

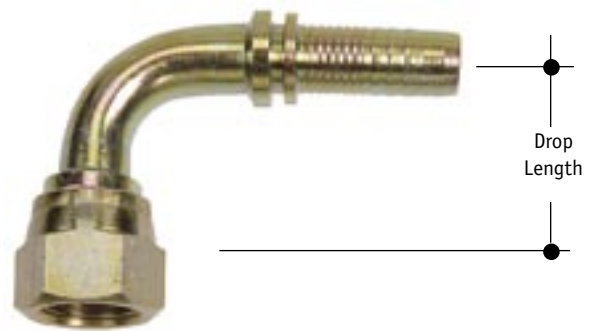
GENERAL INFORMATION

Summary of Thread Designations

00 Hose Mender	36 BSPP Parallel Male
01 Ball Sleeve/Standpipe	38 BSPT Tapered Male
02 Inverted Flare Female	60 Compression
03 Triple Thread Female	61 Metric Standpipe
04 SAE 45° Female	63 DIN 24°/60° Light Female
05 JIC 37° Female	64 DIN 24° Heavy Female
06 NPSM Female Swivel	65 DIN L. O-Ring Female
08 NPTF Solid Female	66 DIN H. O-Ring Female
09 SAE Code 61 Flange	67 French GAZ Female
09C..... Cat Style Flange	68 Komatsu Metric Female
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09H SAE Code 62 Flange	70 Compression Air Brake
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09P Poclain Flange (2 bolt)	72 DIN 60° Male
11 O-Ring Boss Male	73 DIN 24° Light Male
12 Inverted Flare Male	74 DIN 24° Heavy Male
13 Triple Thread Male	77 French GAZ Male
14 SAE 45° Male	78 Komatsu Metric Male
15 JIC 37° Male	83 ORFS Female
16 NPTF Male	93 ORFS Male
26 BSPP Female	
27 BSP Flat Seat Female	
29 Grease Fitting Female	

Drop Length

The drop lengths listed in this catalog are the distance from the fitting seat to the center of the stem:



North American and British Pipe Thread Dimensions:

Pipe Thread (NPTF, NPSM)

Dash Size	Pipe Size	Pitch (threads per inch)	Male Thread O.D.	Female Thread I.D.
-02	1/8"	27	0.41"	0.37"
-04	1/4	18	0.54	0.49
-06	3/8	18	0.68	0.62
-08	1/2	14	0.84	0.76
-12	3/4	14	1.06	0.98
-16	1	11·1/2	1,31	1.24
-20	1·1/4	11·1/2	1.66	1.58
-24	1·1/2	11·1/2	1.90	1.82
-32	2	11·1/2	2.38	2.28

BSP Thread

Dash Size	Pipe Size	Pitch (threads per inch)	Male Thread O.D.	Female Thread I.D.
-02	1/8"	28	0.38"	0.35"
-04	1/4	19	0.52	0.47
-06	3/8	19	0.65	0.60
-08	1/2	14	0.82	0.75
-10	5/8	14	0.88	0.80
-12	3/4	14	1.04	0.97
-16	1	11	1.30	1.22
-20	1·1/4	11	1.65	1.56
-24	1·1/2	11	1.88	1.79
-32	2	11	2.35	2.26

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Thread Identification:

Throughout the world, a somewhat confusing array of thread styles are now being used. Where most local distributors used to see only domestic designs, they are now faced with supplying replacement hoses and fittings of a multitude of styles, dimensions, and sealing methods. To be more easily understood these can be broken down into the following groups.

NPTF and NPSM Pipe Threads



Very common in North America is the NPTF tapered pipe thread, found in many industrial and agricultural applications. Tapered threads seal by an increasing interference of the threads as the fitting is tightened and the tapers engage. Pipe sealant is often used to ensure a good seal along the crests of the threads and to prevent galling (binding). NPSM threads are the same dimension but lack the taper, and so rely on a cone shaped seat on the female fitting to seal against a chamfered male. NPSM threads are typically used on female swivel adapters and are most common on farm equipment.

British Standard Pipe (BSP)



BSP threads seal in the same ways as NPT threads but are different dimensions, just, it sometime seems, to make life complicated for the distributor. BSP is very common on many types of European equipment as well as some Japanese machinery. The differences between BSP and NPT threads are detailed in the chart at the end of this section. BSP threads may be tapered but more often are parallel threads, with females relying on a cone seat for sealing. Male parallel threads seal with a chamfered end on a female with a cone seat, or with a copper gasket on a flat seat, with an o-ring in a recessed port, or finally with a bonded seal in a machined face port.

SAE and JIC Flare Fittings



In general, tube fittings were first designed to allow connections between components using steel or copper tubing. In North America the tubing was flared at the end and secured with a threaded nut and sometimes a back-up sleeve. Therefore this type of fitting is most commonly referred to as a flare fitting, either according to JIC (Joint Industrial Council) which called for a 37° flare for steel tubing, or SAE (Society of Automotive Engineers) which specified a 45° flare on the softer copper tubing most commonly found in low pressure automotive applications. Today JIC fittings are widespread in hydraulic applications, while SAE adapters are commonly brass and are usually confined to truck and plumbing markets. Flare fittings are called by the size of tubing they connect to, rather than the thread dimension. For example a JIC in size "-08" is designed to connect to 1/2" O.D. tubing, but the fitting actually measures 3/4" on the outside of the thread. JIC and SAE thread dimensions match exactly in sizes -02, -03, -04, -05, -08, and -10, and so will often serve quite well when interchanged in low pressure applications, since only the seat angle varies. However in sizes -06, -12, and in larger sizes they will not interchange. Flare fittings can be readily identified by measuring the male thread dimension, the pitch (number of threads per inch), and the flare angle.

O-Ring Boss (ORB) Thread



O-Ring Boss and JIC 37° fittings use the same thread sizes, but the ORB seal occurs on the rubber o-ring of the male ORB connector. The ORB straight thread female port has a machined seat where the o-ring fits and seats when the threads are tightened.

Inverted Flare



This connection is a compact design developed for automotive applications. Since the tubing is flared to 45° but fitted with a male threaded nut, it can attach directly into a port without an adapter.

O-Ring Face Seal (ORFS) Thread



The O-Ring Face Seal connection is a recent coupling innovation designed to minimize leakage, especially in high pressure applications. The o-ring fits in a recessed groove on the face of the straight thread male and seals when compressed onto the flat face of the female as the threads are tightened.

DIN 24° Cone



Unlike North American tube fittings, which rely on a flare for sealing, European fittings are designed with a ferrule which bites into the tubing when compressed by a threaded nut. They are generally referred to as "bite type" fittings. The most common is the German 24° cone DIN (Deutsches Institute fur Normung) fitting. The male fitting has a recessed 24° cone to accept either the metric sized tubing along with the bite ferrule and nut, or a female hose fitting with similar dimensions. For better sealing at high pressures, the female fitting may incorporate an o-ring. Styles with or without o-rings are interchangeable. Since fittings may be designed for light or heavy service, identification is obtained by measuring (in millimeters) the tube O.D., male thread O.D., and pitch expressed in distance from crest to crest.

DIN 60° Cone



In European automotive and other low-pressure applications, a 60° cone seat is sometimes used. Female hose fittings are often designed to interchange with 24° and 60° male fittings in sizes up to 22 mm.

French Metric Fittings



French metrics are very uncommon. They often are characterized by fractional tube sizes and fine threads.

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Japanese JIS 30° Flare Parallel Pipe Thread



The JIS 30° flare connector utilizes BSPP threads but seals on a 30° female flare rather than a cone seat, much like the North American JIC 37° flare. This fitting is common on Toyota and other Japanese equipment.

Komatsu Metric 30° Flare



This Japanese connector combines metric dimension threads with a 30° flare seat and is found primarily on Komatsu equipment. Komatsu style flange fittings are discussed in the flange identification section.

Flange Connections



SAE 4-bolt flange connections are commonly used on mobile heavy equipment and other high pressure applications. There are two SAE series of flanges, code 61 standard series and code 62 high pressure series. Code 62 flanges have larger and thicker head diameters and use a different bolt size, bolt grade (8 instead of 5) and bolt hole pattern. Caterpillar style flanges are also available and feature a thicker 0.560" flange head and require special flange halves, but do conform to code 62 bolt hole patterns. Flange heads have a machined groove where the o-ring seats. The flange seal is achieved when the o-ring is compressed between the flange head and the smooth faced port. The flange head is secured to the port by two split flange clamp halves and four bolts. Other less common flanges include the Komatsu style flange in -10, and the very rare French Poclairn style flanges. The Komatsu flange is available in 5000 series couplings, and Poclairn flanges are listed with the 8600 series fittings.

Banjo Fittings



Banjo fittings are rare in modern hydraulic systems but still appear on diesel engines and automotive applications. Their advantage is that they make a very compact elbow where space is tight. Banjos are available in metric and BSP sizing. Identify the banjo by measuring the threads on the bolt. If it is BSP, the bolt will conform to BSP male parallel thread dimensions. If it is metric, the bolt will have a exact metric size O.D., with 1.5mm pitch, similar to DIN 24° male fittings.

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Flange Dimensions:

	Port Size	Working Pressure	Flange O.D.	Flange Thickness	Bolt Hole Spacing	Bolt Size	Bolt Torque (in-lb)
Code 61 Flange							
-08	1/2"	5000 psi	1.19"	0.265"	1.50"	5/16-18 x 1-1/4"	175-225
-12	3/4	5000	1.50	0.265	1.88	3/8-16 x 1-1/4 250-350	
-16	1	5000	1.75	0.315	2.06	3/8-16 x 1-1/4 325-425	
-20	1-1/4	4000	2.00	0.315	2.31	7/16-14 x 1-1/2	425-550
-24	1-1/2	3000	2.38	0.315	2.75	1/2-13 x 1-1/2 550-700	
-32	2	3000	2.81	0.375	3.06	1/2-13 x 1-1/2 650-800	
-40	2-1/2	2500	3.31	0.375	3.50	1/2-13 x 1-3/4 950-1100	
-48	3	2000	4.00	0.375	4.19	5/8-11 x 1-3/4 1650-1800	
-64	4	500	5.00	0.442	5.13	5/8-11 x 2	1400-1600
Code 62 Flange							
-08	1/2	6000	1.25	0.305	1.59	5/16-18 x 1-1/4	175-225
-12	3/4	6000	1.63	0.345	2.00	3/8-16 x 1-1/2 300-400	
-16	1	6000	1.88	0.375	2.25	7/16-14 x 1-3/4	500-600
-20	1-1/4	6000	2.13	0.405	2.62	1/2-13 x 1-3/4 750-900	
-24	1-1/2	6000	2.50	0.495	3.12	5/8-11 x 2-1/4 1400-1600	
-32	2	6000	3.13	0.495	3.81	3/4-10 x 2-3/4 2400-2600	
Komatsu Flange							
-10	5/8	5000	1.34	0.265		Metric	
Cat Flange							
-12	3/4	6000	1.62	0.560	2.00	3/8-16 x 1-1/2 300-400	
-16	1	6000	1.88	0.560	2.25	7/16-14 x 1-3/4	500-600
-20	1-1/4	6000	2.13	0.560	2.62	1/2-13 x 1-3/4 750-900	

Thread Guide:

Male thread outside diameters in inches, and pitch in threads per inch.

Dash Size	JIC 37° Flare & O-Ring Boss	SAE 45° Flare	Inverted Flare	O-Ring Face Seal
-02	5/16 - 24	5/16 - 24	5/16 - 28	
-03	3/8 - 24	3/8 - 24	3/8 - 24	
-04	7/16 - 20	7/16 - 20	7/16 - 24	9/16 - 18
-05	1/2 - 20	1/2 - 20	1/2 - 20	
-06	9/16 - 18	5/8 - 18	5/8 - 18	11/16 - 16
-07			11/16 - 18	
-08	3/4 - 16	3/4 - 16	3/4 - 18	13/16 - 16
-10	7/8 - 14	7/8 - 14	7/8 - 18	1 - 14
-12	1-1/16 - 12	1-1/16 - 14	1-1/16 - 16	1-3/16 - 12
-14	1-3/16 - 12	1-1/4 - 12		
-16	1-5/16 - 12	1-3/8 - 12		1-7/16 - 12
-20	1-5/8 - 12			1-11/16 - 12
-24	1-7/8 - 12			2 - 12
-32	2-1/2 - 12			

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Metric Thread Guide:

Male thread outside diameters in millimeters, and pitch in millimeters per thread. Dimension d reflects the tube size (mm) which will attach to the given thread. For example, a DIN 24° light male in size M18x1.5 will attach to a metric

standpipe measuring 12mm outside diameter. The same female thread size in a DIN heavy pattern will connect to a 10mm O.D. standpipe.

Metric Size	DIN 60° Cone	DIN 24° Cone Light	DIN 24° Cone Heavy	French GAZ 24° Cone	30° Metric Komatsu
-12	M12x1.5	M12x1.5 d6			
-14	M14x 1.5	M14x1.5 d8			M14x1.5
-16	M16x1.5	M16x1.5 d10	M16x1.5 d8		M16x1.5
-18	M18x1.5	M18x1.5 d12	M18x1.5 d10		M18x1.5
-20			M20x1.5 d12		
-22	M22x1.5	M22x1.5 d15	M22x1.5 d14		M22x1.5
-24			M24x1.5 d16		M24x1.5
-26	M26x1.5	M26x1.5 d18			
-28					
-30	M30x1.5	M30x2.0 d22	M30x2.0 d20	M30x1.5d21.25	M30x1.5
-33					M33x1.5
-36		M36x2.0 d28	M36x2.0 d25	M36x1.5d26.75	M36x1.5
-38	M38x1.5				
-42			M42x2.0 d30		M42x1.5
-45	M45x1.5	M45x2.0 d35		M45x1.5d33.5	
-52	M52x1.5	M52x2.0 d42	M52x2.0 d38		

Fitting and Adapter Installation Torque:

Torque in ft.lb. for:

Dash Size	JIC		O-Ring Face Seal		ORB		NPTF dry*
	Min	Max	Min	Max	Min	Max	
-02							20
-04	11	12	10	12	14	16	25
-05	14	15			18	20	
-06	18	20	18	20	24	26	35
-08	36	39	32	35	50	60	45
-10	57	63	46	50	72	80	
-12	79	88	65	70	125	135	55
-16	108	113	92	100	200	220	65
-20	127	133	125	140	210	280	80
-24	158	167	150	165	270	360	95
-32	245	258					120

- * i) If thread sealant is used, maximum values should be decreased by 25%.
- ii) For male tapered threads coupled to NPSM parallel threads, maximum values should be decreased by 50%.
- iii) Use only enough torque to achieve a seal, since NPTF sealing torques vary greatly.



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PULSAR adapters conform to SAE J514 and J1453 specifications for hydraulic tube fittings (where applicable), and to various ISO specifications depending on thread types. Pressure ratings given here are a general guide. We recommend that on jump size adapters or adapters with two thread styles, the lowest rating be used. Maximum working pressures are given in psi, based on a 4:1 ratio to minimum burst pressure.

Fitting and Adapter Maximum Recommended Working Pressure (psi)

Dash Size	Male Non Swivel	JIC Female Swivel	NPTF Male Pipe Swivel	NPTF Male Pipe Non Swivel	NPTF Female Pipe Non Swivel	NPSM Female Pipe Swivel	Flange Code 61	Flange Code 62	Flange Cat Style	ORB Male Non Swivel	ORFS Male or Female	SAE 45° Flare Female	Flare-less Byte Type J514
-04	5000	5000	3000	5000	5000	5000				5000	6000	3000	5000
-05	5000	5000	3000							5000			5000
-06	4000	4000	3000	4000	4000	4000				5000	6000	3000	4000
-08	4000	4000	3000	4000	4000	4000	5000	6000		4500	6000	3000	3500
-10	4000	4000	2750				5000	6000		4000	6000	2750	2750
-12	4000	4000	2250	4000	2250	2250	5000	6000	6000	4000	6000	2250	2250
-14													
-16	4000	4000	2000	4000	2000	2000	5000	6000	6000	4000	6000	2000	2000
-20	3000	3000		3000	1625	1625	4000	6000	6000	3000	4000	1625	1625
-24	3000	3000		2500			3000	6000	6000		4000	1250	
-32	3000	3000		2500			3000	6000	6000			1125	

Dash Size	BSPP O-ring Female Swivel	BSPT Male Non Swivel	BSPP Male Non Swivel	DIN 24 Light Female Swivel	DIN 24 Light Male Swivel	DIN 24 Heavy Female Swivel	Din 24 Heavy Male Swivel	JIS 30 Flare Female Swivel	Komatsu Metric Female Swivel
-04	5800	5800	5800	3625	3625			5000	5000
-05				3625	3625	5800	5800		
-06	5800	5800	5800	3625	3625	5800	5800	5000	5000
-08	5000	5000	5000	3625	3625	5800	5800	5000	5000
-10	5000	5000	5000	3625	3625	5800	5800		
-12	4500	4500	4500	2320	2320	5800	5800	4000	4000
-14									
-16	3500	3500	3500	2320	2320	5800	5800	3000	3000
-20	2850	2850	2850	1450	1450	5800	5800	2500	2500
-24	2250	2250	2250	1450	1450	3625	3625	1500	1500
-32	1800	1800	1800	1450	1450	3625	3625	1500	1500

*Pressure Rating Hose Assemblies:
The maximum dynamic working pressure of the hose assembly is the LESSER of the rated working pressure of the hose and the fittings used.*

