| Part Name | Part No. |
|---|---|
| Portboard A | **Portboard A** |

**Fig. R129 — Portboard A**

Portboard B (Metric 8mm through 48mm and BSP 1/8 through 1 1/2).

| Part Name | Part No. |
|---|---|
| Portboard B | **Portboard B** |

**Fig. R130 — Portboard B**

## International Thread Kit

Parker's International Thread Kit offers the necessary tools to identify almost any thread you may encounter. The new ITK has LL, L and S series plugs to identify female DIN threads such as EO style hose ends. It also includes the MIK-1 and BSPP plugs in order to identify BSPP hose ends from 1/8" to 2".

| Part Name | Part No. |
|---|---|
| International Thread Kit | **ITK** |

**Fig. R131 — International Thread Kit (ITK)**

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# Par-Lok® Wrench

360° Snap-action ratchet wrench for hex sizes from 3/8" to 2 1/4" across the flats and metric from 10mm to 50mm. Inch sizes meet government specifications and are listed as NSN-5120-00-474-7227. Wrenches are covered by a limited lifetime warranty. Damage due to over-torque is not covered by warranty.

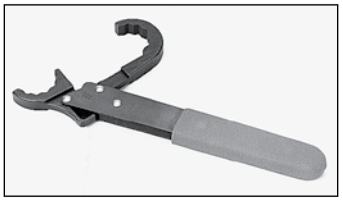

**Fig. R132 — Par-Lok Wrench**

## Install Tube Fittings Faster

Easy access ratchet wrench speeds fittings installation in tight locations. Rugged, snap-action jaws can be opened over tube lines, locked onto fitting hex and ratcheted within 1/8 turn. Full six point contact prevents fitting distortion common with wrench slippage. Ideal for tube line installations where compact runs require multiple fittings make-up, disassembly and remakes.

**Fig. R133 — Par-Lok Wrench Kit**

## Specifications

Par-Lok wrenches are available individually or in six different kit combinations. Par-Lok jaws are constructed from drop-forged, high carbon steel material with a black conversion coat finish. Par-Lok handles are made from heavy gauge steel material, heat treated and with a corrosion resistant black finish. Solid stainless steel rivets and tempered jaw springs are designed into every wrench for maximum strength.

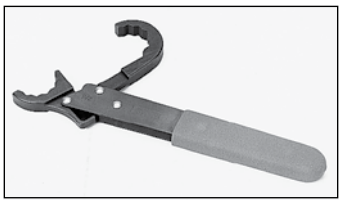

**Fig. R134 — Par-Lok Wrench**

## Inch Hex Size Par-Lok Wrenches

| Hex Size (in.) | Max. Torque (ft.-lbs.) | Part No. |
|---|---|---|
| 3/8 | 24 | **860062-6** |
| 7/16 | 27 | **860062-7** |
| 1/2 | 32 | **860062-8** |
| 9/16 | 43 | **860062-9** |
| 5/8 | 65 | **860062-10** |
| 11/16 | 81 | **860062-11** |
| 3/4 | 92 | **860062-12** |
| 13/16 | 108 | **860062-13** |
| 7/8 | 135 | **860062-14** |
| 15/16 | 152 | **860062-15** |
| 1 | 162 | **860062-16** |
| 1 1/8 | 206 | **860062-18** |
| 1 1/4 | 238 | **860062-20** |
| 1 3/8 | 282 | **860062-22** |
| 1 1/2 | 314 | **860062-24** |
| 1 5/8 | 346 | **860062-26** |
| 1 7/8 | 364 | **860062-30** |
| 2 | 373 | **860062-32** |
| 2 1/4 | 391 | **860062-36** |

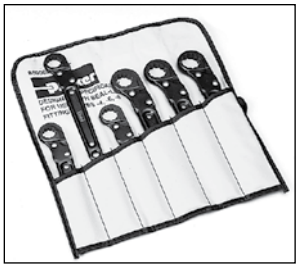

**Fig. R135 — Seal-Lok Wrench Kit**

| Part Description | Part No. |
|---|---|
| Full kit of sizes 3/8" to 1" | **860062-KIT** |
| Full kit of sizes 1 1/8" to 2 1/4" | **860062-KIT2** |
| Seal-Lok Wrench Kit (5/8", 11/16", 3/4", 13/16", 7/8", 15/16") | **860062-LKIT** |
| Triple-Lok and Ferulok Wrench Kit (9/16", 11/16", 7/8", 1", 1 1/4") | **860062-XUKIT** |

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## Metric Hex Size Par-Lok Wrenches

| Hex Size (mm) | Max. Torque (ft.-lbs.) | Max. Torque (N-m) | Part No. |
|---|---|---|---|
| 10 | 26 | 35 | **860063-10** |
| 11 | 27 | 37 | **860063-11** |
| 12 | 31 | 42 | **860063-12** |
| 13 | 33 | 45 | **860063-13** |
| 14 | 42 | 57 | **860063-14** |
| 16 | 65 | 88 | **860063-16** |
| 17 | 79 | 107 | **860063-17** |
| 19 | 92 | 125 | **860063-19** |
| 21 | 110 | 149 | **860063-21** |
| 22 | 131 | 178 | **860063-22** |
| 24 | 154 | 209 | **860063-24** |
| 27 | 74 | 100 | **860063-27** |
| 30 | 74 | 100 | **860063-30** |
| 32 | 125 | 170 | **860063-32** |
| 36 | 125 | 170 | **860063-36** |
| 41 | 229 | 310 | **860063-41** |
| 46 | 243 | 330 | **860063-46** |
| 50 | 243 | 330 | **860063-50** |

**Fig. R136 — Triple-Lok and Ferulok Wrench Kit**

**Fig. R137 — Par-Lok Wrench Kit**

| Part Description | Part No. |
|---|---|
| Full kit of sizes 10mm to 22mm | **860063-KIT** |
| Full kit of sizes 27mm to 50mm | **860063-KIT2** |



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| Tube Fabricating Equipment Weights | |
|---|---|
| **Part No.** | **Approx. Ship Weight (lbs.)** |
| **Vise Block with Flaring Pin** | |
| 4-2866 | 2.00 |
| 5-2866 | 2.00 |
| 6-2866 | 3.00 |
| 8-2866 | 3.50 |
| 10-2866 | 4.00 |
| 12-2866 | 12.00 |
| 14-2866 | 15.00 |
| 16-2866 | 18.00 |
| 20-2866 | 18.00 |
| 24-2866 | 20.00 |
| **Combination Flaring Tool** | |
| 210A | 3.00 |
| **Rolo-Flare Tool** | |
| 945 TH | 4.00 |
| 212FB | 4.00 |
| **Hydra-Tool** | |
| 710400B | 62.00 |
| 720370B-3 | 85.00 |
| **Accessories (Hydra-Tool)** | |
| 900044 | 1.00 |
| 910004 | 1.50 |
| 720377 | 16.00 |
| 710416 | 4.00 |
| 710412 | 3.00 |
| 710419 | 2.00 |
| 710411 | 2.00 |
| 710424-1 | 4.00 |
| 710424-2 | 4.00 |
| 710417-4 | 2.00 |
| 710417-5 | 2.00 |
| 710417-6 | 2.00 |
| 710417-8 | 2.00 |
| 710417-10 | 2.00 |
| 710417-12 | 2.00 |
| 710417-14 | 2.00 |
| 710417-16 | 2.00 |
| 710417-20 | 2.00 |
| 710415-24 | 2.00 |
| 710415-32 | 2.00 |
| **Power Source (Pumps)** | |
| 900085 | 30.00 |
| 900086 | 10.00 |
| **Flaring Dies - Metric (Hydra-Tool)** | |
| 770106-6 | 2.00 |
| 770106-8 | 2.00 |
| 770106-10 | 2.00 |
| 770106-12 | 2.00 |
| 770106-16 | 2.00 |
| 770106-18 | 2.00 |
| 770106-20 | 2.00 |
| 770106-25 | 2.00 |
| 770106-30 | 2.00 |
| 770106-32 | 2.00 |
| **Hydra-Tool Ferulok Pre-Set Tooling** | |
| 770101 | 5.00 |
| 770102 | 3.00 |

| Tube Fabricating Equipment Weights | |
|---|---|
| **Part No.** | **Approx. Ship Weight (lbs.)** |
| **Ferulset Tools (Ferulok Pre-Set Tool)** | |
| 560576 | 0.50 |
| 560577 | 0.50 |
| 560578 | 0.50 |
| 560579 | 0.50 |
| 560580 | 0.50 |
| 560581 | 0.50 |
| 560582 | 0.50 |
| 560583 | 0.50 |
| 560584 | 0.50 |
| 560585 | 0.50 |
| 560586 | 0.50 |
| 560587 | 1.00 |
| 560589 | 1.00 |
| **Hyferset (Ferulok Pre-Set Tool)** | |
| 611011A | 35.00 |
| **Hyferset Accessories** | |
| 900086 | 10.00 |
| 910004 | 2.00 |
| 651085 | 15.00 |
| **Hyferset and Tooling** | |
| 611049C | 53.00 |
| 680370-4 | 3.50 |
| 720105-4 | 0.50 |
| 680370-6 | 3.00 |
| 720105-6 | 0.50 |
| 680370-8 | 3.00 |
| 720105-8 | 0.50 |
| 680370-10 | 2.50 |
| 720105-10 | 0.50 |
| 680370-12 | 2.50 |
| 720105-12 | 0.50 |
| 680370-14 | 2.50 |
| 720105-14 | 0.50 |
| 680370-16 | 1.50 |
| 720105-16 | 1.00 |
| 680370-20 | 2.00 |
| 720105-20 | 1.00 |
| 680370-24 | 1.50 |
| 720105-24 | 1.00 |
| 680370-32 | 1.50 |
| 720105-32 | 1.00 |
| **Straight Thread Taps and Counterbores** | |
| 7/16-20 UNF-2B | 1.00 |
| 9/16-18 UNF-2B | 1.00 |
| 3/4-16 UNF-2B | 1.00 |
| 7/8-14 UNF-2B | 1.50 |
| 1 1/16-12 UN-2B | 1.75 |
| 1 3/16-12 UN-2B | 2.00 |
| 1 5/16-12 UN-2B | 2.00 |
| 1 5/8-12 UN-2B | 2.50 |
| 1 7/8-12 UN-2B | 2.50 |
| 2 1/2-12 UN-2B | 3.00 |

| Tube Fabricating Equipment Weights | |
|---|---|
| **Part No.** | **Approx. Ship Weight (lbs.)** |
| **Straight Thread Taps and Counterbores (Cont'd)** | |
| Y-34730 | 0.50 |
| Y-34731 | 0.50 |
| Y-34732 | 0.50 |
| Y-34733 | 0.75 |
| Y-34734 | 1.00 |
| Y-34735 | 1.00 |
| Y-34736 | 1.50 |
| Y-34737 | 1.50 |
| Y-34738 | 1.75 |
| Y-34739 | 2.00 |
| Y-34740 | 2.00 |
| Y-34741 | 2.50 |
| Y-34743 | 2.50 |
| **Par-Lok Wrenches** | |
| 860062-Kit | 4.50 |
| 860062-Kit 2 | 28.00 |
| 860063-Kit | 4.00 |
| **Tube Cutters** | |
| 218B | 1.00 |
| 1232 | 3.00 |
| **Parker Tru-Kut Sawing Vise** | |
| 710439 | 9.00 |
| 974250 | 198.00 |
| **Deburring Tools** | |
| 226A | 1.00 |
| 972125 | 90.00 |
| **Hand Tube Benders** | |
| 2-2829S | 2.00 |
| 3-2829S | 2.00 |
| 4-2829S | 2.50 |
| 5-2829S | 2.50 |
| 6-2829S | 3.00 |
| 8-2829S | 3.00 |
| 10-2829 | 8.00 |
| 12-2829 | 15.00 |
| 14-2829 | 15.00 |
| 16-2829 | 16.00 |
| 4-2829AH | 1.20 |
| 6-2829AH | 3.70 |
| 8-2829AH | 7.60 |
| **Exactol Tube Benders (412 & 424)** | |
| 560569 | 18.50 |
| 550570 | 5.00 |
| 550572 | 25.50 |
| 621044 | 38.00 |
| 631156 | 10.00 |
| 412 Kit | 42.00 |
| 424 Kit | — |
| **Slide Blocks (412 & 424)** | |
| 550585 | 3.50 |
| 621045 | 5.00 |
| 870150 | 5.00 |

(Continued on next page)

**Table R14 — Tube Fabricating Equipment Weight Chart**

Dimensions and pressures for reference only, subject to change.



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| Tube Fabricating Equipment Weights | |
|---|---|
| **Part No.** | **Approx. Ship Weight (lbs.)** |
| **Radius Blocks (412 & 424)** | |
| 550579 | 1.00 |
| 550580 | 1.00 |
| 550581 | 2.50 |
| 550582 | 3.00 |
| 550583 | 4.00 |
| 550584 | 5.00 |
| 621046 | 7.00 |
| 621047 | 9.00 |
| 621048 | 9.50 |
| 621049 | 10.00 |
| 870149 | 11.00 |
| **Small Radius Blocks (412 & 424)** | |
| 550573 | 2.00 |
| 550574 | 2.00 |
| 550575 | 2.50 |
| 550576 | 2.50 |
| 550577 | 3.00 |
| 550578 | 4.00 |
| **Close Bend Radius Blocks** | |
| 590533 | 2.00 |
| 590535 | 3.00 |
| 590537 | 3.00 |
| **Metric Slide Blocks (412 & 424)** | |
| 820091 | 3.00 |
| 820092 | 5.00 |
| 820093 | 5.00 |
| **Metric Radius Blocks (412 & 424)** | |
| 820090-6mm | 1.00 |
| 820090-8mm | 2.00 |
| 820090-10mm | 2.00 |
| 820090-12mm | 3.00 |
| 820090-14mm | 3.00 |
| 820090-15mm | 4.00 |
| 820090-16mm | 4.50 |
| 820090-18mm | 6.50 |
| 820090-20mm | 7.00 |
| 820090-22mm | 9.00 |
| 820090-25mm | 9.50 |
| 820090-28mm | 10.00 |
| 820090-30mm | 10.50 |
| 820090-32mm | 11.00 |
| **Tube Preparation Centers** | |
| TP432 | 560.00 |
| TP1025 | 880.00 |
| **EO Presetting Tooling** | |
| Nut Die | 1.75 |
| Body Die | .75 |
| EO-Karrymat | 55.00 |

| Tube Fabricating Equipment Weights | |
|---|---|
| **Part No.** | **Approx. Ship Weight (lbs.)** |
| **HB632 Hydraulic Tube Bender** | |
| 631050 (632) | 245.00 |
| 660221 | 8.00 |
| 900085 | 30.00 |
| **Radius Blocks (HB632)** | |
| 540502 | 3.00 |
| 530763 | 3.50 |
| 530764 | 4.00 |
| 530765 | 6.00 |
| 530766 | 10.00 |
| 530768 | 14.00 |
| 530770 | 54.00 |
| 590512-18 | 35.00 |
| 590515-24 | 4.00 |
| 590518-30 | 6.00 |
| 590521-36 | 7.00 |
| 590523-42 | 8.00 |
| 590524-48 | 10.00 |
| 590526-54 | 12.00 |
| 590630-72 | 16.00 |
| 631060-128 | 50.00 |
| **Close Bend Radius Blocks for HB632** | |
| 530597 | 3.50 |
| 530601 | 5.00 |
| 530605 | 6.00 |
| 530609 | 8.00 |
| 530613 | 10.50 |
| 530621 | 12.00 |
| 530625 | 13.00 |
| **Metric Radius Blocks for HB632** | |
| 810023 | 3.00 |
| 780175 | 3.50 |
| 780176 | 4.00 |
| 780177 | 4.00 |
| 780178 | 5.00 |
| 780179 | 6.00 |
| 780180 | 8.00 |
| 780181 | 9.00 |
| 780182 | 10.50 |
| 780183 | 12.00 |
| 780184 | 13.00 |
| **CP432 Parflange Machines** | 225.00 |
| 1025 | 175.00 |
| **Metric Close Bend Radius Blocks for HB632** | |
| 780185 | 3.50 |
| 780186 | 3.50 |
| 780187 | 4.00 |
| 780188 | 5.00 |
| 780189 | 6.00 |
| 780190 | 6.50 |

| Tube Fabricating Equipment Weights | |
|---|---|
| **Part No.** | **Approx. Ship Weight (lbs.)** |
| **Clamp Blocks for HB632** | |
| 864266 | 4.00 |
| 631092 | 3.00 |
| 631093 | 3.00 |
| 027418-28 | 5.00 |
| 027418-32 | 5.00 |
| **Metric Clamp Blocks for HB632** | |
| 790017 | 3.00 |
| 780194 | 4.00 |
| 780195 | 3.00 |
| 780186 | 4.00 |
| **Metric Slide Blocks for HB632** | |
| 790016 | 8.00 |
| 780191 | 11.00 |
| 780192 | 9.00 |
| 780193 | 8.00 |
| **Bender Table** | |
| 520515 | 470.00 |
| **Mandrel Rod Stop Assemblies** | |
| 550571 | 5.00 |
| 631141 | 20.00 |
| **Universal Side Angle Indicator** | |
| 520520 | 25.00 |
| **Karryflare** | 116.00 |
| **Inch Flaring Dies for Karryflare** | |
| M 047415-1 | 4.00 |
| M 157408-1 | 4.00 |
| M 067415-1 | 4.00 |
| M 087415 | 4.00 |
| M 107415 | 3.50 |
| M 127415 | 3.50 |
| M 167415 | 3.50 |
| M 207415 | 3.00 |
| M 157438 | 3.00 |
| **Parflange Tooling** | |
| Pin and Die Set (1025) | 4.50 |
| Pin (1025) | .75 |
| Die (1025) | 3.75 |

**Table R14 — Tube Fabricating Equipment Weight Chart (cont'd.)**

Dimensions and pressures for reference only, subject to change.



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Dimensions and pressures for reference only, subject to change.



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Fig. T47 — Tube not bottomed

Fig. T48 — Shallow bite

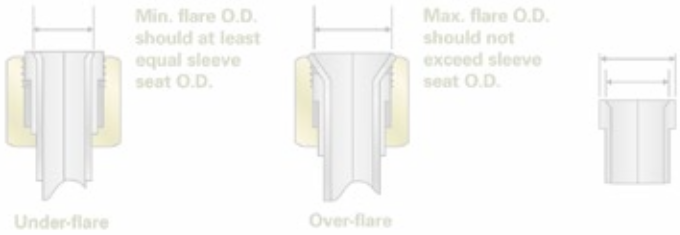


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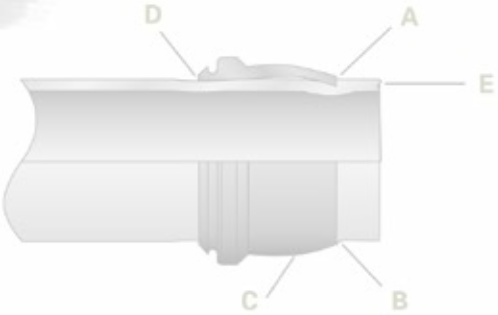
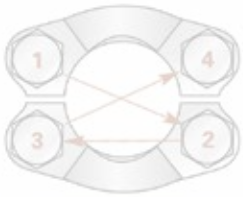
Fig. T49 — Over-set ferrule



Fig. T50 — Ferrule cocked on tube

Fig. T51 — No bite




Recommended bolt torque sequence

Step 6

Step 7 and 8

Over-flanged Assembly

Under-flanged Assembly

Fig. T19 — Flange diameter

# Assembly/Installation

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- Pre-set Using the Fitting Body or Hardened Pre-assembly Tool ..... S32
- Pre-set Inspection ..... S32
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# Port End Assembly

The three common types of port ends used in the United States with tube fittings, pipe fittings and hose fittings are:

1) Parallel thread
2) Tapered Thread
3) Flanges

## Parallel Thread Ports

Unlike tapered threads, parallel thread ports do not require sealing by the threads. The seal is obtained by other means, typically an elastomeric seal. When assembled properly, parallel thread ports provide the best leak-free port connection available.

Parker tube fittings are available with several types of parallel thread port studs (ends):

- SAE straight threads (SAE J1926 / ISO 11926)
- ISO (ISO 6149)
- JIS (JIS B2351)
- BSPP flat face (ISO 1179)
- DIN Metric flat face (ISO 9974).

The SAE straight thread, ISO 6149 and JIS B2351 ports are all of similar design. The male end is fitted with an O-ring. On assembly, the O-ring is firmly sandwiched between the angular sealing surface of the female port, the male end undercut, and the shoulder or back-up washer of the male end. Sealing is thus made possible and maintained by the O-ring compression, which results from the sandwiching of the O-ring in the cavity as shown in Fig. S1. The straight threads do not offer sealing action; they provide the resistance (holding power) for service pressure. Port dimensions for SAE and ISO 6149 ports are given on pages T32 and T33 respectively. For JIS B2351 dimensions, please contact the Tube Fittings Division.

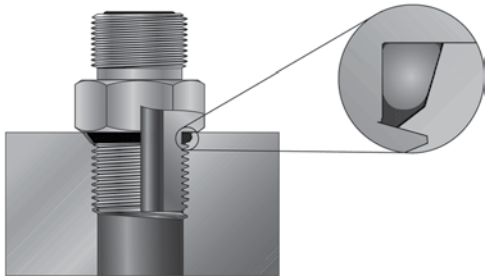

**Fig. S1 – SAE / ISO / JIS B2351 Straight Thread Port O-Ring Upon Assembly**

The SAE straight thread port is the same as MS 16142. **It is also similar to, but dimensionally not the same as, MS 33649 and AND 10050, and thus not interchangeable with them.** Therefore, it is not recommended to use fittings designed for SAE straight thread ports in MS 33649 and AND 10050 ports.

With the BSPP and metric flat face port ends, the sealing actually takes place on the top surface (spot face) of the port. Port dimensions can be found on pages T35 and T36 respectively. There are several sealing methods available for these ports. Port studs with type "E" sealing utilize Parker's EOlastic seal (ED) (see Fig. S2) and are recommended for higher pressures than the other types. Types "G" and "H" use an O-ring that is supported on the outside by a removable retaining ring (see Fig. S3). Type B (cutting face) is designed with a relatively sharp ridge of material that seals by coining the flat face of the female port (see Fig. S4). A fourth sealing method uses a bonded seal which consists of a metal ring with an elastomer bonded to the inside surface (often referred to as Dowty® seal) (see Fig. S5).

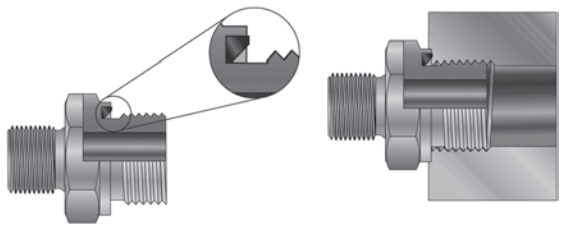

**Fig. S2 – EOlastic Seal, Type E**

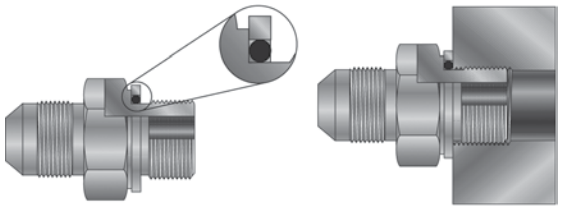

**Fig. S3 – O-Ring with Retaining Ring, Types G & H**

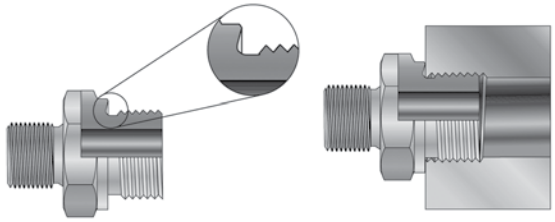

**Fig. S4 – Cutting Face, Type B**

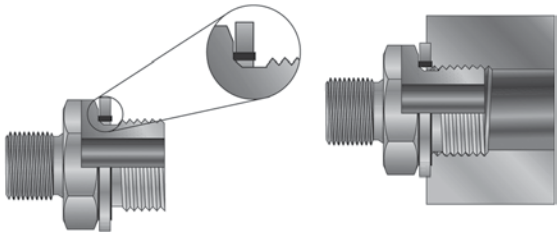

**Fig. S5 – Bonded Seal**

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Counterbores and taps used to machine the various parallel thread ports can be found in section R.

For assembly purposes, there are two main categories of parallel port ends: adjustable and non-adjustable. Adjustable port ends are commonly found on shaped fittings to allow for proper orientation of the fitting. Besides the elastomeric seal, adjustable port ends are assembled with a locknut and a back-up washer as shown in Fig. S6. Non-adjustable port ends are found on straight fittings.

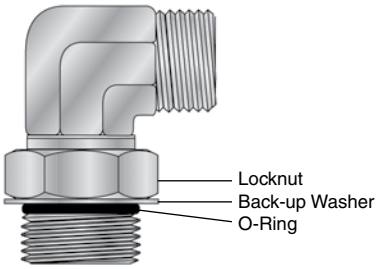
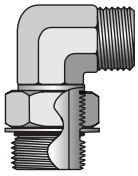



**Fig.S6 – Adjustable Port End Assembly**

The general assembly procedure for all adjustable parallel thread port ends is the same. Likewise, the assembly procedure is the same for all non-adjustable parallel thread port ends.

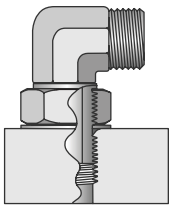
## Adjustable Port End Assembly

1. Inspect components to ensure that male and female port threads and sealing surfaces are free of burrs, nicks and scratches, or any foreign material.
2. If O-ring or seal is not pre-installed to fitting male port end, install proper size O-ring or seal, taking care not to damage it.
3. Lubricate O-ring with light coat of system fluid or a compatible lubricant to help the O-ring slide smoothly into the port and avoid damage.
4. Back off lock nut as far as possible. Make sure back-up washer is not loose and is pushed up as far as possible.



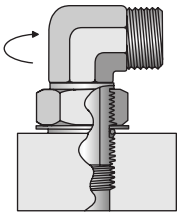

**Step 4**

5. Screw fitting into port until the back-up washer or the retaining ring contacts face of the port. Light wrenching may be necessary. **Over tightening may damage washer.** (This potential damage was eliminated with Parker's Robust Port)



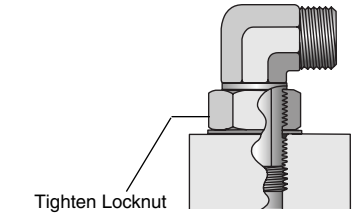
**Step 5**

6. To align the tube end of the fitting to accept incoming tube or hose assembly, unscrew the fitting by the required amount, but not more than one full turn.



**Step 6**

7. Using two wrenches, hold fitting in desired position and tighten locknut to the proper torque value from the appropriate table located on pages S5 - S6.
8. Inspect to ensure that O-ring is not pinched and that washer is seated flat on face of port.




**Steps 7 and 8**

## Non-adjustable Port End Assembly

1. Inspect components to ensure that male and female port threads and sealing surfaces are free of burrs, nicks, and scratches, or any foreign material.
2. If O-ring or seal is not pre-installed to fitting male port end, install proper size O-ring or seal, taking care not to damage it.
3. Lubricate O-ring with light coating of system fluid or a compatible lubricant to help the O-ring slide past the port entrance corner and avoid damaging it.
4. Screw fitting into port and tighten to proper torque from the appropriate table located on pages S5 - S6.

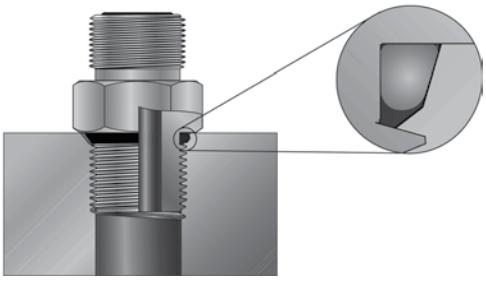


**Fig. S7 — Non-Adjustable Port End Assembly**



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## SAE Straight Thread Port Assembly (SAE J1926)

| SAE Dash Size | Thread Size UN/UNF | Assembly Torque (+10% -0) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Non-Adjustable | | | | Adjustable | | | | Plugs | | | |
| | | Seal-Lok | | Triple-Lok Ferulok Pipe Fittings | | Seal-Lok | | Triple-Lok Ferulok | | Hollow Hex HP5ON-S | | Hex Head P5ON-S | |
| | | ft.lbs. (in. lbs) | N-m | ft.lbs. (in. lbs) | N-m | ft.lbs. (in. lbs) | N-m | ft.lbs. (in. lbs) | N-m | ft.lbs. (in. lbs) | N-m | ft.lbs. (in. lbs) | N-m |
| 2 | 5/16-24 | — | — | (85) | 10 | — | — | (60) | 7 | (30) | 3.5 | (85) | 10 |
| 3 | 3/8-24 | — | — | (155) | 18 | — | — | (100) | 11 | (55) | 6 | (155) | 18 |
| 4 | 7/16-20 | (310) | 35 | (260) | 29 | (180) | 20 | (180) | 20 | (120) | 13.5 | (260) | 29 |
| 5 | 1/2-20 | (360) | 40 | (280) | 32 | (360) | 40 | (250) | 28 | (170) | 19 | (280) | 32 |
| 6 | 9/16-18 | (420) | 46 | (350) | 40 | (420) | 46 | (350) | 40 | (410) | 46 | (350) | 40 |
| 8 | 3/4-16 | 60 | 80 | (620) | 70 | 60 | 80 | (620) | 70 | 60 | 80 | (620) | 70 |
| 10 | 7/8-14 | 100 | 135 | 85 | 115 | 100 | 135 | 85 | 115 | 100 | 135 | 85 | 115 |
| 12 | 1 1/16-12 | 135 | 185 | 135 | 185 | 135 | 185 | 135 | 185 | 135 | 185 | 135 | 185 |
| 14 | 1 3/16-12 | 175 | 235 | 175 | 235 | 175 | 235 | 175 | 235 | 175 | 235 | 175 | 235 |
| 16 | 1 5/16-12 | 200 | 270 | 200 | 270 | 200 | 270 | 200 | 270 | 200 | 270 | 200 | 270 |
| 20 | 1 5/8-12 | 250 | 340 | 250 | 340 | 250 | 340 | 250 | 340 | 250 | 340 | 250 | 340 |
| 24 | 1 7/8-12 | 305 | 415 | 305 | 415 | 305 | 415 | 305 | 415 | 305 | 415 | 305 | 415 |
| 32 | 2 1/2-12 | 375 | 510 | 375 | 510 | 375 | 510 | 375 | 510 | 375 | 510 | 375 | 510 |

**Note:** Lubricate threads before assembly! Values in chart are for steel fittings in steel ports. For stainless steel fittings, please use the upper limit of torque range. For brass, aluminum (and other soft metals), decrease torque value by 35%.

**Table S1 – SAE J1926 Straight Thread Port Assembly Torques**

## BSPP (Thread G) Port Assembly (ISO 1179 / DIN 3852-2)

| Series | Tube O.D. | BSPP Thread G Size | Assembly Torque Nm +10% -0 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Straight Male Stud Fittings | | | Non-Return Valves RHV / RHZ | Banjo Fittings | | Plugs VSTI-ED | Straight and Adjustable Fittings |
| | | | Form A for Sealing Washer | Form B with Cutting Face | Form E with ED-Sealing | Form E with ED-Sealing | WH / TH | SWVE | Form E with ED-Sealing | O-Ring with Retaining Ring and Bonded Washer |
| | 6 | 1/8 - 28 | 9 | 18 | 18 | 18 | 18 | 18 | 13 | 18 |
| | 8 | 1/4 - 19 | 35 | 35 | 35 | 35 | 45 | 40 | 30 | 35 |
| | 10 | 1/4 - 19 | 35 | 35 | 35 | 35 | 45 | 40 | 30 | 35 |
| | 12 | 3/8 - 19 | 45 | 70 | 70 | 50 | 70 | 65 | 60 | 70 |
| L | 15 | 1/2 - 14 | 65 | 140 | 90 | 85 | 120 | 90 | 80 | 90 |
| | 18 | 1/2 - 14 | 65 | 140 | 90 | 85 | 120 | 90 | 80 | 90 |
| | 22 | 3/4 - 14 | 90 | 180 | 180 | 140 | 230 | 125 | 140 | 180 |
| | 28 | 1 - 11 | 150 | 330 | 310 | 190 | 320 | — | 200 | 310 |
| | 35 | 1 1/4 - 11 | 240 | 540 | 450 | 360 | 540 | — | 400 | 450 |
| | 42 | 1 1/2 - 11 | 290 | 630 | 540 | 540 | 700 | — | 450 | 540 |
| | 6 | 1/4 - 19 | 35 | 55 | 40 | 45 | 45 | 40 | — | 40 |
| | 8 | 1/4 - 19 | 35 | 55 | 40 | 45 | 45 | 40 | — | 40 |
| | 10 | 3/8 - 19 | 45 | 90 | 80 | 60 | 70 | 65 | — | 60 |
| | 12 | 3/8 - 19 | 45 | 90 | 80 | 60 | 70 | 65 | — | 60 |
| S | 14 | 1/2 - 14 | 65 | 150 | 115 | 145 | 120 | 90 | — | 90 |
| | 16 | 1/2 - 14 | 65 | 130 | 115 | 100 | 120 | 90 | — | 90 |
| | 20 | 3/4 - 14 | 90 | 270 | 180 | 145 | 230 | 125 | — | 180 |
| | 25 | 1 - 11 | 150 | 340 | 310 | 260 | 320 | — | — | 310 |
| | 30 | 1 1/4 - 11 | 240 | 540 | 450 | 360 | 540 | — | — | 450 |
| | 38 | 1 1/2 - 11 | 290 | 700 | 540 | 540 | 700 | — | — | 540 |

**Note:** Lubricate threads before assembly! Tightening torques are for steel fittings assembled in steel components. Values in chart are for steel fittings in steel ports. For stainless steel fittings, please use the upper limit of torque range. For brass (and other soft metals), decrease torque value by 35%.

**Table S2 – Assembly Torques for ISO 1179-1 / DIN 3852-2 Port**

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## Metric (ISO Thread M) Port Assembly (ISO 9974-1 / DIN 3852-1)

| Series | Tube O.D. | Metric Thread M Size | Assembly Torque Nm +10% -0 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Straight Male Stud Fittings | | | Non-Return Valves RHV / RHZ | Banjo Fittings | | Plugs VSTI-ED | Straight and Adjustable Fittings |
| | | | Form A for Sealing Washer | Form B with Cutting Face | Form E with ED-Sealing | Form E with ED-Sealing | WH / TH | SWVE | Form E with ED-Sealing | O-Ring with Retaining Ring |
| | 6 | M 10 x 1 | 9 | 18 | 18 | 18 | 18 | 18 | 12 | 18 |
| | 8 | M 12 x 1.5 | 20 | 30 | 25 | 25 | 45 | 35 | 25 | 25 |
| | 10 | M 14 x 1.5 | 35 | 45 | 45 | 35 | 55 | 50 | 35 | 40 |
| | 12 | M 16 x 1.5 | 45 | 65 | 55 | 50 | 80 | 60 | 55 | 55 |
| L | 15 | M 18 x 1.5 | 55 | 80 | 70 | 70 | 100 | 80 | 65 | 70 |
| | 18 | M 22 x 1.5 | 65 | 140 | 125 | 125 | 140 | 120 | 90 | 90 |
| | 22 | M 27 x 2 | 90 | 190 | 180 | 145 | 320 | 130 | 135 | 180 |
| | 28 | M 33 x 2 | 150 | 340 | 310 | 210 | 360 | — | 225 | 310 |
| | 35 | M 42 x 2 | 240 | 500 | 450 | 360 | 540 | — | 360 | 450 |
| | 42 | M 48 x 2 | 290 | 630 | 540 | 540 | 700 | — | 360 | 540 |
| | 6 | M 12 x 1.5 | 20 | 35 | 35 | 35 | 45 | 35 | — | 35 |
| | 8 | M 14 x 1.5 | 35 | 55 | 45 | 45 | 55 | 50 | — | 55 |
| | 10 | M 16 x 1.5 | 45 | 70 | 70 | 55 | 80 | 60 | — | 70 |
| | 12 | M 18 x 1.5 | 55 | 110 | 90 | 70 | 100 | 80 | — | 90 |
| S | 14 | M 20 x 1.5 | 55 | 150 | 125 | 100 | 125 | 110 | 80 | 125 |
| | 16 | M 22 x 1.5 | 65 | 170 | 135 | 125 | 135 | 120 | — | 135 |
| | 20 | M 27 x 2 | 90 | 270 | 180 | 135 | 320 | 135 | — | 180 |
| | 25 | M 33 x 2 | 150 | 410 | 310 | 210 | 360 | — | — | 310 |
| | 30 | M 42 x 2 | 240 | 540 | 450 | 360 | 540 | — | — | 450 |
| | 38 | M 48 x 2 | 290 | 700 | 540 | 540 | 700 | — | — | 540 |

**Note:** Lubricate threads before assembly! Values in chart are for steel fittings in steel ports. For stainless steel fittings, please use the upper limit of torque range. For brass, aluminum (and other soft metals), decrease torque value by 35%.

**Table S3 – Assembly Torques for ISO 9974-1 / DIN 3852-1 Port**

## Metric ISO Port Assembly (ISO 6149/DIN 3852-3)

| Metric Thread M Size | Assembly Torque (+10% -0)[3] | | | |
|---|---|---|---|---|
| | ISO 6149-2 Stud Ends (S-Series) (Seal-Lok, EO & VSTI-OR Plugs) | | ISO 6149-3 Stud Ends (L-Series) (Triple-Lok, EO, Ferulok & Pipe Adapters) | |
| | N.m. | ft. lbs. | N.m. | ft. lbs. |
| M8x1 | 10 | 7.5 | 8 | 6 |
| M10x1 | 20 | 15 | 15 | 11 |
| M12x1.5 | 35 | 26 | 25 | 18 |
| M14x1.5 | 45 | 33 | 35 | 26 |
| M16x1.5 | 55 | 41 | 40 | 30 |
| M18x1.5 | 70 | 52 | 45 | 33 |
| M20x1.5[4] | 80 | 59 | — | — |
| M22x1.5 | 100 | 74 | 60 | 44 |
| M27x2 | 170 | 125 | 100 | 74 |
| M30x2[1] | 235 | 175 | 130 | 95 |
| M33x2 | 310 | 230 | 160 | 120 |
| M38x2[2] | 320 | 235 | 185 | 135 |
| M42x2 | 330 | 245 | 210 | 155 |
| M48x2 | 420 | 310 | 260 | 190 |
| M60x2 | 500 | 370 | 315 | 230 |

1) M30X2 will be added to ISO 6149 standards at next revision.
2) M38X2 is not covered in ISO 6149 standards.
3) These torques are for steel fittings, assembled lubricated, for brass (and other soft metals), decrease torque value by 35%.
4) For cartridge valves only.

**Table S4 – ISO 6149 / DIN 3852-3 Port Assembly Torques**

## Tapered Thread Ports

Tapered thread ports include NPTF, BSPT and metric taper. The tapered threads in these ports serve two functions: 1) to hold the fitting in place while under pressure and 2) to serve as the primary seal. The seal for NPTF threads is created by the metal-to-metal contact between the mating roots and crests of the male and female threads. With all other tapered threads, there is not always a contact at the roots and crests, but the spiral gap there is small enough for a sealant to fill and provide a seal.

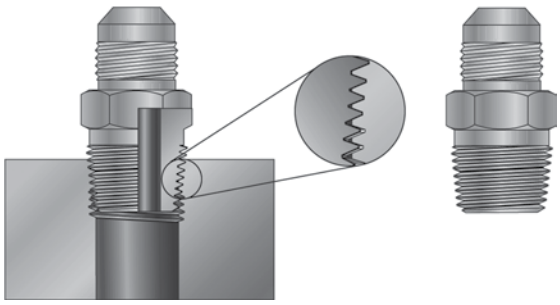

**Fig. S8 – Tapered Thread Port**

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The variety of thread forms available under taper threads include:

**NPT** – American Standard Taper Pipe Thread (ANSI B1.20.1).

**NPTF** – Dryseal American Standard Taper Pipe Thread (SAE J476, ANSI B1.20.3).

**BSPT or JIS "PT"** – British Standard Pipe, Tapered (BS21, JIS B 0203, ISO 7), also known as "R" for male and "Rc" for female.

**M-Keg** – Metric taper threads (DIN 158).

The vast majority of Parker Tube Fittings Division's standard pipe thread fittings are machined with the NPTF thread form. NPTF thread is also referred to as Dryseal Pipe Thread.

The full thread profile contact of NPTF threads is designed to give the tapered threads self-sealing ability without thread sealant. However, variations in condition of mating threads, fitting and port materials, assembly procedures and operating conditions make self-sealing highly improbable. Some type of thread sealant is, therefore, required to achieve proper seal and, in some cases, additional lubricity to prevent galling.

### Types of Sealant/Lubricant

Sealant/Lubricants assist in sealing and provide lubrication during assembly, reducing the potential for galling. Pipe thread sealants are available in various forms such as dry pre-applied, tape, paste and anaerobic liquid.

Pre-applied sealants, such as "Vibraseal" (registered trade-mark of Loctite Corporation) and powdered PTFE are usually applied to connectors by the manufacturer. Connectors with some of these sealants may be remade a few times without needing additional sealant. Vibraseal may also help reduce loosening due to vibration.

PTFE tape, if not applied properly, can contribute to system contamination during assembly and installation. In addition, because of PTFE's high lubricity, fittings can be more easily over tightened; and it does not offer much resistance to loosening due to vibration.

Paste sealants can also contribute to system contamination, if not applied properly. They are also messy to work with; and some types require a cure period after component installation, prior to system start up.

Anaerobic liquids are available from several manufacturers and perform sealing as well as thread locking functions. They are applied to the connectors by the user and require a cure period prior to system start up. Some are soluble in common hydraulic fluids and will not contaminate the system. For proper performance they need to be applied to clean and dry components, carefully following the manufacturer's directions.

### Tapered Thread Port Assembly

The proper method of assembling tapered threaded connectors is to assemble them finger tight and then wrench tighten further to the specified number of turns from finger tight (T.F.F.T.) given in Table S5. The following assembly procedure is recommended to minimize the risk of leakage and/or damage to components.

1. Inspect components to ensure that male and female port threads and sealing surfaces are free of burrs, nicks and scratches, or any foreign material.
2. Apply sealant/lubricant to male pipe threads if not pre-applied. For stainless steel fittings, the use of Parker Threadmate sealant/lubricant is strongly recommended. (Pre-applied dry sealants are preferred over other sealants). With any sealant, the first one to two threads should be left uncovered to avoid system contamination. If PTFE tape is used it should be wrapped 1-1/2 to 2 turns in clockwise direction when viewed from the pipe thread end.

   **Caution:** More than two turns of tape may cause distortion or cracking of the port.
3. Screw the connector into the port to the finger tight position.
4. Wrench tighten the connector to the appropriate T.F.F.T. values shown in Table S5, making sure that the tube end of a shaped connector is aligned to receive the incoming tube or hose assembly. **Never back off (loosen) pipe threaded connectors to achieve alignment.**
5. If leakage persists after following the above steps, check for damaged threads and total number of threads engaged.

If threads on the fitting are badly nicked or galled, replace the fitting. If port threads are damaged, re-tap, if possible, or replace the component. If the port is cracked, replace the component.

Normally, the total number of tapered threads engaged should be between 3-1/2 and 6. Any number outside of this range may indicate either under or over tightening of the joint or out of tolerance threads. If the joint is under tightened, tighten it further but no more than one full turn. If it is over tightened, check both threads, and replace the part which has out-of-tolerance threads.

As a general rule, pipe fittings with tapered threads should not be assembled to a specific torque because the torque required for a reliable joint varies with thread quality, port and fitting materials, sealant used, and other factors. Where many of these factors are well-controlled, such as particular jobs on an assembly floor, a torque range that produces the desired results may be determined by test and used in lieu of turns count for proper joint assembly.

| Tapered Pipe Thread Size | | T.F.F.T. |
|---|---|---|
| BSPT | NPTF | |
| 1/8-28 | 1/8-27 | 2 - 3 |
| 1/4-19 | 1/4-18 | 2 - 3 |
| 3/8-19 | 3/8-18 | 2 - 3 |
| 1/2-14 | 1/2-14 | 2 - 3 |
| 3/4-14 | 3/4-14 | 2 - 3 |
| 1-11 | 1-11 1/2 | 1.5 - 2.5 |
| 1 1/4-11 | 1 1/4-11 1/2 | 1.5 - 2.5 |
| 1 1/2-11 | 1 1/2-11 1/2 | 1.5 - 2.5 |
| 2-11 | 2-11 1/2 | 1.5 - 2.5 |

**Table S5 – Assembly Turns From Finger Tight (T.F.F.T) Values For Steel, Stainless Steel and Brass Pipe Fittings**





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## Flange Ports

Large threaded port connections, such as SAE straight thread, require very high torque to assemble. This makes assembly very difficult, especially where wrench clearance is limited. Split flange connections solve this problem by dividing the hydraulic load among four bolts each requiring much less torque, smaller wrenches and smaller wrench clearance.

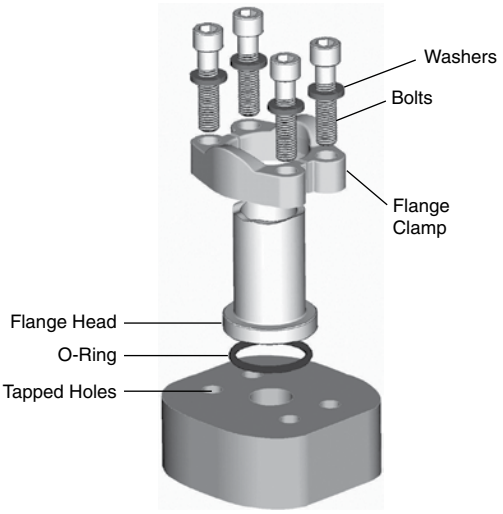


**Fig. S9 – 4-Bolt Split Flange Components**

There are two types of flange port connections:

- ISO 6162, Type 2
  - SAE Code 61 4-bolt split flange
  - SAE Code 62 4-bolt split flange
- ISO 6164

The 4-Bolt Split Flange consists of four main components:

- A body (flange head)
- An O-ring
- One “captive” or two “split” flange clamps
- Four bolts and washer

The four-bolt port is simply a circular opening (flow passage) surrounded by four tapped holes in a certain pattern for acceptance of the flange clamping bolts. The flat surface of the port compresses the O-ring contained in the groove in the flange head when the clamp bolts are torqued. In some instances, the groove is in the port and not in the flange head. The bolts, through the clamp halves, clamp down the flange head onto the flat surface of the port compressing and trapping the O-ring in the groove and leaving no gap for it to extrude under pressure. The hydraulic pressure is thus sealed by the compressed O-ring as long as the bolts are tightened enough to maintain solid metal to metal contact between the flange head at the outside diameter of the O-ring and the top of the port.

### Flange Port Assembly

The steps to properly assemble the flange port clamping bolts are:

1. Inspect components to ensure that male and female port threads and sealing surfaces are free of burrs, nicks and scratches, or any foreign material.
2. Lubricate the O-ring.
3. Position flange and clamp halves.
4. Place lock washers on bolts and insert through clamp halves.
5. Hand tighten bolts.
6. Torque bolts in diagonal sequence (see Fig. S10) in small increments to the appropriate torque level listed in Table S6 or S7 below.

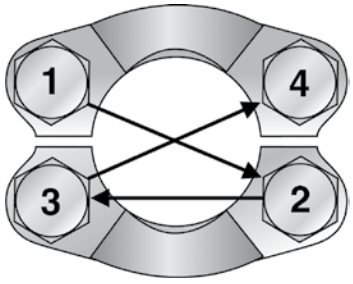


**Fig. S10 – Flange Bolt Tightening Sequence**

| Dash Size | Flange Size | Inch Bolt (J518) | +10% -0 Torque ft. lbs. | Metric Bolt (ISO 6162) | +10% -0 Torque N-m |
|---|---|---|---|---|---|
| 8 | 1/2 | 5/16-18 | 17 | M8 | 24 |
| 12 | 3/4 | 3/8-16 | 31 | M10 | 50 |
| 16 | 1 | 3/8-16 | 31 | M10 | 50 |
| 20 | 1-1/4 | 7/16-14 | 52 | M10 | 50 |
| 24 | 1-1/2 | 1/2-13 | 77 | M12 | 92 |
| 32 | 2 | 1/2-13 | 77 | M12* | 92 |
| 40 | 2-1/2 | 1/2-13 | 77 | M12 | 92 |
| 48 | 3 | 5/8-11 | 155 | M16 | 210 |
| 56 | 3-1/2 | 5/8-11 | 155 | M16 | 210 |
| 64 | 4 | 5/8-11 | 155 | M16 | 210 |
| 80 | 5 | 5/8-11 | 155 | M16 | 210 |

* Does not meet ISO 6162 specification.

**Table S6 – Code 61 Flange Recommended Bolt Torque**

| Dash Size | Flange Size | Inch Bolt (J518) | +10% -0 Torque ft. lbs. | Metric Bolt (ISO 6162) | +10% -0 Torque N-m |
|---|---|---|---|---|---|
| 8 | 1/2 | 5/16-18 | 17 | M8 | 24 |
| 12 | 3/4 | 3/8-16 | 31 | M10 | 50 |
| 16 | 1 | 7/16-14 | 52 | M12 | 92 |
| 20 | 1-1/4 | 1/2-13 | 77 | M14* | 130 |
| 24 | 1-1/2 | 5/8-11 | 155 | M16 | 210 |
| 32 | 2 | 3/4-10 | 265 | M20 | 400 |

* Does not meet ISO 6162 specification.

**Table S7 – Code 62 Flange Recommended Bolt Torque**

| Socket Screw Bolt Circle (LK) | Socket Head Cap Screws | Tightening Torques N-m |
|---|---|---|
| LK35 | M6 | 10 |
| LK40 | M6 | 10 |
| LK55 | M8 | 25 |

**Table S8 – Hydraulic Flange Recommended Bolt Torque**

* In general, variances of torque for soft metal ports/manifolds (ie: aluminum block - 66% of specified torque)

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# Troubleshooting Port End Connections

## 60° Cone (Metric, BSPP and NPSM)

| CONDITION | PROBABLE CAUSE(S) | RECOMMENDATION |
|---|---|---|
| End of swivel nut contacts hex shoulder of adapter before cone and ball nose tightens | • Wrong combination of swivel nut and adapter | • Ensure that components are to the same specification (even with the same type, there are different designs for 60° cone fittings) |
| Thread engagement seems adequate and swivel nut is tight but leakage still occurs | • Scratches or nicks on sealing surface<br>• Chatter marks on sealing surface | • Replace components. These fittings depend on metal-to-metal seal and require smooth mating surfaces to seal |
| There is leakage from the joint and the swivel nut is loose | • Inadequate make-up torque | • Use proper torque to create a seal as well as prevent vibration loosening |
| Swivel nut tightens, cone is tight but connection still leaks | • Inadequate or no chamfer in adapter | • Use components with proper chamfer (very common occurrence with NPTF/ NPSM 60° cone fittings). Male pipe end must have chamfer for proper sealing. Not all male pipe ends have chamfer as standard |

## Tapered Thread (including BSPT, NPT and metric taper)

| CONDITION | PROBABLE CAUSE(S) | RECOMMENDATION |
|---|---|---|
| Thread galling | • Most common in stainless steel, caused by friction and lack of lubricant | • Replace fitting and apply proper thread sealant/lubricant to replacement fitting and tighten to appropriate TFFT |
| Fitting leaks, even after proper tightening | • Sealant omitted or inadequately applied<br>• Damaged or cracked threads<br>• Cracked port<br>• Thread mixing of BSPT and NPT threads | • Re-apply sealant to appropriate TFFT and re-tighten<br>• Replace fitting<br>• Replace component<br>• Determine port thread type and replace fitting with matching thread type |
| Insufficient thread engagement (3 to 6 threads of engagement required) | • Quality problem with port or adapter<br>• Too much thread sealant (tape) | • Have port and adapter thread inspected; replace faulty parts<br>• Remove all thread sealant and re-apply 1 to 2 layers of tape |
| Too much thread engagement (more than recommended 3 to 6 threads) | • Typically port or adapter machining or wear problem, or port could be cracked due to excessive torque | • Inspect port and adapter for proper tolerance or wear, replace faulty parts, retighten to appropriate TFFT |
| Poor-quality threads or damaged/nicked threads | • Larger sizes are more prone to having nicked threads due to handling damage | • Replace fitting with threads that are free of scratches and nicks |

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# Troubleshooting Port End Connections

## Parallel (SAE, BSPP and metric)

| CONDITION | PROBABLE CAUSE(S) | RECOMMENDATION |
|---|---|---|
| Washer is too loose (moves by its own weight or rocks too much on the undercut) | • Washer damaged | • Replace fitting |
| Fitting threads are distorted | • Over-torqued<br>• Mixed threads | • Replace fitting and tighten to proper torque<br>• Determine correct thread type |
| Several scratches or nicks on the port face | • Port face contaminated (dirty) | • Reface the port |
| Spot face of port is smaller than washer diameter | • Improper port tool was used<br>• Wrong fitting selected for port | • Reface the port<br>• Select a proper fitting |
| Port threads are distorted (yielded) | • Fitting over-torqued | • Replace component |
| Leakage persists after locknut has been torqued | • Damaged O-ring<br>• Damaged washer<br>• Improper assembly | • Replace O-ring with new quality O-ring (90 durometer) and reconnect fitting to proper torque<br>• Replace fitting<br>• Follow proper assembly procedure |
| Washer distorted, allowing opportunity for O-ring to extrude | • Exposed upper thread forced washer into port during assembly (over-torquing makes this more prevalent) | • Replace fitting, using proper installation techniques for adjustable port ends |

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# Troubleshooting Port End Connections

## Flange (i.e., ISO 6162 4-Bolt)

| CONDITION | PROBABLE CAUSE(S) | RECOMMENDATION |
|---|---|---|
| Missing or improper O-ring | • Assembly/re-assembly oversight | • Replace with proper O-ring and re-tighten connection using incremental alternating tightening procedure |
| O-ring pinched or extruded | • Improper tightening procedure | • Replace O-ring and re-tighten connection using incremental alternating tightening procedure |
| Evidence of yielded or cracked flange head, tube or hose end | • Misaligned tube or hose connection | • Re-bend or re-route hose/tube lines to eliminate misalignment |
| Components do not mate or gap is too large | • Proprietary flange or pressure series matching problem | • Properly identify all components—most proprietary flanges use standard Code 61/62 bolt patterns and threads but are not usually interchangeable |
| Port has severe scratches or nicks in seal area | • Mishandling or abuse | • Resurface the port to remove scratches and nicks |
| Clamp halves are bent | • Over-pressurization or over-torque | • Replace clamp halves and tighten to proper torque |
| Bolts are bent | • Bolts are too weak or over-torqued | • Replace bolts with grade 5 or better; retighten to proper torque |

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# Tube End Assembly

The assembly of the tube end consists of the following two steps:

1. Tube end preparation (cutting, deburring and cleaning)
2. Assembly and installation

## Tube End Preparation

Tube end preparation is a very critical step to assure the integrity of a tube assembly. Failure to properly perform this function can result in leakage. The three steps in proper tube end preparation are: cutting, deburring and cleaning.

### Cutting

Cut tube reasonably square (within +/- 1°) using a circular toothed cut-off saw (see Fig. S11), or a hacksaw with a fine tooth blade guided by a Tru-Cut Saw Guide (shown in Fig. S12) or other mitre-type saw guide.

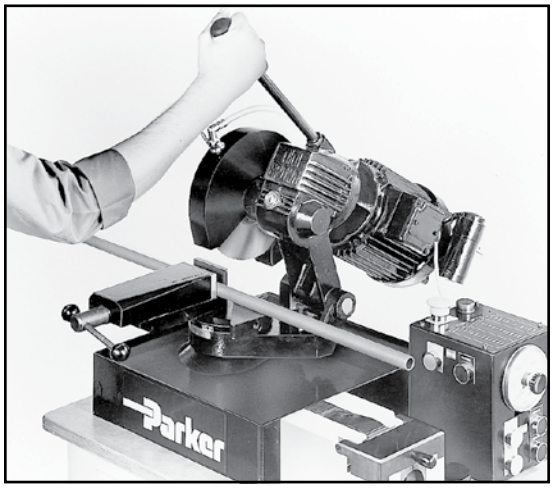


**Fig. S11 – Cut-off Saw on Parker's TP432 or TP1025 Tube Preparation Center**

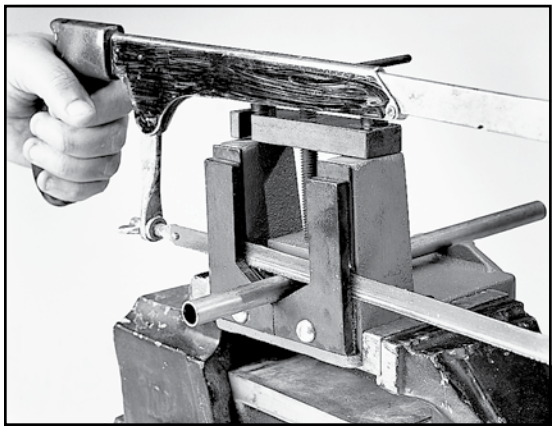

**Fig. S12– Parker's Tru-Kut Sawing Vise used with hacksaw**

A tube cutter may be used with soft tube such as copper and aluminum. It is not recommended for steel and stainless steel tube because it creates a large burr on the I.D., which is difficult to remove and creates flow restriction. Furthermore, if the tube needs to be flared or flanged, the build up on the ID can compromise the sealing surface. For a steel or stainless steel tube application, Fig. S13 illustrates a proper cut and an improper cut (the improper cut was performed by a tube cutter).

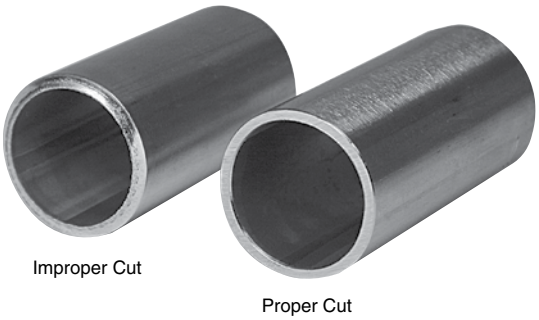


**Fig. S13 – Samples of improper and proper cuts on steel tube**

A square cut is essential to assure a leak-free connection. The following illustrations depict what will result from an uneven cut.

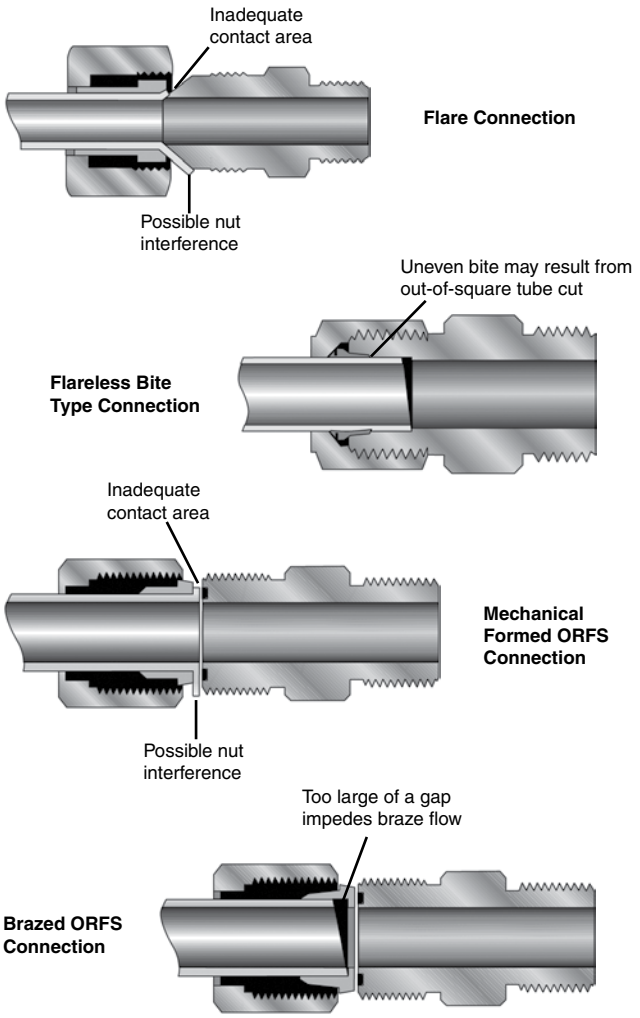


**Fig. S14– Results of Uneven Tube Cuts**



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### Deburring

Lightly deburr the I.D. and O.D. of the tube end to remove burrs and sharp edges. Use the In-Ex deburring tool or power deburring tool (shown on page R22), or emery paper if using tube cutter (for soft tube) or hacksaw. Use front mounted deburring tools if using TP432 or TP1025 tube preparation center found on page R55.

**Note:** Point tube end downward during deburring to keep chips from entering the tube.

### Cleaning

Remove metal chips from I.D. with a brush or compressed air. Wipe the I.D. and the O.D. of the deburred tube end with a clean rag. Debris present in the tube end can result in system contamination or can get embedded into the flange or flare, causing imperfections that are potential leak paths.

# Seal-Lok O-Ring Face Seal Fittings

The proper assembly of the Seal-Lok fitting requires several steps, each important in guaranteeing a leak-free connection and a long service life:

1. Cutting, deburring and cleaning the tube
2. Sleeve Attachment
3. Inspection of sleeve attachment
4. Final installation

The first step of cutting, deburring and cleaning has been covered in a previous section (see page S12).

For recommended minimum and maximum tube wall thickness for Seal-Lok fittings, please refer to Table U3 and U4 on page U3.

Stainless seel lubricant is not necessary for assembly unless parts are washed or heated above 150°. The light wax coating will evaporate at that point.

## Sleeve Attachment

Attaching the sleeve to the tube end is the next critical assembly step. This can be accomplished by two methods mechanically: (flanging) or brazing.

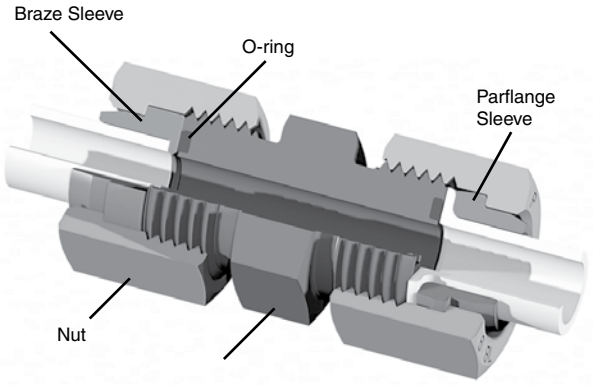


**Fig. S15 – Seal-Lok Union cutaway with flanged and brazed assemblies**

## Flanging

The flanging method requires the use of an appropriate forming machine to create the flange or flat face on the tube end. Since the flat face of the flanged tube seals against the O-ring within the fitting groove, it is important that this surface be relatively smooth. Proper tube end preparation (cutting, deburring and cleaning) will help accomplish this goal

The Parker Parflange® machines utilize an orbital cold forming process to produce a flat, smooth, rigidly supported 90° sealing surface on the tube end.

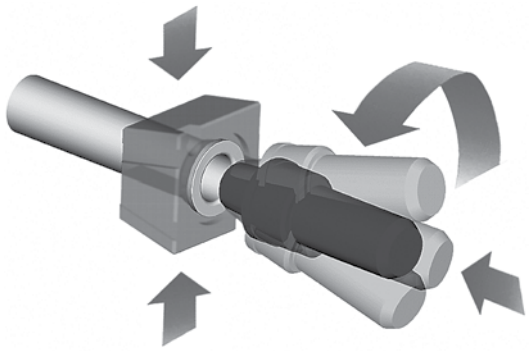

**Fig. S16 – Parker's exclusive orbital spindle motion produces a perfect flange every time**

Parker offers a bench mount model known as the Parflange 1025, shown in Fig. S17, as well as a more versatile, fully automated high speed models. For additional information on the Parflange machines and tooling, refer to section R of this catalog. For additional information on the fully automated models, please contact Parker Tube Fittings Division.

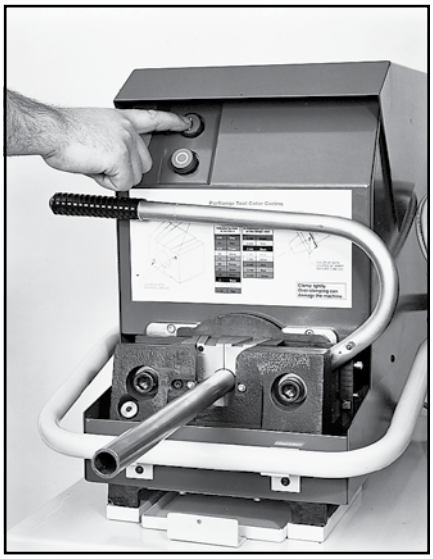

**Fig. S17 – Parflange 1025 machine**





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**Flanging Steps:**

1. Determine the extra cut-off length required for the Parflange process by referring to Tables S9 and S10. (Each table is only a guide. Variations in tube wall thickness and inconsistency in quality of tube cut-off may affect actual dimensions. User should verify actual extra tube cut-off length with one or two flanges prior to large scale flanging.)
2. Select the proper tooling for the tube size. The tube OD, wall thickness and material must be known for proper selection. Refer to Table R6 on page R24 for flanging capability by Parflange machine and availability of tooling
3. With the sleeve properly positioned within the die set, place the die set into the die holder of the machine.
4. Insert the tube through the die opening until it comes in contact with the tube stop. Do not forget to position the tube nut over the tube in the proper orientation, especially if the other tube end has already been flanged, or the tube has sharp bends.
5. Flange the tube as shown in Figure S17.

**Note**: For more information on Parflange procedures, machines, etc., Contact Parker Tube Fittings Division.

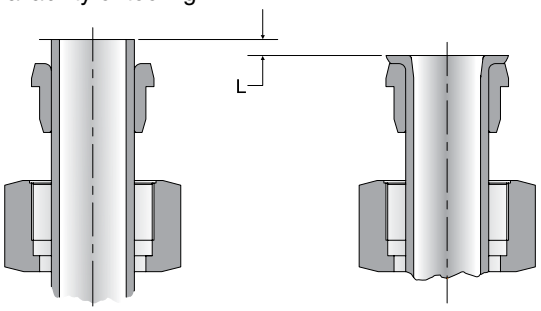


**Fig. S18 – Extra cut-off length**

| Tube O.D. (in.) | Tube Wall Thickness – Inch | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | .028 | .035 | .049 | .065 | .083 | .095 | .109 | .120 | .134 | .156 | .188 |
| 1/4 | 3/16 | 13/64 | 7/32 | | | | | | | | |
| 3/8 | | 5/32 | 3/16 | 13/64 | 15/64 | 1/4 | | | | | |
| 1/2 | | 9/64 | 9/64 | 3/16 | 13/64 | 9/32 | 19/64 | 19/64 | | | |
| 5/8 | | | 11/64 | 3/16 | 13/64 | 1/4 | 17/64 | 17/64 | | | |
| 3/4 | | | 11/64 | 3/16 | 7/32 | 7/32 | 1/4 | 17/64 | 9/32 | | |
| 1 | | | | 3/16 | 3/16 | 13/64 | 15/64 | 1/4 | 19/64 | | |
| 1 1/4 | | | | 11/64 | 3/16 | 13/64 | 15/64 | 1/4 | 19/64 | 19/64 | 21/64 |
| 1 1/2 | | | | 13/64 | 15/64 | 15/64 | 1/4 | 17/64 | 19/64 | 23/64 | 3/8 |

**Table S9 – Extra tube cut-off length guide for inch tube**

| Tube O.D. (in.) | Metric Tube Outside Diameter – (mm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 6 | 8 | 10 | 12 | 16 | 20 | 25 | 30 | 38 |
| 1.0 | 3/16<br>5.2 | 7/32<br>5.7 | 1/8<br>3.1 | 5/32<br>4.1 | 9/64<br>3.6 | | | | |
| 1.5 | 17/64<br>6.7 | 15/64<br>5.9 | 13/64<br>5.1 | 7/32<br>5.4 | 11/64<br>4.2 | | | | |
| 2.0 | | | 13/64<br>5.3 | 15/64<br>6.1 | 3/16<br>4.9 | 7/32<br>5.4 | 15/64<br>6.1 | 17/64<br>6.6 | 9/32<br>7.2 |
| 2.5 | | | | 17/64<br>6.7 | 7/32<br>5.5 | 15/64<br>6.1 | 1/4<br>6.4 | 19/64<br>7.6 | |
| 3.0 | | | | | 15/64<br>5.8 | 17/64<br>6.7 | 9/32<br>7.2 | 5/16<br>7.9 | 19/64<br>7.7 |
| 3.5 | | | | | | 17/64<br>6.9 | 19/64<br>7.5 | 21/64<br>8.5 | |
| 4.0 | | | | | | 9/32<br>7.2 | 5/16<br>8.0 | 11/32<br>8.6 | 11/32<br>8.7 |
| 5.0 | | | | | | | 11/32<br>8.8 | | 3/8<br>9.4 |

**Table S10 – Extra tube cut-off length guide for metric tube**

Dimensions and pressures for reference only, subject to change.



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Another consideration prior to flanging is the minimum straight length to the start of a 90° bend. Table S11 provides this information.

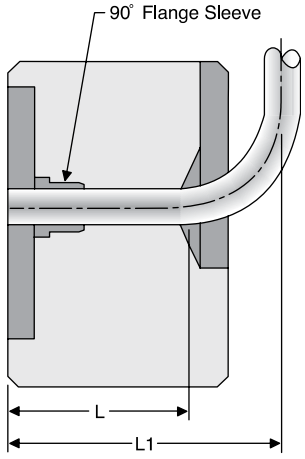


**Fig. S19 – Minimum straight length to start of bend for 90° flanging**

| Tube O.D. Inch Sizes | Tube O.D. Metric Sizes | L* (in.) | L* (mm) | L1** (in.) | L1** (mm) |
|---|---|---|---|---|---|
| 1/4” | 6 | 1 5/16 | 35 | 3 1/8 | 79 |
| 5/16” | 8 | 1 5/16 | 35 | 3 5/32 | 80 |
| 3/8” | 10 | 1 5/16 | 40 | 3 3/16 | 81 |
| 1/2” | 12 | 1 3/8 | 40 | 3 1/4 | 82 |
| | 15 | 1 3/8 | 40 | 3 5/16 | 84 |
| 5/8” | 16 | 1 1/2 | 41 | 3 5/16 | 84 |
| | 18 | 1 5/8 | 42 | 3 11/32 | 85 |
| 3/4” | 20 | 1 3/4 | 50 | 3 3/8 | 86 |
| | 22 | 1 7/8 | 50 | 3 7/16 | 87 |
| | 25 | 1 7/8 | 50 | 3 1/2 | 89 |
| 1” | 28 | 1 7/8 | 50 | 3 9/16 | 90 |
| | 30 | 1 7/8 | 50 | 3 19/32 | 91 |
| 1 1/4” | 32 | 1 7/8 | 50 | 3 5/8 | 92 |
| | 35 | 2 | 50 | 3 11/16 | 94 |
| 1 1/2” | 38 | 2 | 50 | 3 3/4 | 95 |

**Table S11 – Minimum straight length to start of bend for 90° flanging**

**Notes:**

* L is the minimum straight length to the start of tube bend.

** L1 is the minimum centerline dimension necessary for 90° bent tube to clear the frame of the Parflange machine. In bending of the tubes, use radius blocks which will ensure that L1 dimensions are met or exceeded.

### Flange Inspection

The flange should be inspected for proper diameter and sealing surface quality. Table S12 provides the flange diameters for the different sizes. The sleeve can also be used as a quick gauge of the flange diameter. Visually compare the flange diameter to the tapered surface located at the front end of the sleeve (right behind the flange). The large diameter and small diameters at each end of this surface serve as the maximum and minimum flange diameter limits, respectively.

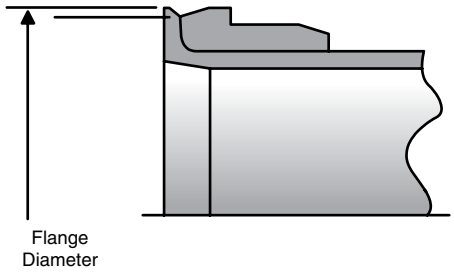


**Fig. S20 — Flange diameter**

| Inch Tube O.D. (in.) | Metric Tube O.D. (mm) | Flange Diameter (in.) |
|---|---|---|
| 1/4 | 6 | .478 / .502 |
| 3/8 | 10 | .594 / .620 |
| 1/2 | 12 | .719 / .745 |
| 5/8 | 14, 15, 16 | .875 / .923 |
| 3/4 | 18, 20 | 1.048 / 1.097 |
| 1 | 22, 25 | 1.298 / 1.347 |
| 1-1/4 | 28, 30, 32 | 1.549 / 1.597 |
| 1-1/2 | 38 | 1.861 / 1.910 |

**Table S12 – Flange dimensions**

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Over-flanging will result in tube nut interference, as well as thinning of the flange tube end. Under-flanging reduces the contact area for sealing against the O-ring in the fitting.

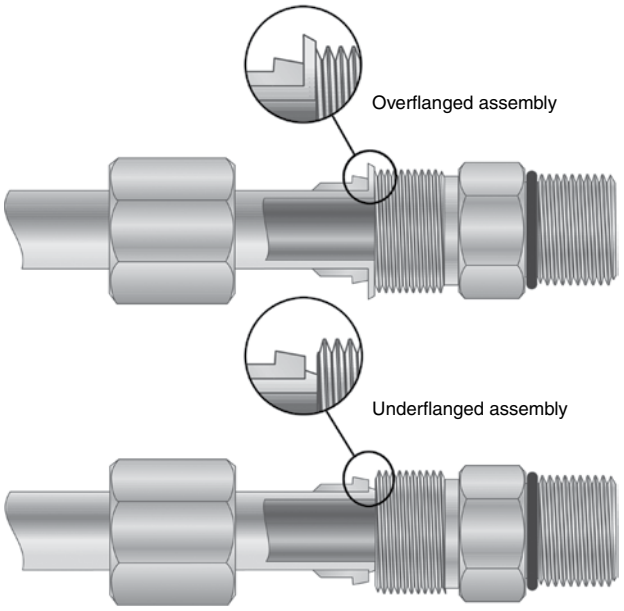


**Fig. S21 – Overflanging and Underflanging**

### Advantages of Parflange process

There are numerous advantages to using the Parflange process over the braze or weld process:

- The Parflange process is several times faster than the brazing or welding methods. For instance, the 1025 model produce flanges at a rate of 9 to 12 times the speed of comparable induction brazing.
- The Parflange process does not require any special pre- or post-flange cleaning of the tube and sleeve.
- Unlike brazing, the Parflange process does not require any flux, braze alloy, post braze cleaner or rust inhibitor. An environmentally safe lubricant applied to the flanging pin is the only additive associated with the Parflange.
- The Parflange process is inherently safe. It does not require open flame or any form of heating. Additionally, there is no emission of hazardous fumes, as is typical with welding and brazing.
- The Parflange process uses only a fraction of the energy needed for welding or brazing.
- The Parflange process accommodates the use of plated components (i.e., tube and sleeve), thus eliminating the need to electroplate assemblies after fabrication.
- The Parflange process eliminates the potential for leaks at the braze or weld joint.
- The Parflange process produces a burnished sealing surface, typically much smoother than the 125 micro-inch requirement of SAE J1453.

## Brazing

Brazing is the other method of attaching the sleeve to the tube end. This process can be accomplished by using a multi-flame torch, as shown in Fig. S22, or an induction brazing unit. (Note: multi-flame torches and induction brazing units are not available through Tube Fittings Division). During the heating process, the pre-formed braze ring or wire-fed filler material is melted between the tube O.D. and the sleeve I.D., creating a strong bond between the two.

**Fig. S22 – Multi-flame torch brazing**

### Brazing Steps:

**1.** Determine the tube length allowance using Table S13.

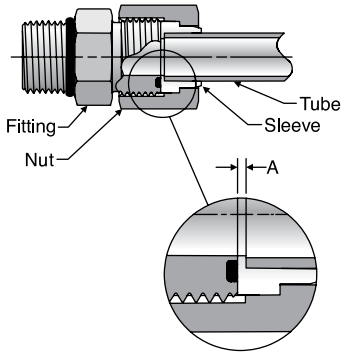


**Fig. S23 – Tube length allowance**

| Nominal Tube O.D. | | A |
|---|---|---|
| Inch | Metric | (in.) |
| 1/4 | 6 | 0.04 |
| 3/8 | 8, 10 | 0.04 |
| 1/2 | 12 | 0.04 |
| 5/8 | 14, 15, 16 | 0.06 |
| 3/4 | 18, 20 | 0.06 |
| 1 | 22, 25 | 0.06 |
| 1 1/4 | 28, 30, 32 | 0.06 |
| 1 1/2 | 35, 38 | 0.06 |

**Table S13 – Tube length allowance**

Dimensions and pressures for reference only, subject to change.



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2. **Cleaning the tube end:** All oil and oxide build-up must be removed from the tube end for at least the length of the braze joint. Oil may be removed by using an oil-free solvent. Oxide build-up may be removed by pickling or by lightly sanding with an aluminum-free emery paper.
3. **Fixturing the parts for brazing:** Care should be taken so the braze fixture allows the sleeve to settle and bottom on the tube completely during heating. Since the Seal-Lok fitting sleeve is designed for a slip fit, this should happen easily. Short tubes can be brazed in the vertical position. On longer tubes, the joint may need to be in the horizontal position, requiring a slight nudge to seat the sleeve on the tube.
4. **Applying flux:** Apply proper flux to tube end (about 1½ sleeve lengths) and sleeve's face and outside surface. Insert appropriate braze ring in the sleeve and place the sleeve on end of the tube. The flux helps protect the parts from oxidizing and promotes braze flow.
5. **Heating the part:** Apply heat uniformly to the joint by using a multi-flame torch as shown in Fig. S22 or with an induction braze unit. Proper brazing involves heating the assembly to brazing temperature and flowing the filler metal through the joint. Heat should be applied broadly and uniformly to the tube as well as the Seal-Lok sleeve. Keep in mind that thicker fitting and tubing sections take longer to heat. The entire assembly should heat to brazing temperature at about the same time. The braze alloy will always flow towards the area of higher temperature. The pre-formed braze ring has been placed inside the joint area—the last area to reach melting temperature. Therefore, when you see the braze material flow to the outside of the joint, you know the joint is complete. If the sleeve does not settle, a slight pressure will cause the sleeve to settle, completing the braze joint.
6. **Cleaning the brazed joint:** After stopping heat application, allow about 10 seconds for the braze alloy to solidify. Then, immerse the joint in hot water (approx. 140°F.). To make cleaning easier, add braze cleaner to the hot water. This sudden cooling cracks the braze flux residue, making it easier to remove. Any remaining residue can be removed by careful wire brushing, making sure not to scratch the sealing surface of the sleeve.
7. **Corrosion protection after brazing:** This is an extremely important step following brazing and even more so following the use of a braze cleaner. Braze cleaners available from Parker are used to facilitate the removal of residual flux after brazing, however are generally corrosive. The residue left on the surface by the cleaner, especially on the I.D. of the tube, can cause rusting in carbon steel tubes rather quickly, if it is not neutralized. Therefore, it is important to neutralize the cleaner residue after cleaning with a solution such as Bernite 136[2] (mix 4 ounces of Bernite 136 with one gallon of water). If the brazed parts are not to be used soon after brazing, a coating of rust inhibitors such as WD-40[3] or SP-350[4] is recommended for the braze and heat affected area.

2 ) Products of Bernite Products, Inc. 84 New York, Westbury, NY 11500 (516) 338-4646.
3 ) A product of WD-40 Company, San Diego, CA 92220.
4 ) A product of CRC Chemicals, USA, Warminister, PA 18974 (215) 674-4300

**Inspection of Brazing**

Inspect the braze for a fillet all the way around the tube at the far end (small diameter) of the sleeve.

**Caution:** If there are gaps in the fillet, the joint may not be sound. In this case, rebrazing is recommended. Remove the sleeve and rebraze a new one in its place.

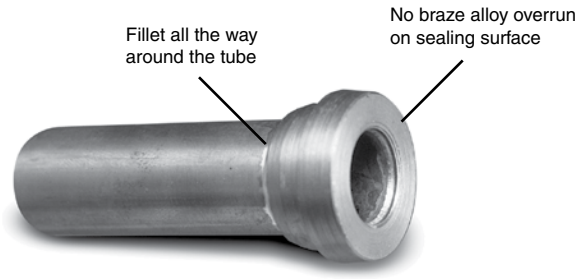


**Fig. S24 – Brazed fitting**

Inspect the sealing surface. There should be no braze alloy overrun or build-up on this surface. If there is build-up, remove it with emery paper, being careful not to scratch the seal surface. If this is not possible, remove the old sleeve and rebraze a new one in its place.

## Final Installation

The following steps are required for final installation of the Seal-Lok fitting:

1. Ensure that the seal is properly installed in the groove of the face seal. Parker provides Seal-Lok fittings with pre-installed trap seals on the grove of the face seal. However, if the seal is being replaced, standard round O-Ring face seal O-rings can be found on page N4, in section N. Since Seal-Lok is machined with the Captive O-ring Groove (CORG), it is recommended that a CORG assembly tool be utilized, as shown in Fig. S25. To properly use the assembly tool, follow these steps

- Position the O-ring inside the CORG assembly tool against the pusher.
- Position the tool over the Seal-Lok tube end until the end is bottomed in the tool.
- Push the plunger of the tool until the O-ring is inserted and seated into the groove.

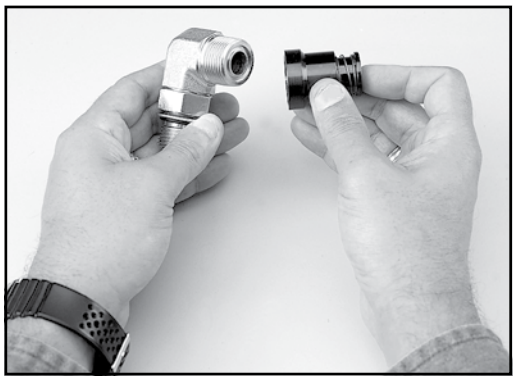

**Fig. S25 – O-Ring installation using the CORG assembly tool**

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2. Place the tube assembly against the fitting body so that the flat face of the flange tube (or braze sleeve) comes in full contact with the O-ring. Thread the nut onto the fitting body by hand and tighten it to the recommended torque represented in Table S14. If torque wrenches are not available, an alternate method of assembly is the Flats From Wrench Resistance (F.F.W.R.) method. Wrench tighten the nut onto the fitting body until light wrench resistance is reached. Tighten further to the appropriate F.F.W.R. value.

   **Note:** A second wrench may be required to prevent the fitting from moving during assembly.

**Caution: The torque method of assembly is the preferred method of assembly for Seal-Lok fittings. It reduces the risk of human error during assembly that is more prevalent in the Flats From Wrench Resistance (F.F.W.R.) method. To ensure the most accurate assembly of the Seal-Lok fitting, it is strongly recommended that the torque method be utilized.**

| O.D. | | SAE Dash Size | Tube Side Thread Size (UN/UNF) | Tube Side Assembly Torque (+10% -0%) | | | Flats from Wrench Resistance (F.F.W.R.) | |
|---|---|---|---|---|---|---|---|---|
| (in.) | (mm) | | | in.-lb. | ft.-lb. | N-m | Tube Nuts | Swivel & Hose Ends |
| 1/4 | 6 | -4 | 9/16-18 | 220 | 18 | 25 | 1/4 to 1/2 | 1/2 to 3/4 |
| 3/8 | 8, 10 | -6 | 11/16-16 | 360 | 30 | 40 | 1/4 to 1/2 | 1/2 to 3/4 |
| 1/2 | 12 | -8 | 13/16-16 | 480 | 40 | 55 | 1/4 to 1/2 | 1/2 to 3/4 |
| 5/8 | 14, 15, 16 | -10 | 1-14 | — | 60 | 80 | 1/4 to 1/2 | 1/2 to 3/4 |
| 3/4 | 18, 20 | -12 | 1 3/16-12 | — | 85 | 115 | 1/4 to 1/2 | 1/3 to 1/2 |
| 1 | 22, 25 | -16 | 1 7/16-12 | — | 110 | 150 | 1/4 to 1/2 | 1/3 to 1/2 |
| 1 1/4 | 28, 30, 32 | -20 | 1 11/16-12 | — | 150 | 205 | 1/4 to 1/2 | 1/3 to 1/2 |
| 1 1/2 | 35, 38 | -24 | 2-12 | — | 230 | 315 | 1/4 to 1/2 | 1/3 to 1/2 |
| 2 | 50 | -32 | 2 1/2-12 | — | 375 | 510 | 1/4 to 1/2 | 1/3 to 1/2 |

**Table S14 – Seal-Lok and UPTC assembly torque and F.F.W.R. For brass, aluminum (and other soft metals) decrease torque value by 35%, however F.F.W.R. is the same.**

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# Seal-Lok Troubleshooting Guide

## O-Ring Face Seal

| CONDITION | PROBABLE CAUSE(S) | RECOMMENDATION |
|---|---|---|
| Immediate leakage when system is pressurized | • Improper tightening of joint | • Check for O-ring damage and re-tighten connection to the recommended torque value |
| Under-flanged assembly | • Undersized tube diameter resulting in tube slippage during flanging<br>• Die gripping surface is worn or dirty | • Verify that the O.D. is correct; if undersized, replace tube.<br>• Inspect die gripping surface; if clogged or excessively worn, clean or replace. |
| Over-flanged assembly | • Sleeve is positioned incorrectly in die | • Check for proper positioning of sleeve in die; if over-flanged, replace tubing |
| Flange out-of-round | • Tubing was not cut properly<br>• Tube was not properly supported during flanging<br>• Tubing is eccentric | • Cut tubing within 90° ±1°<br>• Support tubing so that tube end is perpendicular to tube stop during flanging<br>• Replace with quality tubing<br>• Replace out-of-round flanges |
| Cracked flange | • Tubing too hard | • Replace tubing using recommended quality tube |
| Scored, pitted flange | • Improper deburring and cleaning of tube prior to flanging<br>• Flange pin not cleaned and lubricated properly | • Replace flange using proper deburring and cleaning recommendations<br>• Keep flanging pin clean and working surfaces well lubricated. |
| Leakage at braze joint | • Poor braze joint/improper joint clearance<br>• Mixing of sleeve and tube material<br>• Improper/inadequate flux, braze alloy overrun, or buildup on face<br>• Improper/inadequate braze temperature | • Flux and reheat the joint, remove and replace with new sleeve<br>• Always use steel sleeves with steel tubing and stainless sleeves with stainless tubing<br>• Apply flux liberally to sleeve and tube end prior to brazing. Use recommended flux, braze alloy and brazing temperature. |
| Leakage at face-seal end | • Misalignment or improper fit<br>• Damaged, pinched, improper, or missing O-ring<br>• Extruded O-ring<br>• Damaged fitting<br>• Braze overflow on sealing surface | • Align tube end and connecting fitting properly before tightening tube nut, holding the flat face of the mating fitting against O-ring while tightening<br>• Replace O-ring, properly installing it in the face seal groove<br>• Replace O-ring and check for proper alignment and pressure surges exceeding rated pressure of fitting; tighten the nut to recommended torque or replace fitting if threads or sealing surface is grossly damaged.<br>• Remove and replace sleeve which has braze overflow on its sealing surface. |

**Table S15 – Seal-Lok Troubleshooting guide**

Dimensions and pressures for reference only, subject to change.



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# Triple-Lok 37° Flare Fittings

For leak-free performance, the Triple-Lok fitting requires the following steps:

1. Cutting, deburring and cleaning of the tube
2. Flaring
3. Flare inspection
4. Installation

> **Caution:** Use only seamless or welded and drawn tube that is fully annealed for flaring and bending. (See page T14 for tube/fitting material compatibility information.)

Step 1 has been covered in a previous section (see page S12).

For the recommended minimum and maximum tube wall thickness for Triple-Lok fittings, please refer to Table U3 on page U3.

## Flaring

Several flaring methods, ranging from simple hand flaring to hydraulic/electric power flaring, are available. Various tools for flaring are shown on pages R27 through R34. Power flaring is quicker and produces more accurate and consistent flares compared to hand flaring. Therefore, it is a preferred method of flaring. Hand flaring should be limited to places where power flaring tools are not readily available. The Parflange machines shown on page R23 also flare tube with an orbital flaring process and provide the best flare for stainless steel tube.

Prior to flaring, determine the tube length allowance using Table S16. This tube length allowance should be added to the cut tube length to allow for the "loss" of tube caused by flaring.

| Nominal Tube O.D. | | A |
|---|---|---|
| Inch | Metric | |
| 1/8 | — | 0.07 |
| 3/16 | — | 0.08 |
| 1/4 | 6 | 0.09 |
| 5/16 | 8 | 0.08 |
| 3/8 | 10 | 0.08 |
| 1/2 | 12 | 0.12 |
| 5/8 | 14, 15, 16 | 0.13 |
| 3/4 | 18, 20 | 0.15 |
| 7/8 | 22 | 0.15 |
| 1 | 25 | 0.15 |
| 1 1/4 | 30, 32 | 0.20 |
| 1 1/2 | 38 | 0.18 |
| 2 | 42 | 0.28 |

**Table S16 — Tube length allowance**

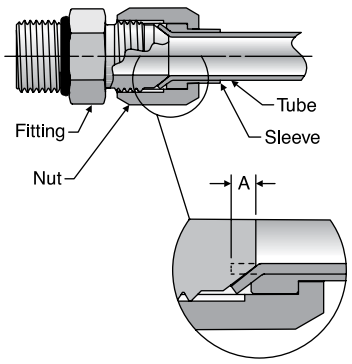



**Fig. S26 — Tube length allowance**

Flare tube end using one of the flaring tools and following its operating instructions. Fig. S26 shows flaring with Hydra-Tool.

> **Note:** Be sure to insert a nut and a sleeve in proper sequence and orientation before flaring either end of a bent tube, or second end of a straight tube (see Fig. S27).

**Fig. S27 – Flaring with Hydra-Tool**

**Fig. S28 – Nuts and sleeves assembled before flaring**

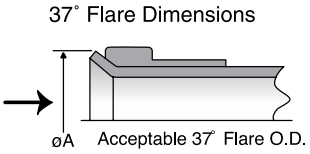
### Flare Inspection

Inspect flare for dimensions and surface quality. Table S17 shows the proper flare dimensions. The sleeve can also be used for a quick check of the flare dimensions as shown in Fig. S29.

Stainless seel lubricant is not necessary for assembly unless parts are washed or heated above 150°. The light wax coating will evaporate at that point.

| Inch Tube O.D. (in.) | Metric Tube O.D. (mm) | 37° Flare Diameter ØA (in.) |
|---|---|---|
| 1/4 | 6 | .340/.360 |
| 5/16 | 8 | .400/.430 |
| 3/8 | 10 | .460/.490 |
| 1/2 | 12 | .630/.660 |
| 5/8 | 15 & 16 | .760/.790 |
| 3/4 | 18 & 20 | .920/.950 |
| 1 | 25 | 1.170/1.200 |
| 1 1/4 | 30 & 32 | 1.480/1.510 |
| 1 1/2 | 38 | 1.700/1.730 |

**Table S17 — 37° Flare Dimensions**



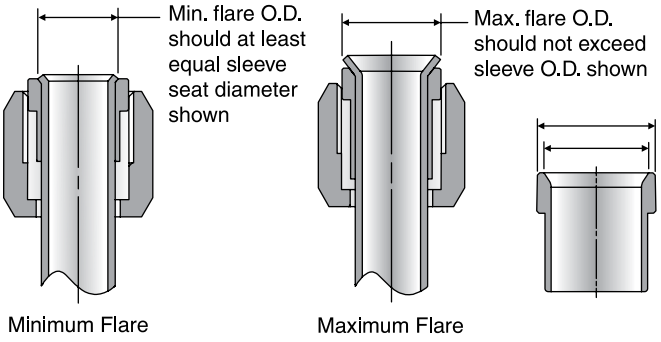




**Fig. S29 – Comparing flare O.D. with sleeve seat and O.D.**

**Underflaring** (see Fig. S30) reduces contact area causing excessive nose collapse and leakage; or, in extreme cases, tube pull out under pressure.

**Overflaring** (see Fig. S30) causes tube nut thread interference, either preventing assembly altogether, or giving a false sense of joint tightness resulting in leakage.



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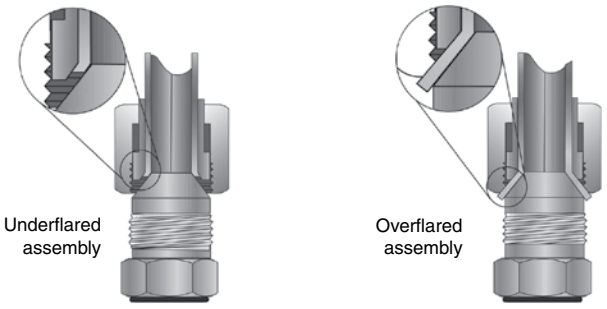


**Fig. S30 – Underflaring and overflaring**

The flare must be reasonably square and concentric with the tube O.D.; and its surface must be smooth, free of rust, scratches, splits, weld beads, draw marks, embedded chips, burrs or dirt. If the flare does not meet the above requirements, cut it off, determine the probable cause from the troubleshooting guide shown in Table S20, take corrective action and re-flare.

## Installation

Improper flaring or installation causes over half of the leakage with flared fittings. Thus, proper installation is critical for a trouble free operation.

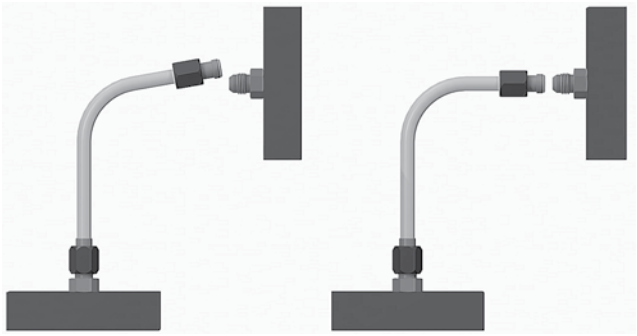

**Fig. S31 – Improper bend and short tube**

Align the tube on the flare (nose) of the fitting body and tighten the nut using one of two methods described below.

1. Flats from Wrench Resistance (FFWR) or "Flats" method
2. Torque method

> **Note:** Do not force an improperly bent tube into alignment (Fig. S31) or draw-in too short a tube using the nut. It puts undesirable strain on the joint leading, eventually, to leakage.

### Flats Method

Tighten the nut lightly with a wrench (approximately 30 in.lb.), clamping the tube flare between the fitting nose and the sleeve. This is considered the Wrench Resistance (WR) position. Starting from this position, tighten the nut further by the number of flats from Table S18. A flat is referred to as one side of the hexagonal tube nut and equates to 1/6 of a turn.

This Flats method is more forgiving of the two. It circumvents the effects of differences in plating, lubrication, surface finishes, etc., that greatly influence the torque required to achieve proper joint tightness or clamping load. Therefore, it is recommended to use this method wherever possible, and especially where the plating combination of components is not known, and during maintenance and repair where the components may be oily. Use Table S18 as a guide for proper tightening method.

| Condition | Recommended Tightening Method |
|---|---|
| 1. Plating of all components is the same. | Either method is acceptable. Use Table S20. |
| 2. Plating is mixed. | Use FFWR method. |
| 3. Plating of nut and sleeve or hose end is unknown. | Use FFWR method. |
| 4. Parts are oily. | Use FFWR method. |
| 5. Stainless or brass components. | Use FFWR method. |

**Table S18 – Joint tightening method guide**

Parker also recommends that wherever possible, the step of marking the nut position relative to the body should be done. This step serves as a quick quality assurance check for joint tightening. To do this, at the initial wrench resistance position, make a longitudinal mark on one of the flats of the nut and continue it on to the body hex with a permanent type ink marker as shown in Fig. S32**.** Then, at the properly tightened position, mark the body hex opposite the previous mark on the nut hex.

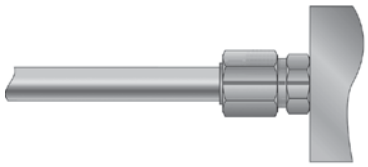

**Fig. S32 – Make reference mark on nut and tube body**

These marks serve two important functions:

1. The displaced marks serve as a quick quality assurance check that the joint has been tightened.
2. The second mark on the body serves as a proper tightening position after a joint has been loosened.

The flats method is slower than the torque method, but it has the two distinct advantages described earlier, namely, circumvention of plating differences and a quick visual check for proper joint tightening.

### Torque Method

With proper tube flare alignment with the nose of the fitting, tighten the nut to appropriate torque value in Table S19. This method is fast and accurate when preset torque wrenches are used. Consistent component selection is recommended so that the effects of dissimilar plating is not an adverse factor in joint integrity. This makes it desirable for high production assembly lines. However, a joint assembled using the torque method can only be checked for proper tightening by torquing it again.

> **Note:** This method should not be used if the type of plating on the fitting and mating parts (sleeve + nut or hose swivel) is not known. The torque method should not be used for lubricated or oily parts as improper clamping forces may result. Over-tightening and fitting damage may occur as a result.





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| SAE Dash Size | Thread Size | Assembly Torque* (+10% -0) in. lb. | Assembly Torque* (+10% -0) ft. lb. | Tube Connection FFWR | Swivel Nut or Hose Connection FFWR |
|---|---|---|---|---|---|
| -2 | 5/16-24 | 35 | 3 | — | — |
| -3 | 3/8-24 | 65 | 5 | — | — |
| -4 | 7/16-20 | 155 | 13 | 2 1/2 | 2 |
| -5 | 1/2-20 | 165 | 14 | 2 | 2 |
| -6 | 9/16-18 | 265 | 22 | 2 | 1 1/2 |
| -8 | 3/4-16 | 505 | 42 | 2 | 1 1/2 |
| -10 | 7/8-14 | 720 | 60 | 1 1/2 | 1 1/2 |
| -12 | 1 1/16-12 | 1000 | 84 | 1 1/2 | 1 1/4 |
| -14 | 1 3/16-12 | 1200 | 100 | 1 1/2 | 1 1/4 |
| -16 | 1 5/16-12 | 1415 | 118 | 1 1/2 | 1 |
| -20 | 1 5/8-12 | 2015 | 168 | 1 | 1 |
| -24 | 1 7/8-12 | 2340 | 195 | 1 | 1 |
| -32 | 2 1/2-12 | 3180 | 265 | 1 | 1 |
| -40 | 3-12 | — | — | 1 | 1 |

**Table S19 – Triple-Lok assembly torques and FFWR**
**For brass and aluminum fittings, use approximately 65% of the torque values shown, unlubricated, however FFWR is same for all materials.**

**Notes:**

1. Assembly Torque: Torque values are for unlubricated carbon steel components and properly lubricated stainless steel components. All stainless steel Triple-Lok tube nuts have an anti-seize lubricant to prevent galling during assembly.
2. FFWR: The Flats From Wrench Resistance or “Flats” method is recommended for steel, stainless steel and brass components.
3. Torque and FFWR: Torques and FFWR shown in the chart are for use with the tube materials, wall thickness, etc. recommended by Parker Hannifin Tube Fittings Division for use with Parker Triple-Lok fittings.

# Triple-Lok Troubleshooting Guide

## 37° Flare

| CONDITION | PROBABLE CAUSE(S) | RECOMMENDATION |
|---|---|---|
| Tube nut binds to tube flare<br><br>Tube nut cannot engage the fitting body | • Flare too large or tube wall too heavy | • Flare new tube end using proper flare diameters |
| Flare is out-of-round (lopsided) | • Tube cut at an angle | • Re-cut tube, reasonably square, to 90° ± 1° and flare new tube end |
| Nicks, scratches, pock marks on tube flare of fitting | • Contaminants on tube ID or flaring cone/pin prior to flaring<br>• Worn/damaged flaring cone/pin<br>• Poor-quality tube | • Flare new tube end using proper tube preparation techniques<br>• Assure that flare cone is clean<br>• Replace poor-quality tube |
| Tube crack on flare | • Poor-quality welded tube; work-hardened tube; tube not annealed (too hard) | • Flare new tube end using appropriate tube (e.g.,fully annealed) and tube cutting methods |
| Tube nut bottoms out before seats are mated properly | • Unintentional use of 45° flare tube nut, or tube sleeve was omitted | • Use appropriate 37° flare components (body, nut and sleeve) |
| Immediate leakage from tube nut | • Connection may not be tightened properly (if at all) | • Check joint for appropriate FFWR or torque; retighten as appropriate |
| Tube nut continues to back off or loosen | • Damaged Fitting<br>• Excessive vibration<br>• Improper assembly torque | • Replace damaged fitting<br>• Re-route or clamp properly<br>• Assemble to appropriate torque |
| Damaged fitting and/or nose collapse, flow reduction | • Frequent assembly and disassembly or over-tightening | • Fitting should be replaced and tightened properly; avoid frequent assembly/disassembly |

**Table S20 — Triple-Lok Troubleshooting guide**

Dimensions and pressures for reference only, subject to change.



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# Ferulok Flareless Bite Type Fittings

Ferulok fitting assembly consists of the following steps:

1) Cutting, deburring and cleaning of the tube
2) Ferrule pre-set
3) Pre-set inspection
4) Final installation

Step 1 (cutting, deburring and cleaning of the tube) has been previously covered (see page S12).

For the recommended minimum and maximum tube wall thickness for Ferulok fittings, please refer to Table U3 on page U3.

Prior to pre-setting, determine the tube length allowance "A" using Table S21.

| Nominal Tube O.D. | A |
|---|---|
| **1/8** | 0.19 |
| **3/16** | 0.23 |
| **1/4** | 0.23 |
| **5/16** | 0.25 |
| **3/8** | 0.25 |
| **1/2** | 0.31 |
| **5/8** | 0.35 |
| **3/4** | 0.35 |
| **7/8** | 0.35 |
| **1** | 0.42 |
| **1 1/4** | 0.42 |
| **1 1/2** | 0.49 |
| **2** | 0.49 |

**Table S21 — Tube length allowance**

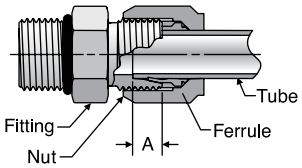



**Fig. S33 — Tube length allowance**

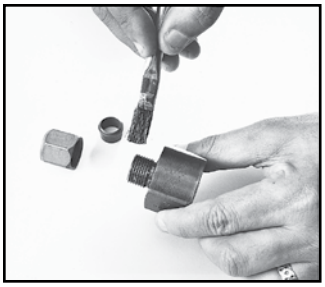
## Ferrule Pre-set

Prior to final installation, the Ferulok fitting requires a pre-setting operation that creates a bite by the ferrule into the outer surface of the tubing. Pre-setting can be accomplished by two different methods: hydraulically using a Hyferset Tool or a Hydra-Tool, or manually using a hardened Ferulset tool or the fitting body.

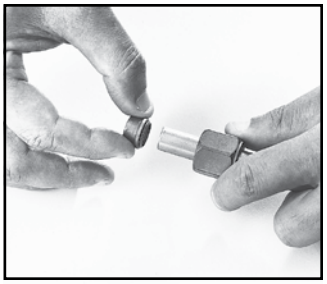
When using the Hyferset or Hydra-Tool method, the pressure build-up "bites" the ferrule into the tubing. When using the Ferulset or fitting body, thread the connection to finger tight and wrench an additional 1-3/4 turns. This will "bite" the ferrule into the tube.

### Pre-setting using Ferulset Tool or Fitting Body

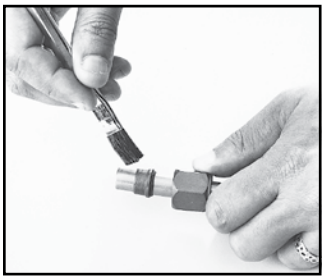
Ferulset pre-setting tools made from hardened steel are available for sizes 2 through 32. (See page R39.) They are recommended over the fitting body because they can be used repeatedly to perform the pre-set operation. The fitting body can be used only once for pre-setting and should be used during final installation with the pre-set tube line. The following steps are required for proper pre-set of the ferrule using the Ferulset tool or fitting body.



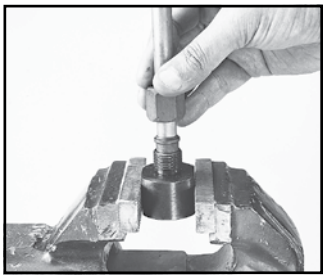
**Step 1 –** Lubricate thread and cone of Ferulset Tool (or fitting body).



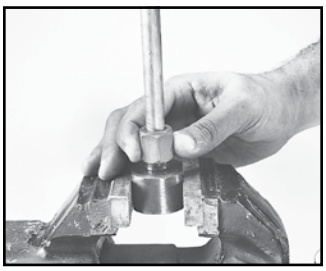
**Step 2 –** Slip nut and ferrule over deburred tube end. Be sure the long, straight end of the ferrule points toward tube end.



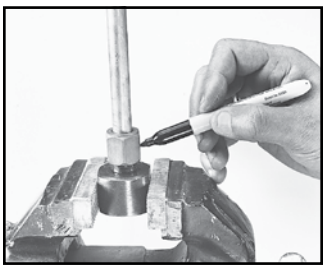
**Step 3 –** Lubricate ferrule with system fluid or a compatible lubricant.



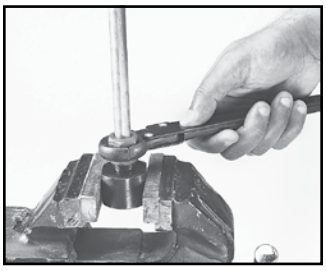
**Step 4 –** Bottom tube end firmly on internal shoulder of Ferulset Tool (or fitting body).



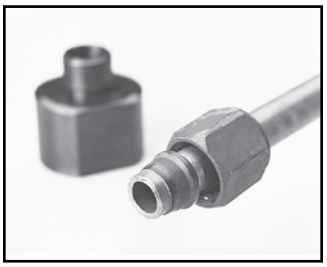
**Step 5 –** Manually screw nut onto Ferulset Tool or fitting body until finger tight.



**Step 6 –** Make reference mark on nut and tube.



**Step 7 –** Hold tube steady against internal shoulder of Ferulset Tool or fitting body and tighten nut an additional **1-3/4 turns.**



**Step 8 –** Loosen nut and check for proper pre-set. Use the following inspection criteria.

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### Pre-setting with Hyferset Tool or Hydra-Tool

Pre-setting with hydraulic equipment (Hyferset or Hydra-Tool) is preferred for fittings larger than size 8 or large production quantities in any sizes.

For full instruction on the use of the Hyferset Tool (see Fig. S34), please refer to Bulletin 4393-B1, which is included with each shipment of the Hyferset Kit #611049C. For full instructions on the use of the Hydra-Tool, please refer to Bulletin 4392-B10.

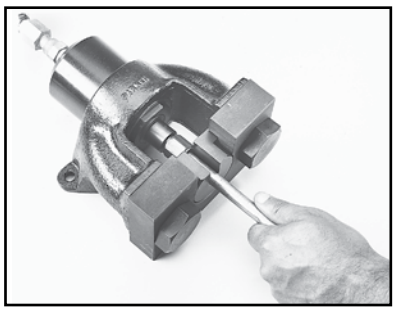

**Fig. S34 – Hyferset tool**

### Pre-Set Inspection

All Ferulok fitting presets must be disassembled and inspected for proper ferrule pre-set before final installation. The following detailed inspection procedures must be followed regardless of the method used to pre-set the ferrule to the tube. (Refer to Fig. S35 for the five inspection points discussed below).

1. A ridge of metal (A) has been raised above the tube surface to a height of at least 50% of the thickness of the ferrule's leading edge, completely around the tube.
2. While the leading edge of the ferrule may be coined flat (B) there is a slight bow to the balance of the pilot section (C).
3. The tail or back end of the ferrule is snug against the tube (D).
4. There is a slight indentation around the end of the tube (E) that indicates the tube was bottomed in the tool or fitting during pre-setting.
5. Avoid rotating the ferrule. Steel ferrules should not be capable of moving back and forth along the tube beyond the bite area (a stainless steel ferrule will move more than steel because of it's spring back characteristics).

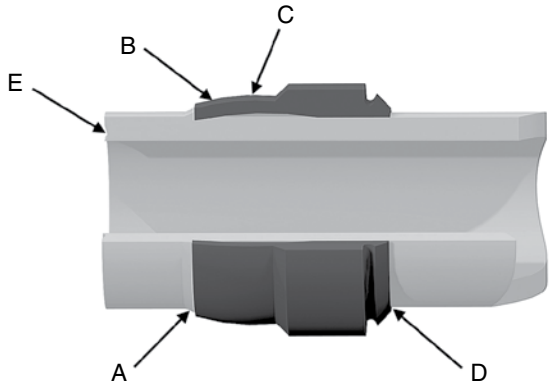


**Fig. S35 – Ferulok preset inspection points**

**Caution:** Wrench torque should never be used as the gauge for reliable Ferulok pre-set and/or assembly. The reliability of the pre-set and assembly of bite type fittings is dependent on the ferrule traveling a prescribed distance into the tapered fitting throat in order to bite into the tube and effect a strong grip and seal.

## Installation

Use one of the following installation procedures, depending on the tooling used earlier to pre-set the ferrule to the tubing.

1. **Fitting body, Hyferset, Hydra-Tool, or Ferulset used to pre-set ferrule** – If the fitting body was used for pre-setting the ferrule, complete the final installation with the **same** fitting body. If one of the tools was used, select the compatible fitting body and lubricate* the threads. Tighten the nut until a sudden and noticeable wrench resistance is achieved. Then wrench an additional **1/6 to 1/4 turn** to complete the final assembly.
2. **Swivel nut assembly procedure (R6BU, C6BU and S6BU)** – For final assembly of swivel nut, a **3/4** turn from finger tight is required for all sizes.

*No additional lubrication is required with stainless steel fittings as the nuts are pre-lubricated.



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## Ferulok Troubleshooting Guide

Problems with bite type hydraulic fittings are most often traced to faulty Pre-Set/Assembly procedure.

| Problem / Probable Cause | Remedy |
|---|---|
| Tube not bottomed | Check for the indentation on the tube end or compare the length from the end of the tube to the front end of the ferrule of a known good assembly to that of the assembly in question. This assembly should be scrapped. (Fig. S36) |
| Shallow bite | Inspect for turned up ridge of material. A failure to achieve this ridge can be traced either to the nut not being tightened enough or the tube not being bottomed against the stop which allowed the tube to travel forward with the ferrule. In some instances this assembly may be re-worked. (Fig. S37) |
| Over-set ferrule | Too much pressure or more than 1 3/4 turns from finger tight were used to pre-set ferrule, or the nut was severely over-tightened in final assembly. This assembly should be scrapped. (Fig. S38) |
| Ferrule cocked on tube | The ferrule may become cocked on the tube when the tube end is not properly lined up with the body. Generally, this condition is caused by faulty tube bending. All bent tube assemblies should drop into the fitting body prior to make up. This assembly should be scrapped. (Fig. S39) |
| No bite | If all of the prior checks have been made and the ferrule still shows no sign of biting the tube, it may be that the tube is too hard. This assembly should be scrapped. (Fig. S40) |

**Table S22 – Ferulok fitting troubleshooting guide**

**Caution: Pre-set tools such as the Ferulset and Hyferset are preferred for pre-setting ferrules prior to final assembly. However, when an actual fitting body is used to pre-set the ferrule, that body should be connected only to the specific ferrule it was used to pre-set.**

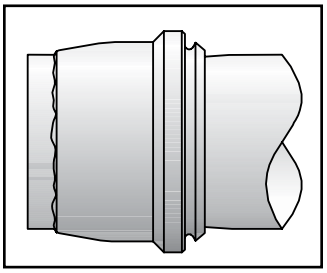

**Fig. S36 – Tube not bottomed**

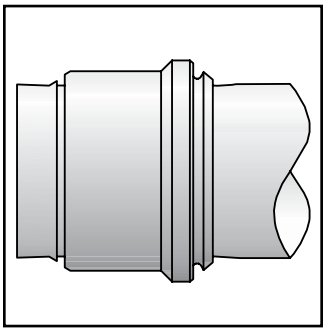

**Fig. S37 – Shallow bite**

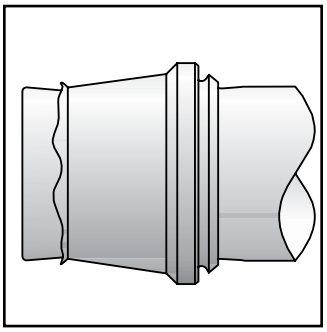

**Fig. S38 – Over-set ferrule**

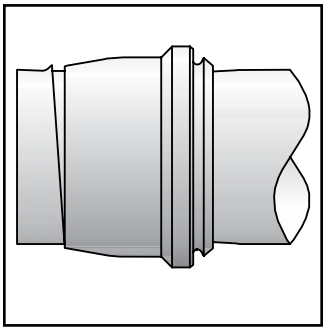

**Fig. S39 – Ferrule cocked on tube**

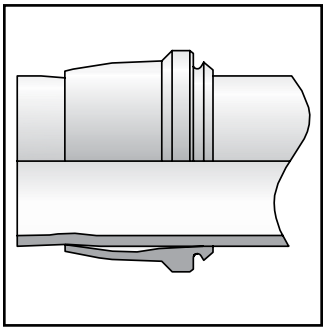

**Fig. S40 – No bite**





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## 24° Flareless Bite

| CONDITION | PROBABLE CAUSE(S) | RECOMMENDATION |
|---|---|---|
| Immediate leakage when system is pressurized | • Improper ferrule/bite ring orientation | • Reset ferrule to ensure that the leading edge of ferrule/bite ring is pointing towards end of tube and seat of the mating fitting |
| Additional/excessive stress apparent on bite | • Non-square tube cut; tube not being properly supported in seat of adapter | • Re-cut tube to 90° ± 1° |
| Flexural stresses allow tube to“rock” back and forth | • Tube not fully supported in fitting’s body seat | • Reset tube end. This time ensure that the tube is bottomed in the presetting tool or fitting body |
| Poor ferrule/bite ring pre-set and/or tube collapse | • Tube may be too hard; or preset pressure or torque might be too high<br>• Tube is too thin | • Use fully annealed tube max hardness $R_B$ 72 for steel, $R_B$ 90 for stainless steel<br>• Consult manufacturer's minimum tube wall thickness requirements; tube supports must be used with certain thin-walled steel or stainless-steel tube. Review preset requirements |
| Tube not bottoming out in fitting body | • Improper preset or wrong tool used for presetting | • In the presetting process, it is important to exert axial force on the tube to keep it fully bottomed in the tool. Check for indentation on end of the tube |
| Shallow bite of ferrule or cut ring into tube | • Worn preset tool<br>• Too low preset pressure or torque<br>• Tube too hard<br>• Tube not bottomed against stop initially in preset | • Replace preset tool<br>• Observe manufacturer’s recommendation for proper preset<br>• Ensure that tube is of correct hardness or material<br>• Hold tube against stop in preset |
| Tube pulls out of fitting in application and ferrule skives end of tube | • Improper preset<br>• Tube too hard<br>• Excessive internal pressure<br>• Excessive axial load on tube<br>• Inadequate make up | • Preset must be inspected for evidence of proper preset, such as raised ridge of metal in front of leading edge<br>• Ensure that tube is of proper hardness and material<br>• Ensure that internal pressure is within rating of fitting (tube might be of a higher rating)<br>• Avoid additional axial load than that caused by internal pressure<br>• Follow proper presetting and assembly procedures |
| Fitting nut is tight but leakage still occurs | • Overset ferrule<br>• Cracked tube<br>• Damaged components | • Excessive force used in presetting of ferrule can cause it not to spring back and effect a seal. Follow manufacturer’s recommendation for preset<br>• Check tube for circumferential crack due to fatigue<br>• Check components for damage such as nicks, scratches and cracks |



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# Intru-Lok Flareless Bite Type Fittings

The steps to properly assemble the Intru-Lok fitting are:

1. Cutting, deburring and cleaning of the tube
2. Installation

## Cutting, Deburring and Cleaning

Cut soft metal tube with tube cutter, circular toothed cut-off saw, or hacksaw with a fine tooth saw blade. A square cut can be attained with a hacksaw using Parker's Tru-Kut Sawing Vise. With a Parker 226 In-Ex deburring tool (see page R22), lightly deburr the inside and outside corner of the tube end.

Plastic tube can be cut with a plastic tube cutter, Parker part number PTC-001 (available from the Parflex Division).

After cutting and deburring, remove loose burrs or dirt with a brush or compressed air.

## Installation

Intru-Lok fittings are designed to permit tube entry and fitting make-up without removal of the nut and ferrule from the fitting body. The following steps are required for proper installation.

1. Insert the tube through the nut and ferrule until it bottoms on the seat within the fitting body.
2. Tighten the nut to the finger tight position, then wrench tighten 1 1/4 turns. (For low pressure instrument air service, 1 turn from finger tight is sufficient. This will also allow for the maximum number of remakes.)

   **Note:** When using the BIP knurled nut and TIP insert for plastic tube, tighten the nut an additional 1 turn from the finger tight position.

## Remake

The nut should be wrenched down until a sudden resistance to wrench force is evident. From this point wrench the nut 1/6 turn more to cause the ferrule to spring into its seal against the tube and fitting body.

## Intru-Lok Troubleshooting Guide

Problems associated with bite type fittings are most often traced to faulty Pre-Set/Assembly procedure.

| Problem / Probable Cause | Remedy |
|---|---|
| Tube not bottomed | On soft metal tubing, check for the indentation on the tube end. For plastic tubing or soft metal, compare the length from the end of the tube to the front end of the ferrule of a known good assembly to that of the assembly in question. This assembly should be scrapped. |
| Shallow bite | Inspect for turned up ridge of material at the front of the ferrule. A failure to achieve this ridge can be traced either to the nut not being tightened enough or the tube not being bottomed against the stop which allowed the tube to travel forward with the ferrule. In some instances this assembly may be re-worked. |
| Over-set ferrule | More than 1 1/4 turns from finger tight were used to pre-set ferrule, or the nut was severely over-tightened in final assembly. This assembly should be scrapped. |
| Ferrule cocked on the tube | The ferrule may become cocked on the tube when the tube end is not properly lined up with the body. Generally this condition is caused by faulty tube bending. All bent tube assemblies should fit into the fitting body prior to make up. This assembly should be scrapped. |

**Table S23 – Intru-Lok troubleshooting guide**





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# EO Metric Bite Type FIttings

The proper make-up and assembly of EO bite type fittings, as with other fittings, is critical to their proper functioning. Proper assembly consists of the following steps:

1. Cutting, deburring and cleaning of the tube
2. Pre-set of progressive ring
3. Pre-set inspection
4. Installation

Step 1 (cutting, deburring and cleaning of the tube) has been previously covered on pages S12-S13.

## Pre-set of Progressive Ring

The EO fitting requires a pre-set operation that creates a bite by the progressive ring into the outer surface of the tube. There are two methods of achieving the pre-set:

- Manually with the fitting body or hardened pre-assembly tool (not recommended for stainless steel tube).
- Hydraulically with the EO-Karrymat, Hydra Tool or Hyferset

## Pre-set Using the Fitting Body or Hardened Pre-assembly Tool

Pre-setting with the fitting body is only recommended for steel and copper tubes. For frequent pre-setting, stainless steel tube and hose standpipe fittings, a hardened pre-assembly tool (VOMO) is strongly recommended (see Fig. S41).

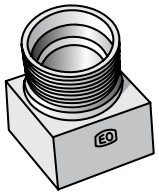
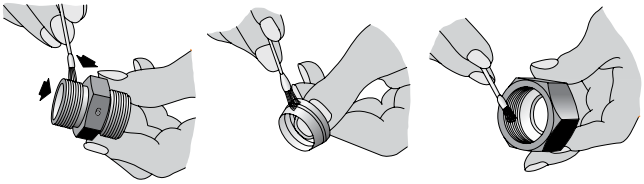



**Fig. S41 – VOMO pre-assembly tool**

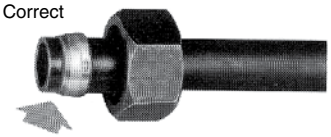
**Steps for pre-set using the fitting body or the hardened pre-assembly tool.**

1. Lubricate thread and cone of fitting body or hardened pre-assembly tool, as well as the progressive ring and nut threads.

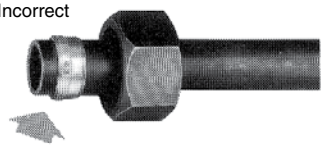


2. Slip nut and progressive ring over tube, assuring that they are in the proper orientation.

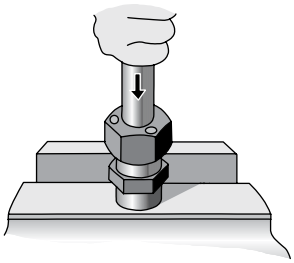
Correct



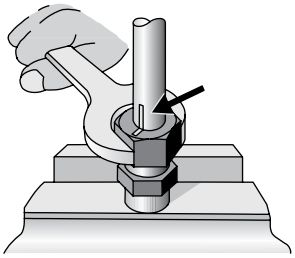
Incorrect



3. Screw nut onto fitting body or hardened pre-assembly tool until finger-tight or light wrench resistance. Hold tube against the shoulder in the cone of the fitting body or hardened pre-assembly tool.



4. Mark nut and tube in the finger-tight or light wrench-resistant position.





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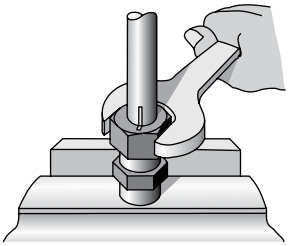
5. Tighten nut 1½ turns if using the fitting body (1-1/2 turns if using the hardened pre-assembly tool). The tube must not turn with the nut. The stop edge in the progressive ring limits over tightening by sharply increasing the tightening torque.



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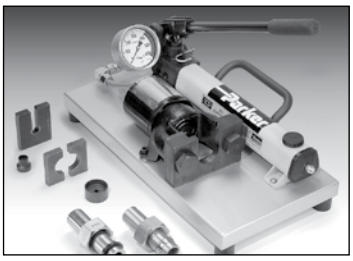
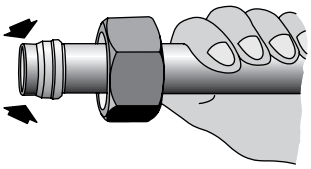


**Fig. S43 – EO Karrymat**

## Pre-set Inspection

To inspect the pre-set, remove the nut and tube from the fitting and check if a visible collar fills the space completely in front of first cutting edge. If not, tighten slightly more. It does not matter if ring can be rotated on tube end.



## Pre-set Using EO-Karrymat, Hydra-Tool or Hyferset

When pre-setting EO fittings larger than sizes 18 mm, it is recommended that a hydraulic tool be used. The EO-Karrymat, Hydra-Tool or the Hyferset (shown in Fig. S42) are recommended for low to medium volume production.

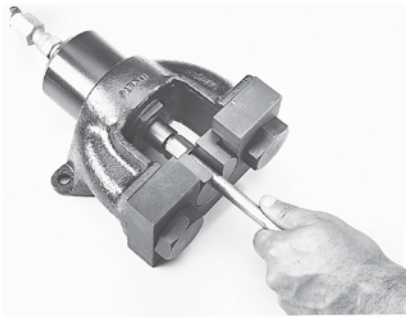


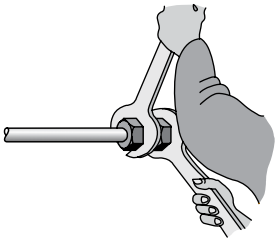
**Fig. S42 – Hyferset tool**

For full instruction on the use of these hydraulic tools, please refer to the Bulletins indicated below:

- EO-Karrymat – Bulletin 4044-T1/UK/DE/FR/T
- Hyferset - Bulletin 4393-B1
- Hydra-Tool – Bulletin 4392-B10

## Installation

To install the pre-set tube assembly to the fitting body, wrench-tighten nut to wrench resistance (light wrenching). From this position, tighten nut another 1/12 turn or 1/2 flat (30°) of the nut. Another wrench must be used to prevent movement of the fitting body.



**Assembly with Support Sleeve (VH)**

If the tube wall thickness is small relative to the tube O.D., this may lead to tube collapse. As a rule, the tube collapse (reduction in diameter) should not exceed 0.3 mm for tubes up to 16 mm O.D. and 0.4 mm for tubes from 18 mm O.D. and above.

When assembling thin walled tube, there is insufficient cross sectional rigidity where the progressive ring cuts. This will have a detrimental effect on the sealing efficiency. For this, internal support sleeves (VH) are available which are inserted in the tube to prevent tube collapse and also increase the cross-sectional rigidity.

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The shape of the tube supports allows them to be inserted easily in the tube. One end of the EO support sleeve is enlarged on its external diameter by a knurl. On insertion, this knurl forces itself into the interior wall of the tube and secures the sleeve against shifting or falling out during assembly and without widening the tube end.

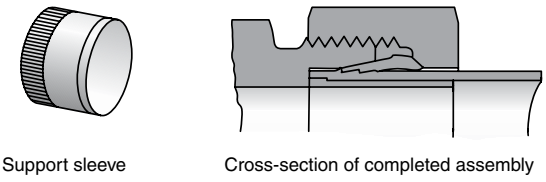



**Fig. S44 — EO fitting completely assembled with support sleeve**

Steel tubes made of 37.4 or soft metal tubes can be checked in accordance with Figs. S45 and S46, respectively, to see if they require support sleeves; for plastic tubes, (support) sleeves are always necessary (see Page E15 for E type sleeves).

For stainless steel tubes of material 1.4571/1.4541, refer to Fig. S44 to determine the need for a support tube.

For thin-walled steel tube of material St.37.4 and stainless steel tubes of material 1.4571/1.4541.

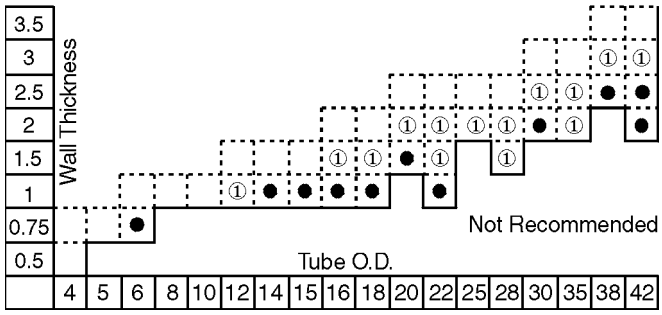



**Fig. S45 — Recommended Tube Wall Thicknesses, Steel, SS**

● Use of VH necessary

① Use of VH is recommended especially in case of frequent loosening and with heavy-duty tubes (vibrations)

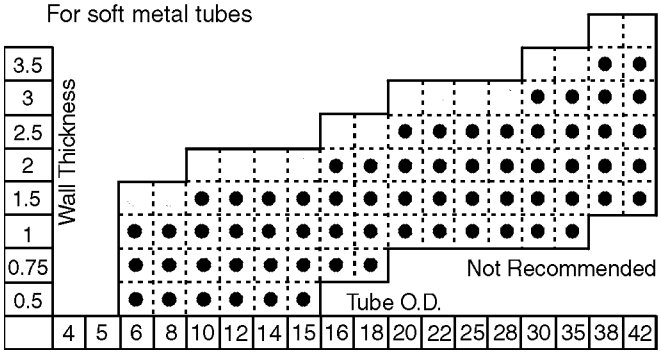


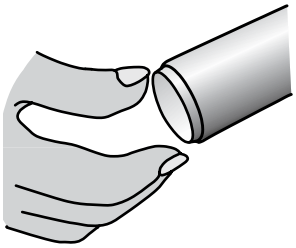

**Fig. S46 — Recommended Tube Wall Thicknesses, Soft Metal Tubing**

● Use of VH necessary

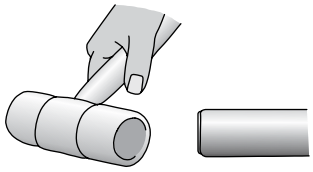
① Use of VH is recommended especially in case of frequent loosening and with heavy-duty tubes (vibrations)

## Steps for Proper Assembly of Support Sleeve (VH)

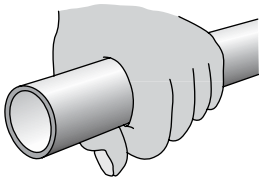
**Step 1 –** Insert support sleeve up to knurl.



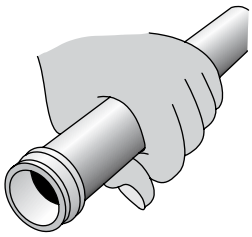
**Step 2 –** Drive knurled end of support into tube.



**Step 3 –** Ensure that support sleeve is flush with tube end.



**Step 4 –** Pre-set progressive ring following one of the pre-setting methods covered earlier (page S29). The support sleeve prevents collapse of tube.





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# EO Troubleshooting Guide

Problems with bite type hydraulic fittings are most often traced to faulty pre-set/assembly procedure.

| Problem | Solution |
|---|---|
| Tube not bottomed | Check for a visible mark on the tube end with EO fitting. (Fig. S47) |
| Shallow bite | Inspect for turned up ridge of material (collar). A failure to achieve this ridge can be traced either to the nut not being tightened enough or the tube not being bottomed against the stop which allowed the tube to travel forward with the ferrule. In some instances this assembly may be re-worked. (Fig. S48) |
| Over-set ferrule | Too much pressure or more than recommended turns from finger tight were used to pre-set ferrule, or the nut was severely over-tightened in final assembly. This assembly should be scrapped. (Fig. S49) |
| Ferrule cocked on tube | The ferrule may become cocked on the tube when the tube end is not properly lined up with the body. Generally, this condition is caused by faulty tube bending. All bent tube assemblies should drop into the fitting body prior to make up. This assembly should be scrapped. (Fig. S50) |
| No bite | If all of the prior checks have been made and the ferrule still shows no sign of biting the tube, it may be that the tube is too hard. This assembly should be scrapped. (Fig. S51) |

**Table S24 — EO Fitting troubleshooting guide**

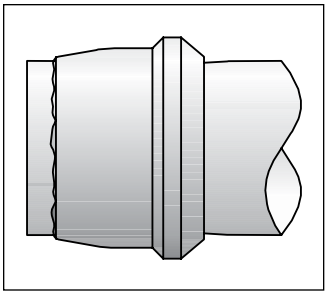

**Fig. S47 — Tube not bottomed**

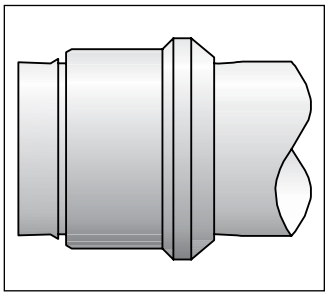

**Fig. S48 — Shallow bite**

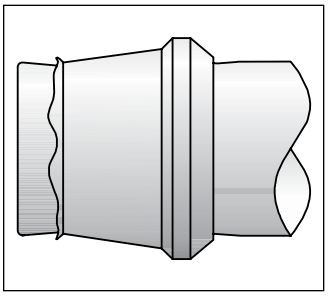

**Fig. S49 — Over-set ferrule**

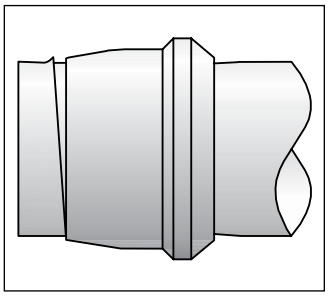

**Fig. S50 — Ferrule cocked on tube**

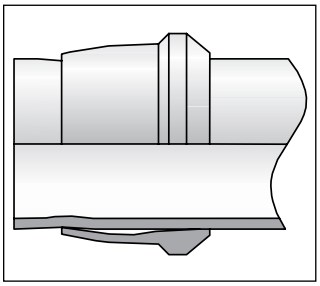

**Fig. S51 — No bite**

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# EO-2 Metric Bite Type Fittings

The steps for the proper assembly of the EO-2 fittings are similar to those of the EO fitting:

1. Cutting, deburring and cleaning of the tube
2. Pre-set of the retaining ring
3. Inspection of the pre-set
4. Installation

For step 1 (cutting, deburring and cleaning of the tube) please refer to page S12.

## Pre-set of the Retaining Ring

The EO-2 functional nut consists of the nut, the sealing ring and the retaining ring. Unlike the EO fitting, the sealing and holding functions are performed by two separate components: the sealing ring and the retaining ring. The retaining ring must be pre-set to create the necessary bite on the tube O.D. The two methods to pre-set the retaining ring are:

- Manually with the fitting body or hardened pre-assembly tool (VOMO)
- Hydraulically with the EO-Karrymat, Hydra Tool or Hyferset

## Pre-set Using the Fitting Body or Hardened Pre-Assembly Tool

1. Prepare the fitting or hardened pre-assembly tool by lubricating the threads of the following sizes:

   **Steel Fittings:**
   20, 22, 25, 28 Lubrication is recommended for ease in assembly

   **Stainless Steel Fitting:**
   For all sizes, lubrication is recommended for ease in assembly

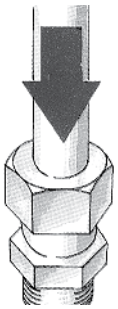
   High quality Niromont (liquid or paste) is recommended for lubrication of the fitting body threads.

   **It is strongly recommended that a hydraulic tool be used to preset EO-2 fittings in sizes 30S, 35L, 38S and 42L.**

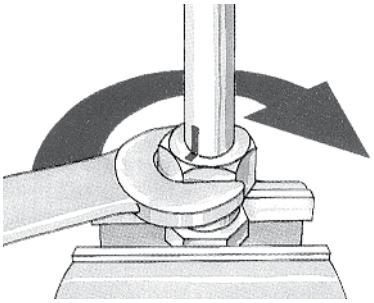
2. Insert tube into the EO-2 fitting body or hardened pre-assembled tool and press hard against the stop in the inner cone.

   **Note:** A faulty assembly will result if the tube is not against the tube stop in the fitting body or hardened pre-assembly tool. To achieve the necessary assembling force, an additional wrench leverage may be necessary for tube O.D.'s 20mm and larger.

3. Turn nut until wrench resistance is felt. Tighten nut further 1 to 1-1/2 turns. As a recommended process control, mark the position of the nut relative to the fitting body.



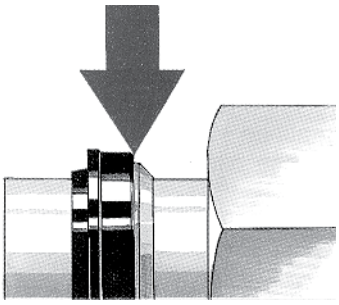
## Pre-set Inspection



Loosen the nut and check that the gap between the sealing ring and retaining ring is fully closed. A slight gap (up to 0.2mm) due to spring back is acceptable.

*Refer to Fig. S45 and S46 for required support sleeves.

## Pre-set Using EO-Karrymat, Hyferset,



## Hydra-Tool and EOMAT III

**EO-Karrymat:** Recommended for use with EO-2 fittings from 6mm through to 42mm.

**Hyferset:** Recommended for use with EO-2 fittings from 6mm through to 28mm.

**Hydra-Tool:** Recommended for use with EO-2 fittings from 6mm through to 42mm.

For instructions on operating one of these machines, refer to the following bulletins:

- EO-Karrymat – Bulletin 4044-T1/UK/DE/FR/IT
- Hyferset – Bulletin 4393-B1
- Hydra-Tool – Bulletin 4392-B10



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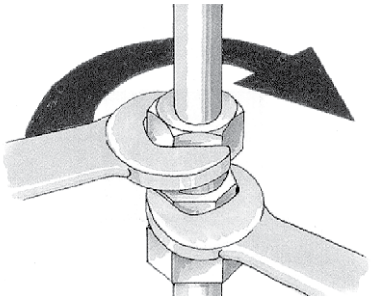
## Installation

Connect tube and nut to fitting body. Holding the body rigid, tighten nut with a wrench until resistance is felt. Continue turning the nut approximately 1/6 to 1/4 turns (= 1 to 1-1/2 flats) to the same position as it was prior to disassembly.

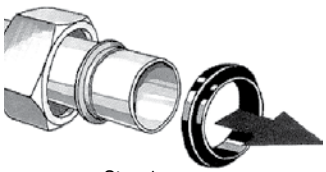
If the assembled position was marked, reassemble until the marks match. To achieve the necessary assembling force, use an additional wrench leverage for tube O.D.'s 20 mm and larger.



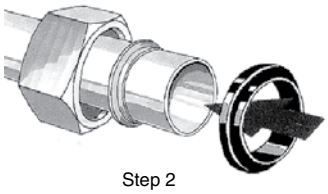
**Caution:** Improper tightening may reduce the seal reliability, pressure capability and the vibration resistance of the connection.

## Re-Assembly with Replacement of Sealing Ring (DOZ)

1. After the nut has been loosened, the sealing ring can be pulled off the tube end. It must be checked for damage and replaced if necessary.
2. Push new sealing ring onto the tube, with metal inner cone facing the retaining ring.
3. Re-install using the installation procedures previously covered in this section.



Step 1



Step 2

## EO-2 Troubleshooting Guide

Problems with bite type hydraulic fittings are most often traced to faulty pre-set/assembly procedure.

| Problem/ Probable Cause | Remedy |
|---|---|
| Tube not bottomed | The tube end is not in firm contact with the fitting body at assembly. The tubing was not completely inserted into the throat of the fitting body until it bottomed out. Failure to bottom out the tubing against the tube stop of the fitting body during the presetting procedure will allow the tube to travel forward with the ferrule resulting in a shallow bite. This assembly should be scrapped. |
| Shallow bite | After presetting, inspect to see that the gap between the bite ring and the sealing ring is closed. A failure to achieve a closed gap can be traced to the nut not being tightened enough. This assembly can be reworked by completing the assembly instructions as indicated in the catalog. Utilization of lubrication and wrench elongation may be necessary for larger sizes. |
| Damaged Seals | Check sealing area for contamination such as chips, zinc particles or other dirt. Also check the inner cone of the fitting body and tubing for damage. Replace DOZ sealing ring if necessary. |
| Fatigue Crack at Bite | Ensure proper assembly techniques are utilized. Utilize lubrication and wrench elongation for larger sizes. Check that the gap between the sealing ring and bite ring are closed. |
| Fatigue Crack at Rear Shoulder of Bite Ring | Check that the application does not have excessive vibration. Utilize rigid clamping, tension piping or hose assemblies if relative movements are evident. |
| Distorted FM Functional Nut at Hydraulic Pre-Assembly | Utilize a split die nut back up plate for presetting of 35L and 42L functional nuts. |

**Table S25 — EO-2 troubleshooting guide**





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## 24° Flareless Bite

| CONDITION | PROBABLE CAUSE(S) | RECOMMENDATION |
|---|---|---|
| Immediate leakage when system is pressurized | • Improper ferrule/bite ring orientation | • Reset ferrule to ensure that the leading edge of ferrule/bite ring is pointing towards end of tube and seat of the mating fitting |
| Additional/excessive stress apparent on bite | • Non-square tube cut; tube not being properly supported in seat of adapter | • Re-cut tube to 90° ± 1° |
| Flexural stresses allow tube to“rock” back and forth | • Tube not fully supported in fitting’s body seat | • Reset tube end. This time ensure that the tube is bottomed in the presetting tool or fitting body |
| Poor ferrule/bite ring pre-set and/or tube collapse | • Tube may be too hard; or preset pressure or torque might be too high<br>• Tube is too thin | • Use fully annealed tube max hardness $R_B$ 72 for steel, $R_B$ 90 for stainless steel<br>• Consult manufacturer's minimum tube wall thickness requirements; tube supports must be used with certain thin-walled steel or stainless-steel tube. Review preset requirements |
| Tube not bottoming out in fitting body | • Improper preset or wrong tool used for presetting | • In the presetting process, it is important to exert axial force on the tube to keep it fully bottomed in the tool. Check for indentation on end of the tube |
| Shallow bite of ferrule or cut ring into tube | • Worn preset tool<br>• Too low preset pressure or torque<br>• Tube too hard<br>• Tube not bottomed against stop initially in preset | • Replace preset tool<br>• Observe manufacturer’s recommendation for proper preset<br>• Ensure that tube is of correct hardness or material<br>• Hold tube against stop in preset |
| Tube pulls out of fitting in application and ferrule skives end of tube | • Improper preset<br>• Tube too hard<br>• Excessive internal pressure<br>• Excessive axial load on tube<br>• Inadequate make up | • Preset must be inspected for evidence of proper preset, such as raised ridge of metal in front of leading edge<br>• Ensure that tube is of proper hardness and material<br>• Ensure that internal pressure is within rating of fitting (tube might be of a higher rating)<br>• Avoid additional axial load than that caused by internal pressure<br>• Follow proper presetting and assembly procedures |
| Fitting nut is tight but leakage still occurs | • Overset ferrule<br>• Cracked tube<br>• Damaged components | • Excessive force used in presetting of ferrule can cause it not to spring back and effect a seal. Follow manufacturer’s recommendation for preset<br>• Check tube for circumferential crack due to fatigue<br>• Check components for damage such as nicks, scratches and cracks |



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# Bulkhead Locknut Assembly

A bulkhead fitting allows one to connect tube or hose through a panel. This panel, often referred to as bulkhead, may be a structural element of the equipment, or an additional plate which is joined to the equipment, to facilitate convenient routing of hose and tube. Bulkhead fittings are also used as a transition point in a hydraulic system, such as connection of tube lines to hose lines or to a quick disconnect coupling.

The following steps are recommended for the proper assembly of the locknut for Triple-Lok, Ferulok and Seal-Lok bulkhead fittings.

1. Drill a pilot hole to dimension W + 0.015" (where W is shown in Tables S26 and S27).
2. Insert the bulkhead end of the fitting (without the locknut assembled) through the bulkhead opening and attach the locknut to the bulkhead end.
3. Finger tighten the locknut and wrench tighten further to the recommended torque shown in Table S28 for Seal-Lok fittings or Table S29 for Triple-Lok and Ferulok fittings.

| TUBE FITTING PART # | THREAD SIZE UN/UNF | W* | ASSEMBLY TORQUE +10% - 0 | | |
|---|---|---|---|---|---|
| | | | in.-lb. | ft.-lb. | N-m |
| **4 WLNL** | 9/16-18 | 0.56 | 180 | 15 | 20 |
| **6 WLNL** | 11/16-16 | 0.69 | 300 | 25 | 34 |
| **8 WLNL** | 13/16-16 | 0.81 | — | 55 | 75 |
| **10 WLNL** | 1-14 | 1.00 | — | 85 | 115 |
| **12 WLNL** | 1 3/16-12 | 1.19 | — | 135 | 180 |
| **14 WLNL** | 1 5/16-12 | 1.31 | — | 170 | 230 |
| **16 WLNL** | 1 7/16-12 | 1.44 | — | 200 | 270 |
| **20 WLNL** | 1 11/16-12 | 1.69 | — | 245 | 330 |
| **24 WLNL** | 2-12 | 2.00 | | 270 | 365 |

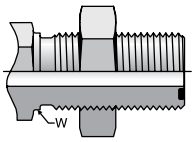
* Recommended clearance hole is W + 0.015"

**Table S26 – Torque for Seal-Lok Bulkhead Fittings**

| TUBE FITTING PART # | THREAD SIZE UN/UNF | W* | ASSEMBLY TORQUE (+10 - 0) | | |
|---|---|---|---|---|---|
| | | | in.-lb. | ft-lb | N-m |
| **3 WLN** | 3/8-24 | 0.38 | 100 | — | 11 |
| **4 WLN** | 7/16-20 | 0.44 | 155 | 13 | 18 |
| **5 WLN** | 1/2-18 | 0.50 | 250 | 20 | 28 |
| **6 WLN** | 9/16-18 | 0.56 | 300 | 25 | 35 |
| **8 WLN** | 3/4-16 | 0.75 | 600 | 50 | 65 |
| **10 WLN** | 7/8-14 | 0.88 | | 85 | 115 |
| **12 WLN** | 1 1/16-12 | 1.06 | | 135 | 180 |
| **14 WLN** | 1 3/16-12 | 1.19 | | 170 | 230 |
| **16 WLN** | 1 5/16-12 | 1.31 | | 200 | 270 |
| **20 WLN** | 1 5/8-12 | 1.63 | | 245 | 330 |
| **24 WLN** | 1 7/8-12 | 1.88 | | 270 | 365 |
| **32 WLN** | 2 1/2-12 | 2.50 | | 310 | 420 |

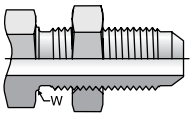
* Recommended clearance hole is W + 0.015"

**Table S27 – Torque for Triple-Lok and Ferulok Bulkhead Fittings**



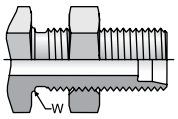

**Seal-Lok Bulkhead Assembly**

See page A8 for maximum bulkhead thickness.




**Triple-Lok Straight Bulkhead**

See page B8 for maximum bulkhead thickness.




**Ferulok Straight Bulkhead**

See page C6 for maximum bulkhead thickness.

# Pipe Swivel Assembly (NPSM)

Unlike traditional pipe thread, these connections seal on the nose of the swivel end. The nose has a 60° inclusive angle that mates against a chamfer of the same angle on the male pipe thread end (also known as a 30˚ chamfer).

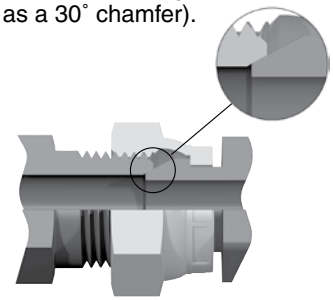


**Fig. S52 - Illustration showing how swivel adapters seal on mating chamfer in male pipe thread end.**

**NPSM Pipe Swivels** **Fig. S52**

NPSM Pipe swivels, also known as Parker 07 Adapters, must connect with a male NPT/NPTF pipe thread with a 30˚ machined seat per SAE J514.

| NPSM Size in. | Steel Assembly TORQUE (+10% - 0% ) | | |
|---|---|---|---|
| | in.-lb. | ft.-lb. | F.F.F.T. |
| 1/8 | 106 | 9 | 1.0 - 1.5 |
| 1/4 | 156 | 13 | 1.0 - 1.5 |
| 3/8 | 192 | 16 | 1.0 - 1.5 |
| 1/2 | 396 | 33 | 1.0 - 1.5 |
| 3/4 | 580 | 48 | 2.0 - 2.5 |
| 1 | 1140 | 95 | 2.0 - 2.5 |
| 1 1/4 | 1420 | 118 | 2.0 - 2.5 |
| 1 1/2 | 2840 | 237 | 2.0 - 2.5 |
| 2 | 3720 | 310 | 2.0 - 2.5 |

**Table S28 – NPSM Pipe Swivel Torques**

**Steps:**
1. Finger tight
2. Wrench tighten to torque specs in Table (S28)

S

Dimensions and pressures for reference only, subject to change.



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# Routing and Clamping

Most hydraulic, pneumatic and lubrication systems require some form of tube line fabrication and fitting installation for completion. Proper fabrication and installation are essential for the overall efficiency, leak free performance, and general appearance of any system.

The following factors should be considered early in the design process, after sizing the tube lines and selecting the appropriate style of fitting:

1. Proper routing of tube lines
2. Adequate tube line support (clamping)

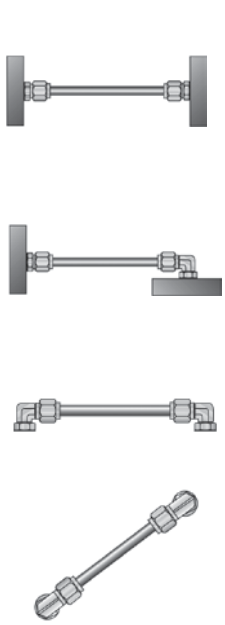
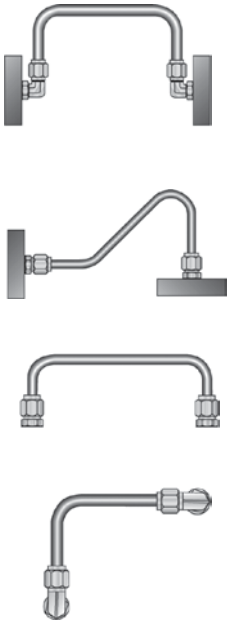
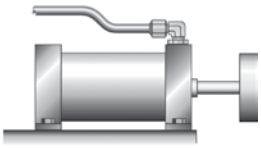
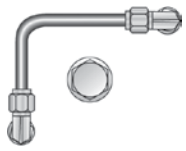
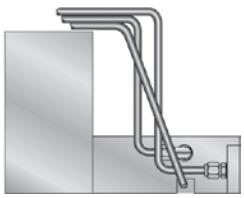
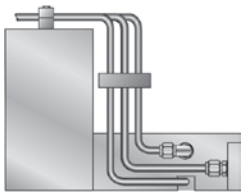
## Routing of Lines

Routing of lines is one of the most difficult, yet most significant of these system design considerations. Proper routing involves getting a connecting line from one point to another through the most logical path, while considering other factors as discussed below.

The most logical path is not always the direct path and should have the following characteristics:

- **Avoid excessive strain on joint —** A strained joint will eventually leak. A straight line tube assembly (with no bends) or a joint that is forced into position are common examples of strain applied to tube assemblies.
- **Allow for expansion and contraction —** Use a "U" bend or a hose in long lines to allow for expansion and contraction due to pressure or temperature fluctuations.
- **Allow for motion under load —** Even some apparently rigid systems do move under load. Use an offset ("S") bend.
- **Get around obstructions without using excessive amount of 90° bends —** Pressure drop due to one 90° bend is greater than that due to two 45° bends.
- **Keep tube lines away from components that require regular maintenance**.
- **Leave fitting joints as accessible as possible —** Inaccessible joints are more difficult to assemble and tighten properly, and more time consuming to service.
- **Have a neat appearance and allow for easy trouble-shooting, maintenance and repair**.

The following illustrations provide several examples of typical routing situations. The graphics show the preferred and non-preferred path along with an explanation.

| Non-preferred Routing | Preferred Routing | Explanation |
|---|---|---|
|  |  | Avoid straight tube lines. There is no margin for error on a straight line, resulting in excess joint strain.<br>Straight tube lines do not allow for expansion and contraction due to pressure and temperature fluctuations. |
| | | Allow for expansion and contraction of lines by utilizing "U" bend. |
| |  | Offset ("S") bend allows for motion under load. |
| | | Avoid excessive pressure drop by getting around obstructions without using 90° bends. One 90° bend causes more pressure drop than two 45° bends. |
| |  | Avoid creating an obstruction by routing lines around areas that require service. Leave adequate clearance for wrenches. |
|  |  | Route lines to allow for proper clamping. When done properly, several lines can typically be clamped together.<br>Route lines to allow for trouble-shooting. Lines that cross and are not in logical order tend to be difficult to work with during maintenance. |



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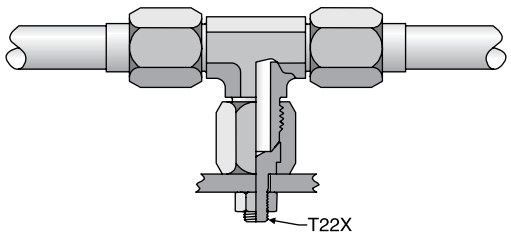
## Tube Clamping

Tube line supports (clamps) serve two primary purposes in tube line systems; mounting and vibration dampening. Fatigue failure due to mechanical vibration accounts for the majority of tube line failures. Proper clamping of the tube also reduces system noise.

Use a clamping system such as Parker's ParKlamp along with proper clamp spacing provided in Table S31.

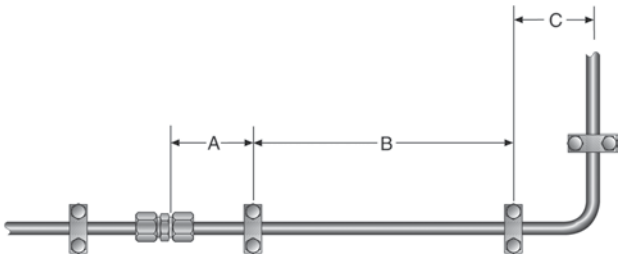
**For tube clamps to dampen vibration effectively, they need to be anchored to a rigid structure. Clamping several tubes together, without rigid structural anchoring, does not provide effective dampening.**

A mountie can be used in lieu of clamps in certain product lines by anchoring a tee fitting to the equipment's structure (see Fig. S53).




The Mountie Caps the End and Provides an Anchor

**Fig. S53 — Mountie cap used with Triple-Lok for anchoring tube lines**




| Tube O.D. (in.) | Tube O.D. (mm) | A (in.) | B (ft.) | C (in.) |
|---|---|---|---|---|
| 1/4 | 6 | 2 | 3 | 4 |
| 5/16 | 8 | | | |
| 3/8 | 10 | | | |
| 1/2 | 12 | 4 | 5 | 8 |
| 5/8 | 14 | | | |
| 3/4 | 18 | | | |
| 7/8 | 22 | | | |
| 1 | 25 | | | |
| 1-1/4 | 30 | 6 | 7 | 12 |
| 1-1/2 | 38 | | | |
| 2 | 50 | | | |

**Table S31 — Recommended tube clamp spacing**

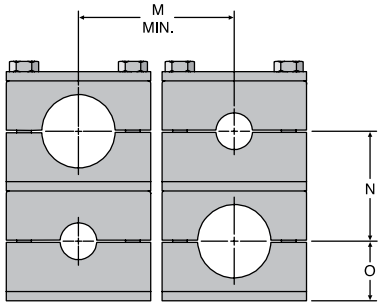
## Layout Data for Tube, Pipe and Hose Clamps: Standard (Inch) and Series A (Metric)

| Group # | | Installation Dimensions M | P | N | O | R |
|---|---|---|---|---|---|---|
| 1 | in. | 1 5/16 | 1 3/16 | 1 3/16 | 5/8 | 15/16 |
| | mm | 33 | 30 | 30 | 16.5 | 24.5 |
| 1a | in. | 1 7/16 | | 1 1/8 | 5/8 | 15/16 |
| | mm | 36 | | 29 | 16 | 24.0 |
| 2 | in. | 1 11/16 | | 1 7/16 | 3/4 | 1 1/16 |
| | mm | 42 | | 36 | 19.5 | 27.5 |
| 3 | in. | 2 | | 1 1/2 | 13/16 | 1 1/8 |
| | mm | 50 | | 38 | 20.5 | 28.5 |
| 4 | in. | 2 3/8 | | 1 3/4 | 15/16 | 1 1/4 |
| | mm | 60 | | 45 | 24 | 32.0 |
| 5 | in. | 2 13/16 | | 2 3/8 | 1 1/4 | 1 9/16 |
| | mm | 70 | | 61 | 32 | 40.0 |
| 6 | in. | 3 1/2 | | 2 11/16 | 1 7/16 | 1 3/4 |
| | mm | 88 | | 69 | 36 | 44.0 |

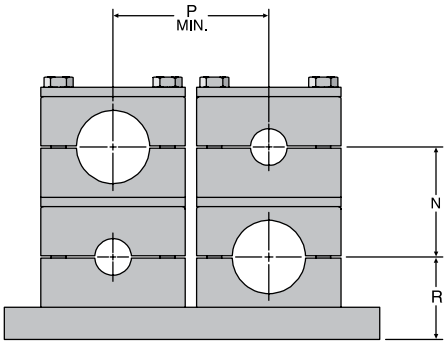
**Table S29 — ParKlamp Standard Series Installation Dimensions**

| Bolt Thread | Torque in.-lbs. | Torque Nm |
|---|---|---|
| 1/4 - 20 UNC | 70 | 8 |

**Table S30 — ParKlamp Standard Series maximum tightening torque**




With Weld Plate




Rail Mounting

Dimensions and pressures for reference only, subject to change.



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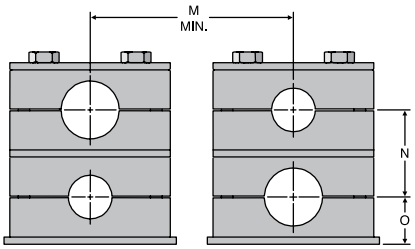
## Layout Data for Tube, Pipe and Hose Clamps: Heavy Series (Inch) and Series C (Metric)

| Group # | | Installation Dimensions | | | | |
|---|---|---|---|---|---|---|
| | | M | N | O | P | R |
| H3 | in. | 2 15/16 | 1 9/16 | 15/16 | 2 5/16 | 1 1/2 |
| | mm | 74 | 40 | 24 | 58 | 38 |
| H4 | in. | 3 1/2 | 2 3/16 | 1 1/4 | 2 7/8 | 1 13/16 |
| | mm | 89 | 56 | 32 | 73 | 46 |
| H5 | in. | 4 1/16 | 2 11/16 | 1 1/2 | 3 7/16 | 2 1/16 |
| | mm | 103 | 68 | 38 | 87 | 52 |
| H6 | in. | 5 7/8 | 3 7/8 | 2 1/8 | 4 5/8 | 2 5/8 |
| | mm | 150 | 98 | 54 | 118 | 66 |
| H7 | in. | 7 1/8 | 5 1/16 | 2 3/4 | N/A | N/A |
| | mm | 180 | 129 | 69 | N/A | N/A |

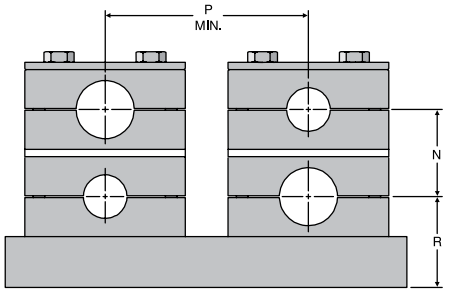
**Table S32 — ParKlamp Heavy Series installation dimensions**




With Weld Plate

| Group # | Bolt Thread | Torque | |
|---|---|---|---|
| | | in-Lb | Nm |
| H3, H4 | 3/8 - 16 UNC | 106 | 12 |
| H5 | 3/8 - 16 UNC | 133 | 15 |
| H6 | 7/16 - 14 UNC | 265 | 30 |
| H7 | 5/8 - 11 UNC | 398 | 45 |

**Table S33 — ParKlamp Heavy Series maximum tightening torque**

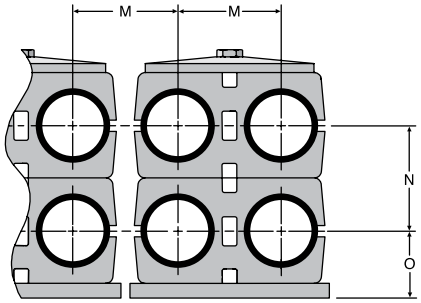



Rail Mounting

## Layout Data for Tube, Pipe and Hose Clamps: Twin Series (Inch) and Series B (Metric)

| Group # | | Installation Dimensions | | | |
|---|---|---|---|---|---|
| | | M | N | O | R |
| T1 | in. | 13/16 | 13/16 | 9/16 | 13/16 |
| | mm | 20 | 20 | 15 | 21 |
| T2 | in. | 1 1/8 | 1 | 11/16 | 15/16 |
| | mm | 29 | 26 | 18 | 24 |
| T3 | in. | 1 7/16 | 1 7/16 | 15/16 | 1 3/16 |
| | mm | 36 | 37 | 23.5 | 29.5 |
| T4 | in. | 1 3/4 | 1 11/16 | 1 | 1 1/4 |
| | mm | 45 | 42 | 26 | 32 |
| T5 | in. | 2 3/16 | 2 1/8 | 1 1/4 | 1 1/2 |
| | mm | 56 | 54 | 32 | 38 |

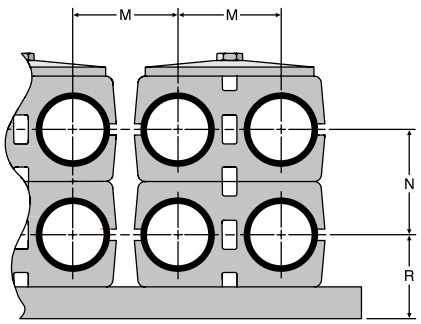
**Table S34 — ParKlamp Twin Series installation dimensions**




With Weld Plate

| Group # | Bolt Thread | Torque | |
|---|---|---|---|
| | | in.-lbs. | Nm |
| T1 | 1/4 - 20 UNC | 45 | 5 |
| T2 - T4 | 5/16 - 18 UNC | 104 | 12 |
| T5 | 5/16 - 18 UNC | 70 | 8 |

**Table S35 — ParKlamp Twin Series maximum tightening torque**




Rail Mounting

Dimensions and pressures for reference only, subject to change.



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# Tools for Tube Bending

For smooth, wrinkle free tube bending without excessive flattening, there are a number of benders that can be selected. Consult the specific bender's instruction bulletins for CLR (centerline radius), wall thickness, and tube material recommendations and limitations. For crank and hydraulic benders, utilize both the mandrel bending determination chart (Fig. S57) and the Parker Bender Capacity Guides on page R7.

1. **Hand held lever type benders** (see pages R4-R6). Individually sized for tube sizes 1/8" through 1" and 6mm through 25mm.

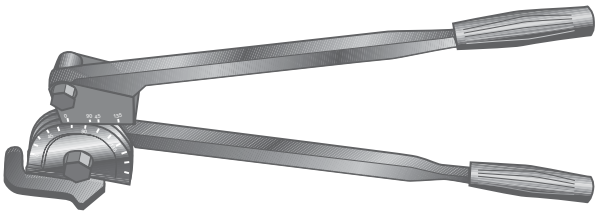

**Fig. S54 — Hand held tube bender**

2. **Manual crank, table mount or vise mount benders:**
   1) Model 412 (page R8). For bending 1/4" through 3/4" O.D. tube or 6mm through 20mm.
   2) Model 424 (page R9). For bending 1/4" through 1 1/2" O.D. tube or 6mm through 38mm.

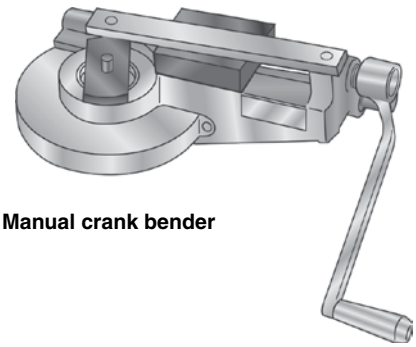

**Fig. S55 — Manual crank bender**

3. **Hydraulically powered bender**

   Model 632 (page R12). For bending 3/8" through 2" O.D. tube or 10mm through 50mm.

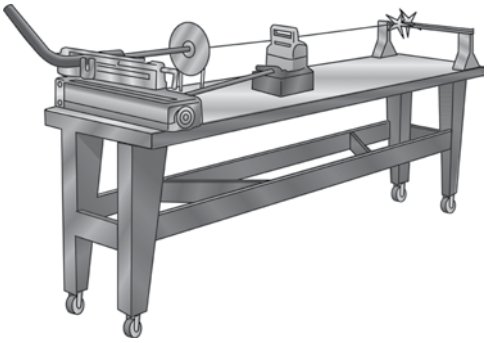

**Fig. S56 — Hydraulic bender with portable table for mandrel bending**

# Mandrel Bending Tools

When bending thin wall tube it may be necessary to insert a mandrel into the tube to prevent excessive distortion, flattening or wrinkling. To determine whether mandrel bending is required, see the Mandrel Bending Requirements Chart and example below.

To accomplish such bending, a mandrel, mandrel rod, and a mandrel rod stop assembly are required. The rod stop assembly holds the end of the mandrel rod in proper alignment with the tube while the mandrel, which is threaded onto the other end of the mandrel rod, supports the tube on its I.D., thus preventing tube kinking or flattening during bending.

**Mandrel Bending Requirements Chart**

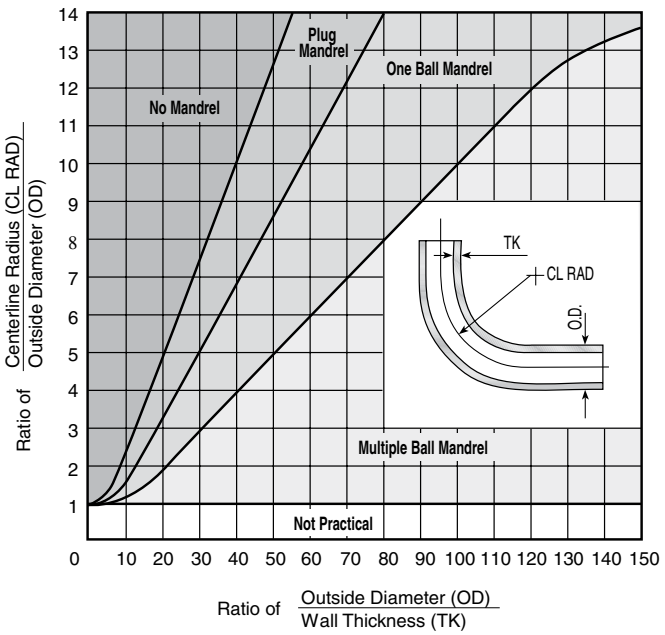


**Fig. S57 — Mandrel bending requirements chart**

**Example:** Determine if it's necessary to use mandrel for bending 3/4 x .049 steel tube through a 3" bend radius without excessive flattening.

Centerline Radius/Tube Outside Diameter = 3 / .75 = 4

Outside Diameter / Wall Thickness = .75/.049 = 15.3

Intersection of these two ratios on the graph falls within the area indicating that no mandrel is required. Note, however, that for the same tube O.D. at a smaller bend radius (e.g. 2") or with a thinner wall thickness (e.g. .035"), a mandrel would be required for preventing excessive flattening.

If the tube wall is very thin, then a plug mandrel alone may not be adequate to prevent wrinkling. In such cases, special ball type mandrels and wiper shoes may be necessary (See Fig. S58 for illustrations of plug and ball type mandrels). As a rule of thumb, if the tube wall thickness is less than 7% of the tube O.D. then mandrel bending is recommended.

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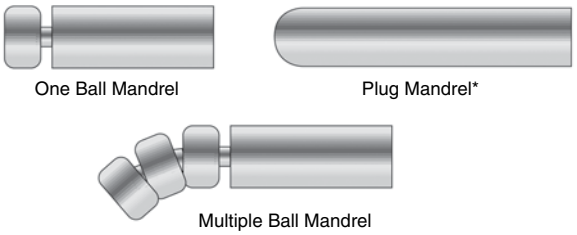


**Fig. S58 — Types of mandrels**

*Parker Tube Fittings Division offers only the plug mandrel.

**Refer to Bulletin 4306-B5 for detailed bending instructions.**

# Plumbing and Assembly Hints

Even after choosing the appropriate type of fitting for your application, there are certain instances when a particular style has advantages over others.

1. Straight thread adjustable elbows and tees have several advantages over similar shaped fittings using tapered pipe threads:

Adjustable straight thread connections:

- Permit exact positioning
- Provide leak free joint
- Eliminate distortion and cracking of boss due to over-tightening
- Are easier to maintain

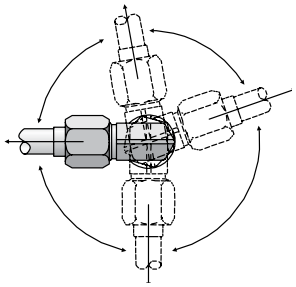

**Fig. S59 — Top view of adjustable straight thread connection – allows for 360° positioning of fitting without losing its sealing capability**

2. Swivel nut fitting should be used with a straight connector to allow for connections in tight spaces, where an elbow or tee fitting cannot be fully rotated (see Fig. S60).

This same combination of fittings, shown in Fig. S60, can also be used to stack tube lines or provide clearance for ports that are relatively close and within the same plane (see Fig. S61).

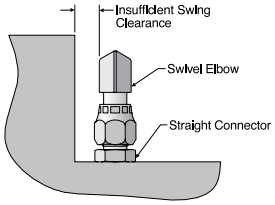


**Fig. S60 — Swivel nut fitting used with straight connector in tight space**

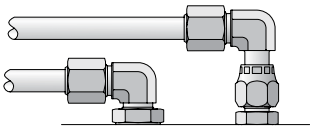

**Fig. S61 — Swivel end fitting with straight connector provides clearance above regular elbow**

3. Use reducers/expanders and jump size fittings.

   There are some instances when it becomes necessary to connect tube lines of different sizes or tube lines to ports of different sizes. This can be accomplished by using either tube reducers, port expanders, port reducers, or jump size fittings. Achieving the reduction or enlargement is the main concern, but this should be accomplished by using the minimum number of connections (potential leak points and wrenching requirements) possible.

4. Use conversion fittings and adapters.

   There are instances when it becomes necessary to use conversion adapters for connecting a fitting to a port with different style threads, for example, UNF thread fitting to a metric thread port. There are also some instances when it is necessary to connect tube ends or hose ends with different style terminations to one another or to a fitting. This can be achieved by using conversion fittings.

5. Use of other adapters and fittings for special applications are shown below.

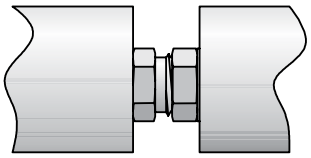

**Fig. S62 — F5OHAO for close coupling of components with two SAE Straight thread ports**

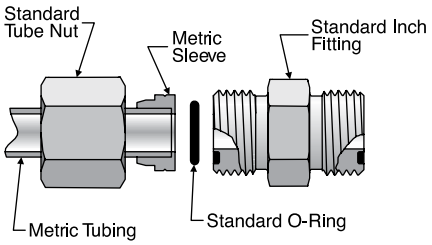


**Fig. S63 — Metric sleeve adapts metric tube to standard Seal-Lok**

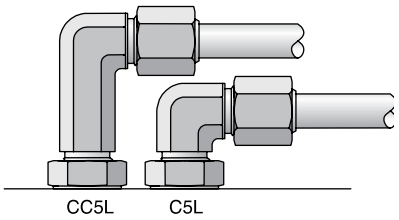


**Fig. S64 — Long elbow (CC5L) stacks above regular elbow (C5L)**



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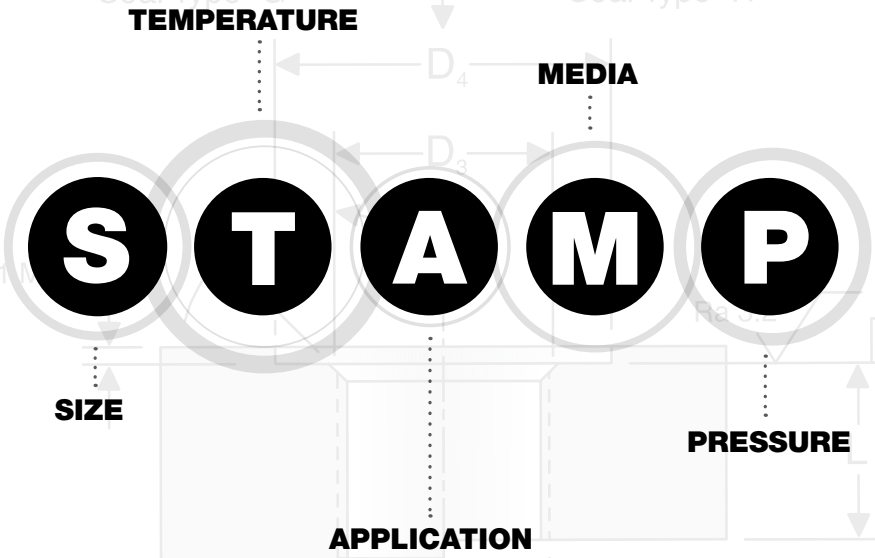


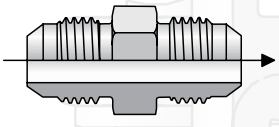

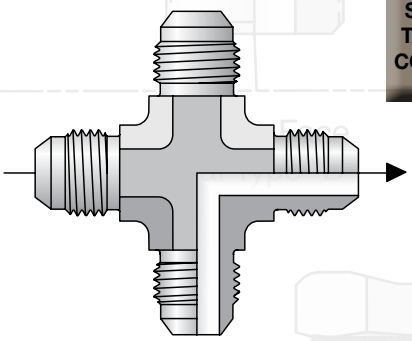

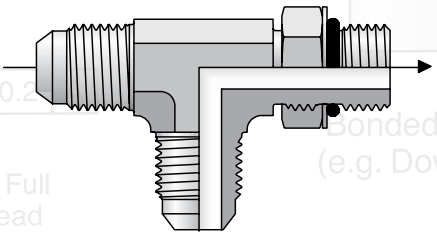

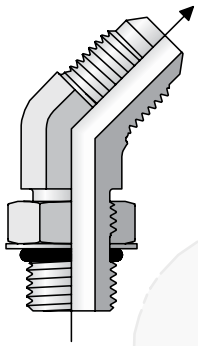

# General Technical

T

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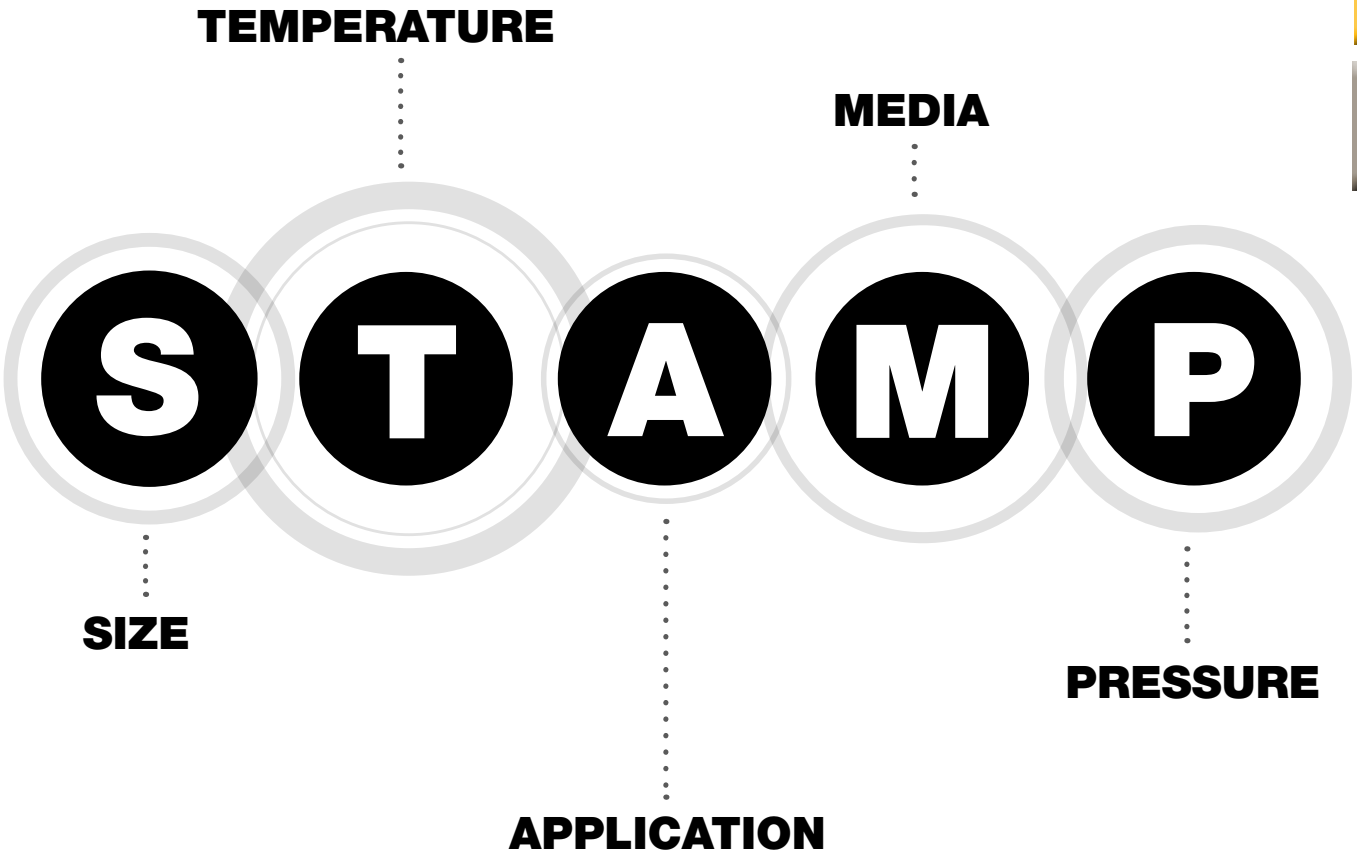


# Before you spec it STAMP it.

When you order fittings and adapters from Parker, remember the word "STAMP." That way you won't forget important information! Size, Temperature, Application, Media and Pressure "STAMP" is the process for determining the proper fitting or adaptor selection. Selecting the proper fitting for a given application is an important part of system design.

# Size

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Proper material, type and size of tubing and fittings for a given application is critical for efficient and trouble free operationof the fluid system. Selection of proper tubing and fittings involves determining the correct flow diameter, then selecting the correct material and the optimum tube size (O.D. and wall thickness).

Proper sizing for various parts of a hydraulic system results in an optimum combination of efficient and cost effective performance. A tube or fitting that is too small causes high fluid velocity, which has many detrimental effects. In suction lines, it causes cavitation which starves and damages pumps. In pressure lines, it causes high friction losses and turbulence, both resulting in high pressure drops and heat generation. High heat accelerates wear in moving parts and rapid aging of seals and hoses, all resulting in reduced component life. High heat generation also means wasted energy, and hence, low efficiency.

Too large of a tube or fitting increases system cost. Thus, optimum sizing is very critical. The following is a simple procedure for sizing of tube and fittings.

**Step 1: Determine Required Flow Diameter**

Use Tables T1 and T2 to determine recommended flow diameter for the required flow rate and type of line.

The table is based on the following recommended flow velocities:

**Pressure lines — 25 ft./sec. or 7.62 meters/sec.**

**Return lines — 10 ft./sec. or 3.05 meters/sec.**

**Suction lines — 4 ft./sec. or 1.22 meters/sec.**

If you desire to use different velocities than the above, use one of the following formulae to determine the required flow diameter.

$$\text{Tube I.D. (in.)} = 0.64 \sqrt{\frac{\text{Flow in GPM}}{\text{Velocity in ft./sec.}}}$$

OR

$$\text{Tube I.D. (in.)} = 4.61 \sqrt{\frac{\text{Flow in liters per minute}}{\text{Velocity in meters/sec.}}}$$

The flow diameter will be used in combination with the temperature, application, media and pressure data to determine the proper tube size (O.D. and wall thickness).

NOTE: The tube fitting dash (-) size will be dependent on the tube outside diameter selected based on the S.T.A.M.P. criteria.



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# Recommended Flow Diameter — In Inches

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| Maximum Flow Rate GPM | Recommended Flow Diameter in Inches | | |
|---|---|---|---|
| | Pressure Lines | Return Lines | Suction Lines |
| 0.25 | 0.064 | 0.101 | 0.160 |
| 0.50 | 0.091 | 0.143 | 0.226 |
| 0.75 | 0.111 | 0.175 | 0.277 |
| 1.00 | 0.128 | 0.202 | 0.320 |
| 1.25 | 0.143 | 0.226 | 0.358 |
| 1.50 | 0.157 | 0.247 | 0.392 |
| 1.75 | 0.169 | 0.267 | 0.423 |
| 2.00 | 0.181 | 0.286 | 0.453 |
| 2.50 | 0.202 | 0.319 | 0.506 |
| 3.00 | 0.222 | 0.350 | 0.554 |
| 3.50 | 0.239 | 0.378 | 0.599 |
| 4.00 | 0.256 | 0.404 | 0.640 |
| 4.50 | 0.272 | 0.429 | 0.679 |
| 5.00 | 0.286 | 0.452 | 0.716 |
| 5.50 | 0.300 | 0.474 | 0.750 |
| 6.00 | 0.314 | 0.495 | 0.784 |
| 6.50 | 0.326 | 0.515 | 0.816 |
| 7.00 | 0.339 | 0.534 | 0.847 |
| 7.50 | 0.351 | 0.553 | 0.876 |
| 8.00 | 0.362 | 0.571 | 0.905 |
| 8.50 | 0.373 | 0.589 | 0.933 |
| 9.00 | 0.384 | 0.606 | 0.960 |
| 9.50 | 0.395 | 0.623 | 0.986 |
| 10.00 | 0.405 | 0.639 | 1.012 |
| 11.00 | 0.425 | 0.670 | 1.061 |
| 12.00 | 0.443 | 0.700 | 1.109 |
| 13.00 | 0.462 | 0.728 | 1.154 |
| 14.00 | 0.479 | 0.756 | 1.197 |
| 15.00 | 0.496 | 0.782 | 1.239 |
| 16.00 | 0.512 | 0.808 | 1.280 |
| 17.00 | 0.528 | 0.833 | 1.319 |
| 18.00 | 0.543 | 0.857 | 1.358 |
| 19.00 | 0.558 | 0.880 | 1.395 |
| 20.00 | 0.572 | 0.903 | 1.431 |
| 22.00 | 0.600 | 0.947 | 1.501 |
| 24.00 | 0.627 | 0.990 | 1.568 |
| 26.00 | 0.653 | 1.030 | 1.632 |
| 28.00 | 0.677 | 1.069 | 1.693 |
| 30.00 | 0.701 | 1.106 | 1.753 |
| 32.00 | 0.724 | 1.143 | 1.810 |
| 34.00 | 0.746 | 1.178 | 1.866 |
| 36.00 | 0.768 | 1.212 | 1.920 |
| 38.00 | 0.789 | 1.245 | 1.973 |
| 40.00 | 0.810 | 1.278 | 2.024 |
| 42.00 | 0.830 | 1.309 | 2.074 |
| 44.00 | 0.849 | 1.340 | 2.123 |
| 46.00 | 0.868 | 1.370 | 2.170 |
| 48.00 | 0.887 | 1.399 | 2.217 |
| 50.00 | 0.905 | 1.428 | 2.263 |
| 55.00 | 0.949 | 1.498 | 2.373 |
| 60.00 | 0.991 | 1.565 | 2.479 |

| Maximum Flow Rate GPM | Recommended Flow Diameter in Inches | | |
|---|---|---|---|
| | Pressure Lines | Return Lines | Suction Lines |
| 65.00 | 1.032 | 1.629 | 2.580 |
| 70.00 | 1.071 | 1.690 | 2.677 |
| 75.00 | 1.109 | 1.749 | 2.771 |
| 80.00 | 1.145 | 1.807 | 2.862 |
| 85.00 | 1.180 | 1.862 | 2.950 |
| 90.00 | 1.214 | 1.916 | 3.036 |
| 95.00 | 1.248 | 1.969 | 3.119 |
| 100.00 | 1.280 | 2.020 | 3.200 |
| 110.00 | 1.342 | 2.119 | 3.356 |
| 120.00 | 1.402 | 2.213 | 3.505 |
| 130.00 | 1.459 | 2.303 | 3.649 |
| 140.00 | 1.515 | 2.390 | 3.786 |
| 150.00 | 1.568 | 2.474 | 3.919 |
| 160.00 | 1.619 | 2.555 | 4.048 |
| 170.00 | 1.669 | 2.634 | 4.172 |
| 180.00 | 1.717 | 2.710 | 4.293 |
| 190.00 | 1.764 | 2.784 | 4.411 |
| 200.00 | 1.810 | 2.857 | 4.525 |

**Table T1 — Recommended Flow Diameters, in Inches**

Dimensions and pressures for reference only, subject to change.



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# Recommended Flow Diameter — In Millimeters

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| Maximum Flow Rate LPM* | Recommended Flow Diameter in Millimeters | | |
|---|---|---|---|
| | Pressure Lines | Return Lines | Suction Lines |
| 1 | 1.670 | 2.640 | 4.180 |
| 2 | 2.362 | 3.734 | 5.911 |
| 3 | 2.893 | 4.573 | 7.240 |
| 4 | 3.340 | 5.280 | 8.360 |
| 5 | 3.734 | 5.903 | 9.347 |
| 6 | 4.091 | 6.467 | 10.239 |
| 7 | 4.418 | 6.985 | 11.059 |
| 8 | 4.723 | 7.467 | 11.823 |
| 9 | 5.010 | 7.920 | 12.540 |
| 10 | 5.281 | 8.348 | 13.218 |
| 12 | 5.785 | 9.145 | 14.480 |
| 14 | 6.249 | 9.878 | 15.640 |
| 16 | 6.680 | 10.560 | 16.720 |
| 18 | 7.085 | 11.201 | 17.734 |
| 20 | 7.468 | 11.806 | 18.694 |
| 22 | 7.833 | 12.383 | 19.606 |
| 24 | 8.181 | 12.933 | 20.478 |
| 26 | 8.515 | 13.461 | 21.314 |
| 28 | 8.837 | 13.970 | 22.118 |
| 30 | 9.147 | 14.460 | 22.895 |
| 32 | 9.447 | 14.934 | 23.646 |
| 34 | 9.738 | 15.394 | 24.373 |
| 36 | 10.020 | 15.840 | 25.080 |
| 38 | 10.295 | 16.274 | 25.767 |
| 40 | 10.562 | 16.697 | 26.437 |
| 45 | 11.203 | 17.710 | 28.040 |
| 50 | 11.809 | 18.668 | 29.557 |
| 55 | 12.385 | 19.579 | 31.000 |
| 60 | 12.936 | 20.449 | 32.378 |
| 65 | 13.464 | 21.284 | 33.700 |
| 70 | 13.972 | 22.088 | 34.972 |
| 75 | 14.463 | 22.863 | 36.200 |
| 80 | 14.937 | 23.613 | 37.387 |
| 85 | 15.397 | 24.340 | 38.538 |
| 90 | 15.843 | 25.045 | 39.655 |
| 95 | 16.277 | 25.732 | 40.742 |
| 100 | 16.700 | 26.400 | 41.800 |
| 110 | 17.515 | 27.689 | 43.840 |
| 120 | 18.294 | 28.920 | 45.790 |
| 130 | 19.041 | 30.101 | 47.659 |
| 140 | 19.760 | 31.237 | 49.458 |
| 150 | 20.453 | 32.333 | 51.194 |
| 160 | 21.124 | 33.394 | 52.873 |
| 170 | 21.774 | 34.421 | 54.501 |
| 180 | 22.405 | 35.419 | 56.081 |
| 190 | 23.019 | 36.390 | 57.617 |
| 200 | 23.617 | 37.335 | 59.114 |
| 220 | 24.770 | 39.158 | 61.999 |
| 240 | 25.872 | 40.899 | 64.756 |
| 260 | 26.928 | 42.569 | 67.400 |
| 280 | 27.944 | 44.176 | 69.945 |

| Maximum Flow Rate LPM* | Recommended Flow Diameter in Millimeters | | |
|---|---|---|---|
| | Pressure Lines | Return Lines | Suction Lines |
| 300 | 28.925 | 45.726 | 72.400 |
| 320 | 29.874 | 47.226 | 74.774 |
| 340 | 30.793 | 48.679 | 77.075 |
| 360 | 31.686 | 50.090 | 79.310 |
| 380 | 32.554 | 51.463 | 81.483 |
| 400 | 33.400 | 52.800 | 83.600 |
| 450 | 35.426 | 56.003 | 88.671 |
| 500 | 37.342 | 59.032 | 93.468 |
| 550 | 39.165 | 61.913 | 98.030 |
| 600 | 40.906 | 64.667 | 102.389 |
| 650 | 42.577 | 67.307 | 106.570 |
| 700 | 44.184 | 69.848 | 110.592 |
| 750 | 45.735 | 72.299 | 114.474 |
| 800 | 47.235 | 74.670 | 118.228 |

**Table T2 — Recommended Flow Diameters, in Millimeters**

*LPM = Liters Per Minute

Dimensions and pressures for reference only, subject to change.



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# Tube Fittings Pressure Drop

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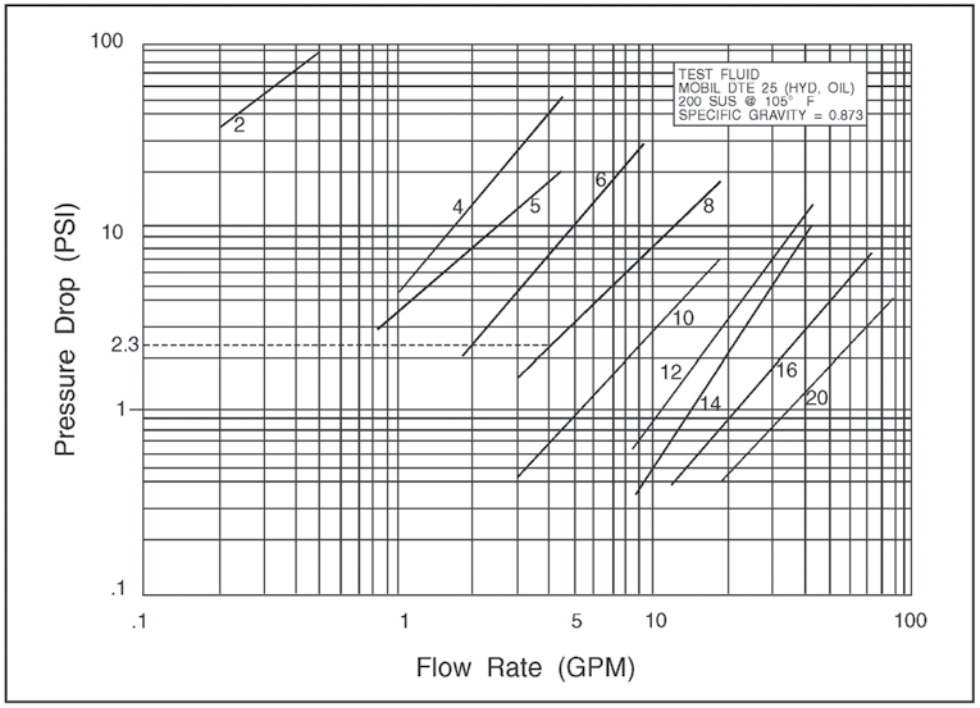
In hydraulic systems, pressure drop represents loss of energy and therefore should be kept to a minimum. Pressure loss in straight tubing and hose is mainly caused by the frictional resistance of the walls, while in fittings it is mainly caused by changes in the magnitude or direction of the fluid velocity. Mathematical analysis of pressure drop, even though possible, may not be exact because of the interrelationship of factors such as fluid density, velocity, flow area and frictional coefficients.

The following pressure drop charts were derived from actual test data and may be used as a guide for determining pressure drops at various flow rates through fittings for fluid indicated. To determine pressure drop for a given flow, trace a vertical line up from the flow axis to the desired size line then trace a horizontal line from this intersection over to the pressure drop axis.

**Example:** A size 8 CTX, with oil, similar to the test fluid, flowing through it at 4 gallons per minute, would cause a pressure drop of approximately 2.3 psi. Conversions will have to be made for fluids which are not similar to test fluid.

The Tube Fittings part numbers are listed below the Pressure Drop Chart to which they apply.




Examples:

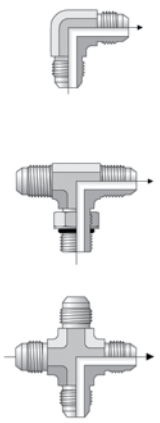


**Fig. T3 — Pressure Drop Chart for 90°Fittings or Branch Path Through a Tee or Cross Fitting (Triple-Lok)**

## Pressure Drops for Other Fitting:

*These pressure drop curves were established with Triple-Lok fittings. The pressure drop values can be adjusted for other fittings of the same size by multiplying the value from the chart by the ratio of Triple-Lok flow diameter to that of the other fitting, raised to the 4th power.

**Example:** Find pressure drop for 6 C5L at 5 gallons per minute flow rate:
From the chart, the pressure drop for 6 C5X is 10 psi.
Also, the ratio of 6 C5X to 6 C5L flow diameters is 0.297/0.264, or 1.125.
Therefore, the pressure drop for Seal-Lok = 10 x (1.125)4 = 16 psi.

## Pressure Drops for Other Fluids:

Pressure drop through a fitting is mainly caused by change in direction and velocity of the fluid. Therefore, it is directly proportional to the specific gravity of the fluid. The drop due to friction, which is dependent on the viscosity of the fluid, is so small in this case that it can be ignored. Thus, the pressure drop with a different fluid can be calculated by multiplying the value from the graph above by the ratio of specific gravity of the two fluids, or:

$$\text{New Drop} = \text{Value from the graph} \times \frac{\text{Specific Gravity of New Fluid}}{\text{Specific Gravity of Test Fluid (0.873)}}$$

Dimensions and pressures for reference only, subject to change.



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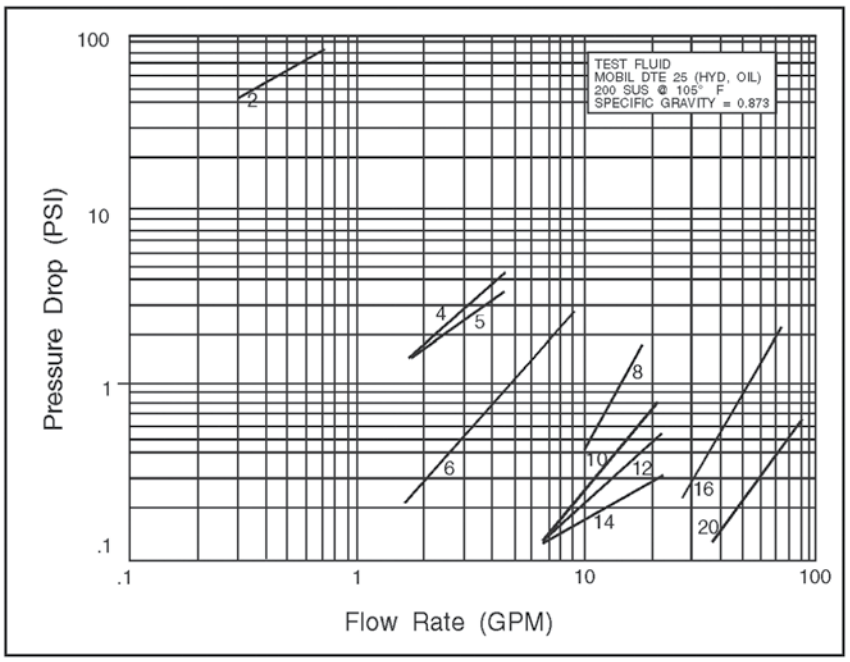



**Examples:**

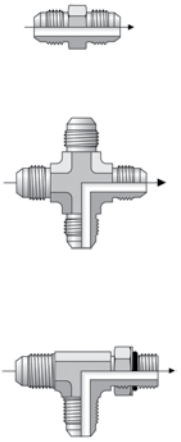
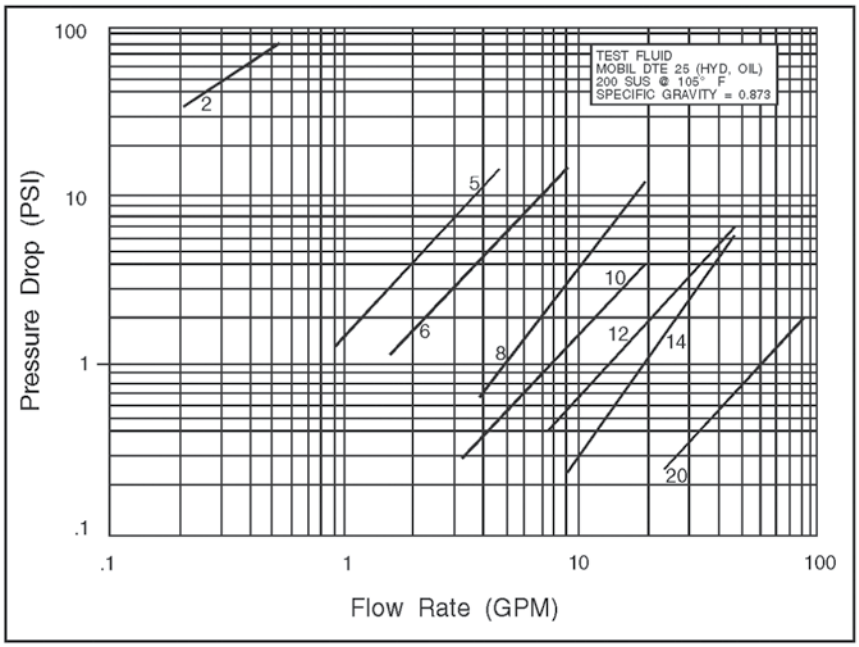


**Fig. T4 — Pressure Drop Chart for Straight Fittings and Run Legs of Tees and Crosses (Triple-Lok)**




**Example:**

**Fig. T5 — Pressure Drop Chart for 45° Elbow Fittings (Triple-Lok)**

Dimensions and pressures for reference only, subject to change.



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# Temperature

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## Temperature Ratings For Common Tube Materials

| Tube Material | Specification | Construction | Condition | Max. Hardness | Temperature Range (7) |
|---|---|---|---|---|---|
| Carbon Steel C-1010 | SAE J524 (ASTM A179) (8) | Seamless | Fully Annealed | HRB 72 | -65° to 500°F -55° to 260°C |
| | SAE J525 (ASTM A178) (8) | Welded & Drawn | | | |
| | SAE J356 | Welded & Flash Controlled | | | |
| Carbon Steel C-1021 | SAE J2467 | Welded & Flash Controlled | Fully Annealed | HRB 75 | -65° to 500°F -55° to 260°C |
| | SAE J2435 | Welded & Drawn | | | |
| Carbon Steel High Strength Low Alloy (HSLA) | SAE 2613 | Welded & Flash Controlled | Sub-critically annealed | HRB 90 | -65° to 500°F -55° to 260°C |
| | SAE J2614 | Welded & Drawn | | | |
| Alloy Steel 4130 | ASTM A519 | Seamless | | | -65° to 500°F -55° to 260°C |
| St 37.4 (Carbon Steel) | DIN 2391 Part 2 (Metric) | Seamless | Fully Annealed | HRB 72 | -65° to 500°F -55° to 260°C |
| Stainless Steel 304 & 316 | ASTM A213 ASTM A269 | Seamless | Fully Annealed | HRB 90 | -425° to 1200° -255° to 650°C (3) |
| | ASTM A249 ASTM A269 | Welded & Drawn | | | |
| 1.4571 1.4541 Stainless Steel | DIN 17458 Tab 8 (Metric) | Seamless | Fully Annealed | HRB 90 | -425° to 1200° -255° to 650°C (3) |
| Copper | SAE J528 (ASTM B-75) (8) | Seamless | Soft Annealed Temper 0 | 60 Max. Rockwell 15T | -325° to 400°F -200° to 205°C |
| Aluminum 6061 | ASTM-B210 | Seamless | T6 Temper | HRB 56 | -325° to 400°F -200° to 205°C |
| | | | 0 & T4 Temper | HRB 30 | |
| Monel 400 | ASTM-B165 | Seamless | Fully Annealed | HRB 70 | -400° to 800°F -240° to 425°C |
| Nylon | | Extruded | Flexible & Semi-Rigid | | -60° to 200°F -50° to 95°C |
| Polyethylene | ASTM D-1248 | Extruded | Instrument Grade | | -80° to 150°F -60° to 65°C |
| PVC | | Extruded | Instrument & Laboratory Grade | | 0° to 140°F -20° to 60°C |
| PFTE | | Extruded & Cintered | | | -65° to 400°F -55° to 205°C |

**Table T6 — Temperature Ratios for Common Tube Materials**

### Tube Derating Factors for Temperature

Besides severity of service, high operating temperature also reduces allowable working pressure of the tubing. Temperaturederating factors for various tube materials are given in Table T7. Where applicable, derating factors for severity of service and temperature should be applied to the design pressure values in Tables T17 and T18 to arrive at the maximum recommended working pressure.

**Example:** Combined derating factor for 316SS tubing for B (severe) service and 500°F. operation is .67 x .9 = .603

**Tube Selection Example:**

*The derating factors are based on allowable design stress values at various temperatures per ASME B31.1 code for pressure piping (1986).

| Maximum Operating Temperature | Steel C-1010 and C-4130 | Stainless Steel | | Copper | Aluminum 6061-T6 | Monel Type 4000 |
|---|---|---|---|---|---|---|
| | | 304 | 316 | | | |
| 100 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 150 | 1.00 | 0.91 | 1.00 | 0.85 | 1.00 | 0.97 |
| 200 | 1.00 | 0.84 | 1.00 | 0.80 | 1.00 | 0.94 |
| 250 | 1.00 | 0.79 | 1.00 | 0.80 | 0.94 | 0.91 |
| 300 | 1.00 | 0.75 | 1.00 | 0.78 | 0.80 | 0.88 |
| 350 | 0.99 | 0.72 | 0.99 | 0.67 | 0.60 | 0.86 |
| 400 | 0.98 | 0.69 | 0.97 | 0.50 | 0.43 | 0.85 |
| 500 | 0.96 | 0.65 | 0.90 | | | 0.84 |
| 600 | | 0.61 | 0.85 | | | 0.84 |
| 700 | | 0.59 | 0.82 | | | 0.84 |
| 800 | | 0.57 | 0.80 | | | 0.83 |
| 900 | | 0.54 | 0.78 | | | |
| 1000 | | 0.52 | 0.77 | | | |
| 1100 | | 0.47 | 0.62 | | | |
| 1200 | | 0.32 | 0.37 | | | |

**Table T7 — Temperature Derating Factors* for Tubes**



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# O-Ring Material Selection

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Standard O-Rings supplied with Parker tube fittings and adapters are 90 durometer hard nitrile (Buna-N) Parker compound #N0552 or similar. These O-Rings are well suited for most industrial hydraulic and pneumatic systems. They have high extrusion resistance making them suitable for very high pressure static applications. Optional high temperature fluorocarbon, Parker compound #V0894, is also available for higher temperature specifications.

O-Rings for other than normal hydraulic media or higher temperature applications can be selected from the following chart. The chart should be used only as a general guide. Before making final selection for a given application, it is recommended that appropriate tests be conducted to assure compatibility with the fluid, temperature, pressure and other environmental conditions.

For fluids not shown in the chart, please contact the Tube Fittings Division.

| Polymer | Abbreviated Name | Parker Compound No. | Color | SAE j515 Type | Hardness Shore "A"7) | Temperature Range (°F) | Recommended For | Not Recommended For |
|---|---|---|---|---|---|---|---|---|
| Nitrile-Butadiene | NBR | N0552 | Black | CH[2] | 90[6] | -30° to 250° | Petroleum base oils and | Phosphate ester base |
| Nitrile-Butadiene | NBR | N0674 | Black | — | 70 | -30° to 250° | fluids, mineral oils, ethylene | hydraulic fluids, auto- |
| Nitrile-Butadiene | NBR | N0103 | Black | — | 70 | -65° to 225° | glycol base fluids, silicone | motive brake fluids, |
| Nitrile-Butadiene (Low compression set) | NBR | N1059 | Black | CH[2] | 90 | -30° to 275° | and di-ester base lubricants, air, water under 150°F, and natural gas. | strong acids, ozone, freons, ketones, halo- genated hydrocarbons, |
| Nitrile-Butadiene | NBR | N0507 | Black | — | 90 | -65° to 180° | Hydrogen fuel cells. | and methanol. |
| Nitrile-Butadiene | NBR | N0304 | Black | — | 75 | -65° to 225° | Hydrogen fuel cells. | |
| Nitrile-Butadiene | NBR | N0508 | Black | — | | -35° to 250° | Meets FDA requirements for food products. | |
| Nitrile-Butadiene | NBR | N0756 | Black | — | 75[6] | -65° to 275° | CNG Applications | |
| Ethylene-Propylene | EPDM | E0540 | Black | CA[3] | 80 | -65° to 275° | Phosphate ester base | Petroleum base oils |
| Ethylene-Propylene | EPDM | E0893 | Purple[1] | CA[3] | 80 | -65° to 275° | hydraulic fluids, hot water, steam to 400°F, silicone oils and greases, dilute acids and alkalis, ketones, alcohols and automotive brake fluids. | and di-ester base lubricants. |
| Ethylene-Propylene | EPDM | E0962 | Black | — | 90 | -65° to 275° | CO2 climate control systems. | |
| Neoprene | CR | C0873 | Black | — | 70 | -45° to 250° | Refrigerants (freons, ammonia), high aniline point petroleum oils, mild acids, and silicate ester lubricants. | Phosphate ester fluids and ketones. |
| Neoprene | CR | C0944 | Red[1] | — | 70 | -45° to 250° | | |
| Fluorocarbon | FKM[5] | V0747 | Black | — | 75 | -15° to 400° | Petroleum base oils and fluids, some phosphate ester base fluids, silicone and silicate ester base lubricants, di-ester base lubricants, acids and halogenated hydrocarbons. | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, and hot hydrofluoric or chlorosulfonic acids. |
| | or | V0884 | Brown[1] | — | 75 | -15° to 400° | | |
| | FPM | V0894 | Brown[1], 5) | HK[4] | 90[6] | -15° to 400° | | |
| Silicone | Si | S0604 | Rust[1] | — | 70 | -65° to 450° | Dry heat (air to 400°F) and high aniline point oils. | Most petroleum fluids, ketones, water and steam. |

**Table T8 — O-Ring Selection**

1) These Parker "Chromassure" color assurance O-Rings are available from the Parker Hannifin O-Ring Division. They help eliminate assembly errors, reduce warranty costs and liability risks, and assure safety in aftermarket business.
2) Formerly SAE Type I.
3) Formerly SAE Type II.
4) Formerly SAE Type III.
5) "FKM" is the ASTM designation for fluorocarbon. Its ISO designation is "FPM". For "DIN" Fittings, color is green.
6) Standard compounds available from stock.
7) Use 90 durometer hard O-Rings for applications with 1500 psi or higher pressures.

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# Application

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## Connector Proliferation

Today many different types of connectors are being used around the world. Most of thesehave come about through historical use and local preference for a certain design concept. Some connections of the North American origin such as four bolt flange, SAE straight thread and 37°Flare have found some degree of acceptance and use in Europe and Japan as a result of the exports of U.S. machinery to the regions after World War II. But, large majority of usage is made up of a variety of indigenous port and tube connections. A quick review of the commonly used connections around the world reveals that there are eight different port connections and eleven different tube/ hose connections.

**Port Connections**

NPTF
SAE Straight Thread (UN/UNF)
4-Bolt Flange
ISO 1179 (BSPP)
ISO 9974 (Metric)
ISO 6149 (Metric Straight Thread O-Ring Port)
JIS-PT (BSPT)
JIS-B2351 (BSPP similar to SAE)

**Tube/Hose Connections:**

37°Flare (SAE)
24°Flareless, Inch Threads (SAE)
60° Cone Swivel, NPSM (SAE)
O-Ring Face Seal (SAE)
24° Cone, Metric (DIN)
60° Cone, BSPP (BSi)
30°Flare, BSPP (JIS)
24°Flareless, Metric (JIS)
60° Cone, BSPP (JIS)
60° Cone, Metric (JIS)
37°Flare, Metric (Russia)

### The Challenge

Leakage is no longer acceptable in world class products. Above proliferation, besides limiting availability and increasing cost, increases leakage potential through misapplications. Therefore, the challenge facing the fluid power industry is two fold — eliminate leakage and minimize proliferation.

### Meeting The Challenge

This challenge has been met through a very intensive and cooperative effort by the member nations of sub-committee 4 of the ISO Technical Committee 131 (ISO/ TC131) The sub-committee started this effort in 1989 and has completed development of performance based standards for the most widely used ports and tube/ hose connections to limit proliferation, and strongly endorsing those with elastomeric seals to eliminate leakage in hydraulic systems.

Ten ports, eight threaded and two four bolt flange, and four tube/ hose connections as shown on page T12 have been standardized. The threaded ports and tube/ hose connections are paired in the ISO 8434 series of fitting standards as defined in the table below.

To minimize proliferation in port usage and promote leak free connections, the sub-committee strongly endorses use of ISO 6149 port for all new designs by including the following statement in all port standards:

> ***"For threaded ports and stud ends specified in new designs in hydraulic fluid power applications, only ISO 6149 shall be used. Threaded ports and stud ends in accordance with ISO 1179, ISO 9974 and ISO 11926 shall not be used for new designs in hydraulic fluid power applications."***

On the tube/hose connection side, only ISO 8434-3 (O-Ring Face Seal) and ISO 8434-4 (24° cone with weld nipple) feature elastomeric seal for zero leak performance. Combining these with the ISO 6149 for the port connection leads to two (2) combinations (complete fittings) for use in leak-free world class products. They are:

| | |
|---|---|
| ISO 8434-3 | O-Ring Face Seal and ISO6149 Port |
| ISO 8434-4 | 24° Cone With Soft Seal and ISO 6149 Port |

For large port connections, the four bolt flange connection per ISO 6162 (SAE J518 is included in ISO 6162) remains widely used and the recommended connection.

| Application | Port | Tube/Hose Connection | | | |
|---|---|---|---|---|---|
| | | 24° Cone Flareless (DIN) (Bite Type) | 37°Flare (Inch Threads) | ORFS | 24° Cone Weld Nipple |
| For All Designs | Metric ISO 6149 (SAE J2244) | ISO 8434-1 | ISO 8434-2 | ISO 8434-3 | ISO 8434-4* |
| Not for New Designs in Hydraulic Fluid Power | Metric ISO 1179 (DIN 3852-2) | ISO 8434-1 | ISO 8434-2 | — — | ISO 8434-4* |
| | Metric ISO 9974 (DIN 3852-1) | ISO 8434-1 | — — | — — | ISO 8434-4* |
| | UN/UNF ISO 11926 (SAE J1926) | — — | ISO 8434-2 | — — | — |

**Table T9 — ISO Standard Port and Tube/Hose Connection Combinations**

*Will be included in ISO 8434-1 at the next revision.

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# Tube/Hose End Summary

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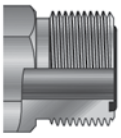
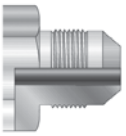
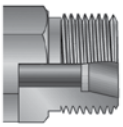
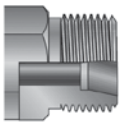
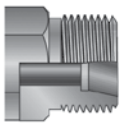
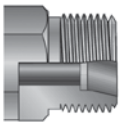
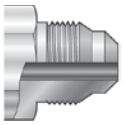
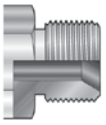
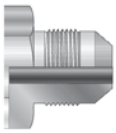
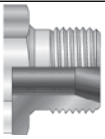
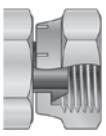
| Tube/Hose End Type | Illustration | Pressure — Dynamic | Pressure — Static | Seal Reliability | Vibration Resistance (in Rigid Systems) | Ease of Installation | Ease of Maintenance | Reusability | Temperature |
|---|---|---|---|---|---|---|---|---|---|
| Seal-Lok O-Ring Face Seal |  | Excellent | Excellent | Excellent | Very Good | Excellent | Excellent | Excellent | Limited by Seal |
| Triple-Lok 37°Flare |  | Very Good | Very Good | Good | Good | Good | Very Good | Good | Excellent |
| Ferulok Inch Bite Type |  | Very Good | Very Good | Very Good | Very Good | Good | Good | Very Good | Excellent |
| EO Metric Bite Type |  | Excellent | Excellent | Very Good | Very Good | Good | Good | Very Good | Excellent |
| EO-2 Soft Seal Metric Bite Type |  | Excellent | Excellent | Excellent | Very Good | Very Good | Good | Excellent | Limited by Seal |
| Intru-Lok Brass Flareless |  | Fair (Low) | Fair (Low) | Very Good | Good | Good | Good | Good | Excellent |
| JIS 30°Flare |  | Good | Good | Very Good | Not Applicable | Very Good | Very Good | Very Good | Limited by Seal |
| JIS 60° Cone B8363 |  | Good | Good | Very Good | Not Applicable | Very Good | Very Good | Very Good | Limited by Seal |
| Komatsu 30°Flare |  | Good | Good | Very Good | Not Applicable | Very Good | Very Good | Very Good | Limited by Seal |
| K4 BSP Adapters |  | Good | Good | Very Good | Not Applicable | Very Good | Very Good | Very Good | Limited by Seal |
| NPSM (Swivel) |  | Good | Good | Very Good | Not Applicable | Good | Good | Very Good | Limited by Seal |

Dimensions and pressures for reference only, subject to change.



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# Port End Summary

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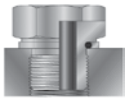
| Port End Type and Seal Style | Illustration | Pressure — Dynamic | Pressure — Static | Temperature | Positioning | Contamination | Seal Reliability | Reusability | Fluid Compatibility |
|---|---|---|---|---|---|---|---|---|---|
| Tapered (NPT, NPTF, BSPT and Metric Taper) | | Poor | Good | Excellent | Poor | Poor | Poor | Poor | Excellent |
| O-Ring in Chamfer (SAE J1926, ISO 6149 and JIS B2351) | | Excellent | Excellent | Limited by Seal | Excellent | Very Good | Excellent | Excellent | Limited by Seal |
| Spot Face with ED Seal (ISO 1179-2 and ISO 9974-2) | | Excellent | Excellent | Limited by Seal | Not Applicable | Very Good | Excellent | Excellent | Limited by Seal |
| Spot Face with Bonded Seal (ISO 1179 and ISO 9974) | | Good | Good | Good | Not Applicable | Very Good | Good | Excellent | Limited by Seal |
| Spot Face with Cutting Face (ISO 1179-4 and ISO 9974-3) | | Poor | Fair | Excellent | Not Applicable | Fair | Poor | Poor | Excellent |
| Spot Face with O-Ring and Retaining Ring (ISO 1179-3) |  | Good | Good | Good | Excellent | Very Good | Good | Excellent | Limited by Seal |
| Spot Face with Hard Metal Seal (ISO 1179 and ISO 9974) | | Poor | Fair | Excellent | Not Applicable | Fair | Poor | Poor | Excellent |
| Spot Face with Soft Metal Seal (ISO 1179 and ISO 9974 with copper gasket) | | Poor | Fair | Good | Not Applicable | Very Good | Poor | Fair | Excellent |
| 4 Bolt Flange (SAE J518 and ISO 6162) | | Excellent | Excellent | Good | Good | Very Good | Good | Excellent | Limited by Seal |
| 4 Bolt Flange (ISO 6164) | | Excellent | Excellent | Good | Good | Good | Good | Excellent | Limited by Seal |

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## Tube to Port[1] Pairing for Medium Pressure[2] Applications A

| Tube O.D. | | | Port Thread | | | |
|---|---|---|---|---|---|---|
| Inch (Dash Size) | | Metric (mm.) | SAE | ISO | NPTF | BSPP |
| 1/8 | (-2) | 4 | 5/16-24 | M8 x 1 | 1/16-27 | G 1/8-28 |
| 3/16 | (-3) | 5 | 3/8-24 | M10 x 1 | 1/8-27 | G 1/8-28 |
| 1/4 | (-4) | 6 | 7/16-20 | M10 x 1 | 1/8-27 | G 1/8-28 |
| 5/16 | (-5) | 8 | 1/2-20 | M12 x 1.5 | 1/8-27 | G 1/4-19 |
| 3/8 | (-6) | 10 | 9/16-18 | M14 x 1.5 | 1/4-18 | G 1/4-19 |
| 1/2 | (-8) | 12 | 3/4-16 | M16 x 1.5 | 3/8-18 | G 3/8-19 |
| — | | 15 | 3/4-16 | M18 x 1.5 | 1/2-14 | G 1/2-14 |
| 5/8 | (-10) | 16, 18 | 7/8-14 | M22 x 1.5 | 1/2-14 | G 1/2-14 |
| 3/4 | (-12) | 20 | 1 1/16-12 | M27 x 2 | 3/4-14 | G 3/4-14 |
| 7/8 | (-14) | 22 | 1 3/16-12 | M27 x 2 | 3/4-14 | G 3/4-14 |
| 1 | (-16) | 25, 28 | 1 5/16-12 | M33 x 2 | 1-11 1/2 | G 1-11 |
| 1 1/4 | (-20) | 30, 35 | 1 5/8-12 | M42 x 2 | 1 1/4-11 1/2 | G 1 1/4-11 |
| 1 1/2 | (-24) | 38, 42 | 1 7/8-12 | M48 x 2 | 1 1/2-11 1/2 | G 1 1/2-11 |
| 2 | (-32) | 50 | 2 1/2-12 | M60 x 2 | 2-11 1/2 | G 2-11 |

**Table T10 — Tube to Port Pairing for Medium Pressure Applications**

1) Ports are in accordance with the standards listed below:
SAE J1926-1, ISO 6149-1, NPTF-SAE J476 and BSPP-ISO 1179-1
2) The pressure range covering all the sizes shown is 1000 to 5000 PSI.

## Tube to Port[1] Pairing for High Pressure[2] Applications

| Tube O.D. | | | Port Thread | | | |
|---|---|---|---|---|---|---|
| Inch (Dash Size) | | Metric (mm.) | SAE | ISO | NPTF | BSPP |
| 1/8 | (-2) | 4 | 5/16-24 | M8 x 1 | 1/16-27 | G 1/8-28 |
| 3/16 | (-3) | 5 | 3/8-24 | M10 x 1 | 1/8-27 | G 1/8-28 |
| 1/4 | (-4) | 6 | 7/16-20 | M12 x 1.5 | 1/8-27 | G 1/8-28 |
| 5/16 | (-5) | 8 | 1/2-20 | M14 x 1.5 | 1/8-27 | G 1/4-19 |
| 3/8 | (-6) | 10 | 9/16-18 | M16 x 1.5 | 1/4-18 | G 1/4-19 |
| 1/2 | (-8) | 12 | 3/4-16 | M18 x 1.5 | 3/8-18 | G 3/8-19 |
| 5/8 | (-10) | 14, 16 | 7/8-14 | M22 x 1.5 | 1/2-14 | G 1/2-14 |
| 3/4 | (-12) | 20 | 1 1/16-12 | M27 x 2 | 3/4-14 | G 3/4-14 |
| 7/8 | (-14) | — | 1 3/16-12 | M30 x 2 | 3/4-14 | G 3/4-14 |
| 1 | (-16) | 25 | 1 5/16-12 | M33 x 2 | 1-11 1/2 | G 1-11 |
| 1 1/4 | (-20) | 30 | 1 5/8-12 | M42 x 2 | 1 1/4-11 1/2 | G 1 1/4-11 |
| 1 1/2 | (-24) | 38 | 1 7/8-12 | M48 x 2 | 1 1/2-11 1/2 | G 1 1/2-11 |
| 2 | (-32) | 50 | 2 1/2-12 | M60 x 2 | 2-11 1/2 | — |

**Table T11 — Tube to Port Pairing for High Pressure Applications**

1) Ports are in accordance with the standards listed below:
SAE J1926-1, ISO 6149-1, NPTF-SAE J476 and BSPP-ISO 1179-1
2) The pressure range covering all the sizes shown is 2500 to 9000 PSI.

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# Conformance to Applicable Specifications and Approvals for TFD Products by Product Type or Subject

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| Fittings | Specifications |
|---|---|
| Seal-Lok | SAE J1453 |
| Metric Seal-Lok | ISO 8434-3 |
| Triple-Lok | SAE J514 |
| | |
| | MS51500 - MS51534* |
| | BS43687, part 4 |
| | ISO 8434-2 |
| Ferulok | SAE J514 |
| | MS51811 - MS51843* |
| | U.S. Coast Guard - meet applicable requirements of ASTM F1387 |
| EO/EO-2 | DIN 3861 |
| | ISO 8434-1-4, ISO 8434-4 (former DIN 2353) |
| | DIN 3865 |
| | DIN 3859 |
| Flange Adapters | SAE J518 |
| | ISO 6162-1 |
| | ISO 6162-2 |
| | ISO 6164 |
| JIS Adapters* | JIS B8363 (with some exceptions) |
| K4 Adapters | BS 5200, ISO 8434-6* |
| Pipe Fittings | SAE J514 |
| Pipe Plugs | SAE J531 |
| Straight Thread Plugs | SAE J514 |
| Pipe Swivel Adapters | SAE J514 |
| All catalog products | Canadian Registration |

**Approvals:**
Parker tube fittings are recognized by various acceptance organizations, among which are:

- Germanischer Lloyd (GL)
- Lloyds Register of Shipping (LR)
- Det Norske Veritas (DNV)
- American Bureau of Shipping (ABS)
- Russian Maritime Register of Shipping (RMS)
- China Classification Society (CCS)
- Deutscher Verein des Gas- und Wasserfaches (DVGW)
- Canadian Technical Standards and Safety Registration (CRN)

For other applications, Parker tube fittings also approved by diverse national authorities.

Numerous original equipment manufacturers and end-users of various industries have approved Parker tube fittings.

**Attention:**
Type Approvals usually are limited to certain products, applications, working conditions, validity time or other restrictions. We will gladly inform you on your individual application and send out the required documentation.

| Plating | Specification |
|---|---|
| Carbon Steel — Chromium 6 Free Zinc | ASTM B633 Type II FE/ZN8** **Clear/Silver Color |
| | MIL-STD-171E |
| | JIS 8610 Class 1 Grade 3 |
| Stainless Steel Passivation | QQ-P35 Type VI |
| | ASTM A380 |
| Carbon Steel — Zinc Phosphate | DOD-P-16232, Class 1 |

| Plating | Specification | Comment |
|---|---|---|
| Products | ASME / ANSI B31.1 | All products meet the design factor requirements of this specification. |

| Test Methods | Specification |
|---|---|
| Leak, Burst, Impulse, Over-Torque and Repeated Assembly | SAE J1644 (cancelled) |
| | ISO 19879 |
| Vibration | NFPA T3.8.3, ISO 7257 |

**Table T12 — Conformance Standards**

*Some parts do not meet dimensional requirements.

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# Media

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## Fluid Compatibility

The fluid compatibility chart on the following page is intended as a guide only and is not to be considered as a sole selection criteria to use Parker Tube Fittings in a specific application or with a specific fluid. Other factors that must be considered include, but are not limited to: Fluid temperature, ambient temperature, system pressure (both operating and peak) and applicable standards or regulations. For media not listed, please contact your Parker representative or the Tube Fittings Division.

## Protective Coatings on Steel

Protective coatings such as electroplated zinc and cadmium1) and zinc phosphate are usually applied to steel fittings for extending their useful service life in corrosive environments. Cadmium and zinc corrode sacrificially, protecting the steel substrate from normal atmospheric rusting due to the common presence of oxygen, moisture and acidic gases. They are, however, rapidly attacked by many fluids including those containing acidic hydrogen and reactive fluorine, chlorine, bromine, iodine, and nitrogen. **Zinc plating will further be attacked by strong bases or water with pH > 12. Zinc reacts with glycol based fire resistant fluids and forms a gelatinous compound that can plug up filters and be harmful otherwise, in a system with many zinc plated tube and hose fittings.** Steel fittings with zinc phosphate coating or stainless steel fittings, along with brass fittings in low pressure applications, are viable options.

The other option is to run the fluid through the system, without components with moving parts in it, with an auxiliary power source, to generate and flush the gelatinous compound. Then re-connect all components, change filters and charge the system with new fluid.

The corrosion resistance of the Chromium-6 Free standard surface treatment is a minimum of 25% improved over traditional zinc gold (hexavalent) chromate surface. Additionally, the Chromium-6 Free surface meets the EU end of life vehicle directive and ROHS compliance.

Zinc-Nickel (Parker XTR) plating offers enhanced performance over both Chromium-6 Free (standard treatment) and traditional zincgold hexavalent chromate surfaces. Parker XTR plating increases protection in salt spray (ASTM B117) testing and in fertilizer (urea) applications.

**Caution: Where low toxicity and low corrosion are required, as in food or beverage applications, steel coated with any form of zinc or other protective coatings is not recommended.**

## Choosing the Tube Material and Type

Selection of tube material depends on the fluid, corrosive nature of the service environment, the operating temperature range and the maximum operating pressure. The tube O.D. and wall thickness selection depends on these four parameters.

A simple method of selecting the proper tube type and material is described below.

Table T16 lists several common tube types with their recommended operating temperature ranges, general application, and fitting compatibility. Based on the fluid system parameters and media, select the appropriate tube type and material.

If media and/or service environment is different from the commonly used ones listed in the general application column, please consult the Fluid Compatibility chart on the following page or contact the Tube Fittings Division.

For selecting proper tube O.D. and wall thickness use the procedure given on pages T4 and T28.

**Caution: When working with highly corrosive media, always consult the Tube Fittings Division.**



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| Media | Fitting Material | | | Seal Material | | | |
|---|---|---|---|---|---|---|---|
| | Brass | Steel | 316 SS | BUNA-N | Ethylene Propylene | Fluorocarbon | Neoprene |
| Acetylene | NR | F | S | S | S | S | F |
| Air (oil free) @ 190°F | S | F | S | S | S | S | S |
| Air (oil free) @ 300°F | S | F | S | F | F | S | F |
| Air (oil free) @ 400°F | S | F | S | NR | NR | S | NR |
| Alcohol, Ethyl | S | NR | NR | NR | S | NR | S |
| Animal Oils (Lard Oil) | F | F | F | S | F | S | F |
| Aromatic Fuel - 50% | ID | ID | ID | F | NR | S | NR |
| Aromatic Solvents | ID | ID | F | F | ID | S | NR |
| Asphalt | NR | NR | S | F | NR | S | F |
| ASTM Oil #1 | S | S | S | S | NR | S | S |
| ASTM Oil #2 | S | S | S | S | NR | S | F |
| ASTM Oil #3 | S | S | S | S | NR | S | NR |
| ASTM Oil #4 | S | S | S | F | NR | S | NR |
| ATF Oil | S | S | S | S | NR | S | F |
| Automotive Brake Fluid | ID | ID | ID | NR | S | NR | F |
| Benzene | NR | F | NR | NR | NR | S | NR |
| Brine (Sodium Chloride) | NR | NR | S | S | S | S | S |
| Butane | NR | S | S | S | NR | S | S |
| Carbon Dioxide | S | F | S | S | S | S | S |
| Carbon Monoxide | S | S | S | S | S | S | F |
| Chlorine (Dry) | F | F | NR | NR | ID | F | F |
| Compressed Air | S | F | S | S | S | S | S |
| Crude Oil | NR | F | S | F | NR | S | NR |
| Cutting Oil | ID | S | S | S | NR | S | F |
| Diesel Fuel | S | S | S | S | NR | S | NR |
| Ethanol | S | NR | S | NR | S | NR | S |
| Ethers | S | S | S | NR | F | F | NR |
| Freon 11 | S | ID | ID | F | NR | F | NR |
| Freon 12 | S | S | NR | F | NR | S | S |
| Freon 22 | S | NR | S | NR | NR | NR | S |
| Fuel Oil | NR | S | S | S | NR | S | F |
| Gasoline | S | F | S | S | NR | S | NR |
| Gas, Liquid Propane (LPG) | S | S | S | S | NR | S | F |
| Gas, Natural | F | S | S | S | NR | S | S |
| Helium | S | S | S | S | S | S | S |
| Hydraulic Oil, Petroleum Base | S | S | S | S | NR | S | S |
| Hydraulic Oil, Water Base | ID | S | S | F | S | NR | F |
| Hydrogen Gas | S | S | S | S | S | S | S |
| Jet Fuel | S | S | S | S | NR | S | NR |
| Kerosene | S | S | S | S | NR | S | F |
| Lubricating Oil SAE 10, 20, 30, 40, 50 | S | S | S | S | NR | S | F |
| Methanol | S | S | S | S | S | NR | S |
| MIL-F-8192 (JP-9) | S | S | S | NR | NR | S | NR |
| MIL-H-5606 | S | S | S | S | NR | S | F |
| MIL-H-6083 | S | S | S | S | NR | S | S |
| MIL-H-7083 | S | S | S | S | S | F | F |
| MIL-H-8446 (MLO-8515) | F | S | S | F | NR | S | S |
| Mil-L-2104 & 2104B | S | S | S | S | NRX | S | F |
| MIL-L-7808 | NR | F | S | S | NR | S | NR |
| Mineral Oil | S | S | S | F | NR | S | F |
| Nitrogen | S | S | S | F | S | S | S |
| Petrolatum | S | S | S | S | NR | S | F |
| Petroleum Oil (<250°F) | S | S | S | S | NR | S | F |
| Propane | S | S | S | S | NR | S | F |
| R134A | S | S | S | NR | S | NR | NR |
| Sea Water | F | NR | S | S | S | S | F |
| Skydrol 500, Type 2 | NR | S | S | NR | S | NR | NR |
| Skydrol 7000, Type 2 | NR | S | S | NR | S | F | NR |
| Soap Solutions | NR | NR | S | S | S | S | F |
| Steam (<400°F) | F | S | S | NR | S | NR | NR |
| Stoddard Solvent | F | S | S | S | NR | S | F |
| Transmission Fluid (Type A) | S | S | S | S | NR | S | F |
| Trichloroethane | ID | F | S | NR | NR | S | NR |
| Water | S | F | S | S | S | F | F |

**Table T13 — Fluid Compatibility Chart** Codes: S = Satisfactory F = Fair NR = Not recommended ID = Insufficient Data
Dimensions and pressures for reference only, subject to change.

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# Corrosion of Base Metals in Contact

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The susceptibility of different base metals to corrosion while incontact, depends upon the difference between the contact potentials, or the electromotive voltages of the metals involved. The greater the potential difference is, the greater is the tendency for corrosion. The metal with the higher potential forms the anode and is corroded. In other words, the larger the separation distance in the electromotive chart between the two metals in contact, the higher the contact potential and chances for corrosion. For example, zinc and aluminum are very short distance apart in the chart; therefore potential for corrosion when these two metals are in contact is very low. On the other hand, aluminum and passivated 316 stainless steel are far apart; hence, when in contact, the potential for corrosion is very high. Aluminum, being more anodic metal, will corrode in this combination.

As a general guideline, if the metals are half the length of the chart or more apart, the combination should be avoided. Also, it is not a good idea to combine an anodic metal part with thin cross section, such as thin wall tubing, with a cathodic or less anodic metal part of a heavy cross section, such as a fitting.

**Example:** A thin wall brass tube with steel fitting is a better, although not ideal, combination than a thin wall steel tube with brass fitting.

| Electromotive or Galvanic Series for Metals | |
|---|---|
| + Anodic (least noble) corroded | Magnesium |
| | Magnesium Alloys |
| | Zinc (Parker steel fittings are zinc plated) |
| | Zinc-Nickel (Parker XTR Plating) |
| | Beryllium |
| | Aluminum 5052, 3004, 3003, 1100, 6053 |
| | Cadmium |
| | Aluminum 2117, 2017, 2024 T4 |
| | Mild steel (1018), wrought iron, free machining steel (12L14) |
| | Low alloy high strength steel, cast iron |
| | Chrome iron (active) |
| | 430 Stainless (active) |
| | 302, 303, 321, 347, 410, 416, stainless steel (active) |
| | Ni-resist |
| | 316, 317 stainless steel (active) |
| | Carpenter 20Cb-3 stainless (active) |
| | Aluminum bronze (CA 687) |
| | Hastelloy C (active) Inconnel 625 (active) Titanium (active) |
| | Lead/Tin solder |
| | Lead |
| | Tin |
| | Inconnel 600 (active) |
| | Nickel (active) |
| | 60 Ni-15 Cr (active) |
| | 80 Ni-20 Cr (active) |
| | Hastelloy B (active) |
| | Naval brass (CA 464), Yellow brass (CA 268), Brass (CA360) |
| | Red brass (CA 230), Admiralty brass (CA 443) |
| | Copper (CA 102) |
| | Maganese bronze (CA 675), Tin bronze (CA 903, 905) |
| | 410, 416 Stainless (passive) Phospher bronze (CA 521, 524) |
| | Silicon bronze (CA 651, 655) |
| | Nickel silver (CA 732, 735, 745, 752, 754, 757, 764, 770, 794) |
| | Cupro Ni 90-10 |
| | Cupro Ni 80-20 |
| | 430 Stainless steel (passive) |
| | Cupro Ni 70-30 |
| | Nickel aluminum bronze (CA 630, 632) |
| | Monel 400, K500 |
| | Silver solder |
| | Nickel (passive) |
| | 60 Ni 15 Cr (passive) |
| | Inconnel 600 (passive) |
| | 80 Ni 20 Cr (passive) |
| | Chrome iron (passive) |
| | 302, 303, 304, 321, 347 stainless steel (passive) |
| | 316, 317 stainless steel (passive) (Parker stainless steel fittings are passivated) |
| | Carpenter 20 Cb-3 stainless (passive), Incoloy 825 |
| | Silver |
| | Titanium (passive), Hastelloy C & C276 (passive), Inconnel 625 (passive) |
| - Cathodic (most noble) protected | Graphic |
| | Zirconium |
| | Gold |
| | Platinum |

Electric current flows from plus to minus
Direction of attack

**Table T14 — Electromotive or Galvanic Series for Metals**



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# O-Ring Material Selection

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Standard O-Rings supplied with Parker tube fittings and adapters are 90 durometer hard nitrile (Buna-N) Parker compound #N0552 or similar. These O-Rings are well suited for most industrial hydraulic and pneumatic systems. They have high extrusion resistance making them suitable for very high pressure static applications. Optional high temperature fluorocarbon, Parker compound #V0894, is also available for higher temperature specifications.

O-Rings for other than normal hydraulic media or higher temperature applications can be selected from the following chart. The chart should be used only as a general guide. Before making final selection for a given application, it is recommended that appropriate tests be conducted to assure compatibility with the fluid, temperature, pressure and other environmental conditions.

For fluids not shown in the chart, please contact the Tube Fittings Division or Parker Seal Group.

| Recommended for | Temperature Range | Not Recommended For | Polymer | Abbreviated Name | Parker Compound | No. Color | SAE J515 Type | Shore Hardness |
|---|---|---|---|---|---|---|---|---|
| Acids | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0747 | Black | — | 75 |
| Acids | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0884 | Brown[1] | — | 75 |
| Acids | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0894 | Brown[1],[5] | HK[4] | 90[6] |
| Air | -30° to 250° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0674 | Black | — | 70 |
| Air | -30° to 250°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0552 | Black | CH[2] | 90[6] |
| Air | -30° to 275°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N1059 | Black | CH[2] | 90 |
| Air | -65° to 225° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0103 | Black | — | 70 |
| Alcohols | -65° to 225°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0540 | Black | CA[3] | 80 |
| Alcohols | -65° to 225°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0893 | Purple[1] | CA[3] | 80 |
| Automotive brake fluids | -65° to 225°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0540 | Black | CA[3] | 80 |
| Automotive brake fluids | -65° to 225°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0893 | Purple[1] | CA[3] | 80 |
| C02 Climate control systems | -65° to 225°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0962 | Black | — | 90 |
| CNG Applications | -65° to 225°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0756 | Black | — | 75[6] |
| Di-ester base lubricants | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0747 | Black | — | 75 |
| Di-ester base lubricants | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0884 | Brown[1] | — | 75 |
| Di-ester base lubricants | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0894 | Brown[1],[5] | HK[4] | 90[6] |
| Dilute acids and alkalis | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0540 | Black | CA[3] | 80 |
| Dilute acids and alkalis | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0893 | Purple[1] | CA[3] | 80 |
| Dry heat (air to 400°F) | -65° to 450°F | Most petroleum fluids, ketones, water and steam | Silicone | Si | S0604 | Rust[1] | — | 70 |
| Ethylene glycol base fluids | -30° to 250° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0674 | Black | — | 70 |

Dimensions and pressures for reference only, subject to change.



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Tube Fittings Division
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| Recommended for | Temperature Range | Not Recommended For | Polymer | Abbreviated Name | Parker Compound | No. Color | SAE J515 Type | Shore Hardness |
|---|---|---|---|---|---|---|---|---|
| Ethylene glycol base fluids | -30° to 250°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0552 | Black | CH[2] | 90[6] |
| Ethylene glycol base fluids | -30° to 275°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N1059 | Black | CH[2] | 90 |
| Ethylene glycol base fluids | -65° to 225° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0103 | Black | — | 70 |
| Food product applications (meets FDA requirements) | -35° to 250° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0508 | Black | — | 75 |
| Halogenated hydrocarbons | -15° to 400°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Fluorocarbon | FKM[5] or FPM | V0747 | Black | — | 75 |
| Halogenated hydrocarbons | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0884 | Brown[1] | — | 75 |
| Halogenated hydrocarbons | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0894 | Brown[1],[5] | HK[4] | 90[6] |
| High aniline point oils | -65° to 450°F | Most petroleum fluids, ketones, water and steam | Silicone | Si | S0604 | Rust[1] | — | 70 |
| High aniline point petroleum oils | -45° to 250°F | Phosphate ester fluids and ketones | Neoprene | CR | C0873 | Black | — | 70 |
| High aniline point petroleum oils | -45° to 250°F | Phosphate ester fluids and ketones | Neoprene | CR | C0944 | Red[1] | — | 70 |
| Hot water | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0540 | Black | CA[3] | 80 |
| Hot water | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0893 | Purple[1] | CA[3] | 80 |
| Hydrogen Fuel Cells | -65° to 180°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0507 | Black | — | 90 |
| Hydrogen Fuel Cells | -65° to 225°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0304 | Black | — | 75 |
| Ketones | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0540 | Black | CA[3] | 80 |
| Ketones | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0893 | Purple[1] | CA[3] | 80 |
| Mild Acids | -45° to 250°F | Phosphate ester fluids and ketones | Neoprene | CR | C0873 | Black | — | 70 |
| Mild Acids | -45° to 250°F | Phosphate ester fluids and ketones | Neoprene | CR | C0944 | Red[1] | — | 70 |
| Mineral Oils | -30° to 250° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0674 | Black | — | 70 |
| Mineral Oils | -30° to 250°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0552 | Black | CH[2] | 90[6] |
| Mineral Oils | -30° to 275°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N1059 | Black | CH[2] | 90 |
| Mineral Oils | -65° to 225° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0103 | Black | — | 70 |
| Natural Gas | -30° to 250° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0674 | Black | — | 70 |
| Natural Gas | -30° to 250°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0552 | Black | CH[2] | 90[6] |

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| Recommended for | Temperature Range | Not Recommended For | Polymer | Abbreviated Name | Parker Compound | No. Color | SAE J515 Type | Shore Hardness |
|---|---|---|---|---|---|---|---|---|
| Natural Gas | -30° to 275°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N1059 | Black | CH[2)] | 90 |
| Natural Gas | -65° to 225° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0103 | Black | — | 70 |
| Petroleum based oils and fluids | -30° to 250° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0674 | Black | — | 70 |
| Petroleum based oils and fluids | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5)] or FPM | V0747 | Black | — | 75 |
| Petroleum based oils and fluids | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5)] or FPM | V0884 | Brown[1)] | — | 75 |
| Petroleum based oils and fluids | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5)] or FPM | V0894 | Brown[1),5)] | HK[4)] | 90[6)] |
| Petroleum based oils and fluids | -30° to 250°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0552 | Black | CH[2)] | 90[6)] |
| Petroleum based oils and fluids | -30° to 275°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N1059 | Black | CH[2)] | 90 |
| Petroleum based oils and fluids | -65° to 225° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0103 | Black | — | 70 |
| Phosphate ester base hydraulic fluids | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0540 | Black | CA[3)] | 80 |
| Phosphate ester base hydraulic fluids | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0893 | Purple[1)] | CA[3)] | 80 |
| Phosphate ester base hydraulic fluids (some) | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5)] or FPM | V0747 | Black | — | 75 |
| Phosphate ester base hydraulic fluids (some) | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5)] or FPM | V0884 | Brown[1)] | — | 75 |
| Phosphate ester base hydraulic fluids (some) | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5)] or FPM | V0894 | Brown[1),5)] | HK[4)] | 90[6)] |
| Refrigerants (freons, ammonia) | -45° to 250°F | Phosphate ester fluids and ketones | Neoprene | CR | C0873 | Black | — | 70 |
| Refrigerants (freons, ammonia) | -45° to 250°F | Phosphate ester fluids and ketones | Neoprene | CR | C0944 | Red[1)] | — | 70 |
| Silicate ester lubricants | -45° to 250°F | Phosphate ester fluids and ketones | Neoprene | CR | C0873 | Black | — | 70 |
| Silicate ester lubricants | -45° to 250°F | Phosphate ester fluids and ketones | Neoprene | CR | C0944 | Red[1)] | — | 70 |
| Silicone and di-ester base lubricants | -30° to 250° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0674 | Black | — | 70 |
| Silicone and di-ester base lubricants | -30° to 250°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0552 | Black | CH[2)] | 90[6)] |
| Silicone and di-ester base lubricants | -30° to 275°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N1059 | Black | CH[2)] | 90 |
| Silicone and di-ester base lubricants | -65° to 225° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0103 | Black | — | 70 |

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Dimensions and pressures for reference only, subject to change.



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Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

| Recommended for | Temperature Range | Not Recommended For | Polymer | Abbreviated Name | Parker Compound | No. Color | SAE J515 Type | Shore Hardness |
|---|---|---|---|---|---|---|---|---|
| Silicone and silicate ester based lubricants | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0747 | Black | — | 75 |
| Silicone and silicate ester based lubricants | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0884 | Brown[1] | — | 75 |
| Silicone and silicate ester based lubricants | -15° to 400°F | Ketones, skydrol fluids, amines (VDMH), anhydrous ammonia, low molecular weight esters and ethers, hot hydroflouric or chlorosulfuric acids | Fluorocarbon | FKM[5] or FPM | V0894 | Brown[1],[5] | HK[4] | 90[6] |
| Silicone oils and greases | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0540 | Black | CA[3] | 80 |
| Silicone oils and greases | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0893 | Purple[1] | CA[3] | 80 |
| Steam to 400°F | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0540 | Black | CA[3] | 80 |
| Steam to 400°F | -65° to 275°F | Petroleum based oils and di-ester base lubricants | Ethylene-Propylene | EPDM | E0893 | Purple[1] | CA[3] | 80 |
| Water under 150°F | -30° to 250° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0674 | Black | — | 70 |
| Water under 150°F | -30° to 250°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0552 | Black | CH[2] | 90[6] |
| Water under 150°F | -30° to 275°F | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonall | Nitrile-Butadiene | NBR | N1059 | Black | CH[2] | 90 |
| Water under 150°F | -65° to 225° | Phosphate ester base hydraulic fluids, automotive brake fluids, strong acids, ozone, freons, ketones, halogenergated hydrocarbons and methonal | Nitrile-Butadiene | NBR | N0103 | Black | — | 70 |

**Table T15 — O-Ring Selection**

1) These Parker “Chromassure” color assurance O-Rings are available from the Parker Hannifin O-Ring Division. They help eliminate assembly errors, reduce warranty costs and liability risks, and assure safety in aftermarket business.
2) Formerly SAE Type I.
3) Formerly SAE Type II.
4) Formerly SAE Type III.
5) “FKM” is the ASTM designation for fluorocarbon. Its ISO designation is “FPM”. For “DIN” Fittings, color is green.
6) Standard compounds available from stock.
7) Use 90 durometer hard O-Rings for applications with 1500 psi or higher pressures.

# Tube and Fitting Material Compatibility

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As a general rule, tube and fitting materials should be the same. If different materials must be considered, the following chart can be used as a general guide. Since operating conditions differ with applications, this chart should be used only as a guide and not a firm recommendation.

Before making a final decision on material combination, it should be sufficiently tested under appropriate conditions to assure suitability for the intended application. For additional material combinations, contact the Tube Fittings Division.

| Tube Material | Specification | Construction | Condition | Max. Hardness | Temperature Range (7) | Application | Tube Material to Fitting & Material Compatibility | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Seal-Lok ORFS (SAE J1453 | | | Triple-Lok 37°Flare (SAE J514) | | | | Ferulok Flareless (SAE J514) | | | Intru-Lok Flareless | EO/EO-2 Flareless (ISO 8434-1) |
| | | | | | | | S | SS | B | S | SS | B | M | S | SS | M | B | S, SS ,B |
| Carbon Steel C-1010 | SAE J524 (ASTM A179) (8) | Seamless | Fully Annealed | HRB 72 | -65° to 500°F -55° to 260°C | High pressure hydraulic, air, & some specialty chemicals | E | NR | (6) | G | NR | (6) | NR | E | NR | NR | NR | NR |
| | SAE J525 (ASTM A178) (8) | Welded & Drawn | | | | | E | NR | (6) | E | NR | (6) | NR | E | NR | NR | NR | NR |
| | SAE J356 | Welded & Flash Controlled | | | | | G | NR | (6) | NR | NR | (6) | NR | G | NR | NR | NR | NR |
| Carbon Steel C-1021 | SAE J2467 | Welded & Flash Controlled | Fully Annealed | HRB 75 | -65° to 500°F -55° to 260°C | High pressure hydraulic | E | NR | (6) | NR | NR | (6) | NR | E | NR | NR | NR | NR |
| | SAE J2435 | Welded & Drawn | | | | | E | NR | (6) | E | NR | (6) | NR | E | NR | NR | NR | NR |
| Carbon Steel High Strength Low Alloy (HSLA) | SAE 2613 | Welded & Flash Controlled | Sub-criti-cally annealed | HRB 90 | -65° to 500°F -55° to 260°C | High pressure hydraulic | E (10) | NR | (6) | NR | NR | (6) | NR | NR | NR | NR | NR | NR |
| | SAE J2614 | Welded & Drawn | | | | | E | NR | (6) | NR | NR | (6) | NR | NR | NR | NR | NR | NR |
| Alloy Steel 4130 | ASTM A519 | Seamless | | | -65° to 500°F -55° to 260°C | High pressure hydraulics | E (4) | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| St 37.4 (Carbon Steel) | DIN 2391 Part 2 (Metric) | Seamless | Fully Annealed | HRB 72 | -65° to 500°F -55° to 260°C | High pressure hydraulic, air, & some specialty chemicals | E | NR | NR | G | NR | NR | NR | NR | NR | NR | NR | E |
| Stainless Steel 304 & 316 | ASTM A213 ASTM A269 | Seamless | Fully Annealed | HRB 90 | -425° to 1200° -255° to 650°C (3) | High pressure, high temperature, or generally corrosive media (1) | (6) | E | (6) | (6) | G | (6) | NR | (6) | E | NR | NR | E |
| | ASTM A249 ASTM A269 | Welded & Drawn | | | | | (6) | E | (6) | (6) | E | (6) | NR | (6) | E | NR | NR | E |
| 1.4571 1.4541 Stainless Steel | DIN 17458 Tab 8 (Metric) | Seamless | Fully Annealed | HRB 90 | -425° to 1200° -255° to 650°C (3) | High pressure, high temperature, or generally corrosive media (1) | (6) | E | NR | (6) | G | NR | NR | NR | E | NR | NR | E |
| Copper | SAE J528 (ASTM B-75) (8) | Seamless | Soft Annealed Temper 0 | 60 Max. Rockwell 15T | -325° to 400°F -200° to 205°C | Low pressure, low temperature, water, oil & air | E | (6) | E | G | (6) | E | NR | G (2) | NR | NR | E | E |
| Aluminum 6061 | ASTM-B210 | Seamless | T6 Temper | HRB 56 | -325° to 400°F -200° to 205°C | Low pressure, low temperature, water,oil, air & some specialty chemicals | NR | NR | NR | G | NR | NR | NR | E (2) | NR | NR | (6) | NR |
| | | | 0 & T4 Temper | HRB 30 | | | E (5) | NR | NR | G | NR | NR | NR | E (2) | NR | NR | (6) | NR |
| Monel 400 | ASTM-B165 | Seamless | Fully Annealed | HRB 70 | -400° to 800°F -240° to 425°C | Sour gas, marine & general chemical processing media | NR | (6) | NR | NR | (6) | NR | E | NR | (6) | E | NR | NR |
| Nylon | | Extruded | Flexible & Semi-Rigid | | -60° to 200°F -50° to 95°C | Lube lines, chemi-cal process controls & air | NR | NR | NR | NR | NR | NR | NR | G (2) | G (2) | G (2) | E | G (2), (9) |
| Polyethylene | ASTM D-1248 | Extruded | Instrument Grade | | -80° to 150°F -60° to 65°C | Instrumentation lines | NR | NR | NR | NR | NR | NR | NR | G (2) | G (2) | G (2) | E | G (2), (9) |
| PVC | | Extruded | Instrument & Laboratory Grade | | 0° to 140°F -20° to 60°C | General purpose laboratory use | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | G | NR |
| PFTE | | Extruded & Cintered | | | -65° to 400°F -55° to 205°C | Very low pressure, high temperature, fuel, lube, chemical & air applications | NR | NR | NR | NR | NR | NR | NR | G (2) | G (2) | G (2) | G | G (2), (9) |

**Table T16 — Tube and Fitting Material Compatibility**

**Ratings Key:**
NR Not Recommended
F Fair
G Good
E Excellent

**Fitting Materials Code:**
S Steel
SS Stainless Steel
B Brass
M Monel

**Notes:**
1) For highly corrosive media or service environment, contact the Tube Fittings Division.
2) Requires different assembly procedure. Contact the Tube Fittings Division.
3) Low temperature limit for stainless steel Ferulok fittings is -20°F (-30°C).
4) For brazing only. Grade 4130 not recommended with Parflange process.
5) For use with Parflange process only. Not recommended with brazing.
6) Use depends on specific application. Contact the Tube Fittings Division.
7) Applies to tube material.
8) Comparable specifications to SAE.
9) With metric version of tubing.
10) Not tested with Parflange. Contact the Tube Fittings Division.

Dimensions and pressures for reference only, subject to change.



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# Pressure

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## Fitting and Adapter Pressure Ratings

### Fitting Pressure Ratings

Pressure ratings shown on the product pages of this catalog are for dynamic systems. A vast majority of systems where our fittings are used fall in this category. However, there are applications, such as hydraulic jacks, where the system pressure is essentially static once it is pressurized. For this type of an application the fittings can be used at higher pressures.

The dynamic and static systems can be defined as follows:

**Dynamic:** A system in which the operating pressure fluctuates, in accordance with load, up to a maximum pressure limited by the relief valve. In addition, the system may also experience shocks, vibration and temperature excursions. Example: A backhoe.

**Static:** A system, once pressurized, is essentially free of pressure fluctuations, shock, vibration and temperature excursions, with such pressurizations not exceeding 30,000 in the life of the system. Example: A hydraulic jack.

The dynamic pressure ratings are based on a minimum design factor of 4. In other words, the fitting is capable of holding a pressure equal to 4 times the rated pressure before leakage or failure. For static applications, the design factor can be 3. Hence, the static rating can be determined by multiplying the dynamic rating by 1.33.

**Static pressure rating = 1.33 x Dynamic pressure rating**

Example: Static pressure rating for a fitting rated at 6000 psi = 1.33 x 6000 = 8000 psi

**Higher (dynamic) Ratings**
Some parts are capable of performing at higher pressures than those shown on the product pages. For information on higher ratings, contact Tube Fittings Division.

**Tubing Pressure Ratings**
Using Tables T20 and T21, determine the tube O.D. and wall thickness combination that satisfies the following two conditions:

A. Has recommended design pressure equal to or higher than maximum operating pressure.
B. Provides tube I.D. equal to or greater than required flow diameter determined earlier.

Design pressure values in Tables T20 and T21 are based on the severity of service rating “A” (design factor of 4) in Table T19, and temperature derating factor of 1 in Table T7 on page T9.

If more severe operating conditions are involved, the values in Tables T20 and T21 should be multiplied by appropriate derating factors from Tables T19 and T7 before determining the tube O.D. and wall thickness combination. Contact the Tube Fittings Division when in doubt.

| Material and Type | Allowable Design Stress for Factor of 4 at 72°F | Tube Specification |
|---|---|---|
| Steel C1010 | 11,250 PSI | SAE J356, J524, J525 |
| Steel C1021 | 15,000 PSI | SAE J2435, L2467 |
| Steel, High Strength Low Alloy (HSLA) | 18,000 PSI | SAE J2613, J2614 |
| Stainless Steel 304 & 316 | 18,800 PSI | ASTM A213, A249, A269 |
| Alloy Steel C4130 | 18,800 PSI | ASTM A519 |
| Copper, K or Y | 6,000 PSI | SAE J528, ASTM B75 |
| Aluminum 6061-T6 | 10,500 PSI | ASTM B210 |
| Monel, 400 | 17,500 PSI | ASTM B165 |

**Table T17 — Design Stress Values**

**Design Pressure Formula (LAME’S)**

$$P = S\left(\frac{D^2 - d^2}{D^2 + d^2}\right)$$ where:

D = Outside diameter of tube, in.
d = Inside diameter of tube (D-2T), in
P = Recommended design pressure, psi
S = Allowable stress for design factor of 4, psi
T = Tube wall thickness, in.

**Table T18 — Design Pressure Formula**

*For thin wall tubes (D/T ≥ 10) the following formula may be Used: **P = 2ST/D**

| Severity of Service | Description | Design Factor | Derating Factor |
|---|---|---|---|
| A (Normal) | Moderate mechanical and hydraulic shocks. | 4.00 | 1.00 |
| B (Severe) | Severe hydraulic shocks and mechanical strain. | 6.00 | 0.67 |
| C (Hazardous) | Hazardous application with severe service conditions. | 8.00 | 0.50 |

**Table T19 — Severity of Service Design and Derating Factors**

Allowable design stress levels and formula used to arrive at the design pressure values are given in the following chart. Values in Table T7 are for fully annealed tubing.

The design factor is generally applied to ultimate strength of material (or burst pressure of tubing) to provide a measure of design margin against the unknowns in material and operating conditions. The derating factors listed here should be applied directly to the design pressure values in Tables T20 and T21 to arrive at maximum recommended working pressures (i.e., multiply values in Tables T20 and T21 by these derating factors).

# Inch Tube Pressure Ratings

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| Inch Tubes* | | | | | | |
|---|---|---|---|---|---|---|
| | | | Design Pressure | | | |
| Tube O.D. (in.) | Wall Thick. (in.) | Tube I.D. (in.) | Steel C-1010 | Steel C-1021 | Stainless Steel 304 & 316, 4130 HSLA | Copper K or Y |
| 0.125 | 0.010 | 0.105 | 1,900 | 2,550 | 3,200 | 1,000 |
| 0.125 | 0.020 | 0.085 | 4,100 | 5,500 | 6,850 | 2,200 |
| 0.125 | 0.028 | 0.069 | 5,950 | 7,950 | 9,950 | 3,150 |
| 0.125 | 0.035 | 0.055 | 7,550 | 10,100 | 12,650 | 4,050 |
| 0.188 | 0.010 | 0.168 | 1,250 | 1,650 | 2,100 | 650 |
| 0.188 | 0.020 | 0.148 | 2,600 | 3,500 | 4,400 | 1,400 |
| 0.188 | 0.028 | 0.132 | 3,800 | 5,050 | 6,350 | 2,000 |
| 0.188 | 0.035 | 0.118 | 4,850 | 6,500 | 8,150 | 2,600 |
| 0.188 | 0.049 | 0.090 | 7,000 | 9,400 | 11,750 | 3,750 |
| 0.250 | 0.020 | 0.210 | 1,900 | 2,550 | 3,200 | 1,000 |
| 0.250 | 0.028 | 0.194 | 2,750 | 3,700 | 4,650 | 1,450 |
| 0.250 | 0.035 | 0.180 | 3,350 | 4,750 | 5,900 | 1,900 |
| 0.250 | 0.049 | 0.152 | 5,150 | 6,900 | 8,600 | 2,750 |
| 0.250 | 0.058 | 0.134 | 6,200 | 8,300 | 10,350 | 3,300 |
| 0.250 | 0.065 | 0.120 | 7,000 | 9,350 | 11,700 | 3,750 |
| 0.250 | 0.083 | 0.084 | 8,950 | 11,950 | 14,900 | 4,750 |
| 0.313 | 0.020 | 0.273 | 1,500 | 2,000 | 2,500 | 800 |
| 0.313 | 0.028 | 0.257 | 2,150 | 2,900 | 3,600 | 1,150 |
| 0.313 | 0.035 | 0.243 | 2,750 | 3,700 | 4,600 | 1,450 |
| 0.313 | 0.049 | 0.215 | 4,000 | 5,350 | 6,700 | 2,150 |
| 0.313 | 0.058 | 0.197 | 4,850 | 6,450 | 8,100 | 2,550 |
| 0.313 | 0.065 | 0.183 | 5,500 | 7,350 | 9,150 | 2,900 |
| 0.313 | 0.083 | 0.147 | 7,150 | 9,550 | 11,950 | 3,800 |
| 0.313 | 0.095 | 0.123 | 8,200 | 10,950 | 13,700 | 4,350 |
| 0.375 | 0.020 | 0.335 | 1,250 | 1,650 | 2,100 | 650 |
| 0.375 | 0.028 | 0.319 | 1,800 | 2,400 | 3,000 | 950 |
| 0.375 | 0.035 | 0.305 | 2,250 | 3,050 | 3,800 | 1,200 |
| 0.375 | 0.049 | 0.277 | 3,300 | 4,400 | 5,500 | 1,750 |
| 0.375 | 0.058 | 0.259 | 3,950 | 5,300 | 6,600 | 2,100 |
| 0.375 | 0.065 | 0.245 | 4,500 | 6,000 | 7,500 | 2,400 |
| 0.375 | 0.083 | 0.209 | 5,900 | 7,850 | 9,850 | 3,150 |
| 0.375 | 0.095 | 0.185 | 6,800 | 9,100 | 11,400 | 3,650 |
| 0.375 | 0.109 | 0.157 | 7,850 | 10,500 | 13,150 | 4,200 |
| 0.500 | 0.028 | 0.444 | 1,300 | 1,750 | 2,200 | 700 |
| 0.500 | 0.035 | 0.430 | 1,650 | 2,200 | 2,800 | 850 |
| 0.500 | 0.049 | 0.402 | 2,400 | 3,200 | 4,000 | 1,250 |
| 0.500 | 0.058 | 0.384 | 2,900 | 3,850 | 4,800 | 1,500 |
| 0.500 | 0.065 | 0.370 | 3,250 | 4,350 | 5,450 | 1,750 |
| 0.500 | 0.083 | 0.334 | 4,300 | 5,700 | 7,150 | 2,250 |
| 0.500 | 0.095 | 0.310 | 4,950 | 6,650 | 8,300 | 2,650 |
| 0.500 | 0.109 | 0.282 | 5,800 | 7,750 | 9,700 | 3,100 |
| 0.500 | 0.120 | 0.260 | 6,450 | 8,600 | 10,750 | 3,400 |
| 0.500 | 0.134 | 0.232 | 7,250 | 9,650 | 12,100 | 3,850 |
| 0.500 | 0.148 | 0.204 | 8,000 | 10,700 | 13,350 | 4,250 |
| 0.500 | 0.188 | 0.124 | 9,900 | 13,250 | 16,550 | 5,300 |
| 0.625 | 0.028 | 0.569 | 1,050 | 1,400 | 1,750 | 550 |
| 0.625 | 0.035 | 0.555 | 1,300 | 1,750 | 2,200 | 700 |
| 0.625 | 0.049 | 0.527 | 1,900 | 1,900 | 1,900 | 1,900 |

| Inch Tubes* | | | | | | |
|---|---|---|---|---|---|---|
| | | | Design Pressure | | | |
| Tube O.D. (in.) | Wall Thick. (in.) | Tube I.D. (in.) | Steel C-1010 | Steel C-1021 | Stainless Steel 304 & 316, 4130 HSLA | Copper K or Y |
| 0.625 | 0.058 | 0.509 | 2,250 | 3,000 | 3,750 | 1,200 |
| 0.625 | 0.065 | 0.495 | 2,550 | 3,400 | 4,250 | 1,350 |
| 0.625 | 0.083 | 0.459 | 3,350 | 4,450 | 5,600 | 1,750 |
| 0.625 | 0.095 | 0.435 | 3,900 | 5,200 | 6,500 | 2,050 |
| 0.625 | 0.109 | 0.407 | 4,500 | 6,050 | 7,550 | 2,400 |
| 0.625 | 0.120 | 0.385 | 5,050 | 6,700 | 8,400 | 2,700 |
| 0.625 | 0.134 | 0.357 | 5,700 | 7,600 | 9,500 | 3,000 |
| 0.750 | 0.035 | 0.680 | 1,050 | 1,450 | 1,800 | 550 |
| 0.750 | 0.049 | 0.652 | 1,550 | 2,050 | 2,600 | 800 |
| 0.750 | 0.058 | 0.634 | 1,850 | 2,450 | 3,100 | 1,000 |
| 0.750 | 0.065 | 0.620 | 2,100 | 2,800 | 3,500 | 1,100 |
| 0.750 | 0.083 | 0.584 | 2,750 | 3,650 | 4,550 | 1,450 |
| 0.750 | 0.095 | 0.560 | 3,150 | 4,250 | 5,300 | 1,700 |
| 0.750 | 0.109 | 0.532 | 3,700 | 4,950 | 6,150 | 1,950 |
| 0.750 | 0.120 | 0.510 | 4,100 | 5,500 | 6,850 | 2,200 |
| 0.750 | 0.134 | 0.482 | 4,650 | 6,200 | 7,750 | 2,450 |
| 0.750 | 0.148 | 0.454 | 5,200 | 6,950 | 8,650 | 2,750 |
| 0.750 | 0.188 | 0.374 | 6,750 | 9,000 | 11,250 | 3,600 |
| 0.875 | 0.035 | 0.805 | 900 | 1,200 | 1,550 | 500 |
| 0.875 | 0.049 | 0.777 | 1,300 | 1,750 | 2,200 | 700 |
| 0.875 | 0.058 | 0.759 | 1,550 | 2,100 | 2,600 | 800 |
| 0.875 | 0.065 | 0.745 | 1,750 | 2,350 | 2,950 | 950 |
| 0.875 | 0.083 | 0.709 | 2,300 | 3,100 | 3,850 | 1,200 |
| 0.875 | 0.095 | 0.685 | 2,650 | 3,600 | 4,500 | 1,400 |
| 0.875 | 0.109 | 0.657 | 3,100 | 4,150 | 5,200 | 1,650 |
| 0.875 | 0.120 | 0.635 | 3,450 | 4,650 | 5,800 | 1,850 |
| 0.875 | 0.134 | 0.607 | 3,900 | 5,250 | 6,550 | 2,100 |
| 0.875 | 0.148 | 0.579 | 4,350 | 5,850 | 7,300 | 2,300 |
| 1.000 | 0.035 | 0.930 | 800 | 1,050 | 1,350 | 400 |
| 1.000 | 0.049 | 0.902 | 1,150 | 1,500 | 1,900 | 600 |
| 1.000 | 0.058 | 0.884 | 1,350 | 1,800 | 2,300 | 700 |
| 1.000 | 0.065 | 0.870 | 1,550 | 2,050 | 2,550 | 800 |
| 1.000 | 0.083 | 0.834 | 2,000 | 2,650 | 3,350 | 1,050 |
| 1.000 | 0.095 | 0.810 | 2,300 | 3,100 | 3,850 | 1,200 |
| 1.000 | 0.109 | 0.782 | 2,700 | 3,600 | 4,500 | 1,400 |
| 1.000 | 0.120 | 0.760 | 3,000 | 4,000 | 5,000 | 1,600 |
| 1.000 | 0.134 | 0.732 | 3,350 | 4,500 | 5,650 | 1,800 |
| 1.000 | 0.148 | 0.704 | 3,750 | 5,050 | 6,300 | 2,000 |
| 1.000 | 0.156 | 0.688 | 4,000 | 5,350 | 6,700 | 2,100 |
| 1.000 | 0.188 | 0.624 | 4,900 | 6,550 | 8,200 | 2,600 |
| 1.000 | 0.220 | 0.560 | 5,850 | 7,800 | 9,750 | 3,100 |
| 1.250 | 0.049 | 1.152 | 900 | 1,200 | 1,500 | 450 |
| 1.250 | 0.058 | 1.134 | 1,050 | 1,450 | 1,800 | 550 |
| 1.250 | 0.065 | 1.120 | 1,200 | 1,600 | 2,050 | 650 |
| 1.250 | 0.083 | 1.084 | 1,550 | 2,100 | 2,650 | 800 |
| 1.250 | 0.095 | 1.060 | 1,800 | 2,450 | 3,050 | 950 |
| 1.250 | 0.109 | 1.032 | 2,100 | 2,800 | 3,550 | 1,100 |
| 1.250 | 0.120 | 1.010 | 2,350 | 3,150 | 3,900 | 1,250 |

**Table T20 — Inch Tube Pressure Ratings**

*See Table T16 for tube specifications.

Dimensions and pressures for reference only, subject to change.



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# Inch Tube Pressure Ratings (cont'd.)

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| Inch Tubes* | | | | | | |
|---|---|---|---|---|---|---|
| | | | Design Pressure | | | |
| Tube O.D. (in.) | Wall Thick. (in.) | Tube I.D. (in.) | Pressure C-1010 | Steel C-1021 | Stainless Steel 304 & 316, 4130 HSLA | Copper K or Y |
| 1.250 | 0.134 | 0.982 | 2,650 | 3,550 | 4,400 | 1,400 |
| 1.250 | 0.148 | 0.954 | 2,950 | 3,950 | 4,900 | 1,550 |
| 1.250 | 0.156 | 0.938 | 3,100 | 4,150 | 5,200 | 1,650 |
| 1.250 | 0.188 | 0.874 | 3,850 | 5,100 | 6,400 | 2,050 |
| 1.250 | 0.220 | 0.810 | 4,550 | 6,100 | 7,650 | 2,450 |
| 1.500 | 0.065 | 1.370 | 1,000 | 1,350 | 1,650 | 500 |
| 1.500 | 0.083 | 1.334 | 1,300 | 1,750 | 2,150 | 700 |
| 1.500 | 0.095 | 1.310 | 1,500 | 2,000 | 2,500 | 800 |
| 1.500 | 0.109 | 1.282 | 1,750 | 2,300 | 2,900 | 900 |
| 1.500 | 0.120 | 1.260 | 1,900 | 2,550 | 3,200 | 1,000 |
| 1.500 | 0.134 | 1.232 | 2,150 | 2,900 | 3,600 | 1,150 |
| 1.500 | 0.148 | 1.204 | 2,400 | 3,200 | 4,050 | 1,250 |
| 1.500 | 0.156 | 1.188 | 2,550 | 3,400 | 4,250 | 1,350 |
| 1.500 | 0.188 | 1.124 | 3,150 | 4,200 | 5,250 | 1,650 |
| 1.500 | 0.220 | 1.060 | 3,750 | 5,000 | 6,250 | 2,000 |
| 1.500 | 0.250 | 1.000 | 4,300 | 5,750 | 7,200 | 2,300 |
| 2.000 | 0.065 | 1.870 | 750 | 1,000 | 1,250 | 400 |
| 2.000 | 0.083 | 1.834 | 950 | 1,250 | 1,600 | 500 |
| 2.000 | 0.095 | 1.810 | 1,100 | 1,450 | 1,850 | 550 |
| 2.000 | 0.109 | 1.782 | 1,250 | 1,700 | 2,150 | 650 |
| 2.000 | 0.120 | 1.760 | 1,400 | 1,900 | 2,350 | 750 |
| 2.000 | 0.134 | 1.732 | 1,600 | 2,100 | 2,650 | 850 |
| 2.000 | 0.148 | 1.704 | 1,750 | 2,350 | 2,950 | 950 |
| 2.000 | 0.156 | 1.688 | 1,850 | 2,500 | 3,150 | 1,000 |
| 2.000 | 0.188 | 1.624 | 2,300 | 3,050 | 3,800 | 1,200 |
| 2.000 | 0.220 | 1.560 | 2,700 | 3,650 | 4,550 | 1,450 |
| 2.000 | 0.250 | 1.500 | 3,100 | 4,200 | 5,250 | 1,650 |
| 2.000 | 0.281 | 1.438 | 3,550 | 4,750 | 5,950 | 1,900 |

**Table T20 — Inch Tube Pressure Ratings (cont'd.)**

*See Table T16 for tube specifications.

Dimensions and pressures for reference only, subject to change.



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# Metric Tube Pressure Ratings

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| Metric Tubes | | | | |
|---|---|---|---|---|
| | | | Static Design Pressure (Bar) | |
| Tube O.D. (mm.) | Wall Thick. (mm.) | Tube I.D. (mm.) | Steel Low-Carbon St. 37-4 | Stainless Steel 1.4571 |
| 4 | 0.5 | 3.0 | 313 | |
| 4 | 0.75 | 2.5 | 409 | |
| 4 | 1.0 | 2.0 | 522 | 600 |
| 5 | 1.0 | 3.0 | 432 | |
| 6 | 0.75 | 4.5 | 333 | |
| 6 | 1.0 | 4.0 | 389 | 426 |
| 6 | 1.5 | 3.0 | 549 | 600 |
| 6 | 2.0 | 2.0 | 692 | |
| 6 | 2.25 | 1.5 | 757 | |
| 8 | 1.0 | 6.0 | 333 | 368 |
| 8 | 1.5 | 5.0 | 431 | 472 |
| 8 | 2.0 | 4.0 | 549 | |
| 8 | 2.5 | 3.0 | 658 | |
| 10 | 1.0 | 8.0 | 282 | 294 |
| 10 | 1.5 | 7.0 | 373 | 389 |
| 10 | 2.0 | 6.0 | 478 | 498 |
| 10 | 2.5 | 5.0 | 576 | |
| 10 | 3.0 | 4.0 | 666 | |
| 12 | 1.0 | 10.0 | 235 | 245 |
| 12 | 1.5 | 9.0 | 353 | 368 |
| 12 | 2.0 | 8.0 | 409 | 426 |
| 12 | 2.5 | 7.0 | 495 | |
| 12 | 3.0 | 6.0 | 576 | |
| 12 | 3.5 | 5.0 | 651 | |
| 14 | 1.5 | 11.0 | 302 | 315 |
| 14 | 2.0 | 10.0 | 357 | 420 |
| 14 | 2.5 | 9.0 | 434 | 452 |
| 14 | 3.0 | 8.0 | 507 | |
| 14 | 3.5 | 7.0 | 576 | |
| 14 | 4.0 | 6.0 | 641 | |
| 15 | 1.0 | 13.0 | 188 | 196 |
| 15 | 1.5 | 12.0 | 282 | 294 |
| 15 | 2.0 | 11.0 | 336 | 392 |
| 15 | 3.0 | 9.0 | 478 | |
| 16 | 1.5 | 13.0 | 264 | 276 |
| 16 | 2.0 | 12.0 | 353 | 368 |
| 16 | 2.5 | 11.0 | 386 | 403 |
| 16 | 3.0 | 10.0 | 452 | 472 |
| 18 | 1.0 | 16.0 | 157 | |
| 18 | 1.5 | 15.0 | 235 | 245 |
| 18 | 2.0 | 14.0 | 313 | 327 |
| 18 | 2.5 | 13.0 | 392 | |
| 18 | 3.0 | 12.0 | 409 | |
| 20 | 1.5 | 17.0 | 212 | |
| 20 | 2.0 | 16.0 | 282 | 294 |
| 20 | 2.5 | 15.0 | 353 | 368 |
| 20 | 3.0 | 14.0 | 373 | 389 |
| 20 | 3.5 | 13.0 | 426 | |
| 20 | 4.0 | 12.0 | 478 | |
| 22 | 1.5 | 19.0 | 192 | 200 |
| 22 | 2.0 | 18.0 | 256 | 267 |
| 22 | 2.5 | 17.0 | 320 | |
| 22 | 3.0 | 16.0 | 343 | |
| 25 | 2.0 | 21.0 | 226 | |
| 25 | 2.5 | 20.0 | 282 | 294 |
| 25 | 3.0 | 19.0 | 338 | 353 |

| Metric Tubes | | | | |
|---|---|---|---|---|
| | | | Static Design Pressure (Bar) | |
| Tube O.D. (mm.) | Wall Thick. (mm.) | Tube I.D. (mm.) | Steel Low-Carbon St. 37-4 | Stainless Steel 1.4571 |
| 25 | 4.0 | 17.0 | 394 | |
| 25 | 4.5 | 16.0 | 437 | |
| 25 | 5.0 | 15.0 | 478 | |
| 28 | 1.5 | 25.0 | 151 | 158 |
| 28 | 2.0 | 24.0 | 201 | 210 |
| 28 | 2.5 | 23.0 | 252 | |
| 28 | 3.0 | 22.0 | 302 | |
| 30 | 2.0 | 26.0 | 188 | |
| 30 | 2.5 | 25.0 | 235 | 245 |
| 30 | 3.0 | 24.0 | 282 | 294 |
| 30 | 4.0 | 22.0 | 336 | 392 |
| 30 | 5.0 | 20.0 | 409 | |
| 35 | 2.0 | 31.0 | 161 | 168 |
| 35 | 2.5 | 30.0 | 201 | |
| 35 | 3.0 | 29.0 | 242 | |
| 35 | 4.0 | 27.0 | 322 | |
| 38 | 2.5 | 33.0 | 186 | |
| 38 | 3.0 | 32.0 | 223 | |
| 38 | 4.0 | 30.0 | 297 | 309 |
| 38 | 5.0 | 28.0 | 332 | |
| 38 | 6.0 | 26.0 | 390 | |
| 38 | 7.0 | 24.0 | 446 | |
| 42 | 2.0 | 38.0 | 134 | 140 |
| 42 | 3.0 | 36.0 | 201 | 210 |
| 42 | 4.0 | 34.0 | 269 | |
| 50 | 6.0 | 38.0 | 338 | |
| 50 | 9.0 | 32.0 | 437 | |
| 65 | 8.0 | 49.0 | 347 | |

**Table T21 — Metric Tube Pressure Ratings**

Dimensions and pressures for reference only, subject to change.



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# Tube Selection Example

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To select tube material and tube sizes for pressure, return and suction lines for a hydraulic power unit with the following operating parameters known:

Type of fluid: Petroleum base hydraulic fluid

Operating temperature range: -20°F to +140°F.

Maximum operating pressure: 3500 psi

Maximum flow rate through each line: 10 GPM

Severity of service: A (normal)

1. **Selecting Tube Material:** Table T6 indicates that carbon steel, C-1010, tubing would meet the media, operating temperature range, and maximum operating pressure (high) requirements.

2. **Sizing the Tube:** From Table T1, the recommended flow diameters for various lines for 10 GPM flow rate are: 0.405 for pressure line, 0.639 for return line, and 1.012 for suction line.

   Now, using Tables T20 and T21, we need to find tubes with inside diameters (I.D.) equal to or larger than the above flow diameters, and wall thicknesses appropriate for design pressures of 3500 psi minimum for the pressure line and about 500 psi for return and suction lines. Since derating factors for Severity of Service (Table T19) and Max. Operating Temperature (Table T7) are both 1, design pressure values in Tables T20 and T21 do not need to be reduced. Matching tube I.D.s and design pressures in Tables T15 and T16 for above conditions, we find:

A) For the pressure line, we would choose 5/8" O.D. x .083" wall tubing. The .095" and .109" wall tubes would also be satisfactory if .083" wall is not readily available.

B) For the return line, either 3/4" x .035" or 3/4" x .049" would meet the requirements. If Ferulok fittings are being used, we will need to go to 3/4" x .065" because .065" is the smallest wall thickness recommended for 3/4" O.D. tubing used with Ferulok fittings in Table T22. This reduces the flow diameter about 3% below the recommended value, but is still in the acceptable range. The alternative is to go to 7/8" O.D. x .072" wall tubing, which is way too large.

C) For the suction line, we can use any one of the following tubes: 1-1/4" O.D. x .049" to .083" wall tube for Triple-Lok or Seal-Lok fittings and 1-1/4" O.D. x .095" wall tube for Ferulok fittings.

One final consideration in choosing the right wall thickness for tubing is bending. If bending without the use of a mandrel is desired, then wall thickness of less than 7% of tube O.D. should not be used.

| Tube Material | | | Steel St. Steel Copper Aluminum | Steel St. Steel Monel | Steel Alloy Steel St. Steel Copper Monel | Copper Aluminum Plastics | Steel St. Steel |
|---|---|---|---|---|---|---|---|
| Size | | | | | | | |
| O.D. (in.) | O.D. (mm) | Dash # | SAE 37° Flare Triple-Lok | SAE Flareless Ferulok | SAE O-Ring Face Seal Seal-Lok | Intru-Lok | Metric Flareless |
| 1/8 | 4 | -2 | .010 - .035 | .010 - .035 | — | .012 - .028 | 0.5 - 1 |
| 3/16 | 6 | -3 | .010 - .035 | .020 - .049 | — | .012 - .035 | 1 - 2 |
| 1/4 | 8 | -4 | .020 - .065 | .028 - .065 | .020 - .083 | .020 - .049 | 1 - 2.5 |
| 5/16 | 10 | -5 | .020 - .065 | .028 - .065 | .020 - .095 | .020 - .065 | 1 - 3 |
| 3/8 | 12 | -6 | .020 - .065 | .035 - .095 | .020 - .109 | .028 - .065 | 1.5 - 3.5 |
| 1/2 | 14 | -8 | .028 - .083 | .049 - .120 | .028 - .148 | .035 - .083 | 1.5 - 4 |
| 5/8 | 15 | -10 | .035 - .095 | .058 - .120 | .035 - .134 | .035 - .083 | 1.5 - 4 |
| 3/4 | 16 | -12 | .035 - .109 | .065 - .120 | .035 - .148 | .035 - .095 | 2 - 4 |
| 7/8 | 18 | -14 | .035 - .109 | .072 - .120 | — | .049 - .095 | 2 - 4 |
| 1 | 20 | -16 | .035 - .120 | .083 - .148 | .035 - .188 | .049 - .120 | 2.5 - 4 |
| 1 1/4 | 22 | -20 | .049 - .120 | .095 - .188 | .049 - .220 | | 2.5 - 4 |
| 1 1/2 | 25 | -24 | .049 - .120 | .095 - .220 | .049 - .250 | | 2.5 - 4.5 |
| 2 | 28 | -32 | .058 - .134 | .095 - .220 | .065 - .220 | | 2.5 - 4.5 |
| | 30 | | | | | | 2.5 - 5 |
| | 35 | | | | | | 3 - 5 |
| | 38 | | | | | | 3 - 6 |
| | 42 | | | | | | 3.5 - 7 |

1) Brazing to attach sleeve can be used for all wall thicknesses. For flanging tool availability, see page R24.

**Table T22 — Recommended "Min./Max" Tube Wall Thickness for Common Fittings**

Dimensions and pressures for reference only, subject to change.



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# How to Order Seal-Lok, Triple-Lok, Ferulok, Intru-Lok, JIS and K4

## TFD Standard Nomenclature Construction

| Box 1 | Box 2 | Box 3 | Box 4 | Box 5 | Box 6 |
|---|---|---|---|---|---|
| Size | Shape or Style | Sub-Style | Type | Material | Plating Options |
| 1 to 4 sets of numbers from Box 1 | Letter code from Box 2 | Number/Letter code from Box 3 | Number/Letter code from Box 4 | Letter code from Box 5 | Letter code from Box 6 |

**Example:** Steel Seal-Lok Adjustable Elbow Connector — 3/8" O.D. (-6) Tube to 7/16-20 UNF (-4) ORB = 6-4 C5L-S

(See the shading in the boxes below for the construction of this example)

**Box 1 — Paired Tube and Port End Size Code Table**

| Tube End | | Port End | | Port End | |
|---|---|---|---|---|---|
| Dash Size | Tube O.D. | Dash Size | SAE Straight Thread | Dash Size | NPTF Pipe Thread |
| -2 | 1/8 | -2 | 5/16-24 | -2 | 1/8 |
| -3 | 3/16 | -3 | 3/8-24 | -2 | 1/8 |
| -4 | 1/4 | -4 | 7/16-20 | -2 | 1/8 |
| -5 | 5/16 | -5 | 1/2-20 | -2 | 1/8 |
| -6 | 3/8 | -6 | 9/16-18 | -4 | 1/4 |
| -8 | 1/2 | -8 | 3/4-16 | -6 | 3/8 |
| -10 | 5/8 | -10 | 7/8-14 | -8 | 1/2 |
| -12 | 3/4 | -12 | 1 1/16-12 | -12 | 3/4 |
| -14 | 7/8 | -14 | 1 3/16-12 | -12 | 3/4 |
| -16 | 1 | -16 | 1 5/16-12 | -16 | 1 |
| -20 | 1 1/4 | -20 | 1 5/8-12 | -20 | 1 1/4 |
| -24 | 1 1/2 | -24 | 1 7/8-12 | -24 | 1 1/2 |
| -32 | 2 | -32 | 2 1/2-12 | -32 | 2 |

**Box 2 — Shape or Style**

| Straights | |
|---|---|
| B | Nut |
| F* | Male Connector |
| FF* | Long Male Connector or Pipe Nipple |
| FFF* | Extra Long Male Connector or Pipe Nipple |
| FN | Cap |
| G* | Female Connector |
| H | Union |
| HH | Long Union |
| HPN* | Plug, Straight Thread, Hollow Hex |
| LH | Large Hex Union |
| PN* | Plug, Straight Thread. Hex Head |
| T | Sleeve or Ferrule |
| TP | Sleeve, Parflange |
| TR | Tube Reducer |
| T22 | Mountie |
| W | Bulkhead Union |
| WF | Bulkhead Male |
| WG | Bulkhead Female |
| WLN | Bulkhead Locknut for Triple-Lok, Ferulok, and Intru-Lok |
| WLNL | Bulkhead Locknut for Seal-Lok |

| 90° Elbows | |
|---|---|
| C* | Male Elbow Connector |
| CC* | Long Male Elbow |
| CCC* | Extra Long Male Elbow |
| D | Female Elbow |
| E | Union Elbow |
| WE | Bulkhead Union Elbow |
| **45° Elbows** | |
| N | Union Elbow |
| V* | Male Elbow Connector |
| WN | Bulkhead Union Elbow |
| **Tees** | |
| J | Union Tee |
| M | Female Run Tee |
| O | Female Branch Tee |
| R* | Male Run Tee |
| S* | Male Branch Tee |
| WJ | Bulkhead Branch Tee |
| WJJ | Bulkhead Run Tee |
| **Cross** | |
| K | Union Cross |

**Box 3 — Sub-Style Modifiers (Connectors, Swivels and Plugs)**

| Connectors (a) | |
|---|---|
| 3 | BSPT Port End |
| 4** | BSPP Port End, O-Ring & RR |
| 5** | SAE Straight Thread Port End |
| 8** | Metric Port End, O-Ring & RR |
| 9 | SAE-ORB with Metal Seal |
| 42 | BSPP Port End, "ED" Seal |
| 47** | BSPP O-Ring Port, B2351 |
| 82 | Metric Port End, "ED" Seal |
| 87** | ISO 6149 Port End |
| J4 (e) | Banjo Connection, BSPP, Soft Seal |
| J8 (e) | Banjo Connection, Metric, Soft Seal |
| **Swivel Unions (b)** | |
| 6 | Female Swivel |
| **Swivel Connectors (c)** | |
| 63 | BSPT Port, Swivel Connector |
| 64** | BSPP Port, Swivel Connector |
| 642 | BSPP, "ED" Seal, Swivel Connector |
| 65** | SAE-ORB, Swivel Connector |
| 68** | Metric Port, Swivel Connector |
| 682 | Metric Port, Swivel Connector |
| 687** | ISO 6149, Swivel Connector |
| Straight Thread Plugs (d) (Modifiers for P) | |
| 4, 5 ,8 ,9 and 87 as in Connectors above. | |
| Notes | |
| a. Modifiers for Connectors as noted with asterisk in Box 2. | |
| b. Modifier for C, V, R ,S ,H ,E and J in Box 2. | |
| c. Modifiers for F only in Box 2. | |
| d. Modifiers for P only in PN and HPN in Box 2. | |
| e. Applies to 90° elbows and tees only. | |

**Box 4 — Fitting Type**

| | |
|---|---|
| I | Intru-Lok |
| K4 | 60° Cone BSPP |
| L** | Seal-Lok |
| P4 | JIS 60° Cone |
| T4 | JIS 30° Flare |
| U | Ferulok |
| X | Triple-Lok |

**Box 5 — Material Code**

| | |
|---|---|
| B | Brass |
| CUNI | Cupro-Nickel (ex. CUNI 70/30) |
| D | Dural (Aluminum) |
| M | Monel |
| S | Steel w/ zinc plating |
| SS | Stainless Steel. 316/316L passivated |

**Box 6 — Plating Options**

| | |
|---|---|
| ZJ | Parker XTR Plating |

**Placing the letter "O" after these sub-style modifiers and fitting types will indicate that you would like an O-Ring on that corresponding end.

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Dimensions and pressures for reference only, subject to change.



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# How to Order 4-Bolt Hydraulic Flanges

## TFD Standard Nomenclature Construction

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| Box 1 | Box 2 | Box 3 | Box 4 | Box 5 | Box 6 | Box 7 |
|---|---|---|---|---|---|---|
| Flange Size | Connection Description | Shape | Flange Connection Type | Mounting Style | Material | Kit Designation |

### Box 1 — Port/Tube/Pipe Flange Size

| Symbol | Description |
|---|---|
| One-to-two digit codes | Size in inches x 16 |

One code is required if end connections are the same size. Two codes are required if they are different sizes (e.g., 16-12).

### Box 2 — Port/Tube/Pipe Connection Description

| Symbol | Description |
|---|---|
| B3 | Braze Socket — silver braze |
| CP1 | Connector Plate — Code 61 |
| CP2 | Connector Plate — Code 62 |
| FCC1 | Flange Clamp, Captive — Code 61 |
| FCC2 | Flange Clamp, Captive — Code 62 |
| FCCT1 | Flange Clamp, Captive with Tapped Holes — Code 61 |
| FCCT2 | Flange Clamp, Captive with Tapped Holes — Code 62 |
| FCS1 | Flange Clamp, Split — Code 61 |
| FCS2 | Flange Clamp, Split — Code 62 |
| G | NPTF Port |
| G3 | BSPT Port |
| G4 | BSPP Port |
| G5 | SAE Port |
| P | Plug (blanking end) |
| SP | Spacer w/o Gage Ports |
| SPG | Spacer w/ 1/4-18 NPTF Gage Port |
| SPG5 | Spacer w/ 7/16-20 UNF Gage Port |
| SPGG5 | Spacer w/ 1/4-18 NPTF & 7/16-20 UNF Ports |
| WSD1 | Weld Saddle — Pipe |
| WSD2 | Weld Saddle — Tube |
| W4 | Flat Weld Socket — Tube |
| W4S | Flat Weld Socket — Tube (shallow) |
| W5 | Flat Weld Socket — Pipe |
| W5S | Flat Weld Socket — Pipe (shallow) |
| W6 | Extended Weld Socket — Tube |
| W6S | Extended Weld Socket — Tube (shallow) |
| W7 | Extended Weld Socket — Pipe |
| W7S | Extended Weld Socket — Pipe (shallow) |
| WB1 | Weld Butt — Schedule 40 |
| WB3 | Weld Butt — Schedule 80 |
| WB5 | Weld Butt — Schedule 160 |
| WB7 | Weld Butt — Schedule XXS |
| WBT | Weld Butt — Tank Pilot |
| WPL | Weld Plate |
| W | Weld Socket |
| W2 | Weld Nipple |
| W3 or WB | Weld Nipple — Weld Butt, Tube |

### Box 3 — Shape Description

| Symbol | Description |
|---|---|
| None | Block and Pad, Straight* |
| E | Elbow 90° |
| H | Barstock, Straight |
| J | Tee |

*The “Block” has O-Ring and drilled mounting holes, while the “Pad” has no O-Ring groove and tapped mounting holes.

### Box 4 — Flange Connection Type

| Symbol | Description |
|---|---|
| Q1 | Code 61 Flange Head w/ O-Ring Groove |
| Q1N | Code 61 Flange Head w/o O-Ring Groove |
| Q2 | Code 62 Flange Head w/ O-Ring Groove |
| Q2N | Code 62 Flange Head w/o O-Ring Groove |
| Q1B | Code 61 Flange Block w/ O-Ring Groove and Drilled Mounting Holes |
| Q1P | Code 61 Flange Block w/o O-Ring Groove and Drilled Mounting Holes |
| Q2B | Code 62 Flange Block w/ O-Ring Groove and Drilled Mounting Holes |
| Q2P | Code 62 Flange Pad w/o O-Ring Groove and Tapped Mounting Holes |
| QSB | Square Flange Block w/ O-Ring Groove and Drilled Mounting Holes |
| QSP | Square Flange Pad w/o O-Ring Groove and Tapped Mounting Holes |

### Box 5 — Mounting Style

| Symbol | Description |
|---|---|
| Omit | Inch Mounting Bolts (screws) |
| M | Metric Mounting Bolts (screws) |

### Box 6 — Material

| Symbol | Description |
|---|---|
| S | Steel, Zinc Plated (braze or weld parts may not be plated) |
| SX | Steel, Oil Dipped |
| SS | Stainless Steel |

### Box 7 — Kit Designation

| Symbol | Description |
|---|---|
| Omit | Flange Only |
| K | Kit (O-Ring, 4 bolts and washers) |

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# How to Order EO and EO-2 Fittings and Accessories

## TFD Standard Nomenclature Construction

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|---|---|---|---|---|---|---|---|---|
| Shape/Style | Tube Size (mm.) | EO-2 Designator | Pressure Series | Port Size/ Designator | Port Sealing Method Modifier | Modifier 1 | Material | Modifier 2 |

| Box 1 — Shape/Style Code | | | |
|---|---|---|---|
| **Straights** | | **Tees** | |
| AS | Weld Connector | EL | Swivel Nut Run |
| AS__/ | Weld Flange | ET | Swivel Nut Branch |
| BFG | Square Flange Connector | GMA1/ | Union w/ Test Point, Pin |
| DA | Distance Adapter | GMA3/ | Union w/ Test Point, M16x2 |
| DG101/ | Rotary Union | LEE | Adjustable Run |
| DG102/ | Rotary Connector | T | Union |
| DG107/ | Rotary Bulkhead Union | TEE | Adjustable Branch |
| DVGE | Plain Bearing Rotary | TH | High Pressure Banjo |
| EGE | Swivel Nut Connector | TR | Reducer Union |
| EGEO | ISO 6149 Swivel Nut Connector | WV | Alternating Valve |
| ESV | Weld Bulkhead Union | **Cross** | |
| G | Union | K | Union |
| GAI | Female Connector | **Accessories** | |
| GE | Male Connector | D | Cutting Ring |
| GEO | ISO 6149 Connector | DKA | Metal Seal Ring |
| GFS__/ | Flange Connector | DKI | Pressure Gage Seal |
| GR | Reducer Union | DOZ | EO-2 Seal Ring |
| GZ | Swivel Union | DPR | Progressive Ring |
| GZR | Reducer Swivel Union | E | Insert |
| MAV | Gage Connector | ED | EOlastic Seal |
| MAVE | Swivel Nut Gage Connector | FM | EO-2 Functional Nut |
| RED | Tube End Reducer | GM | Bulkhead Locknut |
| SKA | Weld Adapter | KD | Plastic Seal |
| SV | Bulkhead Union | KDS | Elastomeric Seal |
| VKA1/ | Test Point Connector, Pin | M | Tube Nut |
| VKA3/ | Test Point Connector, M16x2 | OR | O-Ring |
| **90° Elbows** | | PSR | Progressive Ring (new) |
| BFW | Square Flange Connector | R | Tube |
| DG103/ | Rotary Union | ROV | Plug |
| DG104/ | Rotary Connector | VH | Insert |
| DG108/ | Rotary Bulkhead Union | VKA | Cap |
| DVWE | Plain Bearing Rotary | VSTI | Hollow Hex Plug |
| EW | Swivel Nut | **Valves** | |
| SWVE | Banjo | RHD | Union Check |
| W | Union | RHV | Connector Check |
| WAS | Weld Connector | RHZ | Connector Check |
| WE | Male Connector | RHDI | Female Check |
| WEE | Adjustable | RVP | Cartridge Check |
| WFS__/ | Flange Connector | DV | Low Pressure Shut Off |
| WH | High Pressure Banjo | LD | Medium Pressure Shut Off |
| WSV | Bulkhead Union | VDHA | High Pressure Shut Off |
| **Double 90° Elbows** | | VDHB | High Pressure Shut Off |
| DG105/ | Rotary Union | KH | 2-way Ball Valve |
| DG106/ | Rotary Connector | KH3/2- | 3-way Ball Valve |
| **45° Elbows** | | WV | Alternating Union Tee |
| EV | Swivel Nut | | |
| VEE | Adjustable | | |

| Box 2 — Tube Size (mm.) |
|---|
| 04 |
| 05 |
| 06 |
| 08 |
| 10 |
| 12 |
| 14 |
| 15 |
| 16 |
| 18 |
| 20 |
| 22 |
| 25 |
| 28 |
| 30 |
| 35 |
| 38 |
| 42 |

| Box 3 — EO-2 Designator | |
|---|---|
| Z | EO-2 Assy. |

| Box 4 — Pressure Series | |
|---|---|
| LL | Very Light |
| L | Light |
| S | Heavy |

| Box 5 — Port Size/ Designator (optional) | |
|---|---|
| **Metric** | |
| M_ | Metric Parallel |
| M_X_ | Metric Parallel (Jump Size) |
| M_X_keg | Metric Taper |
| **NPT — Inch** | |
| 1/8NPT | NPT Thread |
| 1/4NPT | NPT Thread |
| 3/8NPT | NPT Thread |
| 1/2NPT | NPT Thread |
| 3/4NPT | NPT Thread |
| 1NPT | NPT Thread |
| 1 1/3NPT | NPT Thread |
| 1 1/2NPT | NPT Thread |
| **SAE-ORB** | |
| 7/16UNF | Inch Parallel Thread |
| 9/16UNF | Inch Parallel Thread |
| 3/4UNF | Inch Parallel Thread |
| 3/4UNF | Inch Parallel Thread |
| 7/8UNF | Inch Parallel Thread |
| 11/16UNF | Inch Parallel Thread |
| 15/16UNF | Inch Parallel Thread |
| 1 5/8UNF | Inch Parallel Thread |
| 1 7/8UNF | |
| **BSPP/BSPT** | |
| R_ | BSPP |
| R_/_keg | BSPT |

| Box 6 — Port Sealing Method Modifier (optional) | |
|---|---|
| ED | EOlastic Seal |
| OR | ISO 6149 O-Ring |
| Kds | Banjo Seal Ring |

| Box 7 — Modifier 1 (optional) | |
|---|---|
| OMD | Without Nut and Sleeve |
| VIT | FPM (omitted for Stainless) |
| NBR | Nitrile Seals (omitted for Steel and Brass) |
| _ _ B | Special Cracking Pressure (check valve) |

| Box 8 — Material | |
|---|---|
| CF | Chromium 6 Free |
| MS | Brass |
| 71 | Stainless Steel |
| VZ | Zinc Plated (tube only) |

| Box 9 — Modifier 2 (optional) | |
|---|---|
| X | Unassembled |

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Dimensions and pressures for reference only, subject to change.



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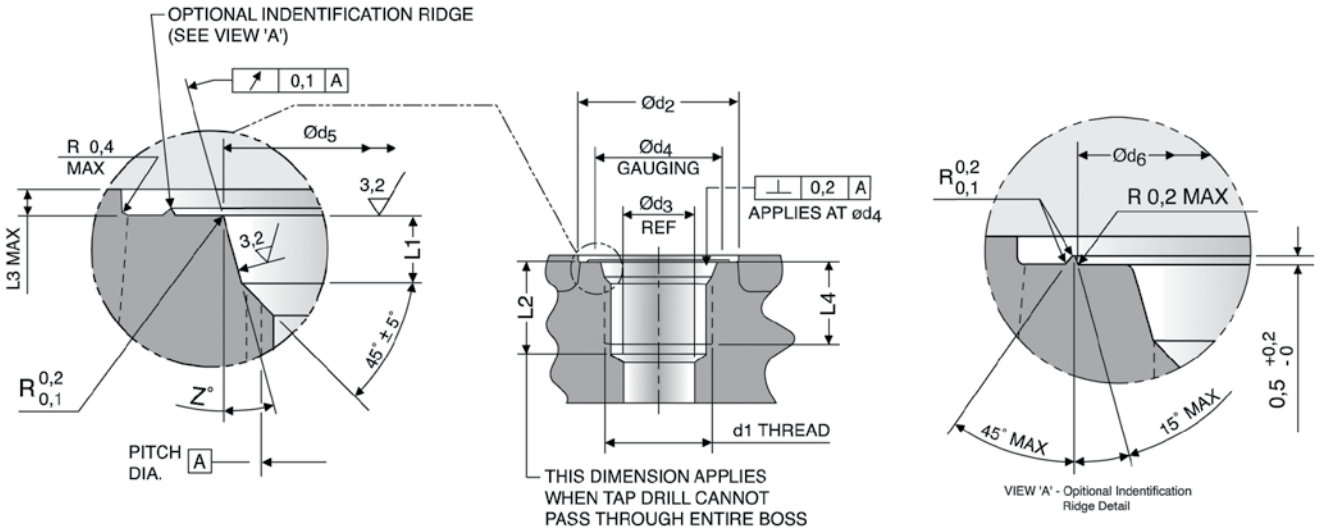
# ISO 6149-1 — Metric Straight Thread O-Ring Port

(SAE 2244-1/DIN 3852, Part 3) Metric ISO 261, "M" Thread




| Thread Size d1[1] | Large d2[2] min | Small d2[3] min. | d3[4] ref. | d4 | d5 +0.1 0 | d6 +0.5 0 | L1 +0.4 0 | L[2] min. | L3 max | L4 min. full thread | Z° ±1° | Parker O-Ring Size[8] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M8 X 1 | 17 | 14 | 3 | 12.5 | 9.1 | 14 | 1.6 | 11.5 | 1 | 10 | 12° | M8 ISO O-Ring |
| M10 X 1 | 20 | 16 | 4.5 | 14.5 | 11.1 | 16 | 1.6 | 11.5 | 1 | 10 | 12° | M10 ISO O-Ring |
| M12 X 1.5 | 23 | 19 | 6 | 17.5 | 13.8 | 19 | 2.4 | 14 | 1.5 | 11.5 | 15° | M12 ISO O-Ring |
| M14 X 1.5 | 25 | 21 | 7.5 | 19.5 | 15.8 | 21 | 2.4 | 14 | 1.5 | 11.5 | 15° | M14 ISO O-Ring |
| M16 X 1.5 | 28 | 24 | 9 | 22.5 | 17.8 | 24 | 2.4 | 15.5 | 1.5 | 13 | 15° | M16 ISO O-Ring |
| M18 X 1.5 | 30 | 26 | 11 | 24.5 | 19.8 | 26 | 2.4 | 17 | 2 | 14.5 | 15° | M18 ISO O-Ring |
| M22 X 1.5 | 33 | 29 | 14 | 27.5 | 23.8 | 29 | 2.4 | 18 | 2 | 15.5 | 15° | M22 ISO O-Ring |
| M27 X 2 | 40 | 34 | 18 | 32.5 | 29.4 | 34 | 3.1 | 22 | 2 | 19 | 15° | M27 ISO O-Ring |
| M30 X 2 | 44 | 38 | 21 | 36.5 | 32.4 | 38 | 3.1 | 22 | 2 | 19 | 15° | M30 ISO O-Ring |
| M33 X 2 | 49 | 43 | 23 | 41.5 | 35.4 | 43 | 3.1 | 22 | 2.5 | 19 | 15° | M33 ISO O-Ring |
| M42 X 2 | 58 | 52 | 30 | 50.5 | 44.4 | 52 | 3.1 | 22.5 | 2.5 | 19.5 | 15° | M42 ISO O-Ring |
| M48 X 2 | 63 | 57 | 36 | 55.5 | 50.4 | 57 | 3.1 | 25 | 2.5 | 22 | 15° | M48 ISO O-Ring |
| M60 X 2 | 74 | 67 | 44 | 65.5 | 62.4 | 67 | 3.1 | 27.5 | 2.5 | 24.5 | 15° | M60 ISO O-Ring |

**FOR CARTRIDGE VALVE CAVITIES ONLY (SEE ISO 7789)**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M20X1.5[7] | 32 | 27 | — — | 25.5 | 21.8 | 27 | 2.4 | — — | 2 | 14.5 | 15° | M20 ISO O-Ring |

**Table T23 — Port Detail — ISO 6149-1**

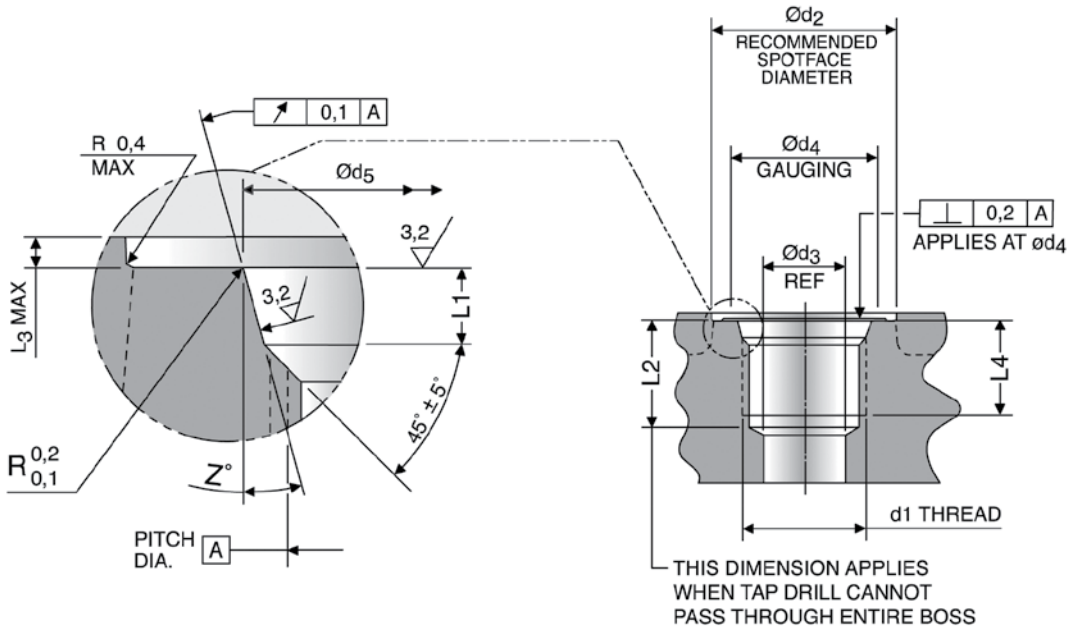
1) Per ISO 261 tolerance class 6H. Tap drill per ISO 2306 class 6H.
2) Spotface diameter with the optional identification ridge.
3) Spotface diameter without identification ridge. Port to be identified by marking "metric" next to it or "ISO 6149-1 Metric" on component name plate.
4) Reference only. Connecting hole application may require a different size.
5) Tap drill depths given require use of a bottoming tap to produce the specified full thread lengths. Where standard taps are used, increase tap drill depths accordingly.
6) Preferred for diagnostic port applications.
7) For cartridge valve cavity applications only.
8) 90 durometer nitrile is standard for hydraulic applications.

**NOTE:** For port tapping tools, see pages R37 and R38. See page S6 for assembly torques.

# SAE J1926-1 — SAE Straight Thread O-Ring Port (ISO 11926-1)

(Conforms to MS16142. Does NOT conform to MS33649[8].)

UN/UNF Threads




| Nominal Tube OD[1] | | | Thread Size | d2 dia.[3] | d3 dia. | d4 dia. | d5 dia.[4] | L1 | L2[5] | L3[3],[6] | L4 | Z | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nom[2] SAE Dash Size | Inch (in.) | Metric (mm.) | ANSI B1.1 (ISO 263) (in.) | (mm.) | min. (mm.) | min. (mm.) | +0.13 -0.00 (mm.) | +0.4 -0.00 (mm.) | min. (mm.) | min. (mm.) | Full Thread min. (mm.) | ±1° deg. | Parker O-Ring Size[7] |
| -2 | 1/8 | — — — | 5/16-24 UNF-2B | 17 | 1.6 | 11 | 9.1 | 1.9 | 12.0 | 1.6 | 10.0 | 12° | 3-902 |
| -3 | 3/16 | 4 | 3/8-24 UNF-2B | 19 | 3.2 | 13 | 10.7 | 1.9 | 12.0 | 1.6 | 10.0 | 12° | 3-903 |
| -4 | 1/4 | 6 | 7/16-20 UNF-2B | 21 | 4.4 | 15 | 12.4 | 2.4 | 14.0 | 1.6 | 11.5 | 12° | 3-904 |
| -5 | 5/16 | 8 | 1/2-20 UNF-2B | 23 | 6.0 | 16 | 14.0 | 2.4 | 14.0 | 1.6 | 11.5 | 12° | 3-905 |
| -6 | 3/8 | 10 | 9/16-18 UNF-2B | 25 | 7.5 | 18 | 15.6 | 2.5 | 15.5 | 1.6 | 12.7 | 12° | 3-906 |
| -8 | 1/2 | 12 | 3/4-16 UNF-2B | 30 | 10.0 | 22 | 20.6 | 2.5 | 17.5 | 2.4 | 14.3 | 15° | 3-908 |
| -10 | 5/8 | 14, 15, 16 | 7/8-14 UNF-2B | 34 | 12.5 | 26 | 23.9 | 2.5 | 20.0 | 2.4 | 16.7 | 15° | 3-910 |
| -12 | 3/4 | 18, 20 | 1 1/16-12 UN-2B | 41 | 16.0 | 32 | 29.2 | 3.3 | 23.0 | 2.4 | 19.0 | 15° | 3-912 |
| -14 | 7/8 | 22 | 1 3/16-12 UN-2B | 45 | 18.0 | 35 | 32.3 | 3.3 | 23.0 | 2.4 | 19.0 | 15° | 3-914 |
| -16 | 1 | 25, 28 | 1 5/16-12 UN-2B | 49 | 21.0 | 38 | 35.5 | 3.3 | 23.0 | 3.2 | 19.0 | 15° | 3-916 |
| -20 | 1 1/4 | 30, 32, 35 | 1 5/8-12 UN-2B | 58 | 27.0 | 48 | 43.5 | 3.3 | 23.0 | 3.2 | 19.0 | 15° | 3-920 |
| -24 | 1 1/2 | 38, 42 | 1 7/8-12 UN-2B | 65 | 33.0 | 54 | 49.8 | 3.3 | 23.0 | 3.2 | 19.0 | 15° | 3-924 |
| -32 | 2 | 50 | 2 1/2-12 UN-2B | 88 | 45.0 | 70 | 65.7 | 3.3 | 23.0 | 3.2 | 19.0 | 15° | 3-932 |

**Table T24 — Port Detail — SAE J1926-1 (ISO 11926-1)**

1) Nominal tube OD is shown for the standard inch sizes and the conversion to equivalent millimeter sizes. Figures are for reference only, as any boss can be used for a tubing size depending upon other design criteria.
2) See SAE J846 for more information.
3) If face of boss is on a machined surface, dimensions d2 and L3 need not apply as long as corner radius R0.2 is maintained.
4) Diameter d5 shall be concentric with thread pitch diameter within 0.004 in (0.1mm) FIM, and shall be free from longitudinal and spiral tool marks. Annular tool marks up to 100 µin (2.5µm) max. shall be permissible.
5) Tap drill depths given require use of bottoming taps to produce the specified full thread lengths. Where standard taps are used, the tap drill depths must be increased accordingly.
6) Maximum recommended spotface depth to permit sufficient wrench grip for proper tightening of the fitting or locknut.
7) 90 durometer nitrile is standard for hydraulic applications.
8) See page T34.

**NOTE:** For port tapping tools, see pages R35 and R36. For assembly torques see page S5.

# ISO 6162 — Four-Bolt Flange Connection (Includes SAE J518)

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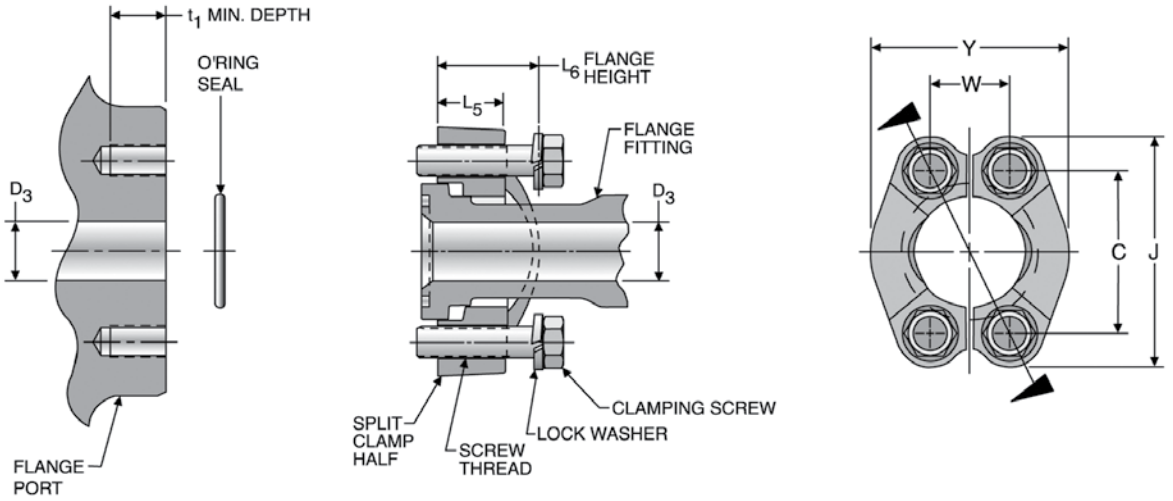


| Nominal Flange Size D3 | | 2.5 to 31.5 MPa Series[1] (SAE Code 61) | | | | | | | | | | | O-Rings[3] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Clamping Screws Screw Holes | | | | Flange Half and Bolt Pattern | | | | | | | | |
| | | Type I | | Type II[2] (SAE J518) | | C | J | | W | Y | L5 | L6 | ISO 3601-1 ID x Section | Parker O-Ring Size |
| (in.) | (mm.) | Thread | $t_1$ Min. depth | Thread (UNC) | $t_1$ Min. depth | ± 0.25 | max. | min. | ± 0.25 | Ref. | | | | |
| 1/2 | 13 | M8 x 1.5 | 12.5 | 5/16 - 18 | 24 | 38.1 | 54.9 | 53.1 | 17.5 | 46 | 13 | 19 | 19 x 3.55 | 2-210 |
| 3/4 | 19 | M10 x 1.5 | 16.5 | 3/8 - 16 | 22 | 47.6 | 65.8 | 64.3 | 22.3 | 52 | 14 | 22 | 25 x 3.55 | 2-214 |
| 1 | 25 | M10 x 1.5 | 14.5 | 3/8 - 16 | 22 | 52.4 | 70.6 | 69.1 | 26.2 | 59 | 16 | 22 | 32.5 x 3.55 | 2-219 |
| 1 1/4 | 32 | M10 x 1.5 | 16.5 | 7/16 - 14 | 28 | 58.7 | 80.3 | 78.5 | 30.2 | 73 | 14[4] | 24 | 37.5 x 3.55 | 2-222 |
| 1 1/2 | 38 | M12 x 1.75 | 19.5 | 1/2 - 13 | 27 | 69.9 | 94.5 | 93.0 | 35.7 | 83 | 16 | 25 | 47.5 x 3.55 | 2-225 |
| 2 | 51 | M12 x 1.75 | 19.5 | 1/2 - 13 | 27 | 77.8 | 103.1 | 100.1 | 42.9 | 97 | 16 | 26 | 56 x 3.55 | 2-228 |
| 2 1/2 | 64 | M12 x 1.75 | 21.5 | 1/2 - 13 | 30 | 88.9 | 115.8 | 112.8 | 50.8 | 109 | 19 | 38 | 69 x 3.55 | 2-232 |
| 3 | 76 | M16 x 2 | 28.5 | 5/8 - 11 | 30 | 106.4 | 136.7 | 133.4 | 61.9 | 131 | 22 | 41 | 85 x 3.55 | 2-237 |
| 3 1/2 | 89 | M16 x 2 | 28.5 | 5/8 - 11 | 33 | 120.7 | 153.9 | 150.9 | 69.9 | 140 | 22 | 28 | 97.5 x 3.55 | 2-241 |
| 4 | 102 | M16 x 2 | 25.5 | 5/8 - 11 | 30 | 130.2 | 163.6 | 160.3 | 77.8 | 152 | 25 | 35 | 112 x 3.55 | 2-245 |
| 5 | 127 | M16 x 2 | 27.5 | 5/8 - 11 | 33 | 152.4 | 182.6 | 185.7 | 92.1 | 181 | 28 | 41 | 136 x 3.55 | 2-253 |

| Nominal Flange Size D3 | | 40 MPa Series[1] (SAE Code 62) | | | | | | | | | | | O-Rings[3] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Clamping Screws Screw Holes | | | | Flange Half and Bolt Pattern | | | | | | | | |
| | | Type I | | Type II[2] (SAE J518) | | C | J | | W | Y | L5 | L6 | ISO 3601-1 ID x Section | Parker O-Ring Size |
| (in.) | (mm.) | Thread | $t_1$ Min. depth | Thread (UNC) | $t_1$ Min. depth | ± 0.25 | max. | min. | ± 0.25 | Ref. | | | | |
| 1/2 | 13 | M8 x 12.5 | 14.5 | 5/16 - 18 | 21 | 40.5 | 57.2 | 55.6 | 18.2 | 48 | 16 | 22 | 19 x 3.55 | 2-210 |
| 3/4 | 19 | M10 x 1.5 | 16.5 | 3/8 - 16 | 24 | 50.8 | 72.1 | 70.6 | 23.8 | 60 | 19 | 28 | 25 x 3.55 | 2-214 |
| 1 | 25 | M12 x 1.75 | 21.5 | 7/16 - 14 | 27 | 57.2 | 81.8 | 80.3 | 27.8 | 70 | 24 | 33 | 32.5 x 3.55 | 2-219 |
| 1 1/4 | 32 | M12 x 1.75 | 18.5 | 1/2 - 13 | 25 | 66.6 | 96.0 | 94.5 | 31.8 | 78 | 27 | 38 | 37.5 x 3.55 | 2-222 |
| 1 1/2 | 38 | M16 x 2 | 25.5 | 5/8 - 11 | 35 | 79.3 | 114.3 | 111.3 | 36.5 | 95 | 30 | 43 | 47.5 x 3.55 | 2-225 |
| 2 | 51 | M20 x 2.5 | 33.5 | 3/4 - 10 | 38 | 96.8 | 134.9 | 131.8 | 44.5 | 114 | 37 | 52 | 56 x 3.55 | 2-228 |

**Table T25 — Port Detail — ISO 6162**

1) 1 MPa = 10 bar = 145 PSI.
2) Not for new design.
3) 90 durometer nitrile is standard for hydraulic applications.

**NOTE:** For port tapping tools, see pages R35 and R36. See page S8 for assembly torques.

Dimensions and pressures for reference only, subject to change.



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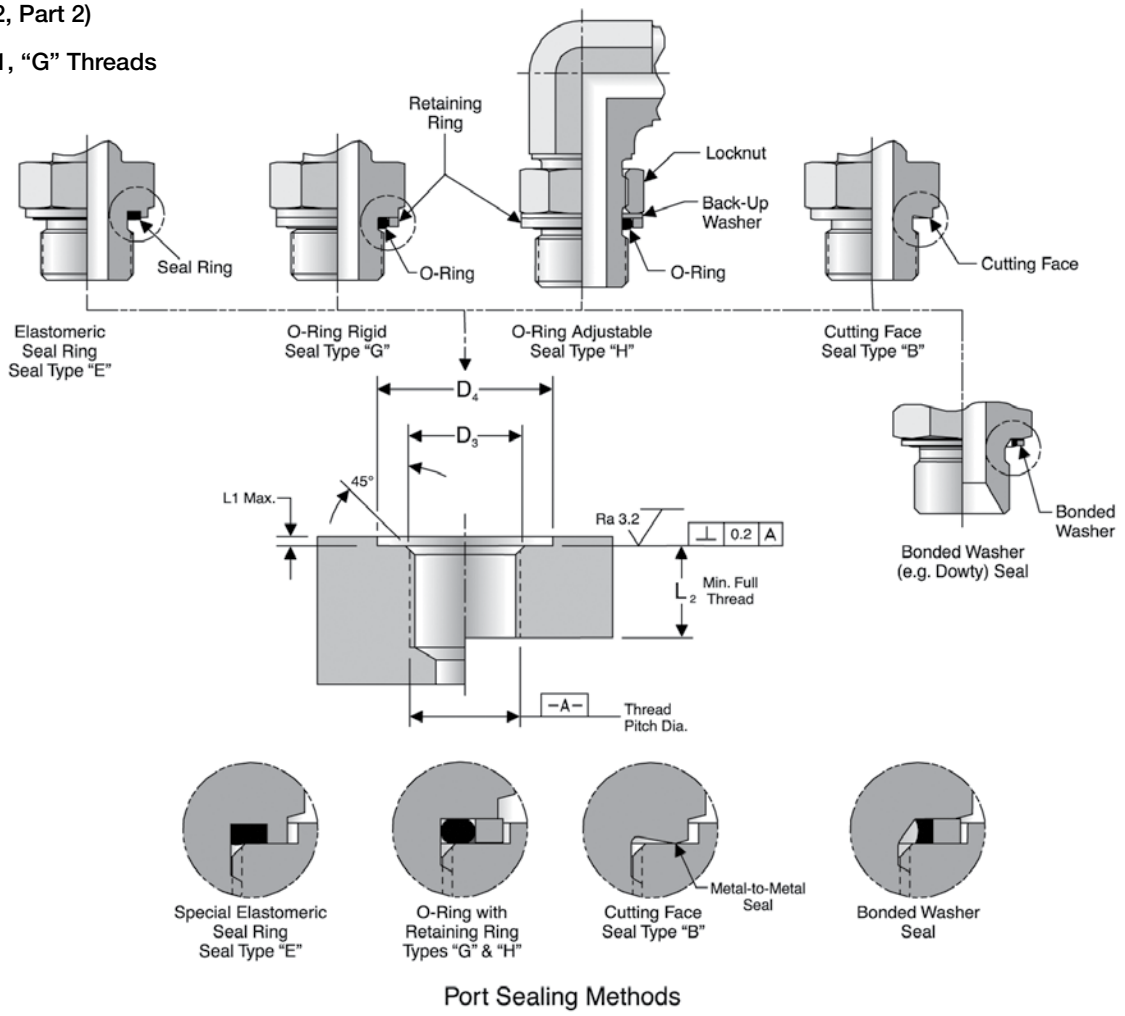
# ISO 1179-1[1] — Flat Face Port with British Standard Pipe, Parallel (BSPP) Threads

(DIN 3852, Part 2)

ISO 228-1, "G" Threads




Port Sealing Methods

| Thread Size (ISO 228-1) | D3 (mm.) | D4 (mm.) Narrow Types B & E | D4 (mm.) Wide Types G & H | L1 max. (mm.) | L2 min. (mm.) | EOlastic Seal (Type E) Part No. | O-Ring and Retaining Ring[1] (Types G & H) O-Ring Size[2] | O-Ring ID x section (mm.) | Retaining Ring Part No. | Bonded Washer Part No.[4] |
|---|---|---|---|---|---|---|---|---|---|---|
| G 1/8-28 | 9.9 | 15 | 17.2 | 1.0 | 8.5 | ED10X1X | 5-585 | 7.98 x 1.88 | 1/8 RR | D9DT-2 |
| G 1/4-19 | 13.3 | 20 | 20.7 | 1.5 | 12.5 | ED14X1.5X | 2-111 | 10.77 x 2.62 | 1/4 RR | D9DT-4 |
| G 3/8 19 | 16.8 | 23 | 24.5 | 2.0 | 12.5 | EDR3/8X | 2-113 | 13.94 x 2.62 | 3/8 RR | D9DT-6 |
| G 1/2-14 | 21.1 | 28 | 34.0 | 2.5 | 14.5 | EDR1/2X | 5-256 | 17.96 x 2.62 | 1/2 RR | D9DT-8 |
| G 3/4-14 | 26.6 | 33 | 40.0 | 2.5 | 16.5 | ED26X1.5X | 2-119 | 23.47 x 2.62 | 3/4 RR | D9DT-12 |
| G 1-11 | 33.5 | 41 | 46.1 | 2.5 | 18.5 | ED33X2X | 2-217 | 29.74 x 3.53 | 1 RR | D9DT-16 |
| G 1 1/4-11 | 42.2 | 51 | 54.0 | 2.5 | 20.5 | ED42X2X | 2-222 | 37.69 x 3.53 | 1 1/4 RR | D9DT-20 |
| G 1 1/2-11 | 48.1 | 56 | 60.5 | 2.5 | 22.5 | ED48X2X | 2-224 | 44.04 x 3.53 | 1 1/2 RR | D9DT-24 |
| G 2-11 | 59.9 | 69 | 73.3 | 3.0 | 26.0 | — | — | — | — | D9DT-32 |

**Table T26 — Port Detail — ISO 1179-1**

1) Conforms to proposed revision.
2) 90 durometer nitrile is standard for hydraulic applications.
3) See page N6 for O-ring and retaining ring ordering information.
4) See page N7 for details.

Dimensions and pressures for reference only, subject to change.



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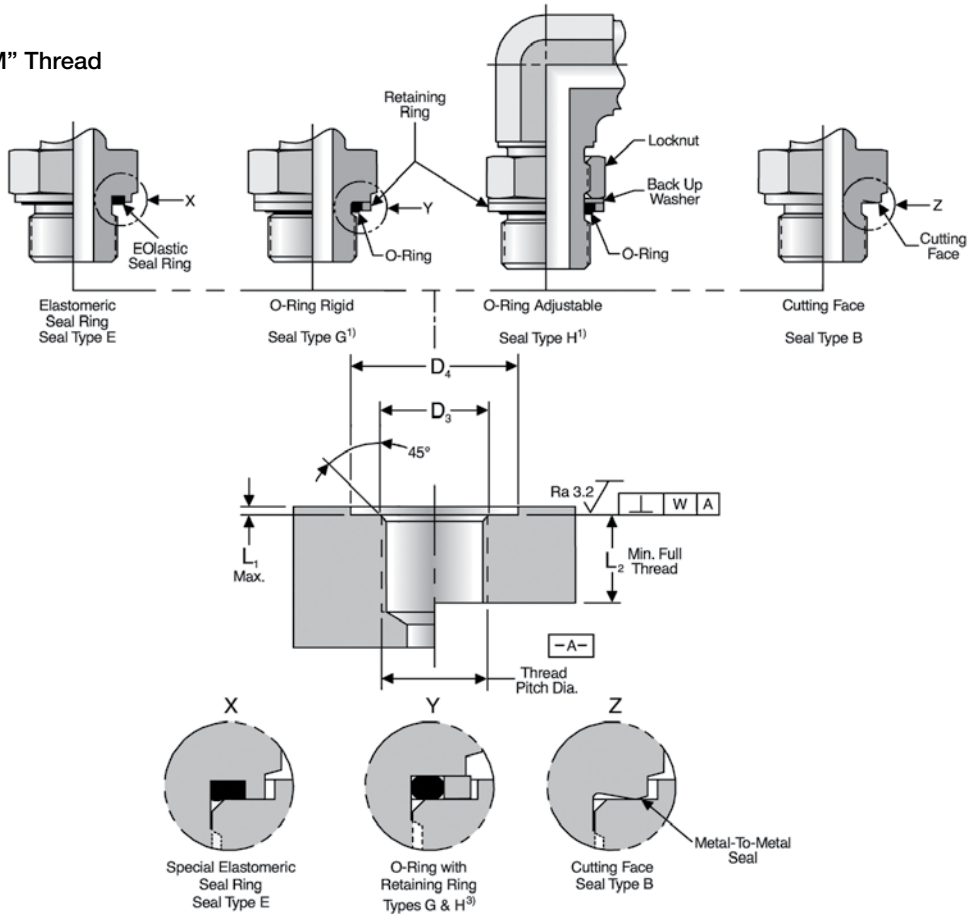
# ISO 9974-1 — Flat Face Port with Metric Threads

(DIN 3852, Part 1)

Metric ISO261, "M" Thread




(See Note 1)

ISO 9974 Port seal types available from Parker

| Thread Size (ISO 261) | D3 (mm.) | D4 (mm.) | L1 max. (mm.) | L2 min. (mm.) | W (mm.) | EOlastic Seal (Type E) | O-Ring and Retaining Ring1) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Part No. | O-Ring Size2) | O-Ring ID x section (mm.) | Retaining Ring Part No. |
| M8 x 1 | 8 +0.2 | 13 | 1 | 8 | | ED8X1X | 3-902 | 6.07 x 1.63 | M8 RR |
| M10 x 1 | 10 +0.2 | 15 | 1 | 8 | | ED10X1X | 6-074 | 8.00 x 1.50 | M10 RR |
| M12 x 1.5 | 12 +0.2 | 18 | 1.5 | 12 | | ED12X1.5X | 2-012 | 9.25 x 1.78 | M12 RR |
| M14 x 1.5 | 14 +0.2 | 20 | 1.5 | 12 | 0.1 | ED14X1.5X | 2-013 | 10.82 x 1.78 | M14 RR |
| M16 x 1.5 | 16 +0.2 | 23 | 1.5 | 12 | | ED16X1.5X | 3-907 | 13.46 x 2.08 | M16 RR |
| M18 x 1.5 | 18 +0.2 | 25 | 2 | 12 | | ED18X1.5XX | 2-114 | 15.54 x 2.62 | M18 RR |
| M20 x 1.53) | 20 +0.2 | 27 | 2 | 14 | | ED20X1.5X | 2-017 | 17.17 x 1.78 | M20 RR |
| M22 x 1.5 | 22 +0.2 | 28 | 2.5 | 14 | | ED22X1.5X | 2-018 | 18.77 x 1.78 | M22 RR |
| M24 x 1.54) | 24 +0.2 | 30 | 2.5 | 14 | | — | 2-019 | 20.35 x 1.78 | M24 RR |
| M26 x 1.5 | 26 +0.2 | 33 | 2.5 | 16 | | ED26X1.5X | 2-118 | 21.89 x 2.62 | M26 RR |
| M27 x 2 | 27 +0.2 | 33 | 2.5 | 16 | | ED26X1.5X | 2-119 | 23.47 x 2.62 | M27 RR |
| M33 x 2 | 33 +0.3 | 41 | 2.5 | 18 | 0.2 | ED33X2X | 2-122 | 28.24 x 2.62 | M33 RR |
| M36 x 24) | 36 +0.3 | 43 | 2.5 | 18 | | — | 2-124 | 31.42 x 2.62 | M36 RR |
| M42 x 2 | 42 +0.3 | 51 | 2.5 | 20 | | ED42X2X | 2-128 | 37.77 x 2.62 | M42 RR |
| M45 x 24) | 45 +0.3 | 50 | 2.5 | 20 | | — | 2-130 | 40.94 x 2.62 | M45 RR |
| M48 x 2 | 48 +0.3 | 56 | 2.5 | 22 | | ED48X2X | 2-132 | 44.12 x 2.62 | M48 RR |

**Table T27 — Port Detail — ISO 9974-1**

1) Seal types G and H are not covered in ISO 9974-1. See page N6 for retaining ring and O-Ring ordering information.
2) 90 durometer nitrile is standard for hydraulic applications.
3) For diagnostic applications.
4) These sizes are not covered in ISO 9974-1.

Dimensions and pressures for reference only, subject to change.



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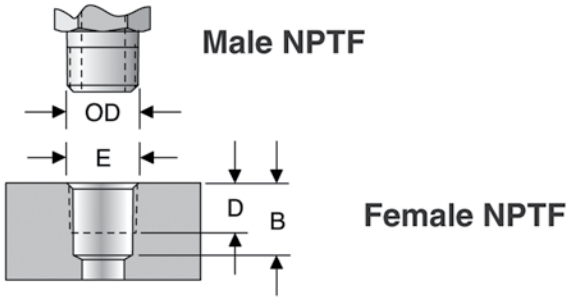
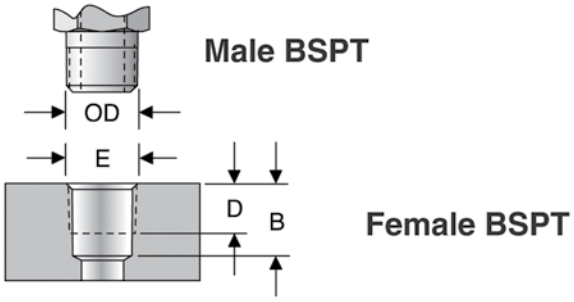
# NPTF and BSPT Dimensions




| Thread Size NPTF | O.D. Male Thread Large Dia. | D Min.. Thread Length | B Min.. Tap Drill Depth[1)] | E Chmf. Dia. |
|---|---|---|---|---|
| 1/8-27 | 0.41 | 0.31 | 0.38 | 0.42 |
| 1/4-18 | 0.55 | 0.44 | 0.47 | 0.55 |
| 3/8-18 | 0.68 | 0.47 | 0.53 | 0.69 |
| 1/2-14 | 0.85 | 0.59 | 0.69 | 0.85 |
| 3/4-14 | 1.06 | 0.63 | 0.75 | 1.06 |
| 1-11 1/2 | 1.33 | 0.75 | 0.84 | 1.34 |
| 1 1/4-11 1/2 | 1.67 | 0.78 | 0.84 | 1.68 |
| 1 1/2-11 1/2 | 1.91 | 0.81 | 0.88 | 1.92 |
| 2-11 1/2 | 2.39 | 0.81 | 0.91 | 2.39 |

**Table T28 — NPTF Dimensions**

1) For bottoming taps only.



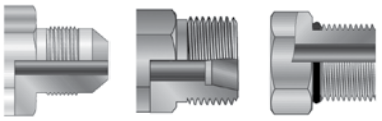

| Thread Size BSPT | O.D. Male Thread Large Dia. | D Min.. Thread Length | B Min.. Tap Drill Depth[1)] | E Chmf. Dia. |
|---|---|---|---|---|
| 1/8-28 | 0.39 | 0.31 | 0.38 | 0.42 |
| 1/4-19 | 0.53 | 0.44 | 0.47 | 0.55 |
| 3/8-19 | 0.67 | 0.47 | 0.53 | 0.69 |
| 1/2-14 | 0.84 | 0.59 | 0.69 | 0.85 |
| 3/4-14 | 1.06 | 0.63 | 0.75 | 1.06 |
| 1-11 | 1.33 | 0.75 | 0.84 | 1.34 |
| 1 1/4-11 | 1.67 | 0.78 | 0.84 | 1.68 |
| 1 1/2-11 | 1.90 | 0.81 | 0.88 | 1.92 |
| 2-11 | 2.37 | 0.81 | 0.91 | 2.39 |

**Table T29 — BSPT Dimensions**

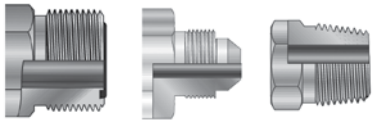
1) For bottoming taps only.

T

# Thread Guide



| Dash Size | Tube Size | Triple-Lok SAE 37° Flare | Ferulok SAE Flareless | SAE Straight Thread |
|---|---|---|---|---|
| 2 | 1/8 | 5/16-24 | 5/16-24 | 5/16-24 |
| 3 | 3/16 | 3/8-24 | 3/8-24 | 3/8-24 |
| 4 | 1/4 | 7/16-20 | 7/16-20 | 7/16-20 |
| 5 | 5/16 | 1/2-20 | 1/2-20 | 1/2-20 |
| 6 | 3/8 | 9/16-18 | 9/16-18 | 9/16-18 |
| 8 | 1/2 | 3/4-16 | 3/4-16 | 3/4-16 |
| 10 | 5/8 | 7/8-14 | 7/8-14 | 7/8-14 |
| 12 | 3/4 | 1 1/16-12 | 1 1/16-12 | 1 1/16-12 |
| 16 | 1 | 1 5/16-12 | 1 5/16-12 | 1 5/16-12 |
| 20 | 1 1/4 | 1 5/8-12 | 1 5/8-12 | 1 5/8-12 |
| 24 | 1 1/2 | 1 7/8-12 | 1 7/8-12 | 1 7/8-12 |
| 32 | 2 | 2 1/8-12 | 2 1/8-12 | 2 1/8-12 |



| Dash Size | Tube Size | Seal-Lok O-Ring Face Seal | SAE 45° Flare | N.P.T. |
|---|---|---|---|---|
| 2 | 1/8 | — | 5/16-24 | 1/8-27 |
| 3 | 3/16 | — | 3/8-24 | — |
| 4 | 1/4 | 9/16-18 | 9/16-18 | 1/4-18 |
| 5 | 5/16 | — | 1/2-20 | — |
| 6 | 3/8 | 11/16-16 | 5/8-18 | 3/8-18 |
| 8 | 1/2 | 13/16-16 | 3/4-16 | 1/2-14 |
| 10 | 5/8 | 1-14 | 7/8-14 | — |
| 12 | 3/4 | 1 3/16-12 | 1 1/16-14 | 3/4-14 |
| 16 | 1 | 1 7/16-12 | 1 3/8-12 | 1-11 1/2 |
| 20 | 1 1/4 | 1 11/8-12 | — | 1 1/4-11 1/2 |
| 24 | 1 1/2 | 2-12 | — | 1 1/2-11 1/2 |
| 32 | 2 | — | — | 2-11 1/2 |

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Dimensions and pressures for reference only, subject to change.



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# Appendix

U

# Fitting Materials

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| Material | | | | Product Type | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Seal-Lok, Triple-Lok, Ferulok, Intru-Lok, Pipe, Port Adapters, JIS, Komatsu, Flanges | | | | |
| Type | Condition | Standard | Grade | Body | Nut | Sleeve | Ferrule | Welding Parts |
| Steel[1] | | ASTM A108 | 12L14 | • | • | • | • | |
| | Bar Stock | ASTM A108 | C1045 | • | • | • | | |
| | | ASTM A108 | C1018 | | • | | | • |
| | Cold Form | ASTM A576 | C1008 | • | • | • | | |
| | | ASTM A576 | C1010 | • | • | • | | |
| | | ASTM A576 | C1012 | • | • | • | | |
| | | ASTM A576 | C1020 | | | • | | |
| | Forging | ASTM A576 | 1214 | • | | | | |
| | | ASTM A576 | 1215 | • | | | | |
| | | ASTM A576 | C1045 | • | • | | | |
| Stainless Steel[2] | Bar Stock | ASTM A479 | 316 | • | • | • | | • |
| | | ASTM A479 | 316L | | | | | |
| | | ASTM A564 | 630 | | | | • | |
| | Cold Form | ASTM A479 | 316 | • | • | • | | • |
| | | ASTM A479 | 316L | | | | | |
| | Forging | ASTM A182 | 316 | • | • | | | |
| | | ASTM A182 | 316L | | | | | |
| Brass[3] | Bar Stock | ASTM B16 | CA360 | • | • | | • | |
| | | ASTM B453 | CA345 | • | • | | | |
| | | ASTM B371 | CA694 | | | • | | |
| | Cold Form | ASTM B121 | CA335 | • | • | | | |
| | | ASTM B111 | CA443 | | | • | | |
| | | ASTM B111 | CA444 | | | • | | |
| | Forging | ASTM B124 | CA377 | • | | | | |
| Aluminum | Bar Stock | ASTM B211 | 2024-T351 | • | • | • | | |
| | Forging | AMS 4133 | 2014-T6 | • | | | | |

[1] Standard steel products have silver/clear zinc chromium 6 free plating. Brazing and welding products are not plated.
[2] Stainless steel fittings are passivated. Standard stainless steel nuts are coated to prevent galling during assembly.
[3] Brass is not available for Ferulok. Where brass is required, use Intru-Lok. Intru-Lok is only available in brass.

**Table U1 — Standard Material Specifications**

| Material | | | | | Product Type | | |
|---|---|---|---|---|---|---|---|
| | | | | | EO, EO2, K4 | | |
| Type | Condition | Standard | Grade | U.S. Equivalent grade | Body | Nut | Welding Parts |
| Steel[1] | Bar Stock | DIN EN 10277-3 | 1.0718 | 12L14 | • | | |
| | | DIN EN 10277-3 | 1.0715 | 1213 | • | | |
| | | DIN EN 10277-3 | 1.0727 | 1146 | • | | |
| | | DIN EN 10277-3 | 1.0401 | C1015 | | | • |
| | Cold Form | DIN EN 10263 | 1.0214 | C1010 | | • | |
| | Forging | DIN 1651 | 1.0710 | | • | | |
| | | DIN EN 10087 | 1.0764 | | • | | |
| | | DIN EN 10083 | 1.0503 | C1045 modified | | • | |
| Stainless Steel | Bar Stock | DIN EN 10088 | 1.4571 | 316TI | • | • | • |
| | Forging | DIN EN 10088 | 1.4571 | 316TI | • | • | • |
| Brass | Bar Stock | DIN 17660 | 2.0540 | | • | • | |
| | Forging | DIN 17660 | 2.0540 | | • | | |

[1] Standard steel products have silver/clear zinc chromium 6 free plating. Brazing and welding products are not plated.

**Table U2 — Standard Material Specifications for EO and K4 Product**



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# Recommended Tube Wall Thickness

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| Fitting Dash Size | Tube O.D. (inch) | Product Type | | | | | |
|---|---|---|---|---|---|---|---|
| | | Recommended Wall Thickness (Inch) | | | | | |
| | | Seal-Lok | | Triple-Lok | | Ferulok | |
| | | Min. | Max. | Min. | Max. | Min. | Max.[1] |
| -2 | 1/8 | - | - | 0.010 | 0.035 | 0.010 | 0.035 |
| -3 | 3/16 | - | - | 0.010 | 0.035 | 0.020 | 0.049 |
| -4 | 1/4 | 0.020 | 0.083 | 0.020 | 0.065 | 0.028 | 0.065 |
| -5 | 5/16 | - | - | 0.020 | 0.065 | 0.028 | 0.065 |
| -6 | 3/8 | 0.020 | 0.109 | 0.020 | 0.065 | 0.035 | 0.095 |
| -8 | 1/2 | 0.028 | 0.148 | 0.028 | 0.083 | 0.049 | 0.120 |
| -10 | 5/8 | 0.035 | 0.134 | 0.035 | 0.095 | 0.058 | 0.120 |
| -12 | 3/4 | 0.035 | 0.148 | 0.035 | 0.109 | 0.065 | 0.120 |
| -14 | 7/8 | 0.035 | 0.156 | 0.035 | 0.109 | 0.072 | 0.120 |
| -16 | 1 | 0.035 | 0.188 | 0.035 | 0.120 | 0.083 | 0.148 |
| -20 | 1 1/4 | 0.049 | 0.220 | 0.049 | 0.120 | 0.095 | 0.188 |
| -24 | 1 1/2 | 0.049 | 0.250 | 0.049 | 0.120 | 0.095 | 0.220 |
| -32 | 2 | 0.058 | 0.250 | 0.058 | 0.134 | 0.095 | 0.220 |

[1] Thicker tubing may be used, but pressure capability is limited by fitting.
[2] Please consult Parker Hannifin Tube Fittings Division for tube sizes not listed.

**Table U3 — Recommended Inch Tube Wall Thickness**

| Metric Tube | | | | | | |
|---|---|---|---|---|---|---|
| Tube O.D. (mm) | Recommended Wall Thickness (mm) | | | | | |
| | Seal-Lok | | | Triple-Lok | | |
| | Fitting Size | Min. | Max. | Fitting Size | Min. | Max. |
| 6 | -4 | 0.5 | 2.25 | -4 | 0.5 | 2.0 |
| 8 | -6 | 1.0 | 2.5 | -5 | 0.5 | 2.0 |
| 10 | -6 | 1.0 | 3.0 | -6 | 0.5 | 2.0 |
| 12 | -8 | 1.0 | 3.5 | -8 | 1.0 | 2.0 |
| 14 | -10 | 1.0 | 4.0 | -10 | 1.0 | 2.5 |
| 15 | -10 | 1.0 | 3.0 | -10 | 1.0 | 2.5 |
| 16 | -10 | 1.0 | 3.0 | -10 | 1.0 | 2.5 |
| 18 | -12 | 1.0 | 3.0 | -12 | 1.0 | 3.0 |
| 20 | -12 | 1.5 | 4.0 | -12 | 1.0 | 3.0 |
| 22 | -16 | 1.0 | 3.0 | -14 | 1.0 | 3.0 |
| 25 | -16 | 2.0 | 5.0 | -16 | 1.0 | 3.0 |
| 28 | -20 | 1.5 | 5.0 | - | - | - |
| 30 | -20 | 2.0 | 5.0 | -20 | 1.5 | 3.0 |
| 32 | -20 | 2.0 | 2.5 | -20 | 1.5 | 3.0 |
| 35 | -24 | 2.0 | 6.0 | - | - | - |
| 38 | -24 | 2.5 | 7.0 | -24 | 1.5 | 3.0 |
| 50 | - | - | - | -32 | 1.5 | 3.5 |

**Table U4 — Recommended Metric Tube Wall Thickness**





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# Tube End Connections
## Threads, Conformance Specifications and Use

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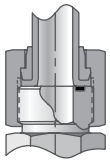
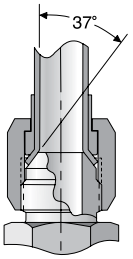
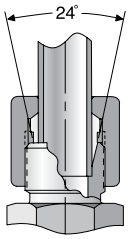
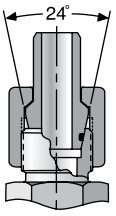
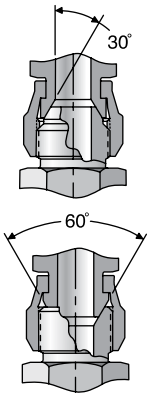
| | | | | | | |
|---|---|---|---|---|---|---|
| |  |  | **SAE J514<br>ISO 8434-1<br>JIS B2351**<br>  | **ISO 8434-4**<br>  | |  |
| **Description** | **O-Ring Face Seal (ORFS) "Seal-Lok"** | **37° Flare "Triple-Lok"** | **Inch 24° Cone Flareless "Ferulok"** | **Metric 24° Cone Flareless "EO" and "EO2"** | **Metric 24° Cone Flareless "JIS"** | **30° Flare and 60° Cone "JIS"** |
| **Thread Type** | ISO 263<br>ANSI B1.1 unified | ISO 263<br>ANSI B1.1, unified | ISO 263<br>ANSI B1.1, unified | ISO 261<br>Metric fine | ISO 261<br>JIS B 0207 | ISO 228-1<br>JIS B0202, BS2779 |
| **ISO No.** | 8434-3 (12151-1)[1] | 8434-2 (12151-6)[1] | — | 8434-1 & -4 (12151-2)[1] | — | — |
| **SAE No.** | J1453/J516[2] | J514/J516[2] | J514 | — | — | — |
| **DIN No.** | — | — | — | 3861, 3865 & 20078[2] | — | — |
| **JIS No.** | — | — | — | Similar to B2351 | B2351 | B8363[3] |
| **BSI No.** | — | — | — | — | — | Similar to BS 5200[4] |
| **Current use** | Mainly used in North America slowly gaining acceptance in Europe and Japan. | Used throughout the world with major usage in North America. | Mainly used in North America. | Mainly used in Europe. Slowly gaining acceptance in North America. | Mainly used in Japan for hard plumbed systems. | Mainly used in Japan, U.K. and British common-wealth countries. |

**Table U5 — Tube End Connections**

1) Hose fitting specification no.
2) Hose fitting specification no.
3) Adapter and hose fitting specification no.
4) 60° cone fittings only. See page U6 for more information.

Dimensions and pressures for reference only, subject to change.



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# Tube End Connections
## Thread Size Guide — Inch Thread

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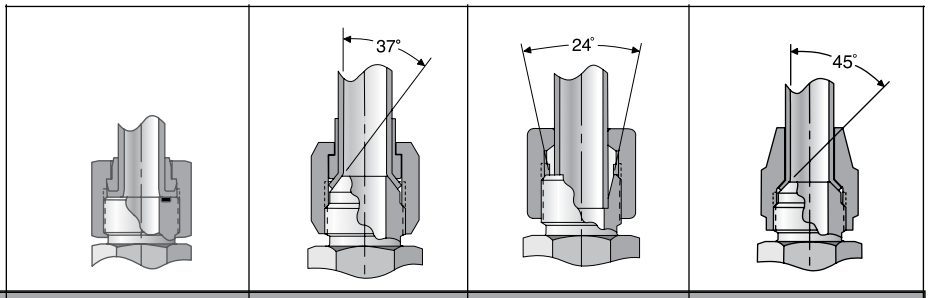


| Tube O.D. or Adapter Size | | | O-ring Face Seal (ORFS) | 37° Flare | Inch 24° cone[3] Flareless | SAE 45° Flare[3] |
|---|---|---|---|---|---|---|
| Nominal metric size[3] | Nominal Inch size | Nominal Inch SAE dash size | SAE J1453 "Seal-Lok" | SAE J514 "Triple-Lok" | SAE J514 "Ferulok" | SAE J512 |
| (mm) | (in) | | Inch ANSI B1.1, unified (ISO 263) | Inch ANSI B1.1, unified (ISO 263) | Inch ANSI B1.1, unified (ISO 263) | Inch ANSI B1.1, unified (ISO 263) |
| — | 1/8 | -2 | — | 5/16-24 | 5/16-24 | 5/16-24 |
| 4 | — | — | — | — | — | — |
| 5 | 3/16 | -3 | — | 3/8-24 | 3/8-24 | 3/8-24 |
| 6 | 1/4 | -4 | 9/16-18 | 7/16-20 | 7/16-20 | 7/16-20 |
| 8 | 5/16 | -5 | — | 1/2-20 | 1/2-20 | 1/2-20 |
| 10 | 3/8 | -6 | 11/16-16 | 9/16-18 | 9/16-18 | 5/8-18 |
| 12 | 1/2 | -8 | 13/16-16 | 3/4-16 | 3/4-16 | 3/4-16 |
| 14 | 5/8 | -10 | 1-14 | 7/8-14 | 7/8-14 | 7/8-14 |
| 15[1] | 5/8 | -10 | 1-14 | 7/8-14 | — | — |
| 16 | 5/8 | -10 | 1-14 | 7/8-14 | — | — |
| 18[1] | 3/4 | -12 | 1 3/16-12 | 1 1/16-12 | 1 1/16-12 | 1 1/16-14 |
| 20 | 3/4 | -12 | 1 3/16-12 | 1 1/16-12 | — | — |
| 22[1] | 7/8 | -14 | — | 1 3/16-12 | 1 3/16-12 | — |
| 25 | 1 | -16 | 1 7/16-12 | 1 5/16-12 | 1 5/16-12 | — |
| 28[1] | 1 1/4 | -20 | 1 11/16-12 | — | 1 5/8-12 | — |
| 30 | 1 1/4 | -20 | 1 11/16-12 | 1 5/8-12 | — | — |
| 32[2] | 1 1/4 | -20 | 1 11/16-12 | 1 5/8-12 | — | — |
| 38 | 1 1/2 | -24 | 2-12 | 1 7/8-12 | 1 7/8-12 | — |
| 50 | 2 | -32 | 2 1/2-12 | 2 1/2-12 | 2 1/2-12 | — |

**Table U6 — Tube End Connections**

1) Not preferred for high pressure applications.
2) Non-preferred size. Use 30mm size in place of 32mm size.
3) Metric tube sizes do not apply to "Ferulok" and 45° flare fittings.





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# Tube End Connections

## Thread Size Guide — Metric, BSPP and JIS Threads

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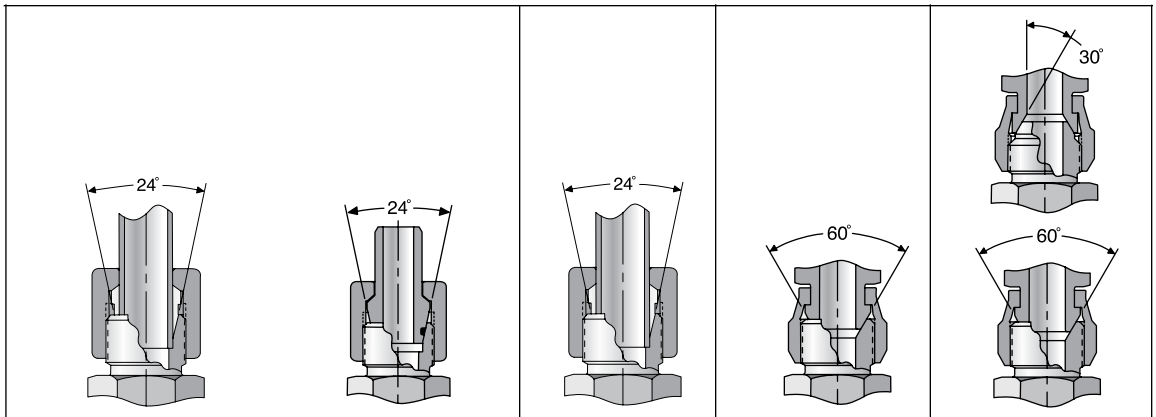


| Tube O.D. or Adapter Size | Metric 24° cone Flareless DIN 3861 "EO" and "EO-2" | | Weld Nipple DIN 3865 | Metric 24° cone Flareless JIS B2351 "JIS" | 60° Cone BS 5200 | 30° Flare and 60° Cone JIS B8363 |
|---|---|---|---|---|---|---|
| | LL Series Metric ISO 261 | L Series Metric ISO 261 | S Series Metric ISO 261 | Metric ISO 261 (JIS B0207) | ISO 228-1 (BSPP)[5] | ISO 228-1 (JIS B 0202) (BSPP)[5] |
| (mm) | | | | | | |
| — | — | — | — | — | — | — |
| 4 | M8 x 1 | — | — | — | — | — |
| 5 | M10 x 1[3] | — | — | — | — | — |
| 6 | M10 x 1 | M12 x 1.5 | M14 x 1.5 | M12 x 1.5 | G 1/8 A | G 1/4 B |
| 8 | M12 x 1 | M14 x 1.5 | M16 x 1.5 | M14 x 1.5 | G 1/4 A | — |
| 9[2] | — | — | — | — | — | G 3/8 B |
| 10 | M14 X 1[4] | M16 x 1.5 | M18 x 1.5 | M16 x 1.5 | G 3/8 A | — |
| 12 | M16 x 1[4] | M18 x 1.5 | M20 x 1.5 | M18 x 1.5 | G 1/2 A | G 1/2 B |
| 14 | — | — | M22 x 1.5 | — | — | — |
| 15[1] | — | M22 x 1.5 | — | — | — | — |
| 16 | — | — | M24 x 1.5 | M24 x 1.5 | G 5/8 A[6] | — |
| 18[1] | — | M26 x 1.5 | — | — | — | — |
| 19[2] | — | — | — | — | — | G 3/4 B |
| 20 | — | — | M30 x 2 | M28 x 1.5 | G 3/4 A | — |
| 22[1] | — | M30 x 2 | — | — | — | — |
| 25 | — | — | M36 x 2 | M35 x 1.5 | G 1 A | G 1 B |
| 28[1] | — | M36 x 2 | — | — | — | — |
| 30 | — | — | M42 x 2 | M40 x 1.5 | G 1-1/4 A | — |
| 32[2] | — | — | — | — | — | G 1-1/4 B |
| 35[1] | — | M42 x 2 | — | — | — | — |
| 38 | — | — | M52 x 2 | M48 x 1.5 | G 1-1/2 A | G 1-1/2 B |
| 42[1] | — | M52 x 2 | — | — | — | — |
| 50 | — | — | — | — | G 2 A | G 2 B |

**Table U7— Tube End Connections**

1) Not preferred for high pressure applications.
2) Not preferred sizes. Use 10mm, 20mm and 30mm sizes in place of 9mm, 19mm and 32mm sizes, respectively.
3) Covered in ISO 8434-1. Non-standard with Parker TFDE (Ermeto).
4) Not part of DIN or ISO standards, but offered by Parker TFDE (Ermeto).
5) ISO 228-1 G threads and JIS B 0202 G or PF threads can be interchanged. "A" and "B" indicate different tolerance classes on the male threads, "A" having tighter tolerances than "B".
6) Non-preferred size.

Dimensions and pressures for reference only, subject to change.



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# Port End Connections
## Threads, Conformance Specifications, and Use

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| | | | | |
|---|---|---|---|---|
| **Port Description** | **Metric Straight Thread O-Ring Port** | **SAE Straight Thread O-Ring Port** | **Four Screw Split Flange** | **Four Screw One Piece Square Flange** |
| **Thread Type** | ISO 261 Metric Fine | ISO 263 ANSI B1.1, Unified | Metric screws: ISO 261 Inch screws: ISO 263 | ISO 261 |
| **ISO No.** | 6149 | 11926 | 6162 | 6164 |
| **SAE No.** | J2244 | J1926 | J518 (covers inch screws only) | — |
| **DIN No.** | 3852-3 Form “W” | — | — | — |
| **JIS No.** | — | — | B8363 (covers flange head only) | — |
| **BSI No.** | — | — | — | — |
| **Current use** | Gaining use in U.S. and western Europe. Widely used in former Soviet block countries. | Widely used in North America. Limited use in the rest of the world. | Widely used throughout the world. | Mainly used in Germany. Limited use elsewhere. |

**Table U8 — Port End Connections**

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# Port End Connections
## Threads, Conformance Specifications, and Use

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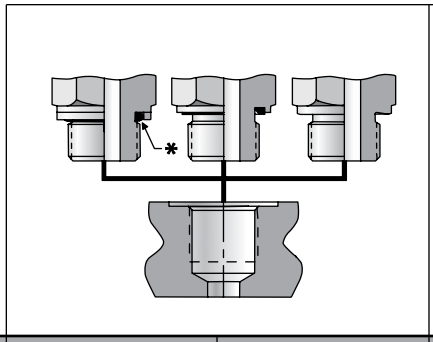
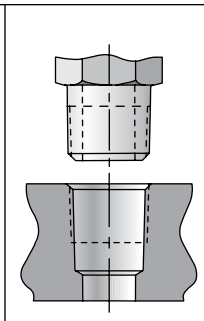
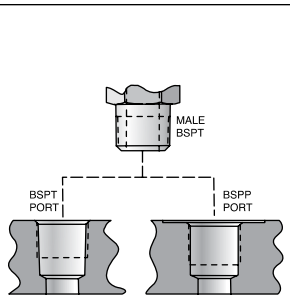
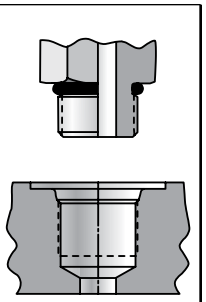
| |  |  |  |  |
|---|---|---|---|---|
| **Port Description** | **British Standard Pipe Parallel (BSPP) Flat Face Port** | **Metric Straight Thread Flat Face Port** | **NPTF - Dryseal American Standard Taper Pipe** | **JIS/BSPT British Standard Pipe, Taper** | **JIS/BSPP British Standard Pipe, Parallel O-ring Port** |
| **Thread Type** | ISO 228-1<br>BS 2779 | ISO 261<br>Metric Fine | ANSI B1.20.3 | ISO 7<br>BS 21<br>JIS B 0203 | ISO 228-1<br>BS 2779<br>JIS B 0202 |
| **ISO No.** | 1179 | 9974 | — | — | — |
| **SAE No.** | — | — | J476 | — | — |
| **DIN No.** | 3852-2<br>Form X or Y | 3852-1<br>Form X or Y | — | Similar to: 3852-2<br>form Z | — |
| **JIS No.** | — | — | — | B8363 | B2351 Type “O” |
| **BSI No.** | — | — | — | — | Similar to BS 5380 |
| **Current use** | Most popular in western Europe and former UK colonies. Limited use in rest of the world. | Moderate use in Europe, mainly in Germany. | Mainly used in North America some use in rest of the world. | Mainly used in Japan and parts of western Europe. | Mainly used in Japan. Some use in U.K. of similar port, BS5380. |

**Table U9 — Port End Connections**

Dimensions and pressures for reference only, subject to change.



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# Hydra-Tool Pre-Setting Pressures for EO and EO-2 Steel Fittings

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## Pressures for Steel EO Fittings Using Stop Adapter (971107 & 971108)

| Pre-Setting Pressues (psi) for EO Fittings Wall Thickness (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Size** | **Series** | **1.0** | **1.5** | **2.0** | **2.5** | **3.0** | **4.0** |
| **6** | **L** | 500 | 500 | 500 | | | |
| **6** | **S** | 500 | | | | | |
| **8** | **L** | 500 | | 500 | | | |
| **8** | **S** | 500 | 500 | | | | |
| **10** | **L** | | 500 | | | | |
| **10** | **S** | | 500 | | | | |
| **12** | **L** | 300 | 300 | 500 | | | |
| **12** | **S** | | 300 | | | | |
| **14** | **S** | | | 1,500 | | | |
| **15** | **L** | | 500 | 800 | | | |
| **16** | **S** | | | 1,200 | | 1,300 | |
| **18** | **L** | | 1,000 | | | 1,300 | |
| **20** | **S** | | | | 2,000 | | |
| **22** | **L** | | 1,500 | 1,500 | | | |
| **25** | **S** | | | | | 2,000 | 2,000 |
| **28** | **L** | | | 2,000 | | | |
| **30** | **S** | | | | | 3,000 | |
| **35** | **L** | | | 3,000 | | 3,300 | |
| **38** | **S** | | | | | | 3,500 |
| **42** | **L** | | | | | 4,000 | |

**Table U10 — Pre-Setting Pressures for Steel EO Fittings**

**NOTE:** The values provided in this chart are provided as a guide only and normally will produce a satisfactory bite when using the Parker Hydra-Tool.

## Pressures for Steel EO-2 Fittings Using Stop Adapter (971107 & 971108)

| Hydra-Tool Pre-Setting Pressures (psi) for EO-2 Fittings in Steel and Stainless Steel Using the Stop Adapter | | |
|---|---|---|
| **Size** | **Series** | **psi** |
| **6** | **L** | 1,100 |
| **6** | **S** | 1,100 |
| **8** | **L** | 1,300 |
| **8** | **S** | 1,300 |
| **10** | **L** | 1,800 |
| **10** | **S** | 1,800 |
| **12** | **L** | 2,000 |
| **12** | **S** | 2,000 |
| **14** | **S** | 2,300 |
| **15** | **L** | 2,300 |
| **16** | **S** | 3,000 |
| **18** | **L** | 3,000 |
| **20** | **S** | 4,100 |
| **22** | **L** | 3,100 |
| **25** | **S** | 5,500 |
| **28** | **L** | 3,700 |
| **30** | **S** | 6,600 |
| **35** | **L** | 5,300 |
| **38** | **S** | 8,400 |
| **42** | **L** | 7,600 |

**Table U11 — Pre-Setting Pressures for Steel and Stainless Steel EO-2 Fittings**

**NOTE:** The values provided in this chart are provided as a guide only and normally will produce a satisfactory bite when using the Parker Hydra-Tool.

# Hydra-Tool Pre-Setting Pressures for Ferulok Fittings[1) 2) 3)]

| Tube Size | Wall Thickness – Steel | | | | | | | Wall Thickness – Stainless Steel | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.035 | 0.049 | 0.065 | 0.083 | 0.095 | 0.109 | 0.120 | 0.035 | 0.049 | 0.065 | 0.083 | 0.095 | 0.109 | 0.120 |
| **4** | 300 | 300 | 500 | 600 | 600 | 600 | | 300 | 300 | 500 | 700 | 700 | 700 | |
| **6** | 300 | 500 | 600 | 700 | 700 | 700 | 700 | 300 | 500 | 700 | 700 | 700 | 700 | 800 |
| **8** | | 500 | 700 | 800 | 900 | 1,000 | 1,000 | | 600 | 700 | 1,000 | 1,000 | 1,100 | 1,100 |
| **10** | | | 700 | 900 | 1,000 | 1,100 | 1,100 | | | 800 | 1,000 | 1,100 | 1,300 | 1,300 |
| **12** | | | 900 | 1,000 | 1,100 | 1,100 | 1,300 | | | 1,000 | 1,100 | 1,300 | 1,300 | 1,500 |
| **14** | | | 1,000 | 1,100 | 1,100 | 1,300 | 1,500 | | | 1,000 | 1,300 | 1,300 | 1,500 | 1,600 |
| **16** | | | | 1,100 | 1,300 | 1,500 | 1,600 | | | | 1,500 | 1,500 | 1,600 | 1,600 |
| **20** | | | | | 1,500 | 1,600 | 1,800 | | | | | 1,600 | 2,000 | 2,000 |
| **24** | | | | | 1,800 | 2,000 | 2,300 | | | | | 2,100 | 2,300 | 2,300 |
| **32** | | | | | 2,800 | 2,900 | 3,300 | | | | | 3,100 | 3,300 | 3,300 |

**Table U12 — Hydra-Tool Recommended Pre-Setting Pressures for Inch Tube**

1) These values are provided as a guide only and normally will produce a satisfactory bite.
2) Ferulok pre-setting dies are positive stop dies. Use of above pressures is optional.
3) For wall thicknesses greater than those listed, contact the Tube Fittings Division.



Dimensions and pressures for reference only, subject to change.



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# Hyferset Pre-Setting Pressures for Ferulok Fittings[1)]

| Tube Size | Wall Thickness — Steel | | | | | | | Wall Thickness — Stainless Steel | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.035 | 0.049 | 0.065 | 0.083 | 0.095 | 0.109 | 0.120 | 0.035 | 0.049 | 0.065 | 0.083 | 0.095 | 0.109 | 0.120 |
| 4 | 800 | 900 | 1,400 | 1,800 | 1,800 | 1,800 | | 900 | 1,000 | 1,500 | 2,000 | 2,000 | 2,000 | |
| 6 | 900 | 1,400 | 1,800 | 2,000 | 2,000 | 2,000 | 2,200 | 1,000 | 1,500 | 2,000 | 2,000 | 2,000 | 2,000 | 2,500 |
| 8 | | 1,600 | 2,000 | 2,500 | 2,700 | 3,000 | 3,200 | | 1,800 | 2,200 | 3,000 | 3,000 | 3,500 | 3,500 |
| 10 | | | 2,200 | 2,700 | 3,000 | 3,500 | 3,500 | | | 2,500 | 3,000 | 3,500 | 4,000 | 4,000 |
| 12 | | | 2,700 | 3,000 | 3,500 | 3,500 | 4,000 | | | 3,000 | 3,500 | 4,000 | 4,000 | 4,500 |
| 14 | | | 3,000 | 3,500 | 3,500 | 4,000 | 4,500 | | | 3,000 | 4,000 | 4,000 | 4,500 | 5,000 |
| 16 | | | | 3,500 | 4,000 | 4,500 | 5,000 | | | | 4,500 | 4,500 | 5,000 | 5,000 |
| 18 | | | | 4,000 | 4,500 | 4,500 | 5,000 | | | | 4,500 | 5,000 | 5,000 | 5,500 |
| 20 | | | | | 4,500 | 5,000 | 5,500 | | | | | 5,000 | 6,000 | 6,000 |
| 24 | | | | | 5,500 | 6,000 | 7,000 | | | | | 6,500 | 7,000 | 7,000 |
| 28 | | | | | 7,000 | 7,500 | 8,000 | | | | | 7,500 | 8,000 | 8,500 |
| 32 | | | | | 8,500 | 9,000 | 10,000 | | | | | 9,500 | 10,000 | 10,000 |

**Table U13 — Pre-Setting Pressures for Ferulok Fittings**

1) Ferulok pre-setting dies are positive stop dies. Use of above pressures is optional.

# Hyferset Pre-Setting Pressures for EO Steel Fittings[2)]

| Pre-Setting Pressures (psi) for EO Fittings | | | | | |
|---|---|---|---|---|---|
| Tube Size (mm) | Wall Thickness (mm) | | | | |
| | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
| 6-L | 650 | 650 | | | |
| 6-S | 650 | 650 | | | |
| 8-L | 900 | 900 | | | |
| 8-S | 900 | 900 | | | |
| 10-L | 1,350 | 1,350 | 1,550 | | |
| 10-S | 1,350 | 1,350 | 1,550 | | |
| 12-L | 1,750 | 1,750 | 1,750 | 1,750 | |
| 12-S | 1,750 | 1,750 | 1,750 | 1,750 | |
| 14-S | | 2,000 | 2,000 | 2,200 | 2,200 |
| 15-L | 1,800 | 1,800 | | | |
| 16-S | | 2,200 | 1,450 | 1,450 | |
| 18-L | 2,000 | 2,000 | 2,000 | | |
| 20-S | | | 3,300 | 3,500 | |
| 22-L | | 3,100 | 3,100 | | |
| 25-S | | | | 4,000 | 4,000 |
| 28-L | | 3,500 | 3,500 | | |

**Table U14 — Pre-Setting Pressures for EO Fittings**

2) EO and EO-2 pre-setting dies are not positive stop style. Pre-setting must be done using pressures given in these charts.

# Hyferset Pre-Setting Pressures for EO-2 Steel Fittings[2)]

| Hyferset Pre-Setting Pressures (psi) for EO-2 Fittings | | |
|---|---|---|
| Size | Series | Any wall |
| 6 | L | 1,150 |
| 6 | S | 1,150 |
| 8 | L | 1,450 |
| 8 | S | 1,450 |
| 10 | L | 2,450 |
| 10 | S | 2,450 |
| 12 | L | 2,800 |
| 12 | S | 2,800 |
| 14 | S | 3,500 |
| 15 | L | 2,800 |
| 16 | S | 3,900 |
| 18 | L | 3,200 |
| 20 | S | 5,600 |
| 22 | L | 4,950 |
| 25 | S | 6,400 |
| 28 | L | 5,600 |

**Table U15 — Pre-Setting Pressures for EO-2 Fittings**

2) EO and EO-2 pre-setting dies are not positive stop style. Pre-setting must be done using pressures given in these charts.

Dimensions and pressures for reference only, subject to change.



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# Hydra-Tool

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## Recommended Flaring Pressures For Metric Tube

| Size (mm) | Material | Tube Wall Thickness 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | Min. Straight Length to Start of Bend |
|---|---|---|---|---|---|---|---|
| 6 | SS | 400 | 700 | 1100 | | | 1-5/8 |
| | Steel | 300 | 500 | 800 | | | |
| | Copper | 150 | 200 | 350 | | | |
| | Aluminum | 150 | 200 | 350 | | | |
| 8 | SS | 500 | 800 | 1300 | | | 1-5/8 |
| | Steel | 400 | 600 | 1000 | | | |
| | Copper | 150 | 250 | 400 | | | |
| | Aluminum | 150 | 250 | 400 | | | |
| 10 | SS | 600 | 900 | 1500 | | | 1-5/8 |
| | Steel | 500 | 700 | 1100 | | | |
| | Copper | 200 | 300 | 500 | | | |
| | Aluminum | 200 | 300 | 500 | | | |
| 12 | SS | 800 | 1200 | 2000 | 2500 | | 2-3/16 |
| | Steel | 600 | 900 | 1500 | 1900 | | |
| | Copper | 250 | 350 | 600 | 750 | | |
| | Aluminum | 250 | 350 | 600 | 750 | | |
| 16 | SS | 900 | 2000 | 2500 | 2800 | 3000 | 2-5/16 |
| | Steel | 680 | 1500 | 1900 | 2100 | 2300 | |
| | Copper | 275 | 600 | 750 | 800 | 900 | |
| | Aluminum | 275 | 600 | 750 | 800 | 900 | |
| 18 | SS | 1000 | 1700 | 2500 | 3100 | 3500 | 2-5/16 |
| | Steel | 750 | 1300 | 1900 | 2300 | 2700 | |
| | Copper | 300 | 500 | 750 | 900 | 1100 | |
| | Aluminum | 300 | 500 | 750 | 900 | 1100 | |
| 20 | SS | | 1500 | 2400 | 3000 | 3400 | 2-7/16 |
| | Steel | | 1100 | 1800 | 2300 | 2600 | |
| | Copper | | 500 | 700 | 900 | 1000 | |
| | Aluminum | | 500 | 700 | 900 | 1000 | |
| 25 | SS | | | 2400 | 3000 | 3400 | 2-7/16 |
| | Steel | | | 1800 | 2300 | 2600 | |
| | Copper | | | 700 | 900 | 1000 | |
| | Aluminum | | | 700 | 900 | 1000 | |
| 30 | SS | | | 2800 | 3400 | 4000 | 2-1/2 |
| | Steel | | | 2100 | 2600 | 3000 | |
| | Copper | | | 800 | 1000 | 1200 | |
| | Aluminum | | | 800 | 1000 | 1200 | |
| 32 | SS | | | | 4000 | 4500 | 2-7/8 |
| | Steel | | | | 3000 | 3400 | |
| | Copper | | | | 1200 | 1300 | |
| | Aluminum | | | | 1200 | 1300 | |
| 38 | SS | | | | 4500 | 5800 | 2-7/8 |
| | Steel | | | | 3400 | 4400 | |
| | Copper | | | | 1300 | 1700 | |
| | Aluminum | | | | 1300 | 1700 | |
| 42 | SS | | | | 4700 | 6500 | 2-7/8 |
| | Steel | | | | 3600 | 5200 | |
| | Copper | | | | 1500 | 1900 | |
| | Aluminum | | | | 1500 | 1900 | |
| 50 | SS | | | | 5200 | 7200 | 2-7/8 |
| | Steel | | | | 3900 | 6100 | |
| | Copper | | | | 1900 | 2300 | |
| | Aluminum | | | | 1900 | 2300 | |

**Table U16 — Recommended Flaring Pressures, Metric Tube**

Dimensions and pressures for reference only, subject to change.



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# Hydra-Tool

## Recommended Flaring Pressures For Inch Tube

| Size | Material | Tube Wall Thickness | | | | | | | | Minimum Straight Length To Start of Bend |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.035 | 0.049 | 0.065 | 0.083 | 0.095 | 0.109 | 0.120 | 0.134 | |
| 4 | SS | 400 | 700 | 1100 | | | | | | 1-5/8 |
| | Steel | 300 | 500 | 800 | | | | | | |
| | Copper | 150 | 200 | 350 | | | | | | |
| | Aluminum | 150 | 200 | 350 | | | | | | |
| 5 | SS | 500 | 800 | 1300 | | | | | | 1-5/8 |
| | Steel | 400 | 600 | 1000 | | | | | | |
| | Copper | 150 | 250 | 400 | | | | | | |
| | Aluminum | 150 | 250 | 400 | | | | | | |
| 6 | SS | 600 | 900 | 1500 | | | | | | 1-5/8 |
| | Steel | 500 | 700 | 1100 | | | | | | |
| | Copper | 200 | 300 | 500 | | | | | | |
| | Aluminum | 200 | 300 | 500 | | | | | | |
| 8 | SS | 800 | 1200 | 2000 | 2500 | | | | | 2-3/16 |
| | Steel | 600 | 900 | 1500 | 1900 | | | | | |
| | Copper | 250 | 350 | 600 | 750 | | | | | |
| | Aluminum | 250 | 350 | 600 | 750 | | | | | |
| 10 | SS | 900 | 2000 | 2500 | 2800 | 3000 | | | | 2-5/16 |
| | Steel | 680 | 1500 | 1900 | 2100 | 2300 | | | | |
| | Copper | 275 | 600 | 750 | 800 | 900 | | | | |
| | Aluminum | 275 | 600 | 750 | 800 | 900 | | | | |
| 12 | SS | 1000 | 1700 | 2500 | 3100 | 3500 | 4000 | | | 2-5/16 |
| | Steel | 750 | 1300 | 1900 | 2300 | 2700 | 3000 | | | |
| | Copper | 300 | 500 | 750 | 900 | 1100 | 1200 | | | |
| | Aluminum | 300 | 500 | 750 | 900 | 1100 | 1200 | | | |
| 14 | SS | | 1500 | 2400 | 3000 | 3400 | 4200 | | | 2-7/16 |
| | Steel | | 1100 | 1800 | 2300 | 2600 | 3200 | | | |
| | Copper | | 500 | 700 | 900 | 1000 | 1300 | | | |
| | Aluminum | | 500 | 700 | 900 | 1000 | 1300 | | | |
| 16 | SS | | | 2400 | 3000 | 3400 | 4200 | 4800 | | 2-7/16 |
| | Steel | | | 1800 | 2300 | 2600 | 3200 | 3600 | | |
| | Copper | | | 700 | 900 | 1000 | 1300 | 1400 | | |
| | Aluminum | | | 700 | 900 | 1000 | 1300 | 1400 | | |
| 20 | SS | | | 2800 | 3400 | 4000 | 4800 | 5300 | | 2-1/2 |
| | Steel | | | 2100 | 2600 | 3000 | 3600 | 4000 | | |
| | Copper | | | 800 | 1000 | 1200 | 1400 | 1600 | | |
| | Aluminum | | | 800 | 1000 | 1200 | 1400 | 1600 | | |
| 24 | SS | | | | 4000 | 4500 | 5300 | 5800 | | 2-7/8 |
| | Steel | | | | 3000 | 3400 | 4000 | 4400 | | |
| | Copper | | | | 1200 | 1300 | 1600 | 1700 | | |
| | Aluminum | | | | 1200 | 1300 | 1600 | 1700 | | |
| 32 | SS | | | | | 3300 | 4000 | 5000 | 6300 | 3 |
| | Steel | | | | | 2500 | 3000 | 3800 | 4700 | |
| | Copper | | | | | 1000 | 1200 | 1500 | 1900 | |
| | Aluminum | | | | | 1000 | 1200 | 1500 | 1900 | |

**Table U17 — Recommended Flaring Pressures, Inch Tube**

**Note:** If tube size and wall thickness are not shown on this chart, see page U3, Table U3 for recommended tube size for use with 37° flare fittings.

Dimensions and pressures for reference only, subject to change.



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# Recommended Use of Porting Tools

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Parker offers porting tools for machining precision ports (glands) conforming to DIN 3852-1, SAE J1926-1 (SAE straight thread port) and the new world standard port, ISO 6149-1.

Machining ports to accept Parker tube fittings is completed in three simple steps.

To begin, select the appropriate size port tooling for the fitting end in question. Next, follow these machining steps.

**1. Pilot Hole Drilling.**

First, make a pilot hole for the couterbore by using a drill or bore size found in the couterbore tooling tables. Make hole depth according to the port detail on pages T32, T33 and T36. Parker Tube Fittings Division does not sell tap drills or bore tooling.

**2. Port Counterboring.**

Then, run the counterbore tool into the pilot diameter created in step 1. All features and dimensions of the port and O-ring cavity are built into the counterboring tool except the depth. The depth of the counterbore machining may vary from a light spotface, up to the maximum spotface depth listed on the port detail on pages U7 and U8.

**3. Thread Tapping.**

Lastly, the machined port must be threaded to accommodate the fitting. Use the appropriate Parker tapping tool or another tap intended for the same thread type, size, and class.

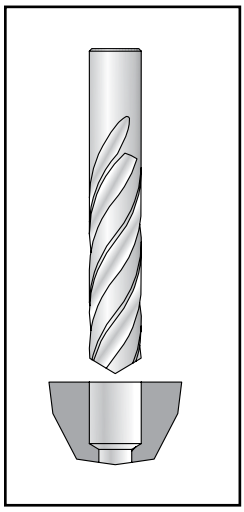

**Fig. U1 — Pilot drilling for counterbore tool**

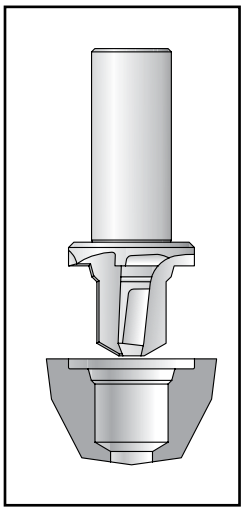

**Fig. U2 — Counterboring tool**

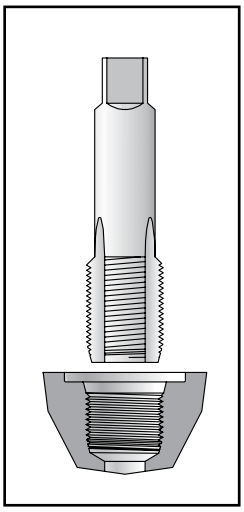

**Fig. U3 — Tapping**

**Note:** It is necessary to create a spotface surface which is flat and perpendicular to the port, and with a smooth finish to prevent leakage or O-ring extrusion. Cast or forged surfaces must be spotface machined to meet these requirements. Even on smooth surfaces (machined surfaces), it is necessary to lightly touch the surfact to assure a smooth radius at the entrance of the port.





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# Applicable Standards For TFD Products
## by Standard Number

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| | |
|---|---|
| ASTM A269 | Seamless and welded type 316 Stainless Steel tubing |
| ASTM B633 | Zinc plating |
| ASTM F1387 | Mechanically attached fittings — Triple-Lok, Ferulok and Seal-Lok |
| DIN 2353 | 24° cone compression (bite-type) fitting range (configurations) |
| DIN 3852-1 | Metric parallel thread port (ISO 9974-1) |
| DIN 3852-2 | BSPP parallel thread port (ISO 1179-1) |
| DIN 3852-3 | Metric O-ring port (ISO 6149-1) |
| DIN 3861 | 24° cone machining and sleeve for compression (bite-type) fittings |
| DIN 3865 | 24° cone nipple with O-ring |
| DIN 3859 | Technical delivery conditions for compression fittings |
| DIN 1630 | Seamless steel tube |
| DIN 2391 | Seamless precision steel tubes |
| DIN 17458 | Stainless steel tubes |
| ISO 1179 | BSPP, flat face port and stud ends – same as DIN 3852 - Part 2 |
| ISO 3304 | Seamless precision steel tubes |
| ISO 3305 | Welded precision steel tubes |
| ISO 6149 | Metric straight thread O-ring port and stud ends – same as SAE J2244 and DIN 3852, Part 3 |
| ISO 6162 | Four bolt split flange connections – inch and metric bolts (inch bolt, Part II – same as SAE J518) |
| ISO 8434-1 | 24° cone bite type fittings (EO fittings) |
| ISO 8434-2 | Metric 37° flare fittings (Metric Triple-Lok) |
| ISO 8434-3 | Metric face seal fitting with ISO 6149 port end – (Metric Seal-Lok) |
| ISO 8434-4 | 24° cone bite type fittings with weld nipple (EO Fittings) |
| ISO 19879 | Test methods for threaded fluid connectors |
| ISO 8434-6 | 60° cone connectors with BSPP threads |
| ISO 9974 | Metric flat face port and stud ends – same as DIN 3852 - Part 1 |
| JIS B8363 | 60° cone (male and female) hose adapters |
| MIL-16142 | UN/UNF straight thread O-ring port – same as SAE J1926-1 |
| MIL-33649 | Straight thread O-ring port – **different from SAE J1926-1** |
| NFPA T3.8.3[2)] | Test methods for steel separable tube fittings |
| SAE J343 | Tests and procedures for hose and hose assemblies (impulse test applies to fittings) |
| SAE J356 | Welded and flash controlled low carbon steel tubing |
| SAE J512 | Automotive tube fittings<br>- 45° flare type<br>- Inverted flare type<br>- Tapered sleeve compression type |
| SAE J514 | Hydraulic tube fittings<br>- 37° flare (Triple-Lok)<br>- Flareless – 24° bite type (Ferulok)<br>- O-ring plugs<br>- Pipe fittings<br>- Adapter unions (pipe swivel – “07” adapters) |
| SAE J515 | Hydraulic O-rings (SAE straight thread, face seal, four-bolt split flange, and metric O-ring port) |
| SAE J518 | Code 61 and 62 four-bolt split flange connections – (same as ISO 6162 Type II flange connection) |
| SAE J524 | Seamless low carbon steel tubing |
| SAE J525 | Welded and cold drawn low carbon steel tubing |
| SAE J527 | Brazed double wall steel tubing |
| SAE J528 | Seamless copper tube |
| SAE J531 | Automotive pipe, filler and drain plugs (HP and HHP plugs) |
| SAE J533 | Flares for tubing – 37° and 45° single and double flares |
| SAE J846 | Coding system for identification of fluid connectors |
| SAE J1065 | Pressure ratings for hydraulic tubing |
| SAE J1231 | Beaded tube hose fittings |
| SAE J1453 | O-ring face seal fitting with SAE port end – (Seal-Lok) |
| SAE J1644 | Test methods for fluid connectors |
| SAE J1926 | SAE straight thread O-ring port and stud ends – same as ISO 11926 |
| SAE J2244 | Metric straight thread O-ring port and stud ends – same as ISO 6149 |
| SAE J2435 | Welded and flash controlled C-1021 tubing |
| SAE J2467 | Welded and cold drawn, C-1021 tubing |
| SAE J2613 | Welded and flash controlled high strength low alloy (HSLA) tubing |
| SAE J2614 | Welded and cold drawn HSLA tubing |

**Table U18 — Applicable Standards by Standard Number**



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# Thread Designations and Standards for Threads Used in Fluid Connectors

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| Abbreviation | Description | Applicable Std. |
|---|---|---|
| **Straight Pipe** | | |
| NPSC | American Standard Straight Pipe Threads in Pipe Couplings Couplings | ANSI B1.20.1 FED-STD-H28/7 |
| NPSF | Dryseal American Standard Fuel Internal Straight Pipe Threads (generally used in soft or ductile materials to mate with NPTF external taper threads) | SAEJ476 ANSI B1.20.3 FED-STD-H28/8 |
| NPSI | Dryseal American Intermediate Internal Straight Pipe Threads (for brittle or hard materials; intended to mate with PTF-SAE short external taper threads) | SAE J476 ANSI B1.20.3 FED-STD-H28/8 |
| NPSM | American Standard Straight Pipe Threads for Free-Fitting Mechanical Joints for Fixtures (these threads fit freely over NPTF threads. They are used in swivel nuts of 07 adapters) | ANSI B1.20.1 FED-STD-H28/7 |
| **Taper Pipe** | | |
| ANPT | Aeronautical National Taper Pipe Threads (similar to NPT with various additional requirements in gaging) | MIL-P-7105 |
| NPT | American Standard Taper Pipe Threads for General Use | ANSI B1.20.1 FED-STD-H28/7 |
| NPTF | Dryseal American Standard Taper Pipe Threads (used in all of our steel and brass fittings) | SAE J476 ANSI B1.20.3 FED-STD-H28/8 |
| PTF — SAE Short | Dryseal SAE Short Taper Pipe Threads (mainly used in low pressure pneumatic and fuel applications) | SAE J476 ANSI B1.20.3 FED-STD-H28/8 |
| PTF — SPL Short[1)] | Dryseal Special Short Taper Pipe Threads | ANSI B1.20.3 |
| PTF — SPL Extra Short[1)] | Dryseal Special Extra Short Taper Pipe Threads | ANSI B1.20.3 |
| **Unified Threads** | | |
| UN | Unified Constant Pitch Threads (standard series: 4, 6, 8, 12, 16, 20, 28, 32) | ANSI B1.1 FED-STD-H28/2 |
| UNC | Unified Coarse Threads | ANSI B1.1 FED-STD-H28/2 |
| UNEF | Unifed Extra Fine Threads | ANSI B1.1 FED-STD-H28/2 |
| UNF | Unified Fine Threads | ANSI B1.1 FED-STD-H28/2 |
| UNS | Unified Special Pitch Threads | ANSI B1.1 FED-STD-H28/3 |
| UNJ | Unified Controlled Root Radius Threads | ANSI B1.15 FED-STD-H28/4 |

**Table U19 — Thread Designations and Standards for Threads Used in Fluid Connectors** **(continued on the next page)**

1) Used in some pneumatic components where shortened thread depth is required because of lack of enough material due to component size limitations.





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## Thread Designations and Standards for Threads Used in Fluid Connectors (Continued)

| Abbreviation | Description | Applicable Std. |
|---|---|---|
| **Metric Threads** | | |
| M | Metric Screw Threads — M profile | ISO 261<br>ANSI B1.13M<br>FED-STD-H28/21 |
| M — Keg | Metric Taper Threads (mainly used in Germany) | DIN 158 |
| **British Standard Pipe Threads** | | |
| R (BSPT) | British Standard Taper Pipe Threads, External | BS 21<br>ISO 7/1 |
| Rc (BSPT) | British Standard Taper Pipe Threads, Internal | BS 21<br>ISO 7/1 |
| Rp or G (BSPP) | British Standard Pipe (Parallel) Threads | BS 2779<br>ISO 228/1 |
| **Japanese Standard Pipe Threads** | | |
| PF[1)] | JIS Parallel Pipe Threads | JIS B202<br>ISO 228/1 |
| PT[1)] | JIS Taper Pipe Threads | JIS B203<br>ISO 7/1 |
| PS | JIS Parallel Internal Pipe Threads (to mate with PT threads) | JIS B203 |

**Table U19 (Cont'd) — Thread Designations and Standards for Threads Used in Fluid Connectors**

1) PF and PT threads are functionally interchangeable with BSPP and BSPT threads, respectively.
These are old designations. They are being replaced with G (for PF) and R and Rc (for PT) as documents are revised.

# Document Sources for Connector Specifications

**ANSI**
American National Standards Institute
11 West 42nd Street, 13th Floor
New York, New York 10036-8002
Phone: 212-642-4900
Fax: 212-398-0023
www.ansi.org/public/std_info.html

**BSI**
British Standards Institution
389 Chiswick High Road
London, W4 4AL
United Kingdom
Phone: 44-181-996-9000
Fax: 44-181-996-7400
www.bsi.org.uk/bsis/index.htm

British Standards are also available from ANSI

**DIN**
Deutsches Institut Fur Normung
(German Institute for Standards)
Burggrafenstrasse 6
Postfach 1107
D - 1000 Berlin 30, Germany
www.beuth.de/beuth.htm/?datenbanken

**English translations of some German Standards can be obtained from:**

**ANSI**

**— or —**

**Global Engineering Documents**
**15 Inverness Way East**
**Englewood, CO 80112-9660**
**Phone: 1-800-854-7179**

**FED-STD**
Federal Standard
Department of Defense Single Stock Point
Commanding Officer
Naval Publications and Forms Center
5801 Taber Avenue
Philadelphia, PA 19120-5099

**ISO**
International Organization for Standardization
Case Postale 56
I, Rue de Varembe
CH - 1211 Geneve 20
Switzerland
www.iso.ch/infoe/catinfo.html

**ISO Documents are also available from ANSI**

**JIS**
Japanese Industrial Standards
Published by Japanese Standards Association
1-24 Akasaka 4
Minto-ku, Tokyo 107-8440
Japan
Phone: 81-3-3583-8000
Fax: 81-3-3586-2014

**English translations of some Japanese Standards can be obtained from ANSI**

**SAE**
SAE International
400 Commonwealth Drive
Warrendale, PA 15096-0001
Phone: 412-776-4841
Fax: 412-776-0002
www.sae.org/prodserv/stds/stdsinfo/standard.html

| SI Prefixes | | |
|---|---|---|
| Prefix | SI Symbol | Multiplication Factor |
| tera | T | $10^{12}$ |
| giga | G | $10^{9}$ |
| mega | M | $10^{6}$ |
| kilo | k | $10^{3}$ |
| hecto | h | $10^{2}$ |
| deka | da | $10^{1}$ |
| deci | d | $10^{-1}$ |
| centi | c | $10^{-2}$ |
| milli | m | $10^{-3}$ |
| micro | m | $10^{-6}$ |
| nano | n | $10^{-9}$ |
| pico | p | $10^{-12}$ |
| femto | f | $10^{-15}$ |
| atto | a | $10^{-18}$ |

**Table U20 — SI Prefixes**

| Derived Units | | | |
|---|---|---|---|
| Quantity | Unit | SI Symbol | Formula |
| Acceleration | Meter per Second Squared | — | $m/s^2$ |
| Angular Velocity | Radian per Second | — | rad/s |
| Area | Square Meter | — | $m^2$ |
| Density | Kilogram per Cubic Meter | — | $kg/m^3$ |
| Electric Resistance | Ohm | W | V/A |
| Energy & Work | Joule | J | N.m |
| Force | Newton | N | $kg.m/s^2$ |
| Frequency | Hertz | Hz | cycles/s |
| Power | Watt | W | J/s |
| Pressure & Stress | Pascal | Pa | $N/m^2$ |
| Quantity of Heat | Joule | J | N.m |
| Specific Heat | Joule per Kilogram-Kelvin | — | J/kg.K |
| Thermal Conductivity | Watt per Meter-Kelvin | — | W/m.K |
| Velocity | Meter per second | — | m/s |
| Viscosity, Dynamic | Pascal Second | — | Pa.s |
| Viscosity, Kinematic | Square Meter per Second | — | $m^2/s$ |
| Voltage | Volt | V | W/A |
| Volume | Cubic Meter | — | $m^3$ |

**Table U21 — Derived Units**

| Basic Units | | |
|---|---|---|
| Quantity | Unit | SI Symbol |
| Length | Meter | m |
| Mass | Kilogram | kg |
| Time | Second | s |
| Electric Current | Ampere | A |
| Thermodynamic Temperature | Kelvin | K |
| Amount of Substance | Mole | mol |
| Luminous Intensity | Candela | cd |

**Table U22 — Basic Units**

| Supplementary Units | | |
|---|---|---|
| Quantity | Unit | SI Symbol |
| Plane Angle | Radian | rad |
| Solid Angle | Sterodian | sr |

**Table U23 — Supplementary Units**

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| English to Metric | | | | Metric to English | | |
|---|---|---|---|---|---|---|
| | To Convert From | To | Multiply By | To Convert From | To | Multiply By |
| Area | sq. in. ($in^2$) | sq. mm ($mm^2$) | 645.16 | square millimeters ($mm^2$) | square inches ($in^2$) | 0.00155 |
| | sq. in. ($in^2$) | sq. cm ($cm^2$) | 6.4516 | | | |
| | sq. ft. ($ft^2$) | sq. meters ($m^2$) | 0.0929 | | | |
| Density | pounds/cubic ft ($lb/ft^3$) | Kilograms/cubic meter ($kg/m^3$) | 16.02 | kilograms/cubic meter ($kg/m^3$) | pounds/cubic ft ($lb/ft^3$) | 0.0624 |
| Energy | British thermal units (Btu) (1 J = Ws = 0.2388 cal) | joules (J) | 1055 | joules (J) | British thermal units (Btu) | 0.000947 |
| Force | pounds - force (lbf) (1N = 0.102 kgf) | newtons (N) | 4.448 | newtons (N) | pounds - force (lbf) | 0.2248 |
| Length | inches (in) | millimeters (mm) | 25.4 | millimeters (mm) | inches (in) | 0.03937 |
| | feet (ft) | meters (m) | 0.3048 | meters (m) | feet (ft) | 3.281 |
| | miles (mi) | kilometers (km) | 1.609 | kilometers (km) | miles (mi) | 0.621 |
| Mass (Weight) | ounces (oz) | grams (g) | 28.35 | grams (g) | ounces (oz) | 0.035 |
| | pounds-mass (lb) | kilograms (kg) | 0.4536 | kilograms (kg) | pounds-mass (lb) | 2.205 |
| | short tons (2000 lb) (tn) | metric tons (1000 kg) (t) | 0.9072 | metric tons (1000 kg) (t) | short tons (2000 lb) (tn) | 1.102 |
| Power | horsepower (550 ft. lb/s) (hp) | kilowatts (kW) | 0.7457 | kolowatts (kW) | horsepower (550 ft. lb/s) (hp) | 1.341 |
| Pressure | pounds/square inch (psi) | kilograms (f)/square cm ($kg\ (f)/cm^2$) | 0.0703 | kilograms (f)/square cm ($kg\ (f)/cm^2$) | pounds/square inch (psi) | 14.22 |
| | pounds/square inch (psi) | kilopascals (kPa) | 6.8948 | kolopascals (kPa) | pounds/square inch (psi) | 0.145 |
| | pounds/square inch (psi) | bars (100 kPa) | 0.06895 | bars (100 kPa) | pounds/square inch (psi) | 14.503 |
| Stress | pounds/square inch (psi) ($1\ N/mm^2 = 1$ MPa) | megapascals (MPa) | 0.006895 | megapascals (MPa) ($1\ N/mm^2 = 1$ MPa) | pounds/square inch (psi) | 145.039 |
| Temperature | degrees fahrenheit (°F) | degrees celsius (°C) | 5/9 (after subtracting 32) | degrees celsius (°C) | degrees fahrenheit (°F) | 9/5 (then add 32) |
| Torque or Bending Moment | pounds-force-foot (lb-ft) | Newtons-meter (Nm) | 1.3567 | Newtons-meter (Nm) | pounds-force-foot (lb-ft) | 0.737 |
| | pounds-force-inch (lb-in) | Newtons-meter (Nm) | 0.113 | Newtons-meter (Nm) | pounds-force-inch (lb-in) | 8.85 |
| Velocity | feet/second (ft/s) | meters/second (m/s) | 0.3048 | meters/second (m/s) | feet/second (ft/s) | 3.2808 |
| Viscosity | dynamic (centipoise) | pascal-second (Pas) | 0.001 | pascal-second )Pas) | dynamic (centipoise) | 1000 |
| | kenematic-$foot^2$/sec ($ft^2/s$) | $meter^2$/sec ($m^2/s$) | 0.0929 | $meter^2$/sec ($m^2/s$) | $foot^2$/sec ($ft^2/s$) | 10.7643 |
| Volume | cubic inch ($in^3$) | cubic centimeter ($cm^3$) (milliliter) | 16.3871 | cubic centimeter ($cm^3$) (milliliter) | cubic inch ($in^3$) | 0.061 |
| | quarts (qt) | liters (1000 $cm^3$) | 0.9464 | liters (1000 $cm^3$) | quarts (qt) | 1.057 |
| | gallons (gal) | liters | 3.7854 | liters | gallons (gal) | 0.2642 |

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Dimensions and pressures for reference only, subject to change.

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# Glossary of Key Tube Fittings, Fluid Power and Other Engineering Terms

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**Alloy:** A substance having metallic properties and composed of two or more chemical elements of which at least one is a metal.

**Annealing:** Heat treating process used primarily to soften metals or to stabilize their structures.

**Boss:** A relatively short protrusion or projection from the surface of a forging or casting, often cylindrical in shape.

**Brass:** An alloy consisting mainly of copper (over 50%) and zinc, to which smaller amounts of other elements may be added.

**Braze 505:** Braze 505 is a trademark of the Handy & Harman Company.

**Brazing:** The joining of metals through the use of heat and capillary flow of a filler metal. The filler metal having a melting temperature above 840 degrees Fahrenheit, but below the melting point of the metals being joined.

**Bright Annealing:** Annealing in a protective atmosphere to prevent discoloration of the bright surface.

**Brinell Hardness Test:** A test for determining the hardness of a material by forcing a hard steel or carbide ball of specified diameter into it under a specified load.

**Brittle Fracture:** A fracture which is accompanied by little or no plastic deformation.

**Brittleness:** The quality of a material that leads to crack propagation without appreciable plastic deformation.

**Bulk Modulus:** The measure of resistance to compressibility of a fluid. It is the reciprocal of the compressibility.

**Burnishing:** Smoothing surfaces of a work piece through frictional contact between it and some hardened tooling.

**Carbonitriding:** A case hardening process of suitable ferrous material that is effected by the simultaneous absorption of nitrogen and carbon into the surface of the work piece, by heating above the lower transformation temperature in a suitable gaseous atmosphere.

**Cavitation:** A localized gaseous condition within a liquid stream which occurs when the pressure is reduced to the vapor pressure. Generally occurs in pumps and suction lines where fluid velocity is too high due to poorly sized (too small) line size.

**Chatter:** The undesirable wavy surface on a machined surface, produced by vibration of the tool, grinding wheel or work piece itself during machining or grinding.

**Chromate Treatment:** A treatment of metal in a solution of a hexavalent chromium compound to produce a conversion coating of chromium compounds on the surface of the metal, thus improving the resistance to corrosion.

**Cold Heading:** Working metal at room temperature in such a manner that the cross-sectional area of a portion or all of the stock is increased.

**Cold Working (Cold Forming):** Permanently deforming metal, usually at room temperature, by the application of an external force in order to produce a near net shape component.

**Compressibility:** The change in volume of a unit volume of a fluid when subjected to a unit change in pressure.

**Corrosion:** The deterioration of a metal by chemical or electrochemical reaction with its environment.

**Creep:** Time dependent strain occuring under stress. This phenomenon may result in relaxation i.e.the relief of pre-load/ pre-stress in assembled components.

**Crimping:** A swaging and squeezing operation usually used to secure components, such as, nuts and shells to their mating parts.

**Deburring:** Removing burrs, sharp edges or fins from metal parts usually by filing, grinding or tumbling the work in a barrel containing suitable liquid medium and abrasives.

**Density:** Ratio of the mass of an object (including fluids) to its volume.

**Diamond Pyramid Hardness Test (DPH):** An indentation hardness test employing a 136° diamond pyramid indenter and variable loads.

**Ductility:** The ability of a metal to deform plastically (permanently) without fracturing.

**Dynamic Pressure Rating:** See PRESSURE, RATED DYNAMIC.

**Easy Flo 45:** Easy Flo 45 is a trademark of the Handy & Harman Company.

**Elastic Deformation:** Change of dimensions accompanying stress in the elastic range, original dimensions being restored upon release of stress.

**Elastomer:** Often referred to as rubber, is a high polymer that can be, or has been modified to a state exhibiting little plastic flow and quick recovery from an extending force.

**Erosion:** Destruction of metals or other materials by the abrasive action of moving fluids, or particles.

**Extrusion:** Conversion of an ingot slug or billet into lengths of uniform cross section by plastically forcing the metal through a die orifice having the desired cross sectional profile.

**Fatigue/Endurance Limit:** The maximum stress below which a material can presumably endure an infinite number of stress cycles.

**Fatigue Fracture:** The initiation of minute cracks, propagating into ultimate fracture under the application of repeated or fluctuating stresses having a maximum value less than the tensile strength of the material.

**Ferrous Metal:** A metal in which the major constituent is iron.

**Fire Point:** The temperature to which a fluid must be heated to *ignite* and *burn* for at least five seconds in the presence of air when a small flame is applied.





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**Fitting:** A connector or closure for fluid power lines and passages.

**Flare Test:** A test applied to tubing, involving a tapered expansion over a cone, in order to verify tube ductility and resistance to cracking during flaring operation.

**Flaring:** Forming an outward acute-angle flange on a tubular part.

**Flash Point:** The temperature to which a liquid must be heated to form a mixture with air that can be ignited *momentarily* by a flame.

**Flow:** Movement of fluid generated by pressure differences.

**Flow, Laminar:** A flow situation in which fluid moves in parallel lamina or streamlined layers.

**Flow Lines:** A fiber pattern, frequently observed in wrought metal, which indicates the manner in which the metal flowed during forming.

**Flow Rate:** The volume, mass or weight of a fluid passing through any conductor per unit of time.

**Flow, Turbulent:** A flow situation in which the fluid particles move in a random fluctuation manner. This is generally caused by too high fluid velocity.

**Fluid Friction:** Friction due to the viscosity of the fluid.

**Fluid Power System:** A system that transmits and controls power through the use of a pressurized fluid within an enclosed circuit.

**Fluorocarbon Rubber:** An elastomeric material which is extensively used for O-ring. Fluorocarbon (Viton) is recommended for higher temperatures than nitrile (Buna N) material.

**Flux:** In brazing, cutting, soldering or welding, material used to dissolve or facilitate the removal of oxides and other undesirable substances.

**Folds:** Defects in metals, usually on or near the surface caused by continued fabrication of overlapping surfaces.

**Forgeabiltiy:** Term used to describe the relative ability of materials to deform without rupture.

**Forging:** Plastically deforming metal, usually hot, into desired shapes with compressive force, with or without dies.

**Forging Die:** A forging whose shape is determined by impressions in specially prepared dies.

**Free Machining:** Denotes the machining characteristics of an alloy to which one or more ingredients have been introduced to produce small broken chips, lower power consumption, better surface finish and longer tool life.

**Galling:** Localized welding on mating surfaces of metal parts caused from excessive friction developed during the rubbing action that occurs during assembly.

**Galvanic Corrosion:** Corrosion resulting from the placing of two dissimilar metals in direct contact with each other then exposing them to an incompatible fluid or atmosphere.

**Hammer, Liquid:** Pressure and depression waves created by relatively rapid flow changes and transmitted through the system.

**Handy Flux:** Handy Flux is a trademark of the Handy & Harman Company.

**Hardening:** Increasing the hardness of a material by suitable treatment, usually involving heating and rapid cooling.

**Hardness:** Resistance of a material to scratching, abrasion, cutting or deformation.

**Head, Pressure:** The pressure due to the height of a column or body of fluid.

**Heading:** See COLD HEADING.

**Hot Finishing/Hot Forming:** A deformation operation performed at elevated temperature, usually above the recrystallization temperature of the metal.

**Hydraulic Power:** Power derived from flow rate and pressure differential of the fluid.

**Hydraulics:** Engineering science pertaining to liquid pressure and flow.

**Hydrogen Embrittlement:** A condition of low ductility in metals resulting from the absorption of hydrogen.

**Hydropneumatics:** Engineering science pertaining to the combination of hydraulic and pneumatic fluid power.

**Impact Test:** A single blow to determine the behavior of materials when subjected to high rates of loading, usually sudden and in the bending, tension or torsion mode. Charpy or Izod tests are typically used to measure materials' impact energy characteristics.

**Inclusions:** Nonmetallic materials in solid metallic matrix.

**Intergranular Corrosion:** A preferential corrosive attack at the grain boundaries of a metal.

**LB2000:** Registered Trademark of ITW.

**Lubricant:** Any substance used to reduce friction between two surfaces which are in contact.

**MPG 2:** Registered Trademark of Dubois Chemical Inc.

**Machinability:** The relative ease of machining a metal.

**Machining:** Removing material, in the form of chips, from work, usually through the use of a machine.

**Malleability:** The characteristic of metals that permits plastic deformation in compression without rupture.

**Mandrel:** (1) A metal bar around which other metal may be cast bent, formed, or shaped. (2) A rod used to retain the cavity in hollow metal products during working.

**Mechanical Properties:** The properties of a material that reveal its elastic and inelastic behavior under the application of force, thus indicating the material's suitability for mechanical applications. Examples of such properties are: tensile strength, elongation, modulus of elasticity, yield strength, reduction in area and fatigue limit.

**Microhardness:** The hardness of microscopic areas or of the individual microconstituents in a metal.

**Microstructure:** The structure of polished and etched metals as revealed by a microscope at a magnification greater than ten diameters.



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**Mild Steel:** Carbon steel with a maximum of .25 percent carbon.

**Nitriding:** A case hardening process conducted by the introduction of nitrogen into the surface of a solid ferrous alloy.

**Nitrile (Buna N):** A copolymer of butadienne and acrylonitrile. It is the elastomer most widely used to manufacture O-rings.

**Nondestructive:** Inspection or test by methods that do not destroy the part.

**O-ring:** A torus, or doughnut shaped object, generally made from elastomer and is used primarily for sealing.

**Passivation:** A process used to improve corrosive behavior of a metal by changing its chemically active surface to a much less reactive state.

**Pipe:** (l) The defect in wrought or cast products resulting from the central cavity formed by contraction in metal, especially ingots, during solidification. (2) A tubular metal product that includes iron pipe size (I.P.S.) and schedule number in its classification.

**Pipe Thread, Dry Seal:** Tapered pipe threads in which sealing is a function of root and crest interference.

**Pitting:** Forming small sharp cavities in a metal surface by corrosion, mechanical action or nonuniform electrodeposition.

**Plastic Deformation:** Deformation that does or will remain permanent in an element after removal of the stress that caused it.

**Pneumatics:** Engineering science pertaining to gaseous pressure and flow.

**Port:** A terminus of a passage in a component to which conductors can be connected.

**Port, Pipe:** A port which conforms to pipe thread standards.

**Port, Straight Thread:** A port which conforms to straight thread standards. It typically employs an O-ring compressed in a wedge-shaped cavity.

**Power Supply, Fluid:** Energy source which generates and maintains a flow of fluid under pressure.

**Precipitation Hardening:** Hardening caused by the precipitation of a constituent from a supersaturated solid solution.

**Pressure:** Force per unit area, usually expressed in pounds per square inch (psi).

**Pressure, Absolute:** The pressure above absolute zero, i.e., the sum of atmospheric pressure plus gage pressure.

**Pressure, Atmospheric:** Pressure exerted by the atmosphere at any specific location. [Sea level atmospheric pressure is approximately 14.7 pounds per square inch (about 1 bar)]

**Pressure, Burst:** The pressure which causes failure of, and consequential loss of fluid through the product envelope.

**Pressure, Cyclic Test:** A pressure range applied in cyclic endurance tests that are performed to help determine recommended working pressure.

**Pressure, Differential (Pressure Drop):** The difference in pressure between any two points of a system or a component.

**Pressure, Gage:** Pressure differential above or below ambient atmospheric pressure.

**Pressure, Nominal:** A pressure value assigned to a component or system for the purpose of convenient designation.

**Pressure, Operating:** See WORKING PRESSURE.

**Pressure, Proof:** The non-destructive test pressure, in excess of the maximum rated operating pressure, which causes no permanent deformation, external leakage, or other resulting malfunction.

**Pressure, Rated Dynamic:** The maximum fluctuating pressure load that a pressure containing envelope is capable of sustaining for a minimum of 1 million operating cycles without failure.

**Pressure, Rated Static:** The maximum pressure that a pressure containing envelope is capable of sustaining in an application not exceeding 30,000 operating cycles in a system free of pressure surges, shocks, vibration, temperature excursions, etc.

**Pressure, Relief:** The pressure at which the relief valve is set for actuation. This pressure is generally slightly higher than the system working pressure.

**Pressure Shock:** A pressure wave front which moves at a sonic velocity, due to sudden stoppage of fluid flow.

**Pressure, Static:** The pressure in a fluid at rest.

**Pressure, Surge:** The pressure increases resulting from pressure fluctuations in a hydraulic system.

**Pressure, Working:** The pressure at which the apparatus is being operated in a given application.

**Pressure, Working Rated:** The qualified operating pressure which is recommended for a system or a component by the manufacturer.

**Proof Load:** A pre-determined load, generally some multiple of the service load, to which a specimen or structure is submitted before acceptance for use.

**Quenching:** Rapid cooling method used in heat treating process.

**Residual Stress:** Stress existing in a body that is free of external forces or thermal gradients.

**Rockwell Hardness Test:** A test for determining the hardness of a material based upon the depth of penetration of a specified penetrator into the specimen.

**Roughness:** Relatively finely-spaced surface irregularities, the height, width and direction of which establish the predominant surface pattern.

**STP:** Distributed by First Brand Corp. Danbury, CT.

**Scaling:** (1) Forming a thick layer of oxidation products on metals at high temperatures. (2) Depositing water-insoluble constituents on a metal surface, as in cooling tubes and water boilers.

**Seam:** A fold or lap on the surface of a metal appearing as a crack, usually resulting from a defect obtained in casting or in working.

**Segregation:** Concentration of alloying elements in specific regions in a metallic object.





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**Shear Strength:** The load divided by the original cross-sectional area of a section separated by a shear force.

**Sour Environment:** Fluids containing water as a liquid and hydrogen sulfide, and may cause sulfide stress cracking (SSC) of susceptible materials.

**Specific Gravity, Liquid:** The ratio of the weight of a given volume of liquid to an equal volume of water.

**Spot Facing:** Machining in the mating component, a flat seat for a bolt head, nut, locknut or other similar element.

**Springback:** (1) The elastic recovery of metal after stressing. (2) The degree to which metal tends to return to its original shape or contour after undergoing a forming operation.

**Stainless Steel:** Basically, low carbon alloy steels containing at least 11.5% chromium. These steels are characterized by their high resistance to corrosion.

**Static Pressure Rating:** See pressure, rated static

**Steel:** An iron-based alloy, containing: manganese, usually carbon, and often other alloying elements.

**Strain:** A measure of the relative change in size or shape of a body. Example, linear strain is computed as the ratio of change in length to the original length.

**Stress:** The result of a force acting on a given surface area. Computed as the ratio of the applied force to the affected area.

**Stress Corrosion Cracking (SCC):** Fracture in a material resulting from the combined action of applied stress and corrosive environment.

**Stress Raisers/Concentration:** Changes in contour or discontinuities in structure that cause local increases in stress.

**Stringer:** In wrought materials, an elongated configuration of microconstituents or foreign material aligned in the direction of working.

**Sulfide Stress:** Brittle failure by cracking under the combined action of tensile stress and corrosion in the presence of water Cracking (SSC) and hydrogen sulfide.

**Surge:** A transient rise of pressure or flow.

**Swaging:** Forming a taper or a reduction on metal products such as rod and tubing by forging, squeezing or hammering.

**Temperature, Ambient:** The temperature of the environment in which the apparatus is working.

**Tensile Strength:** In tensile testing, the ratio of maximum load to original cross-sectional area.

**Tensile Strength, Ultimate:** The maximum stress that a material can withstand.

**Torque:** Turning effort (moment) applied to a component for fastening, tightening or assembling.

**Torsion:** A twisting action resulting in shear stresses and strain.

**Toughness:** Ability of a metal to absorb energy and deform without fracturing.

**Tube:** Hollow, cylindrical products having outside diameters that are not standardized for threading. Tubes are dimensionally classified in terms of their outside diameters and wall thicknesses.

**Upsetting:** See COLD HEADING.

**Vacuum:** Pressure less than ambient atmospheric pressure.

**Vibra-Seal:** Vibra-Seal is a registered trademark of Loctite Corporation.

**Viscosity:** A measure of the internal friction or the resistance of a fluid to flow.

**Viton:** Viton is a registered trademark of E.I. Du Pont de Nemours and Company.

**Welding:** Joining two or more pieces of metal by applying heat, pressure or both with or without filler metal, to produce a localized union through fusion or recrystallization across the interface.

**Work Hardening:** An increase in hardness and strength caused by plastic deformation at temperatures lower than the recrystallization range. (Same as Strain Hardening. See also, Cold Working.)

**Working Pressure, Dynamic:** See PRESSURE, RATED DYNAMIC.

**Working Pressure, Static:** See PRESSURE, RATED STATIC.

**Yield Strength:** The maximum stress that can be applied to a material, which upon removal, the material will return to approximately its original shape.



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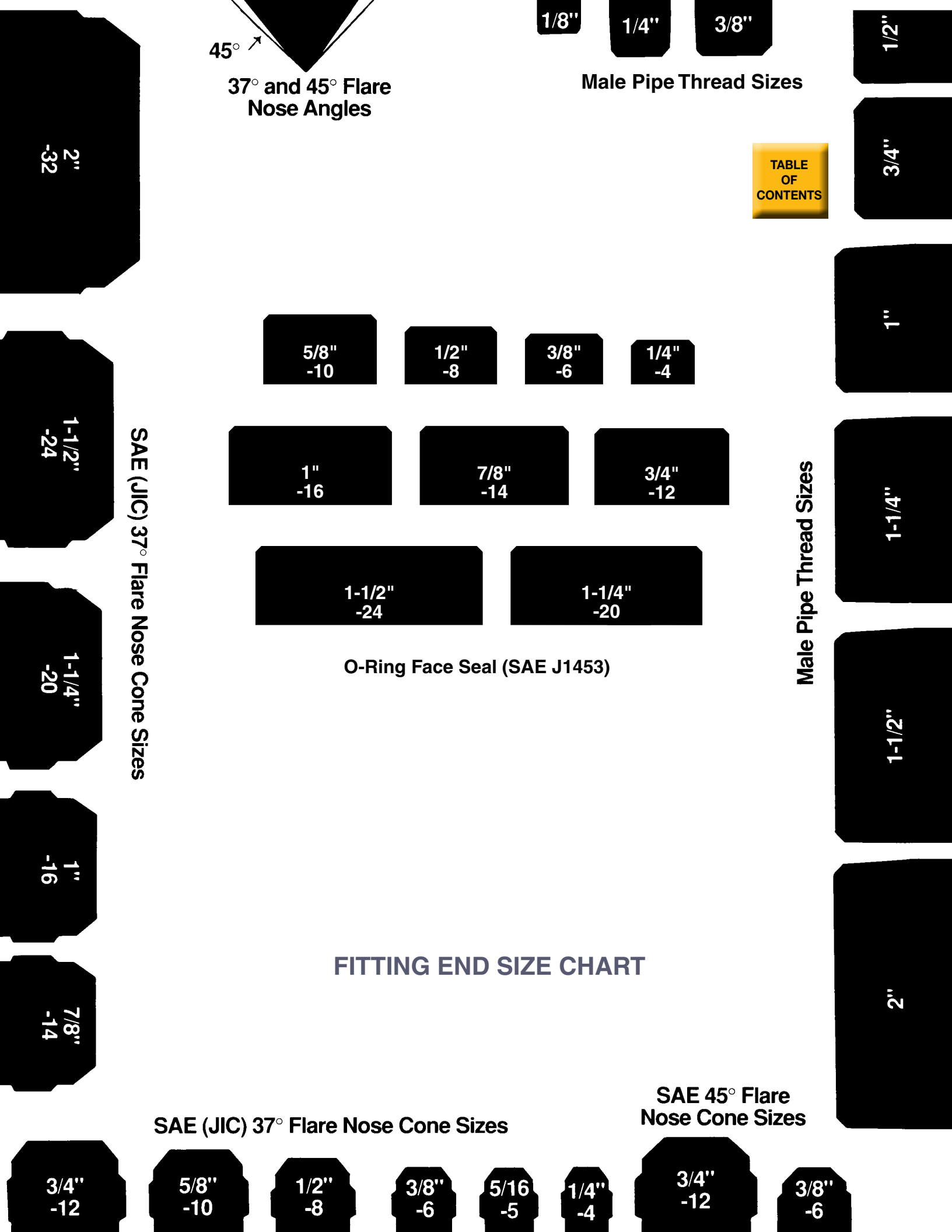
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20. **Compliance with Laws.** Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards of care, including those of the United Kingdom, the United States of America, and the country or countries in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act") and the U.S. Food Drug and Cosmetic Act ("FDCA"),each as currently amended, and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that it is familiar with the provisions of the U. K. Bribery Act, the FCPA, the FDA, and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller.



**Parker Hannifin Corporation**
Tube Fittings Division
Columbus, Ohio
http://www.parker.com/tfd

# Parker's Motion & Control Product Groups

***At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 1 800 C-Parker (1 800 272 7537).***

## Aerospace

### Key Markets

Aftermarket services
Commercial transports
Engines
General & business aviation
Helicopters
Launch vehicles
Military aircraft
Missiles
Power generation
Regional transports
Unmanned aerial vehicles

### Key Products

Control systems & actuation products
Engine systems & components
Fluid conveyance systems & components
Fluid metering, delivery & atomization devices
Fuel systems & components
Fuel tank inerting systems
Hydraulic systems & components
Thermal management
Wheels & brakes

## Automation

### Key Markets

Alternative energy
Conveyor & material handling
Factory automation
Food & beverage
Life sciences & medical
Machine tools
Packaging machinery
Paper machinery
Plastics machinery
Primary metals
Safety & security
Semiconductor & electronics
Transportation & automotive

### Key Products

AC/DC drives & systems
Air preparation
Electric actuators, gantry robots & slides
Human machine interfaces
Inverters
Manifolds
Miniature fluidics
Pneumatic actuators & grippers
Pneumatic valves & controls
Rotary actuators
Stepper motors, servo motors, drives & controls
Structural extrusions
Vacuum generators, cups & sensors

## Climate & Industrial Controls

### Key Markets

Agriculture
Air conditioning
Construction Machinery
Food & beverage
Industrial machinery
Life sciences
Oil & gas
Precision cooling
Process
Refrigeration
Transportation

### Key Products

Accumulators
Advanced actuators
$CO_2$ controls
Electronic controllers
Filter driers
Hand shut-off valves
Heat exchangers
Hose & fittings
Pressure regulating valves
Refrigerant distributors
Safety relief valves
Smart pumps
Solenoid valves
Thermostatic expansion valves

## Filtration

### Key Markets

Aerospace
Food & beverage
Industrial plant & equipment
Life sciences
Marine
Mobile equipment
Oil & gas
Power generation & renewable energy
Process
Transportation
Water Purification

### Key Products

Analytical gas generators
Compressed air filters & dryers
Engine air, coolant, fuel & oil filtration systems
Fluid condition monitoring systems
Hydraulic & lubrication filters
Hydrogen, nitrogen & zero air generators
Instrumentation filters
Membrane & fiber filters
Microfiltration
Sterile air filtration
Water desalination & purification filters & systems

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## Fluid Connectors

### Key Markets

Aerial lift
Agriculture
Bulk chemical handling
Construction machinery
Food & beverage
Fuel & gas delivery
Industrial machinery
Life sciences
Marine
Mining
Mobile
Oil & gas
Renewable energy
Transportation

### Key Products

Check valves
Connectors for low pressure fluid conveyance
Deep sea umbilicals
Diagnostic equipment
Hose couplings
Industrial hose
Mooring systems & power cables
PTFE hose & tubing
Quick couplings
Rubber & thermoplastic hose
Tube fittings & adapters
Tubing & plastic fittings

## Hydraulics

### Key Markets

Aerial lift
Agriculture
Alternative energy
Construction machinery
Forestry
Industrial machinery
Machine tools
Marine
Material handling
Mining
Oil & gas
Power generation
Refuse vehicles
Renewable energy
Truck hydraulics
Turf equipment

### Key Products

Accumulators
Cartridge valves
Electrohydraulic actuators
Human machine interfaces
Hybrid drives
Hydraulic cylinders
Hydraulic motors & pumps
Hydraulic systems
Hydraulic valves & controls
Hydrostatic steering
Integrated hydraulic circuits
Power take-offs
Power units
Rotary actuators
Sensors

## Instrumentation

### Key Markets

Alternative fuels
Biopharmaceuticals
Chemical & refining
Food & beverage
Marine & shipbuilding
Medical & dental
Microelectronics
Nuclear Power
Offshore oil exploration
Oil & gas
Pharmaceuticals
Power generation
Pulp & paper
Steel
Water/wastewater

### Key Products

Analytical Instruments
Analytical sample conditioning products & systems
Chemical injection fittings & valves
Fluoropolymer chemical delivery fittings, valves & pumps
High purity gas delivery fittings, valves, regulators & digital flow controllers
Industrial mass flow meters/ controllers
Process control double block & bleeds
Process control fittings, valves, regulators & manifold valves
Permanent no-weld tube fittings
Precision industrial regulators & flow controllers

## Seal

### Key Markets

Aerospace
Chemical processing
Consumer
Fluid power
General industrial
Information technology
Life sciences
Microelectronics
Military
Oil & gas
Power generation
Renewable energy
Telecommunications
Transportation

### Key Products

Dynamic seals
Elastomeric o-rings
Electro-medical instrument design & assembly
EMI shielding
Extruded & precision-cut, fabricated elastomeric seals
High temperature metal seals
Homogeneous & inserted elastomeric shapes
Medical device fabrication & assembly
Metal & plastic retained composite seals
Shielded optical windows
Silicone tubing & extrusions
Thermal management
Vibration dampening

Parker

ENGINEERING YOUR SUCCESS.

# Parker Fluid Connectors Group
# North American Divisions & Distribution Service Centers

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***Your complete source*** for quality tube fittings, hose & hose fittings, brass & composite fittings, quick-disconnect couplings, valves and assembly tools, locally available from a worldwide network of authorized distributors.

***Fittings:***
Available in inch and metric sizes covering SAE, BSP, DIN, GAZ, JIS and ISO thread configurations, manufactured from steel, stainless steel, brass, aluminum, nylon and thermoplastic.

***Hose, Tubing and Bundles:***
Available in a wide variety of sizes and materials including rubber, wire-reinforced, thermoplastic, hybrid and custom compounds.

***Worldwide Availability:***
Parker operates Fluid Connectors manufacturing locations and sales offices throughout North America, South America, Europe and Asia-Pacific.

***For information,*** call toll free...

**1-800-C-PARKER**
**(1-800-272-7537)**

## North American Divisions

**Fluid System Connectors Division**
Otsego, MI
phone 269 694 9411
fax 269 694 4614

**Hose Products Division**
Wickliffe, OH
phone 440 943 5700
fax 440 943 3129

**Industrial Hose Division**
Wickliffe, OH
phone 440 833 2120
fax 440 833 2230

**Parflex Division**
Ravenna, OH
phone 330 296 2871
fax 330 296 8433

**Quick Coupling Division**
Minneapolis, MN
phone 763 544 7781
fax 763 544 3418

**Tube Fittings Division**
Columbus, OH
phone 614 279 7070
fax 614 279 7685

## Distribution Service Centers

**Buena Park, CA**
phone 714 522 8840
fax 714 994 1183

**Conyers, GA**
phone 770 929 0330
fax 770 929 0230

**Louisville, KY**
phone 502 937 1322
fax 502 937 4180

**Portland, OR**
phone 503 283 1020
fax 503 283 2201

**Toledo, OH**
phone 419 878 7000
fax 419 878 7001
fax 419 878 7420
(FCG Kit Operations)

**Canada**
**Grimsby, ONT**
phone 905 945 2274
fax 905 945 3945
(Contact Grimsby for other Service Center locations.)

**Mexico**
**Toluca, MEX**
phone (52) 722 2754 200
fax (52) 722 2722 168

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