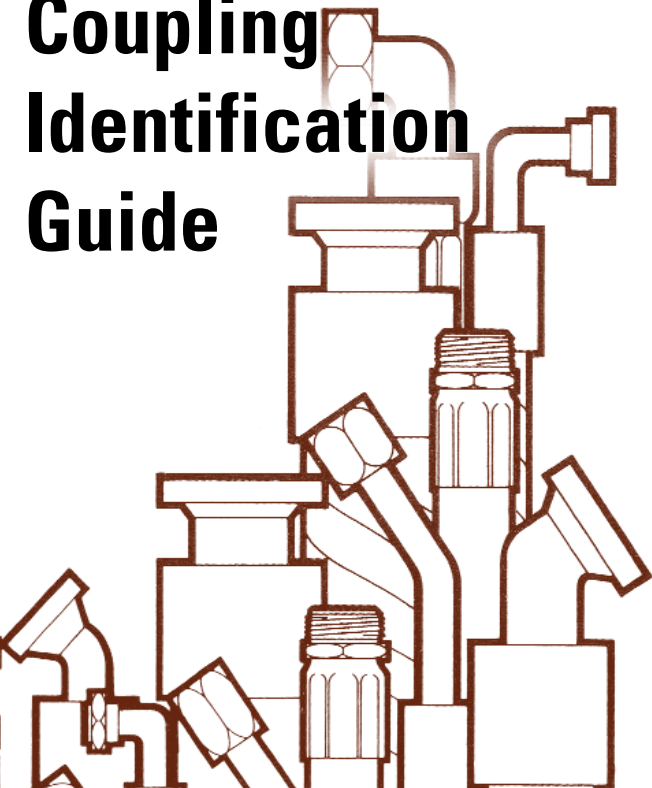


CATERPILLAR®

Coupling Identification Guide



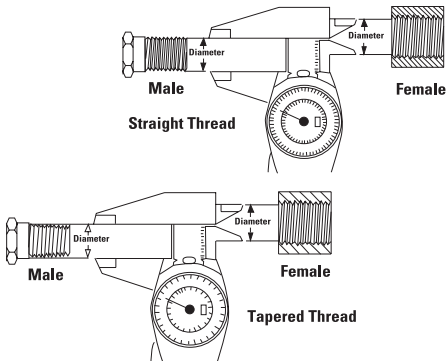
Introduction

This booklet is designed to aid in the identification of couplings used in hydraulic and other fluid power systems. Accurate identification is essential in selecting and installing the correct Cat replacement hose assembly.

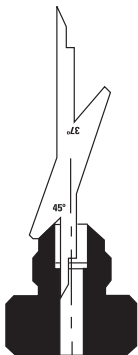
How to Identify Threaded Couplings Using This Booklet and the Caterpillar 8T0450 Thread Identification Kit

When used in conjunction with the Caterpillar 8T0450 Thread Identification Kit, this booklet makes coupling identification quick and easy. Just follow these six basic steps:

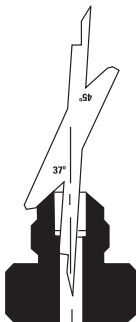
1. Determine if the threads are straight or tapered. Use the 8T0447 Caliper as shown when tapered threads are not obvious.



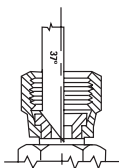
2. If the threads are **straight**, measure the seat angle using either the 8T0449 or 8T0451 Seat Angle Gauge. The correct angle is determined when the centerline of the coupling and gauge is parallel as shown.



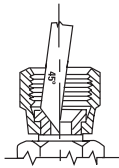
**Correct Gauge
Parallel to
Centerline**



**Incorrect
Not Parallel
to Centerline**



Correct



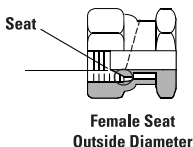
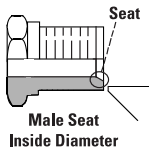
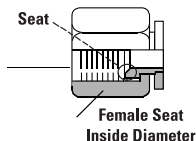
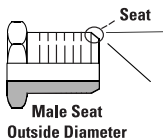
Incorrect

If the seat angle is **90°** -- your coupling is either an O-Ring Face Seal (ORFS) or SAE Straight Thread O-Ring Boss (STOR).

If the seat angle is **45°** -- your coupling is either an SAE Inverted Flare or an SAE 45° Flare.

If the seat angle is **37°** -- your coupling is a JIC 37° Flare.

If the seat angle is 30°, your coupling is either a JIS 30° Flare, JIS Metric 30° Flare, BSPP, DIN 60° Cone, or National Pipe Straight Mechanical (NPSM). To identify your coupling, determine the seat location as shown below. If the male's seat is on the outside diameter or the female's seat is on the inside diameter, your coupling is a JIS 30° Flare or JIS Metric 30° Flare. If the male's seat is on the inside diameter or the female's seat is on the outside diameter, follow the thread measurement procedures in Step 5 and consult the tables to determine whether you have a BSPP, DIN 60° Cone, or NPSM coupling.



If the seat angle is **12°**, your coupling is either a DIN 24° Cone, GAZ 24° Cone or French Millimetric. To identify your coupling, use the caliper to measure the male thread outside diameter or female thread inside diameter (See Step 4) and the tube diameter. Locate the appropriate fitting in the table.

NOTE: There is no seat angle on the SAE Straight Thread O-Ring Boss. This type of fitting easily can be identified by its straight threads and O-Ring position.

If the threads are **tapered**, your coupling is either an NPTF, BSPT or Japanese Tapered Pipe Thread. To determine which type you have, determine the number of threads per inch (See Step 5) using the 8T0448 Pitch Gauge. After referring to the tables, it also may be necessary to measure the thread diameter.

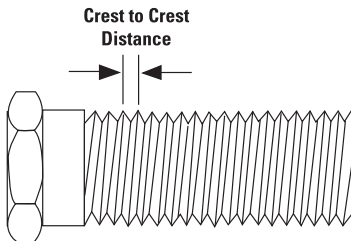
NOTE: Thread type may be checked by mating it with a coupling from inventory.

3. Once the type of coupling has been determined, refer to the appropriate table in this booklet.

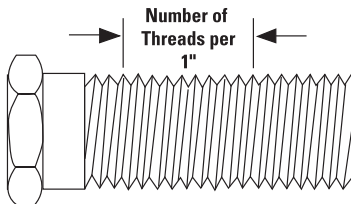
4. Using the 8T0447 Caliper, measure the female thread inside diameter or male thread outside diameter. Male and female threads that have a taper should be measured at the point where the diameter is greatest. (See Step 1 illustration.)

NOTE: Due to wear, the measured diameter often will not indicate an exact size. It may be necessary to increase the measured size slightly on a male thread, or decrease the measured size slightly on a female thread, to get a standard thread size.

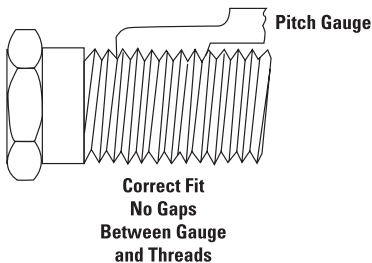
5. Using the 8T0448 Pitch Gauge, measure the thread pitch of the coupling. For metric threads, measure the actual pitch, or distance in millimeters between crests.



For all other thread types, determine the number of threads per inch.



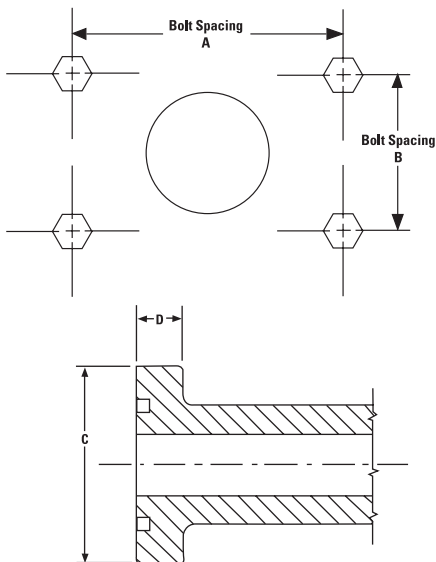
Select a blade that will engage completely with the screw threads. When the fit is correct, there will be no gap between the gauge and threads.



6. Refer to the proper hose section in the current Cat Hose Product & Tooling Guide for Mobile Equipment, PECP5030. Find the proper coupling style and match the thread size and, if necessary, the hose size to the correct entry to determine the Caterpillar part number.

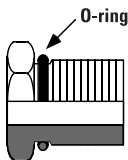
How to Identify Flange Head (Non-Threaded) Couplings

Use the 8T0447 Caliper to measure the bolt hole spacings of the port (A&B) and/or the head diameter (C) and head thickness (D) of the coupling. Compare measurements to the dimensions located in the tables of this guide to determine end configuration. Refer to the appropriate section in the Cat Hose Product & Tooling Guide, PECP5030, for the proper Caterpillar part number.

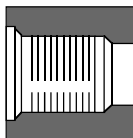


Straight Thread O-Ring Boss (STOR)

The **SAE Straight Thread O-Ring Boss** male coupling and the corresponding female port have straight threads. The male end has an O-ring next to the hex that seals on the angled face in the female port.



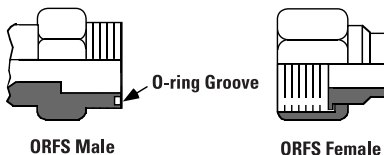
STOR Male



STOR Port

Dash Size (dash)	Inch Size (in)	Thread Size (in-TPI)	Female Thread Inside Diameter		Male Thread Outside Diameter	
			(mm)	(in)	(mm)	(in)
-2	1/8	5/16 – 24	6.9	0.27	7.8	0.31
-3	3/16	3/8 – 24	8.5	0.34	9.4	0.37
-4	1/4	7/16 – 20	9.9	0.39	11.2	0.44
-5	5/16	1/2 – 20	11.5	0.45	12.6	0.49
-6	3/8	9/16 – 18	12.9	0.51	14.1	0.56
-8	1/2	3/4 – 16	17.5	0.69	18.9	0.74
-10	5/8	7/8 – 14	20.5	0.81	22.1	0.87
-12	3/4	1-1/16 – 12	24.9	0.98	26.9	1.06
-14	7/8	1-3/16 – 12	28.1	1.11	30.0	1.18
-16	1	1-5/16 – 12	31.3	1.23	33.1	1.31
-20	1-1/4	1-5/8 – 12	39.2	1.54	41.1	1.62
-24	1-1/2	1-7/8 – 12	45.6	1.79	47.4	1.87
-32	2	2-1/2 – 12	61.4	2.42	63.3	2.49

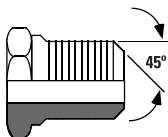
O-Ring Face Seal (ORFS)



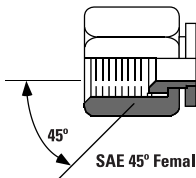
The male and female ends of the **O-Ring Face Seal (ORFS)** coupling have straight threads. The male end of the coupling has an O-ring groove in its face and the female has a flat face. The O-ring in the male face forms the seal on the flat face of the female coupling.

Dash Size	Inch Size	Thread Size	Female Thread Inside Diameter		Male Thread Outside Diameter	
			(mm)	(in)	(mm)	(in)
-4	1/4	9/16 – 18	12.9	0.51	14.1	0.56
-6	3/8	11/16 – 16	15.9	0.63	17.3	0.68
-8	1/2	13/16 – 16	19.1	0.75	20.5	0.81
-10	5/8	1 – 14	23.6	0.93	25.2	0.99
-12	3/4	1-3/16 – 12	28.1	1.11	30.0	1.18
-16	1	1-7/16 – 12	34.4	1.36	36.3	1.43
-20	1-1/4	1-11/16 – 12	40.8	1.61	42.7	1.68
-24	1-1/2	2 – 12	48.7	1.92	50.6	1.99

SAE 45° Flare



SAE 45° Male

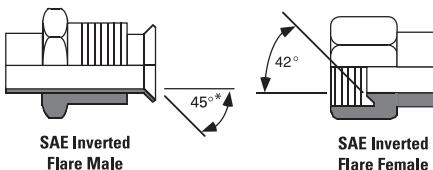


SAE 45° Female

The **SAE 45° Flare** and the **Joint Industrial Conference (JIC) 37° Flare** both form metal-to-metal seals between the external flare on the male end and the internal flare in the female. The threads hold the joint together. Both styles of couplings have straight threads. Some sizes of the JIC 37° flare and the SAE 45° flare have the same threads, but mixing these couplings will not form a seal. The seat angle differentiates these two couplings.

Dash Size	Inch Size	Thread Size	Female Thread Inside Diameter		Male Thread Outside Diameter	
			(mm)	(in)	(mm)	(in)
-2	1/8	5/16 – 24	6.9	0.27	7.9	0.31
-3	3/16	3/8 – 24	8.6	0.34	9.6	0.38
-4	1/4	7/16 – 20	9.9	0.39	11.2	0.44
-5	5/16	1/2 – 20	11.4	0.45	12.7	0.50
-6	3/8	5/8 – 18	14.2	0.56	15.7	0.62
-7	7/16	11/16 – 16	15.7	0.62	17.3	0.68
-8	1/2	3/4 – 16	17.0	0.68	19.0	0.75
-10	5/8	7/8 – 14	20.3	0.80	22.3	0.88
-12	3/4	1-1/16 – 14	25.1	0.99	26.9	1.06
-14	7/8	1-1/4 – 12	29.5	1.16	31.7	1.25
-16	1	1-3/8 – 12	32.5	1.28	35.0	1.38

SAE 45° Inverted Flare

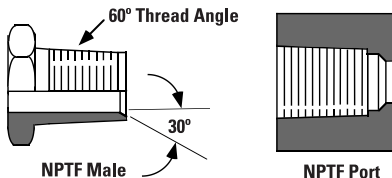


The **SAE Inverted Flare** coupling has straight threads. The male end of this coupling has either a 42° or 45° inverted flare while the female end has a 42° seat. The flare in the male end forms a metal-to-metal seal with the seat in the female end.

Dash Size	Inch Size	Thread Size	Female Thread Inside Diameter		Male Thread Outside Diameter	
(dash)	(in)	(in-TPI)	(mm)	(in)	(mm)	(in)
-2	1/8	5/16 – 28	6.9	0.27	7.9	0.31
-3	3/16	3/8 – 24	8.6	0.34	9.6	0.38
-4	1/4	7/16 – 24	9.9	0.39	11.2	0.44
-5	5/16	1/2 – 20	11.4	0.45	12.7	0.50
-6	3/8	5/8 – 18	14.2	0.56	15.7	0.62
-7	7/16	11/16 – 18	15.7	0.62	17.3	0.68
-8	1/2	3/4 – 18	17.0	0.68	19.0	0.75
-10	5/8	7/8 – 18	20.3	0.80	22.3	0.88
-12	3/4	1-1/16 – 16	25.1	0.99	26.9	1.06

* 42° angle for machined male adapters.

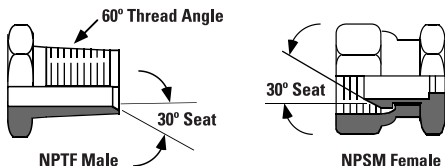
National Pipe Tapered Fuel (NPTF)



The **NPTF** male end has tapered threads and an inverted 30° cone seat. The threads on the female NPTF port are tapered but there is no seat. The male and female end of the NPTF couplings seal through thread compression.

Dash Size (dash)	Inch Size (in)	Thread Size (in-TPI)	Female Thread Inside Diameter		Male Thread Outside Diameter	
			(mm)	(in)	(mm)	(in)
-2	1/8	1/8 – 27	8.7	0.34	10.3	0.41
-4	1/4	1/4 – 18	11.9	0.47	14.3	0.56
-6	3/8	3/8 – 18	15.1	0.59	17.5	0.69
-8	1/2	1/2 – 14	18.3	0.72	21.4	0.84
-12	3/4	3/4 – 14	23.8	0.94	27.0	1.06
-16	1	1 – 11-1/2	30.2	1.19	33.3	1.31
-20	1-1/4	1-1/4 – 11-1/2	38.9	1.53	42.9	1.69
-24	1-1/2	1-1/2 – 11-1/2	44.5	1.75	48.4	1.91
-32	2	2 – 11-1/2	57.2	2.25	60.3	2.38

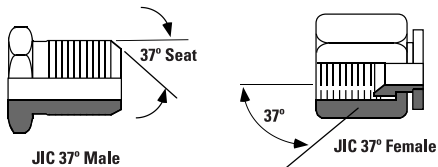
National Pipe Straight Mechanical (NPSM)



The **NPSM** female coupling has straight threads and a 30° inverted seat. The male NPTF coupling and the NPSM female coupling will form a seal through the 30° seat. The threads hold the seat in place.

Dash Size	Inch Size	Thread Size	Female Thread Inside Diameter		Male Thread Outside Diameter	
(dash)	(in)	(in-TPI)	(mm)	(in)	(mm)	(in)
-2	1/8	1/8 – 27	8.7	0.34	10.3	0.41
-4	1/4	1/4 – 18	11.9	0.47	14.3	0.56
-6	3/8	3/8 – 18	15.9	0.63	17.5	0.69
-8	1/2	1/2 – 14	19.1	0.75	21.4	0.84
-12	3/4	3/4 – 14	24.6	0.97	27.0	1.06
-16	1	1 – 11-1/2	31.0	1.22	33.3	1.31
-20	1-1/4	1-1/4 – 11-1/2	39.7	1.56	42.9	1.69
-24	1-1/2	1-1/2 – 11-1/2	45.2	1.78	48.4	1.91
-32	2	2 – 11-1/2	57.2	2.25	60.3	2.38

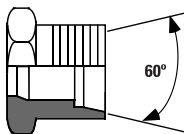
JIC 37° Flare



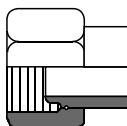
The **Joint Industrial Conference (JIC) 37° Flare** and the **SAE 45° Flare** both form metal-to-metal seals between the external flare on the male end and the internal flare in the female. The threads hold the joint together. Both styles of couplings have straight threads. Some sizes of the JIC 37° flare and the SAE 45° flare have the same threads, but mixing these couplings will not form a seal. The seat angle differentiates these two couplings.

Dash Size	Inch Size	Thread Size	Female Thread Inside Diameter		Male Thread Outside Diameter	
			(mm)	(in)	(mm)	(in)
-2	1/8	5/16 – 24	6.9	0.27	7.8	0.31
-3	3/16	3/8 – 24	8.5	0.34	9.4	0.37
-4	3/4	7/16 – 20	9.9	0.39	11.2	0.44
-5	5/16	1/2 – 20	11.5	0.45	12.6	0.49
-6	3/8	9/16 – 18	12.9	0.51	14.1	0.56
-8	1/2	3/4 – 16	17.5	0.69	18.9	0.74
-10	5/8	7/8 – 14	20.5	0.81	22.1	0.87
-12	3/4	1-1/16 – 12	24.9	0.98	26.9	1.06
-14	7/8	1-3/16 – 12	28.1	1.11	30.0	1.18
-16	1	1-5/16 – 12	31.3	1.23	33.1	1.31
-20	1-1/4	1-5/8 – 12	39.2	1.54	41.1	1.62
-24	1-1/2	1-7/8 – 12	45.6	1.79	47.4	1.87
-32	2	2-1/2 – 12	61.4	2.42	63.3	2.49

DIN 60° Cone



**DIN 60°
Male Cone**

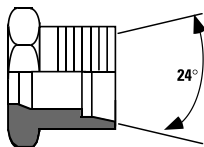


**DIN Universal Female
Spherical (24° / 60°) Seat**

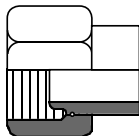
The **DIN 60° Cone** male end attaches only to the DIN Universal Female Spherical (24°/60°) Seat. These couplings have straight metric threads. The seat of the male end forms a metal-to-metal seal with the Universal Female Spherical (24°/60°) Seat.

Metric Thread (dia x pitch)	Female Thread Inside Diameter		Male Thread Outside Diameter		Tube Outside Dia. 60° Cone	
	(mm)	(in)	(mm)	(in)	(mm)	(in)
M12 x 1.5	10.5	0.41	12	0.47	6	0.24
M14 x 1.5	12.5	0.49	14	0.55	8	0.31
M16 x 1.5	14.5	0.57	16	0.63	10	0.39
M18 x 1.5	16.5	0.65	18	0.71	12	0.47
M22 x 1.5	20.5	0.81	22	0.87	15	0.59
M26 x 1.5	24.5	0.96	26	1.02	18	0.71
M30 x 1.	28.5	1.12	30	1.18	22	0.87
M38 x 1.5	36.5	1.44	38	1.50	28	1.10
M45 x 1.5	43.5	1.71	45	1.77	35	1.38
M52 x 1.5	50.5	1.99	52	2.05	42	1.65

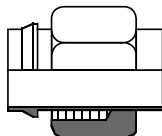
DIN (Deutsche Industrial Norme) 24° Cone



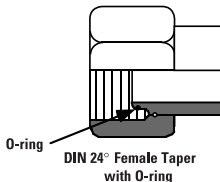
DIN 24° Male Cone



DIN 24° Universal Female Spherical (24°/60°) Cone



DIN Female Metric Tube

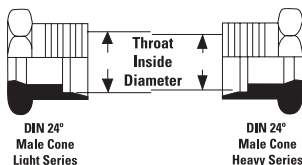


DIN 24° Female Taper with O-ring

The **DIN 24° Cone** male and its three corresponding females have straight metric threads. The male end has a 24° included angle that forms a metal-to-metal seal with the DIN Universal Female Spherical (24°/60°) Cone and the DIN Female Metric Tube. The 24° included angle in the male end forms a seal with the female DIN 24° Female Taper with O-ring on the O-ring.

DIN 24° Cone (cont'd)

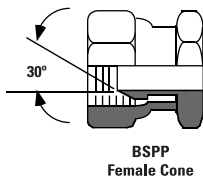
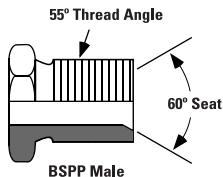
Light and heavy versions of DIN 24° couplings are available. The throat inside diameter mates with the tube outside diameter. In the heavy series, the tube outside diameter on the female and the throat inside diameter of the male are smaller than the light series. The tube outside diameter and the throat inside diameter should match.



Metric Thread (dia x pitch)	Female Thread Inside Diameter (mm) (in)		Male Thread Outside Diameter (mm) (in)		Tube Outside Diameter			
					Light Series		Heavy Series	
	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
M12 x 1.5	10.5	0.41	12	0.47	6	0.24	*	*
M14 x 1.5	12.5	0.49	14	0.55	8	0.31	6	0.24
M16 x 1.5	14.5	0.57	16	0.63	10	0.39	8	0.31
M18 x 1.5	16.5	0.65	18	0.71	12	0.47	10	0.39
M20 x 1.5	18.5	0.73	20	0.79	*	*	12	0.47
M22 x 1.5	20.5	0.81	22	0.87	15	0.59	14	0.55
M24 x 1.5	22.5	0.89	24	0.94	*	*	16	0.63
M26 x 1.5	24.5	0.96	26	1.02	18	0.71	*	*
M30 x 2.0	27.9	1.10	30	1.18	22	0.87	20	0.79
M36 x 2.0	33.9	1.33	36	1.42	28	1.10	25	0.98
M42 x 2.0	39.9	1.57	42	1.65	*	*	30	1.18
M45 x 2.0	42.9	1.69	45	1.77	35	1.38	*	*
M52 x 2.0	49.9	1.96	52	2.05	42	1.65	38	1.50

* No DIN 24° Cone in this size.

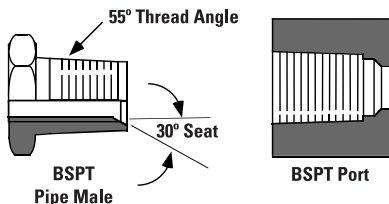
British Standard Pipe Parallel (BSPP)



The **BSPP** male and female couplings have straight threads and 30° cone seats. The BSPP couplings form a metal-to-metal seal on the seat.

Dash Size (dash)	Inch Size (in)	Thread Size (in-TPI)	Female Thread Inside Diameter		Male Thread Outside Diameter	
			(mm)	(in)	(mm)	(in)
-2	1/8	1/8 – 28	8.7	0.34	9.5	0.38
-4	1/4	1/4 – 19	11.1	0.44	13.5	0.53
-6	3/8	3/8 – 19	15.1	0.59	16.7	0.66
-8	1/2	1/2 – 14	18.3	0.72	20.6	0.81
-10	5/8	5/8 – 14	20.6	0.81	23.0	0.91
-12	3/4	3/4 – 14	23.8	0.94	26.2	1.03
-16	1	1 – 11	30.2	1.19	33.3	1.31
-20	1-1/4	1-1/4 – 11	38.9	1.53	42.1	1.66
-24	1-1/2	1-1/2 – 11	45.2	1.78	47.6	1.88
-32	2	2 – 11	56.4	2.22	59.5	2.34

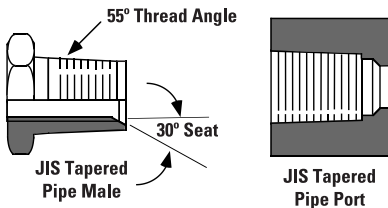
British Standard Pipe Tapered (BSPT)



The **BSPT** male coupling and female port have tapered threads. The male end has a 30° inverted cone seat but the female port does not have a seat. The BSPT male coupling seals with the BSPT female port through thread compression. These couplings are interchangeable with the JIS Tapered Pipe Couplings. The BSPT male will also mate with the BSPP female and forms a metal-to-metal seal on the seat.

Dash Size	Inch Size	Thread Size	Female Thread Inside Diameter		Male Thread Outside Diameter	
(dash)	(in)	(in-TPI)	(mm)	(in)	(mm)	(in)
-2	1/8	1/8 – 28	8.7	0.34	9.5	0.38
-4	1/4	1/4 – 19	11.1	0.44	13.5	0.53
-6	3/8	3/8 – 19	15.1	0.59	16.7	0.66
-8	1/2	1/2 – 14	18.3	0.72	20.6	0.81
-10	5/8	5/8 – 14	20.6	0.81	23.0	0.91
-12	3/4	3/4 – 14	23.8	0.94	26.2	1.03
-16	1	1 – 11	30.2	1.19	33.3	1.31
-20	1-1/4	1-1/4 – 11	38.9	1.53	42.1	1.66
-24	1-1/2	1-1/2 – 11	45.2	1.78	47.6	1.88
-32	2	2 – 11	56.4	2.22	59.5	2.34

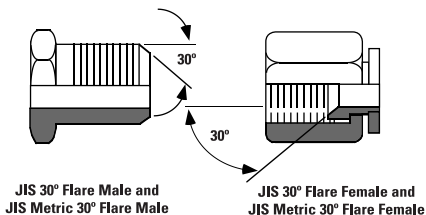
JIS Tapered Pipe



The **Japanese Tapered Pipe** couplings are the same as the BSPT couplings except the JIS Tapered Pipe Thread male which does not have a 30° cone. These couplings are interchangeable with the BSPT couplings.

Dash Size	Inch Size	Thread Size	Female Thread Inside Diameter		Male Thread Outside Diameter	
(dash)	(in)	(in-TPI)	(mm)	(in)	(mm)	(in)
-2	1/8	1/8 – 28	8.7	0.34	9.5	0.38
-4	1/4	1/4 – 19	11.1	0.44	13.5	0.53
-6	3/8	3/8 – 19	15.1	0.59	16.7	0.66
-8	1/2	1/2 – 14	18.3	0.72	20.6	0.81
-10	5/8	5/8 – 14	20.6	0.81	23.0	0.91
-12	3/4	3/4 – 14	23.8	0.94	26.2	1.03
-16	1	1 – 11	30.2	1.19	33.3	1.31
-20	1-1/4	1-1/4 – 11	38.9	1.53	42.1	1.66
-24	1-1/2	1-1/2 – 11	45.2	1.78	47.6	1.88
-32	2	2 – 11	56.4	2.22	59.5	2.34

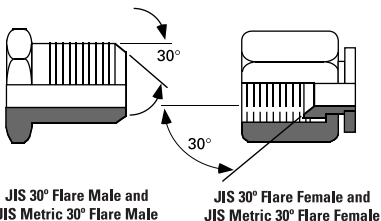
JIS 30° Flare



The **JIS 30° Flare** male end has a 30° external flare and the female has a 30° seat. The JIS 30° Flare couplings have British Standard Pipe Parallel (BSPP) threads. The 30° flare on the male end forms a metal-to-metal seal on the 30° seat in the female end.

Dash Size	Inch Size	Thread Size	Female Thread Inside Diameter		Male Thread Outside Diameter	
(dash)	(in)	(in-TPI)	(mm)	(in)	(mm)	(in)
-2	1/8	1/8 – 28	8.7	0.34	9.5	0.38
-4	1/4	1/4 – 19	11.9	0.47	13.5	0.53
-6	3/8	3/8 – 19	15.1	0.59	16.7	0.66
-8	1/2	1/2 – 14	19.1	0.75	20.6	0.81
-10	5/8	5/8 – 14	20.6	0.81	23.1	0.91
-12	3/4	3/4 – 14	23.8	0.94	26.2	1.03
-16	1	1 – 11	30.2	1.19	33.3	1.31
-20	1-1/4	1-1/4 – 11	38.9	1.53	42.1	1.66
-24	1-1/2	1-1/2 – 11	45.2	1.78	47.6	1.88
-32	2	2 – 11	56.4	2.22	59.5	2.34

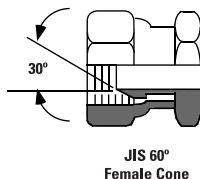
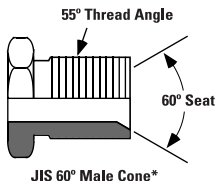
JIS Metric 30° Flare



The JIS Metric 30° flare male end has a 30° external flare and the female has a 30° seat. The JIS metric 30° flare couplings have metric threads. The 30° flare on the male end forms a metal-to-metal seal on the 30° seat in the female end.

Metric Thread (dia. x pitch)	Female Thread Inside Diameter		Male Thread Inside Diameter	
	(mm)	(in)	(mm)	(in)
M14 X 1.5	12.5	0.49	14.0	0.55
M18 X 1.5	16.5	0.65	18.0	0.71
M22 X 1.5	20.5	0.81	22.0	0.87
M24 X 1.5	22.5	0.89	24.0	0.94
M30 X 1.5	28.5	1.12	30.0	1.18
M33 X 1.5	31.5	1.24	33.0	1.30
M36 X 1.5	34.5	1.36	36.0	1.42
M42 X 1.5	40.5	1.59	42.0	1.65

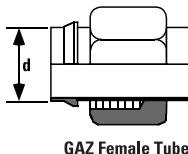
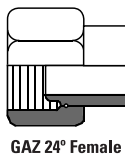
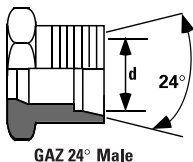
JIS 60° Cone



The **JIS 60° Cone** couplings are the same as the BSPP couplings. **These couplings are interchangeable with the BSPP couplings.**

Dash Size (dash)	Inch Size (in)	Thread Size (in-TPI)	Female Thread Inside Diameter		Male Thread Outside Diameter	
			(mm)	(in)	(mm)	(in)
-2	1/8	1/8 – 28	8.7	0.34	9.5	0.38
-4	1/4	1/4 – 19	11.1	0.44	13.5	0.53
-6	3/8	3/8 – 19	15.1	0.59	16.7	0.66
-8	1/2	1/2 – 14	18.3	0.72	20.6	0.81
-10	5/8	5/8 – 14	20.6	0.81	23.0	0.91
-12	3/4	3/4 – 14	23.8	0.94	26.2	1.03
-16	1	1 – 11	30.2	1.19	33.3	1.31
-20	1-1/4	1-1/4 – 11	38.9	1.53	42.1	1.66
-24	1-1/2	1-1/2 – 11	45.2	1.78	47.6	1.88
-32	2	2 – 11	56.4	2.22	59.5	2.34

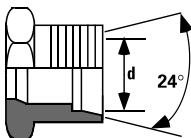
GAZ 24° Cone



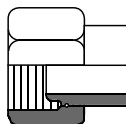
The **GAZ 24° Cone** and the **French Millimetric** male ends each have two corresponding female ends. The male ends of these couplings have a 24° seat that forms a metal-to-metal seal with the 24° seat in the female ends. Both the GAZ and the French Millimetric couplings have metric threads. The inside diameter of the male end and the outside diameter of the female end are slightly different on the GAZ and French Millimetric couplings.

Metric Thread	Female Thread Inside Dia.		Male Thread Outside Dia.		Tube Outside Dia. (d)	
(dia x pitch)	(mm)	(in)	(mm)	(in)	(mm)	(in)
M20 x 1.5	18.5	0.73	20.0	0.78	13.25	0.52
M24 x 1.5	22.5	0.89	24.0	0.94	16.75	0.66
M30 x 1.5	28.5	1.12	30.0	1.18	21.25	0.83
M36 x 1.5	34.5	1.36	36.0	1.41	26.75	1.05
M45 x 1.5	43.5	1.71	45.0	1.77	33.50	1.32
M52 x 1.5	50.5	1.99	52.0	2.04	42.25	1.66

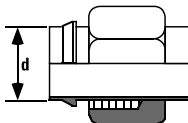
French Millimetric



French Millimetric Male



French Millimetric Female



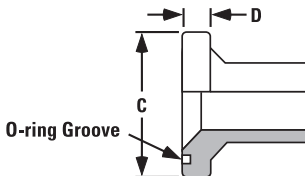
French Millimetric Female Tube

The **French Millimetric** male ends have two corresponding female ends. The male ends of these couplings have a 24° seat that forms a metal-to-metal seal with the 24° seat in the female ends.

French Millimetric (cont'd)

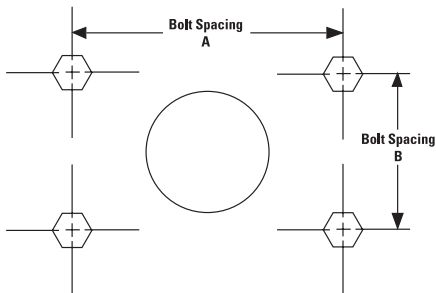
Metric Thread (dia x pitch)	Female Thread Inside Diameter		Male Thread Outside Diameter		Tube Outside Dia. (d)	
	(mm)	(in)	(mm)	(in)	(mm)	(in)
M12 x 1.0	11.0	0.43	12.0	0.47	6	0.24
M14 x 1.5	12.5	0.49	14.0	0.55	8	0.31
M16 x 1.5	14.5	0.57	16.0	0.63	10	0.39
M18 x 1.5	16.5	0.65	18.0	0.71	12	0.47
M20 x 1.5	18.5	0.73	20.0	0.79	14	0.55
M22 x 1.5	20.5	0.81	22.0	0.87	15	0.59
M24 x 1.5	22.5	0.89	24.0	0.94	16	0.63
M27 x 1.5	25.5	1.00	27.0	1.06	18	0.71
M30 x 1.5	28.5	1.12	30.0	1.18	22	0.87
M33 x 1.5	31.5	1.24	33.0	1.30	25	0.98
M36 X 1.5	34.5	1.36	36.0	1.42	28	1.10
M39 X 1.5	37.5	1.48	39.0	1.54	30	1.18
M42 X 1.5	40.5	1.59	42.0	1.65	32	1.26
M45 X 1.5	43.5	1.71	45.0	1.77	35	1.38
M48 X 1.5	46.5	1.83	48.0	1.89	38	1.50
M52 X 1.5	50.5	1.99	52.0	2.05	40	1.57
M54 X 2.0	51.9	2.04	54.0	2.13	45	1.77

SAE Code 61, JIS Type I, DIN Form-R & Komatsu Style Flange Head Couplings

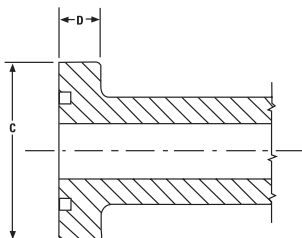


**SAE Code 61 Flange
and Komatsu Style Flange**

SAE Code 61, JIS Type I and DIN Form-R O-Ring Flange Head couplings attach with four bolt split flanges. Tightening the bolts causes the O-ring in the face of the flange head to seal on the flat surface of the port. The bolts may have either inch or metric threads.



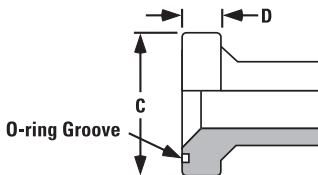
SAE Code 61, JIS Type I, DIN Form-R & Komatsu Style Flange Head Couplings



Flange Size			Bolt Spacing A		Bolt Spacing B		Head Size				Max. Working Pressure
							C		D		
(dash)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(psi)
-8	1/2	12	1.50	38.1	0.69	17.5	1.19	30.2	.265	6.7	5000
-10	5/8	16	1.69	42.9	0.78	19.8	1.34	34.0	.265	6.7	5000
-12	3/4	20	1.88	47.6	0.88	22.2	1.50	38.1	.265	6.7	5000
-16	1	25	2.06	52.4	1.03	26.2	1.75	44.4	.315	8.0	5000
-20	1-1/4	32	2.31	58.7	1.19	30.2	2.00	50.8	.315	8.0	4000
-24	1-1/2	40	2.75	69.9	1.41	35.7	2.38	60.3	.315	8.0	3000
-32	2	50	3.06	77.8	1.69	42.9	2.81	71.4	.375	9.5	3000
-40	2-1/2	60	3.50	88.9	2.00	50.8	3.31	84.1	.375	9.5	2500

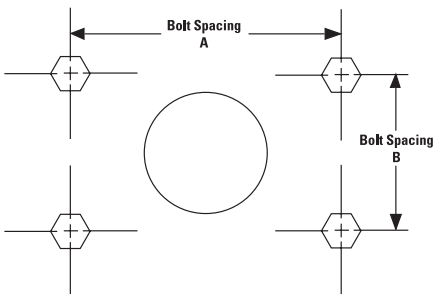
Bold type indicates Komatsu Style Flange.

SAE Code 62, JIS Type II, DIN Form-S Flange & Caterpillar Head Couplings

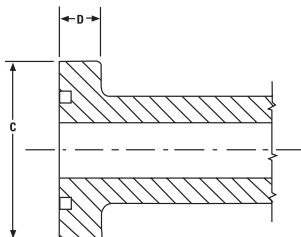


SAE Code 62 Flange
and Caterpillar Flange

SAE Code 62, JIS Type II and DIN Form-S O-Ring Flange Head couplings attach with four bolt split flanges. Tightening the bolts causes the O-ring in the face of the flange head to seal on the flat surface of the port. The bolts may either have inch or metric threads. These couplings can be replaced with Caterpillar's Flange hose couplings if the hardware is also replaced.



SAE Code 62, JIS Type II, DIN Form-S Flange & Caterpillar Head Couplings



Flange Size			Bolt Spacing A		Bolt Spacing B		Head Size				Max. Working Pressure
							C		D *		
(dash)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(psi)
-8	1/2	12	1.59	40.5	0.72	18.2	1.25	31.8	.325	7.8	6000
-12	3/4	20	2.00	50.8	0.94	23.8	1.63	41.4	.345	8.8	6000
-16	1	25	2.25	57.2	1.09	27.8	1.88	47.8	.375	9.5	6000
-20	1-1/4	32	2.62	66.7	1.25	31.8	2.12	54.0	.405	10.3	6000
-24	1-1/2	40	3.12	79.4	1.44	36.5	2.50	63.5	.495	12.6	6000
-32	2	50	3.81	96.8	1.75	44.5	3.13	79.4	.495	12.6	6000

* The thickness of the head on Caterpillar Flange Couplings is .560 in. (14.2 mm) for all sizes.

CATERPILLAR®

