




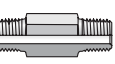



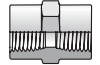








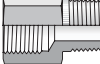




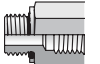







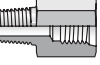



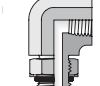
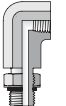


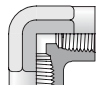
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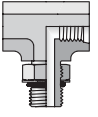
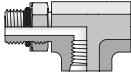
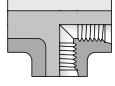
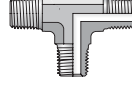
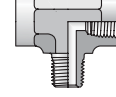
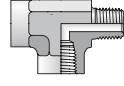

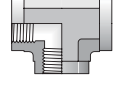
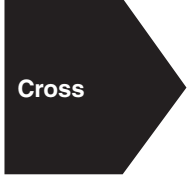
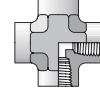













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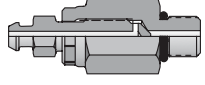
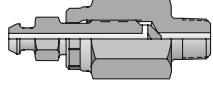
# Pipe Fittings and Port Adapters

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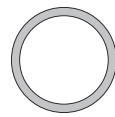

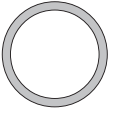
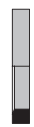
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	<b>FF33M</b> BSPT / BSPT  F12	<b>Couplings</b>	<b>G5HG5</b> SAE-ORB / SAE-ORB  F12	<b>GG</b> NPTF / NPTF  F12	<b>G8HG8</b> Metric-ORR / Metric-ORR  F13
<b>Reducers, Expanders, Conversions</b>	<b>F5OG5</b> SAE-ORB / SAE-ORB  F13		<b>F5OG</b> SAE-ORB / NPTF  F13	<b>F5OHG8</b> SAE-ORB / Metric  F14	<b>F5OHF42</b> SAE-ORB / BSPP-ED  F14
	<b>FHG5</b> NPTF / SAE-ORB  F14	<b>FG</b> NPTF / NPTF  F15	<b>PTR</b> Pipe Thread Reducer  F15	<b>FHG8</b> NPTF / Metric  F15	<b>FHG4</b> NPTF / BSPP  F15
<b>F8OHG5</b> Metric-ORR / SAE-ORB  F16	<b>F8OHG</b> Metric-ORR / NPTF  F16	<b>F82HG8</b> Metric-ED / Metric-ORR  F17	<b>F4OHG5</b> BSPP-ORR / SAE-ORB  F17	<b>F4OHG</b> BSPP-ORR / NPTF  F17	<b>GHG4</b> BSPP / NPTF  F17
<b>PTR34M</b> BSPT / BSPP  F17	<b>RI-ED</b> BSPP-ED / BSPP  F18	<b>RI</b> BSPP-CF / BSPP  F19	<b>FHF3</b> BSPT / NPTF  F20	<b>F3HG</b> BSPT / NPTF  F20	<b>F3HG5</b> BSPT / SAE-ORB  F20
<b>45° Elbows</b>	<b>CD45</b> NPTF / NPTF  F20	<b>DD45</b> NPTF / NPTF  F21	<b>90° Elbows</b>	<b>AOEG5</b> SAE-ORB / SAE-ORB  F21	<b>AOEG</b> SAE-ORB / NPTF  F21
	<b>AOE4G</b> SAE-ORB / NPTF Long  F21	<b>CR</b> NPTF / NPTF  F22		<b>CD</b> NPTF / NPTF  F22	<b>DD</b> NPTF / NPTF  F22

<b>G5G5JAO</b> SAE-ORB Branch Tee  F23	<b>AOG5JG5</b> SAE-ORB Run Tee  F24	<b>G5G5JG5</b> SAE-ORB Tee  F24	<b>RRS</b> NPTF Tee  F24	<b>MMS</b> NPTF Branch Tee  F24	<b>MRO</b> NPTF Run Tee  F24
<b>MMO</b> NPTF Tee  F25	<b>MMO444M</b> BSPP Tee  F25	 Cross	<b>KMMOO</b> NPTF Cross  F25	 Plugs, Bleed Adapters	<b>P5ON</b> SAE-ORB Hex Head  F25
<b>HP5ON</b> SAE-ORB Hollow Hex  F26	<b>HP</b> NPTF Hex Head  F26	<b>SHP</b> NPTF Square Head  F26	<b>HHP</b> NPTF Hollow Hex Head  F26	<b>HPC</b> NPTF Pipe Cap  F27	<b>P87OMN</b> ISO 6149 Hex Head  F27
<b>VSTI M-OR</b> ISO 6149 Hollow Hex  F27	<b>VSTI M-ED</b> Metric-ED Hollow Hex  F27	<b>VSTI R-ED</b> BSPP-ED Hollow Hex  F28	<b>P47OMN</b> BSPP-ORB Hex Head  F28	<b>HP3M</b> BSPT Hex Head  F28	

**Diagnostic, Orifice and Bleed Adapters (Shown in Section M)**

 Bleed Adapters	<b>P5ONBA</b> Bleed Screw / Bleed Adapter  M10	<b>HPBA</b> Bleed Screw / NPT  M10
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**O-Rings and Seals (Shown in Section N)**

 O-Rings and Seals	<b>SAE O-Ring</b>  N4	<b>ISO 6149 O-Ring</b>  N5	<b>Metric O-Ring</b>  N5	<b>Metric Retaining Ring</b>  N5	<b>BSPP O-Ring</b>  N6
<b>BSPP Retaining Ring</b>  N6	<b>Elastic Seal Ring</b>  N6				

## 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.

Dimensions and pressures for reference only, subject to change.

## Assembly and Installation

Please refer to Section S for the assembly and installation instructions for Pipe Fittings and Port Adapters.

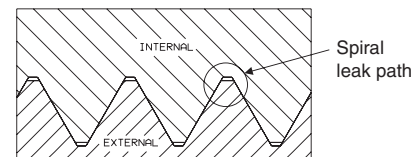
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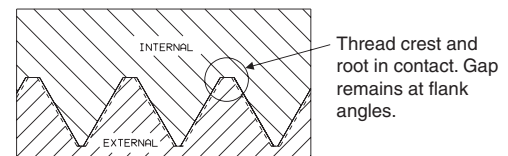
Thread	Standard
NPT	ANSI B1.20.1, FED-STD-H28/7
NPTF	SAE J476, ANSI B1.20.3, FED-STD-H28/8
BSPT	BS 21, ISO 7/1
BSPP	BS 2779, ISO 228/1
Metric	ISO 261, ANSI B1.13M, FED-STD-H28/21
UN/UNF*	ANSI B1.1, FED-STD-H28/2

\*Class 2A or 2B

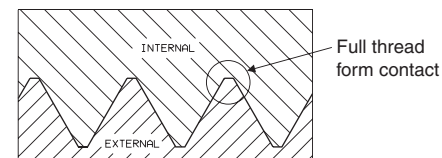
**Table F1 — Thread Conformance Standards**



**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**

## Application Guidelines for Tapered Threads

### Straight Connectors with NPT/NPTF 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.

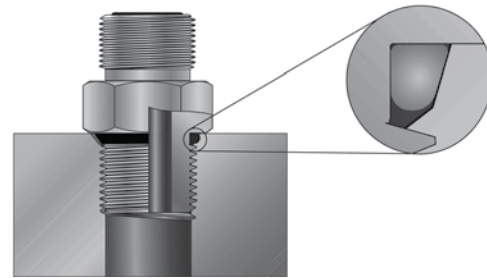


Fig. F4 — Typical O-Ring Boss Port

## 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.

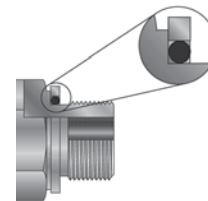


Fig. F5 — O-Ring with Retaining Ring

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.

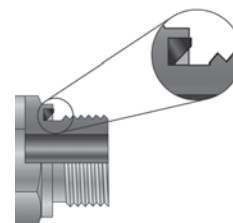


Fig. F6 — O-Ring in Fitting Groove

Dimensions and pressures for reference only, subject to change.

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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.

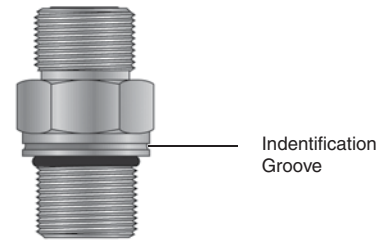
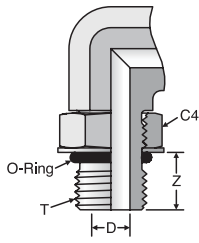


Fig. F7 — ISO 6149 Male

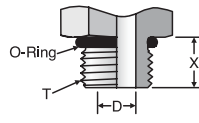
Feature	Advantage	Benefit
<b>Tapered Thread Fittings</b>		
Compact size	Suitable selection for plumbing in limited or tight space in a compact system.	Compact systems are more efficient and reduce the need for excessive routing of costly hose or tube
Widespread acceptability	Available worldwide for OEM 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
<b>Straight Thread Fittings</b>		
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

Dimensions and pressures for reference only, subject to change.

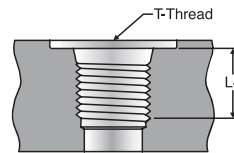
## Port Ends for SAE J1926-1 (ISO 11926-1) Port



**SAE J1926  
Adjustable**



**SAE J1926  
Nonadjustable**



**SAE J1926-1  
Port<sup>2)</sup>**

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	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)
<b>LIGHT DUTY (TRIPLE-LOK, FERULOK, ADAPTERS)</b>						
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
<b>HEAVY DUTY (SEAL-LOK)</b>						
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.

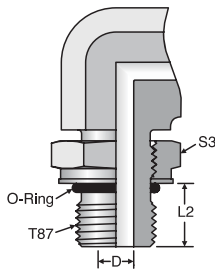
2) See page T33 for port details.

Dimensions and pressures for reference only, subject to change.

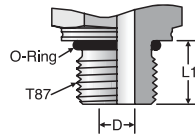
## Port Ends for ISO 6149-1 Port

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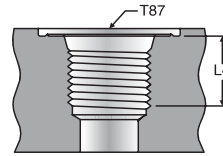
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**ISO 6149  
Adjustable**



**ISO 6149  
Nonadjustable**



**ISO 6149  
Port<sup>2)</sup>**

	Thread	Drill	Minimum Thread	Stud Length		Lockhead Hex
SIZE	T87 Metric	D Ref. (mm)	L4 Min (mm)	L1 (mm)	L2 Max (mm)	S3 (mm)
<b>LIGHT DUTY (TRIPLE-LOK, FERULOK, ADAPTERS)</b>						
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
<b>HEAVY DUTY (SEAL-LOK)</b>						
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.

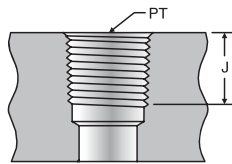
Dimensions and pressures for reference only, subject to change.



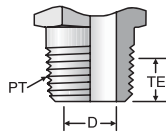
## NPTF and BSPT Port Ends

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**NPTF and BSPT  
Stud**

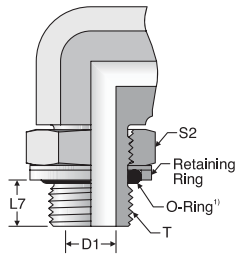
**F**

	Thread	Drill	Minimum Thread	Thread Engagement
SIZE	PT	D Ref. (inch)	J (inch)	TE (inch)
<b>NPTF</b>				
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
<b>BSPT</b>				
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

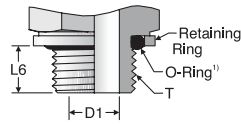
Dimensions and pressures for reference only, subject to change.

# Port Ends for ISO 9974-1 and 1179-1 Ports

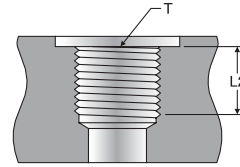
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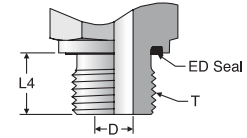
**ISO 9974 and 1179 Adjustable O-Ring with Retaining Ring<sup>2)</sup>**



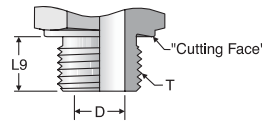
**ISO 9974 and 1179 Non-Adjustable O-Ring with Retaining Ring<sup>2)</sup>**



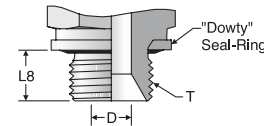
**ISO 9974<sup>3)</sup> and 1179<sup>4)</sup> Port**



**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

SIZE	Thread	Drill Ref.			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
		O-Ring, RR Stud	Light Duty (L Series)	Heavy Duty (S Series)							
	T	D1	D		L2	L4	L6	L7	S2	L8	L9
	Metric	(mm)	(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(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

SIZE	Thread	Drill Ref.			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
		O-Ring, RR Stud	Light Duty (L Series)	Heavy Duty (S Series)							
	T	D1	D		L2	L4	L6	L7	S2	L8	L9
	BSP	(mm)	(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(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.

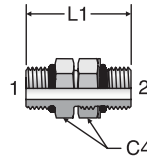
Dimensions and pressures for reference only, subject to change.



## F5OHAO

Straight Thread Union  
SAE-ORB / SAE-ORB

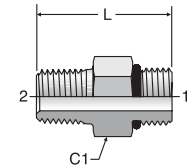
HPD Base # 0505



TUBE FITTING PART #	END SIZE		C4 HEX (in.)	L1 (in.)	Dynamic Pressure (x 1,000 PSI)		
	1	2			-S	-SS	-B
	UN/UNF-2A	UN/UNF-2A					
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		C1 HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1	2			-S	-SS	-B
	UN/UNF-2A	NPTF					
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

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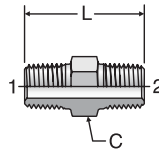
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## FF

Pipe Nipple  
NPTF / NPTF

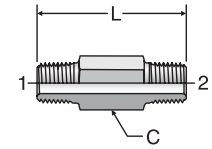
HPD Base # 0101 SAE 140137



TUBE FITTING PART #	END SIZE		C HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1	2			-S	-SS	-B
	NPTF	NPTF					
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

## FFF

Long Pipe Nipple  
NPTF / NPTF



TUBE FITTING PART #	END SIZE		C HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1	2			-S	-SS	-B
	NPTF	NPTF					
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

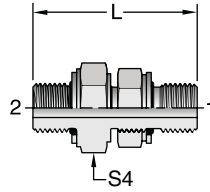
Note: All steel "FF" fittings have a 30° chamfer for sealing with NPSM swivel type fittings.

Dimensions and pressures for reference only, subject to change.



# F80HA80

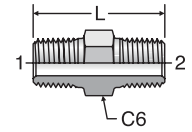
Metric Union  
Metric-ORR / Metric-ORR  
(for ISO 9974 / DIN 3852-1 Port)



TUBE FITTING PART #	End Size		S4 Hex (mm)	L (mm)	Dynamic Pressure (x 1,000 PSI)		
	1 Metric Str	2 Metric Str			S	SS	B
M10F80HA80	M10X1	M10X1	16	33.8	6.0		
M12F80HA80	M12X1.5	M12X1.5	19	36.8	6.0		
M14F80HA80	M14X1.5	M14X1.5	22	37.3	6.0		
M16F80HA80	M16X1.5	M16X1.5	22	46.0	5.0		
M18F80HA80	M18X1.5	M18X1.5	27	48.8	5.0		
M20M18F80HA80	M20X1.5	M18X1.5	27	49.8	4.0		
M22F80HA80	M22X1.5	M22X1.5	27	52.6	4.0		
M27F80HA80	M27X2	M27X2	32	62.0	4.0		
M33F80HA80	M33X2	M33X2	41	62.0	3.0		

# FF33M

BSPT Pipe Nipple  
BSPT / BSPT



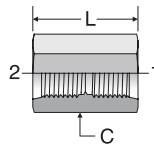
TUBE FITTING PART #	END SIZE		C6 HEX (mm)	L (mm)	Dynamic Pressure (x 1,000 PSI)		
	1 BSPT	2 BSPT			S	SS	B
1/8FF33M	1/8 - 28	1/8 - 28	11	27	6.0	6.0	3.3
1/4x1/8FF33M	1/4 - 19	1/8 - 28	14	32	6.0	6.0	3.3
1/4FF33M	1/4 - 19	1/4 - 19	14	37	6.0	6.0	3.3
3/8x1/4FF33M	3/8 - 19	1/4 - 19	17	37	6.0	6.0	3.3
3/8FF33M	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

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# G5HG5

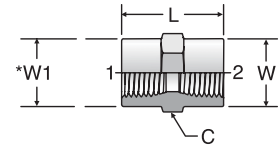
Straight Thread Coupling  
Female SAE / Female SAE



TUBE FITTING PART #	END SIZE		C HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 UN/UNF-2B	2 UN/UNF-2B			-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

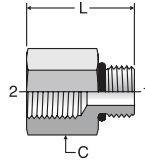
TUBE FITTING PART #	END SIZE		C HEX (in.)	L (in.)	W1 (in.)	W (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPTF	2 NPTF					-S	-SS	-B
1/8 GG	1/8 - 27	1/8 - 27	5/8	0.75	0.63	0.63	6.0	6.0	3.9
1/4 x 1/8 GG	1/4 - 18	1/8 - 27	3/4	0.94	0.75	0.63	6.0	6.0	3.9
1/4 GG	1/4 - 18	1/4 - 18	3/4	1.13	0.75	0.75	6.0	6.0	3.9
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.



## F50HG8

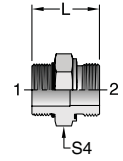
Conversion Adapter  
SAE-ORB / Metric



TUBE FITTING PART #	END SIZE		C HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 UN/UNF-2A	2 METRIC STR			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

## F50HF42

Conversion Adapter  
SAE-ORB / BSPP-ED



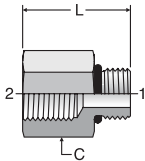
TUBE FITTING PART #	End Size		S4 Hex (mm)	L (mm)	Dynamic Pressure (x 1,000 PSI)	
	1 UN/UNF-2A	2 BSPP			S	B
4-1/8F5OHF42ED	7/16-20	1/8-28	17	27.2	9.2	
4-1/4F5OHF42ED	7/16-20	1/4-19	19	31.8	9.2	
5-1/4F5OHF42ED	1/2-20	1/4-19	19	31.4	9.2	
6-1/4F5OHF42ED	9/16-18	1/4-19	19	32.0	9.2	
6-3/8F5OHF42ED	9/16-18	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	

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## F50HG4

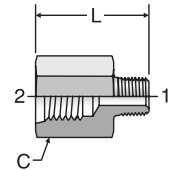
Conversion Adapter  
SAE-ORB / BSPP



TUBE FITTING PART #	END SIZE		C HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 UN/UNF-2A	2 BSPP			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



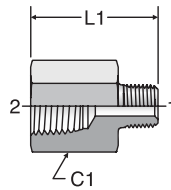
HPD Base # 0110

TUBE FITTING PART #	END SIZE		C HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPTF	2 UN/UNF-2B			-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.

**FG**  
Expander / Adapter  
NPTF / NPTF

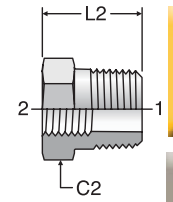
SAE 140139  
HPD Base # 0201



TUBE FITTING PART #	END SIZE		C1 HEX (in.)	L1 (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPTF	2 NPTF			-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



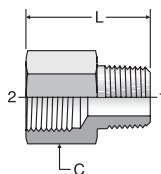
TUBE FITTING PART #	END SIZE		C2 HEX (in.)	L2 (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPTF	2 NPTF			-S	-SS	-B
1/4 x 1/8 PTR	1/4 - 18	1/8 - 27	5/8	0.86	6.0	6.0	3.9
3/8 x 1/8 PTR	3/8 - 18	1/8 - 27	3/4	0.86	6.0	6.0	3.9
3/8 x 1/4 PTR	3/8 - 18	1/4 - 18	3/4	0.86	6.0	6.0	3.9
1/2 x 1/8 PTR	1/2 - 14	1/8 - 27	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



**F**

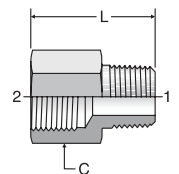
**FHG8**  
Conversion Adapter  
NPTF / Metric

TUBE FITTING PART #	END SIZE		C HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPTF	2 METRIC STR			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		C HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPTF	2 BSPP			-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.

# F87OHG87M

Reducer / Expander  
ISO 6149 / ISO 6149

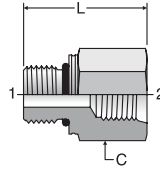


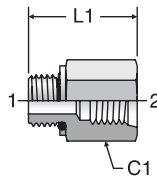
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TUBE FITTING PART #	END SIZE		C HEX (mm)	L (mm)	Dynamic Pressure (x 1,000 PSI)		
	1 METRIC STR	2 METRIC STR			S	SS	B
M10M8F87OHG87M	M10X1	M8X1	14	27.5	10.0	7.5	3.3
M10M12F87OHG87M	M10X1	M12X1.5	19	30.0	8.0	6.0	3.3
M12M10F87OHG87M	M12X1.5	M10X1	17	29.5	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

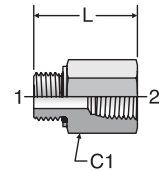
# F8OHG5

Conversion Adapter  
Metric-ORR / SAE-ORB  
(for ISO 9974 / DIN 3852-1 Port)



# F8OHG

Conversion Adapter  
Metric-ORR / NPTF  
(for ISO 9974 / DIN 3852-1 Port)



TUBE FITTING PART #	END SIZE		C1 HEX (in.)	L1 (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 METRIC STR	2 UN/UNF-2B			S	SS	B
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

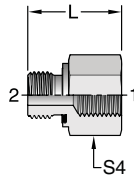
TUBE FITTING PART #	END SIZE		C1 HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 METRIC STR	2 NPTF			S	SS	B
M12-1/4F8OHG	M12X1.5	1/4 - 18	3/4	1.24	5.0	5.0	3.3
M14-1/4F8OHG	M14X1.5	1/4 - 18	3/4	1.24	5.0	5.0	3.3
M16-3/8F8OHG	M16X1.5	3/8 - 18	7/8	1.36	5.0	5.0	3.3
M16-1/2F8OHG	M16X1.5	1/2 - 14	1 1/8	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.



## F82HG8

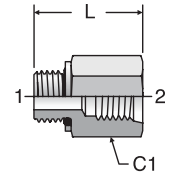
Conversion Adapter  
Metric-ED / Metric-ORR  
(for ISO 9974 / DIN 3852-1 Port)



TUBE FITTING PART #	End Size		S4 Hex (mm)	L (mm)	Dynamic Pressure (x 1,000 PSI)		
	1 Metric Str	2 Metric Str			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

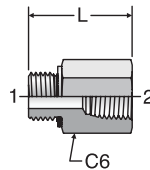
Conversion Adapter  
BSPP-ORR / SAE-ORB  
(for ISO 1179-1 / DIN 3852-2 Port)



TUBE FITTING PART #	END SIZE		C1 HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 BSPP	2 UN/UNF-2B			-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

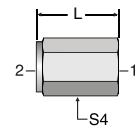
Conversion Adapter  
BSPP-ORR / NPTF  
(for ISO 1179-1 / DIN 3852-2 Port)



TUBE FITTING PART #	END SIZE		C6 HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 BSPP	2 NPTF			-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

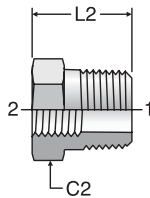
Female Pipe Adapter  
BSPP / NPTF



TUBE FITTING PART #	End Size		S4 Hex (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 NPTF	2 BSPP			-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		C2 (mm)	L2 (mm)	Dynamic Pressure (x 1,000 PSI)		
	1 BSPT	2 BSPP			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)

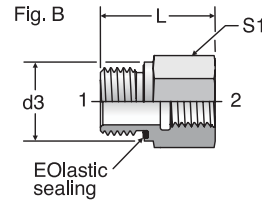
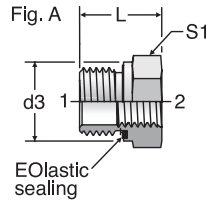


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TUBE FITTING PART #	END SIZE		d3 (mm)	L (mm)	S1 (mm)	Fig.	Dynamic Pressure (x 1,000 PSI)		
	1 BSPP	2 BSPP					CF	71	MS
RI1/8EDX1/4	1/8 - 28	1/4 - 19	14	31.0	19	B	5.8	5.8	3.3
RI1/8EDX3/8	1/8 - 28	3/8 - 19	14	32.0	24	B	5.8	5.8	3.3
RI1/4EDX1/8	1/4 - 19	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.

# RI

BSPP Reducing Adatper / Expander  
BSPP / BSPP-CF  
(for ISO 1179-1 / DIN 3852-2 Port)

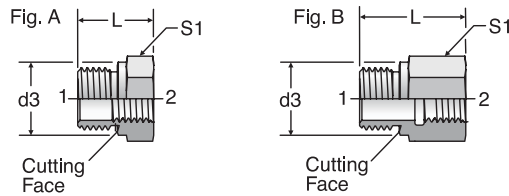


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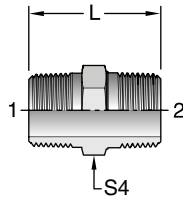
F

TUBE FITTING PART #	END SIZE		d3 (mm)	L (mm)	S1 (mm)	Fig.	Dynamic Pressure (x 1,000 PSI)		
	1 BSPP	2 BSPP					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
RI1/2X1 1/4	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
RI3/4X1 1/4	3/4 - 14	1 1/4 - 11	32	55.0	55	B	2.3	2.3	1.5
RI3/4X1 1/2	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
RI1X1 1/4	1 - 11	1 1/4 - 11	39	57.0	55	B	2.3	2.3	1.5
RI1X1 1/2	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
RI11/4X1 1/2	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
RI11/2X1 1/4	1 1/2 - 11	1 1/4 - 11	55	58.0	55	B	2.3	2.3	1.5
RI2X1 1/2	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.

### FHF3

Male Pipe Adapter  
BSPT / NPTF

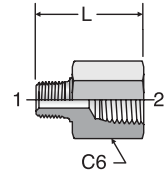


TUBE FITTING PART #	End Size		S4 Hex (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPTF	2 BSPT			-S		
1/8 FHF3	1/8-27	1/8-28	7/16	1.09	6.0		
1/4 FHF3	1/4-18	1/4-19	5/8	1.45	6.0		
3/8 x 1/4 FHF3	3/8-18	1/4-19	3/4	1.45	6.0		
1/4 x 3/8 FHF3	1/4-18	1/8-28	3/4	1.45	6.0		
3/8 FHF3	3/8-18	3/8-19	3/4	1.45	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



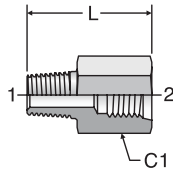
TUBE FITTING PART #	END SIZE		C6 HEX (in.)	L (mm)	Dynamic Pressure (x 1,000 PSI)		
	1 BSPT	2 NPTF			-S	-SS	-B
1/8 x 1/8F3HG	1/8 - 38	1/8 - 27	9/16	1.08	6.0	6.0	3.3
1/4 x 1/4F3HG	1/4 - 19	1/4 - 18	3/4	1.37	6.0	6.0	3.3
3/8 x 3/8F3HG	3/8 - 19	3/8 - 19	7/8	1.38	6.0	6.0	3.3
1/2 x 1/2F3HG	1/2 - 14	1/2 - 14	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

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### F3HG5

Conversion Adapter  
BSPT / SAE-ORB

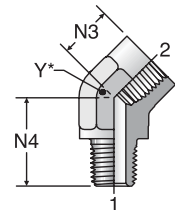


TUBE FITTING PART #	END SIZE		C1 HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 BSPT	2 UN/UNF-2B			-S	-SS	-B
1/8-4F3HG5	1/8 - 28	7/16 - 20	11/16	1.09	6.0	6.0	3.3
1/8-5F3HG5	1/8 - 28	1/2 - 20	3/4	1.09	6.0	6.0	3.3
1/4-6F3HG5	1/4 - 19	9/16 - 18	13/16	1.36	6.0	6.0	3.3
3/8-8F3HG5	3/8 - 19	3/4 - 16	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



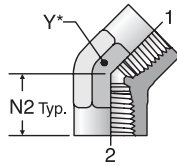
TUBE FITTING PART #	END SIZE		N3 (in.)	N4 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPTF	2 NPTF				-S	-SS	-B
1/8 CD45	1/8 - 27	1/8 - 27	0.47	0.72	9/16	5.0	5.0	3.2
1/4 CD45	1/4 - 18	1/4 - 18	0.63	1.05	3/4	5.0	5.0	3.2
3/8 CD45	3/8 - 18	3/8 - 18	0.72	1.06	7/8	4.5	4.5	2.9
1/2 CD45	1/2 - 14	1/2 - 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.

## DD45

45° Female Pipe Elbow  
NPTF / NPTF

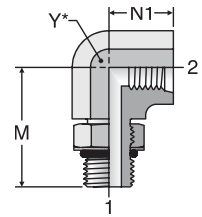
SAE 140338  
HPD Base # 4202



## AOEG5

Straight Thread Elbow  
SAE-ORB / SAE-ORB

HPD Base # 2510



\* Y – Across  
Wrench Flats

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TUBE FITTING PART #	END SIZE		N2 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1	2			-S	-SS	-B
	NPTF	NPTF					
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

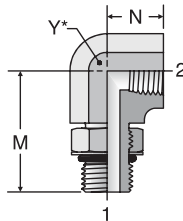
TUBE FITTING PART #	END SIZE		M (in.)	N1 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1	2				-S	-SS	-B
	UN/UNF-2A	UN/UNF-2B						
4 AOE5	7/16 - 20	7/16 - 20	1.23	0.63	3/4	6.0	6.0	3.3
6 AOE5	9/16 - 18	9/16 - 18	1.38	0.75	7/8	5.0	5.0	3.3
8 AOE5	3/4 - 16	3/4 - 16	1.59	0.88	1 1/16	4.0	4.0	2.6
10 AOE5	7/8 - 14	7/8 - 14	1.81	1.02	1 1/16	2.5	2.5	1.6
12 AOE5	1 1/16 - 12	1 1/16 - 12	2.00	1.21	1 5/16	2.5	2.5	1.6
16 AOE5	1 5/16 - 12	1 5/16 - 12	2.26	1.33	1 5/8	2.5	2.5	1.6

F

## AOEG

Female Pipe Elbow  
NPT / SAE-ORB

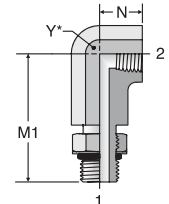
HPD Base # 2502



## AOE4G

Extra Long Female Pipe Elbow  
NPTF / SAE-ORB

HPD Base # 5502



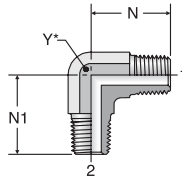
TUBE FITTING PART #	END SIZE		M (in.)	N (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1	2				-S	-SS	-B
	UN/UNF-2A	NPTF						
6-1/4 AOE	9/16 - 18	1/4 - 18	1.34	0.63	3/4	5.0	5.0	3.3
8-3/8 AOE	3/4 - 16	3/8 - 18	1.47	0.63	7/8	4.5	4.5	2.9
10-1/2 AOE	7/8 - 14	1/2 - 14	1.81	0.75	1 1/16	3.0	3.0	1.9
12-3/4 AOE	1 1/16 - 12	3/4 - 14	2.00	0.81	1 5/16	3.0	3.0	1.9
16-1 AOE	1 5/16 - 12	1 - 11 1/2	2.25	1.00	1 5/8	1.8	1.8	1.1

TUBE FITTING PART #	END SIZE		M1 (in.)	N (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1	2				-S	-SS	-B
	UN/UNF-2A	NPTF						
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.

**CR**  
Male Pipe Elbow  
NPTF / NPTF

SAE 140237\*



\* Y – Across  
Wrench Flats

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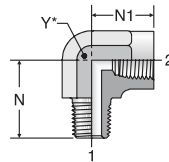
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TUBE FITTING PART #	END SIZE		N (in.)	N1 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPTF	2 NPTF				-S	-SS	-B
	1/8 CR	1/8 - 27						
1/4 CR	1/4 - 18	1/4 - 18	1.09	1.09	9/16	6.0	6.0	3.9
3/8 CR	3/8 - 18	3/8 - 18	1.22	1.22	3/4	6.0	6.0	3.9
3/8 x 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.

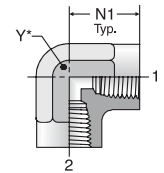
**CD**  
Street Elbow  
NPTF / NPT

SAE 140239  
HPD Base # 2102



**DD**  
Female Pipe Elbow  
NPT / NPT

SAE 140238  
HPD Base # 2202



TUBE FITTING PART #	END SIZE		N (in.)	N1 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPTF	2 NPT				-S	-SS	-B
	1/8 CD	1/8 - 27						
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

TUBE FITTING PART #	END SIZE		N1 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 NPT	2 NPT			-S	-SS	-B
	1/8 DD	1/8 - 27					
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.

# A87LPOEG87LPM

ISO 6149\* Female Elbow  
SHORT ISO 6149 / SHORT ISO 6149

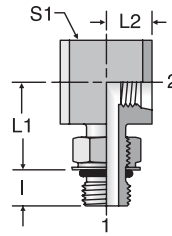


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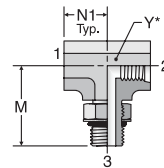
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TUBE FITTING PART #	END SIZE		I (mm)	L1 (mm)	L2 (mm)	S1 (mm)	Dynamic Pressure (x 1,000 PSI)		
	1	2					S	SS	B
	Metric	Metric							
M08A87LPOEG87LPM	M8X1	M8X1	8.5	13.5	7.5	15	4.0	4.0	2.6
M10A87LPOEG87LPM	M10X1	M10X1	8.5	14.5	7.5	15	4.0	4.0	2.6
M12A87LPOEG87LPM	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			M (in.)	N1 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1	2	3				-S	-SS	-B
	UN/UNF-2B	UN/UNF-2B	UN/UNF-2A						
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

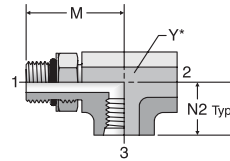
Dimensions and pressures for reference only, subject to change.

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# AOG5JG5

Straight Thread Run Tee  
SAE-ORB (all three ends)

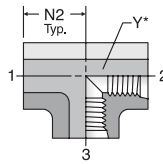


\* Y – Across Wrench Flats

TUBE FITTING PART #	END SIZE			M (in.)	N2 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 UN/UNF-2A	2 UN/UNF-2B	3 UN/UNF-2B				-S	-SS	-B
	4 AOG5JG5	7/16 - 20	7/16 - 20						
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)

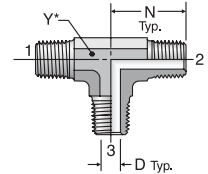


\* Y – Across Wrench Flats

TUBE FITTING PART #	END SIZE		N2 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1-3 UN/UNF-2B				-S	-SS	-B
	4 G5G5JG5	7/16 - 20					
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)

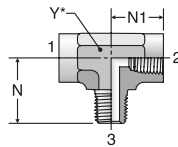


SAE 140437

TUBE FITTING PART #	END SIZE		N (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1-3 NPTF				-S	-SS	-B
	1/8 RRS	1/8 - 27					
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)

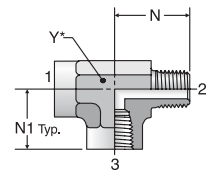


SAE 140425  
HPD Base # 212T

TUBE FITTING PART #	END SIZE		N (in.)	N1 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1-3 NPTF					-S	-SS	-B
	1/8 MMS	1/8 - 27						
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		N (in.)	N1 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
	1-3 NPTF					-S	-SS	-B
	1/8 MRO	1/8 - 27						
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.

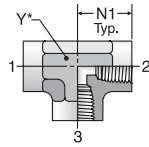




# MMO

Female Pipe Tee  
NPTF (all three ends)

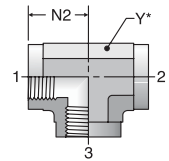
SAE 140438  
HPD Base # 022T



TUBE FITTING PART #	END SIZE	N1 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
				1-3 NPTF		
	-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	N2 (mm)	Y (mm)	Dynamic Pressure (x 1,000 PSI)		
				1-3 BSPP		
	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

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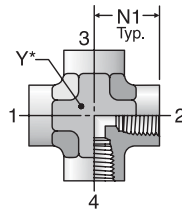
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# KMMOO

Female Pipe Cross  
NPTF (all four ends)

SAE 140538  
HPD Base # 022X

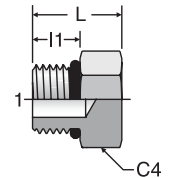


TUBE FITTING PART #	END SIZE	N1 (in.)	Y (in.)	Dynamic Pressure (x 1,000 PSI)		
				1-4 NPTF		
	-S			-SS	-B	
1/8 KMMOO	1/8 - 27	0.66	9/16	5.0	5.0	3.2
1/4 KMMOO	1/4 - 18	0.88	3/4	5.0	5.0	3.2
3/8 KMMOO	3/8 - 18	1.02	7/8	4.5	4.5	2.9
1/2 KMMOO	1/2 - 14	1.23	1 1/16	3.0	3.0	1.9
3/4 KMMOO	3/4 - 14	1.36	1 5/16	3.0	3.0	1.9
1 KMMOO	1 - 11 1/2	1.63	1 5/8	1.8	1.8	1.1

# P50N

Hex Head Plug  
SAE-ORB

SAE 090109A  
HPD Base # 05CP



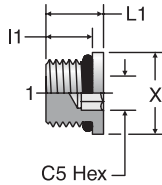
TUBE FITTING PART #	END SIZE	C4 HEX (in.)	I1 (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
					1 UN/UNF-2A		
	-S				-SS	-B	
2 P50N	5/16 - 24	7/16	0.30	0.60	7.5	9.0	3.3
3 P50N	3/8 - 24	1/2	0.30	0.60	7.5	9.0	3.3
4 P50N	7/16 - 20	9/16	0.36	0.67	7.5	9.0	3.3
5 P50N	1/2 - 20	5/8	0.36	0.67	6.0	7.2	3.3
6 P50N	9/16 - 18	11/16	0.39	0.73	6.0	7.2	3.3
8 P50N	3/4 - 16	7/8	0.44	0.80	6.0	7.2	3.3
10 P50N	7/8 - 14	1	0.50	0.94	6.0	7.2	3.3
12 P50N	1 1/16 - 12	1 1/4	0.59	1.09	6.0	7.2	3.3
14 P50N	1 3/16 - 12	1 3/8	0.59	1.09	5.5	6.6	3.3
16 P50N	1 5/16 - 12	1 1/2	0.59	1.13	5.5	6.6	3.3
20 P50N	1 5/8 - 12	1 7/8	0.59	1.20	4.0	4.8	2.6
24 P50N	1 7/8 - 12	2 1/8	0.59	1.27	3.0	3.6	1.9
32 P50N	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.

# HP50N

Hollow Hex Plug  
SAE-ORB

SAE 090109B  
HPD Base # 05HP

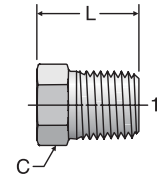


TUBE FITTING PART #	END SIZE 1 UN/UNF-2A	C5 HEX (in.)	I1 (in.)	L1 (in.)	X DIA (in.)	Dynamic Pressure (x 1,000 PSI)		
						-S	-SS	-B
2 HP50N	5/16 - 24	1/8	0.30	0.40	0.44	6.0	6.0	3.3
3 HP50N	3/8 - 24	5/32	0.30	0.40	0.50	6.0	6.0	3.3
4 HP50N	7/16 - 20	3/16	0.36	0.47	0.56	6.0	6.0	3.3
5 HP50N	1/2 - 20	7/32	0.36	0.47	0.63	6.0	6.0	3.3
6 HP50N	9/16 - 18	1/4	0.40	0.50	0.69	6.0	6.0	3.3
8 HP50N	3/4 - 16	5/16	0.44	0.58	0.88	6.0	6.0	3.3
10 HP50N	7/8 - 14	3/8	0.50	0.65	1.00	6.0	6.0	3.3
12 HP50N	1 1/16 - 12	9/16	0.59	0.77	1.25	6.0	6.0	3.3
14 HP50N	1 3/16 - 12	9/16	0.59	0.77	1.38	5.5	5.5	3.3
16 HP50N	1 5/16 - 12	5/8	0.59	0.77	1.50	5.5	5.5	3.3
20 HP50N	1 5/8 - 12	3/4	0.59	0.77	1.88	4.0	4.0	2.6
24 HP50N	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

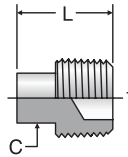


TUBE FITTING PART #	END SIZE 1 NPTF	C HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
				-S	-SS	-B
1/8 HP	1/8 - 27	7/16	0.56	6.0	7.2	3.9
1/4 HP	1/4 - 18	9/16	0.75	6.0	7.2	3.9
3/8 HP	3/8 - 18	11/16	0.78	6.0	7.2	3.9
1/2 HP	1/2 - 14	7/8	0.97	6.0	7.2	3.9
3/4 HP	3/4 - 14	1 1/16	1.06	5.5	6.6	3.5
1 HP*	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

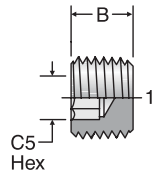


TUBE FITTING PART #	END SIZE 1 NPTF	C SQUARE (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)		
				-S	-SS	-B
1/8 SHP	1/8 - 27	9/32	0.51	6.0	7.2	3.3
1/4 SHP	1/4 - 18	3/8	0.75	6.0	6.0	3.3
3/8 SHP	3/8 - 18	7/16	0.83	6.0	6.0	3.3
1/2 SHP	1/2 - 14	9/16	1.08	6.0	6.0	3.3
3/4 SHP	3/4 - 14	5/8	1.14	6.0	6.0	3.3
1 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

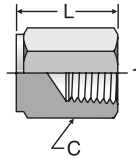
Dimensions and pressures for reference only, subject to change.

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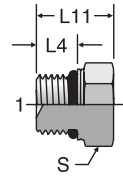
Hex Pipe Cap  
NPTF



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
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

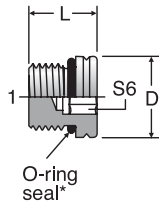
TUBE FITTING PART #	END SIZE 1 THREAD	L4 (mm)	L11 (mm)	S HEX (mm)	Dynamic Pressure (x 1,000 PSI)		
					S	SS	B
	M8P87OMN	M8X1	8.5	16.2	12	9.0	9.0
M10P87OMN	M10X1	8.5	16.2	14	8.0	8.0	3.3
M12P87OMN	M12X1.5	11.0	18.5	17	9.0	9.0	3.3
M14P87OMN	M14X1.5	11.0	19.5	19	9.0	9.0	3.3
M16P87OMN	M16X1.5	11.5	21.5	22	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

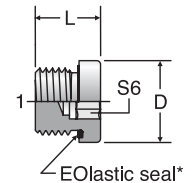


TUBE FITTING PART #	END SIZE 1 METRIC	D (mm)	L (mm)	S6 (mm)	Dynamic Pressure (x 1,000 PSI)		
					CF	71	MS
	VSTI10X1OR	M10 x 1	13	13.5	5	9.1	9.1
VSTI12X1.5OR	M12 x 1.5	17	15.1	6	9.1	9.1	3.3
VSTI14X1.5OR	M14 x 1.5	19	16.0	6	9.1	9.1	3.3
VSTI16X1.5OR	M16 x 1.5	21	17.5	8	9.1	9.1	3.3
VSTI18X1.5OR	M18 x 1.5	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)

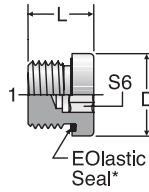


TUBE FITTING PART #	END SIZE 1 THREAD	D (mm)	L (mm)	S6 (mm)	Dynamic Pressure (x 1,000 PSI)		
					CF	71	MS
	VSTI10X1ED	M10 x 1	14	12.0	5	5.8	5.8
VSTI12X1.5ED	M12 x 1.5	17	17.0	6	5.8	5.8	3.3
VSTI14X1.5ED	M14 x 1.5	19	17.0	6	5.8	5.8	3.3
VSTI16X1.5ED	M16 x 1.5	22	17.0	8	5.8	5.8	3.3
VSTI18X1.5ED	M18 x 1.5	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.

## VSTI R-ED

BSPP Hollow Hex Plug  
BSPP-ED  
(for ISO 1179-1 / DIN 3852-2 Port)



## P470MN

Hex Head Plug  
BSPP-ORB

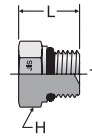


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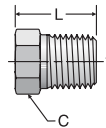
VISUAL  
INDEX

TUBE FITTING PART #	END SIZE	D (mm)	L (mm)	S6 (mm)	Dynamic Pressure (x 1,000 PSI)		
					1 BSPP	CF	71
	VSTI1/8ED	1/8 - 28	14	12.0	5	5.8	5.8
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

TUBE FITTING PART #	END SIZE	H HEX (mm)	L (mm)	Dynamic Pressure (x 1,000 PSI)		
				1 BSPP	S	SS
	4P470MNS	1/4-19	19	19.1	5.0	
6P470MNS	3/8-19	22	20.0	5.0		
8P470MNS	1/2-14	27	24.1	5.0		
12P470MNS	3/4-14	36	26.9	4.0		
16P470MNS	1-11	41	31.0	3.0		

## HP3M

Hex Head Pipe Plug  
BSPT



TUBE FITTING PART #	END SIZE	C HEX (mm)	L (mm)	Dynamic Pressure (x 1,000 PSI)		
				1 BSPT	S	SS
	1/8HP3M	1/8 - 28	10	14.2	6.0	6.0
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

Dimensions and pressures for reference only, subject to change.