

FITTING TYPES IDENTIFICATION

NPTF

Dryseal American Standard Taper Pipe Thread

SAE J476

ANSI B1.20.3 NPSM ANSI B1.20.1

TECHNICAL SPECIFICATIONS

This type of fitting uses thread interface to seal and has a tapered thread that deforms and forms the seal.

NPTF fittings have 30° sealing angle surfaces, forming a 60° concave seat.

These fittings are most frequently seen on machines of US origin.

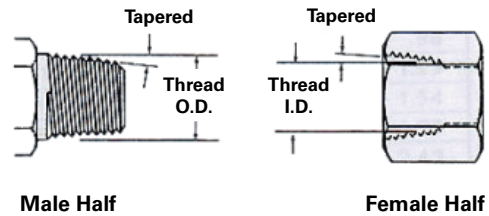
The NPTF male will mate with the NPTF, NPSF or NPSM females.

NPTF fittings (with 60° thread angle) should not be confused with BSPT fittings (with 55° thread angle).

WORKING PRESSURE

Recommended working pressures are in accordance with SAE J514

DASH SIZE	NPTF THREAD SIZE	WORKING PRESSURE	
		Bar	Psi
02	1/8 - 27	345	5000
04	1/4 - 18	350	5070
06	3/8 - 18	280	4060
08	1/2 - 14	245	3550
12	3/4 - 14	210	3040
16	1 - 11	175	2530
20	1.1/4 - 11	145	2100
24	1.1/2 - 11	145	2100
32	2 - 11		



A tapered thread seals by the interference in the engagement of the male and female threads. These threads deform when they are tightened, causing metal deformation and a pressure-tight joint.

Note that the fitting connection may also be affected by the following factors:

- Number of threads engaged
- Impulses
- Vibrations
- Thermal Expansions and contractions

NOTE

The ANSI B1.20.3 standard divides the NPTF threads in two classes:
CLASS 1 - without inspection of crest and root truncation, so that a sealant is required to accomplish dry sealing between threads.

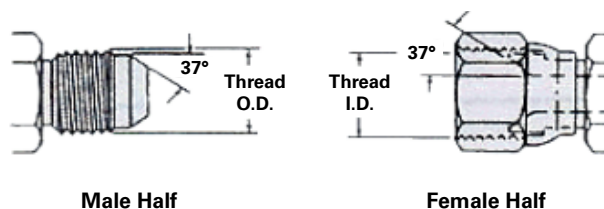
CLASS 2 - with inspection of crest and root truncation, and consequently a sealant is not required to assure the sealing.

The CLASS required must be specified in the order.

DIMENSIONS AND TORQUE INSTALLATION

Torque values are provided as a „benchmark“, believed to give the best results for leak free connections.

Dash Size	NPTF Thread Size	Male Thread O.D.	Female Thread I.D.	Male Thread O.D.	Female Thread I.D.	SUGGESTED TORQUE	
		mm	mm	inch	inch	N.m	lbs.Ft
02	1/8 - 27	10,3	8,7	0,41	0,34	20	15
04	1/4 - 18	14,3	11,9	0,56	0,47	30	22
06	3/8 - 18	17,5	15,1	0,69	0,59	40	29
08	1/2 - 14	21,4	18,3	0,84	0,72	55	41
12	3/4 - 14	27	23,8	1,06	0,94	70	52
16	1 - 11	33,3	30,2	1,31	1,19	90	66
20	1.1/4 - 11	42,9	38,9	1,69	1,53	100	74
24	1.1/2 - 11	48,4	44,5	1,91	1,75	120	88



TECHNICAL SPECIFICATIONS

Identification: Straight threads. Both male and Female have 37° flare seat.

Application: SAE specifies use with high-pressure hydraulic hose.

A flared nut is tightened against the cone a swivel nut.

By forcing the flare against the cone during the torquing process, the nose is slightly deformed to create a metal-to-metal seal.

Note that the fitting connection may also be affected by the following factors:

- Number of threads engaged
- Impulses
- Vibrations
- Thermal Expansions and contractions

When using fittings with two different thread size or thread type, we suggest to use the lower pressure rating of the two threads.

WORKING PRESSURE

Recommended working pressures are in accordance with SAE J514

DASH SIZE	TUBE SIZE	THREAD	WORKING PRESSURE		WORKING PRESSURE	
			Female Bar	Male Bar	Female Psi	Male Psi
03	3/16"	3/8 - 24	344	344	5000	5000
04	1/4"	7/16 - 20	310	344	4500	5000
05	5/16"	1/2 - 20	275	344	4000	5000
06	3/8"	9/16 - 18	275	344	4000	5000
08	1/2"	3/4 - 16	275	310	4000	4500
10	5/8"	7/8 - 14	206	241	3000	3500
12	3/4"	1 - 1/16	206	241	3000	3500
14	7/8"	1 - 3/16	172	206	2500	3000
16	1"	1 - 5/16 - 12	172	206	2500	3000
20	1.1/4"	1 - 5/8 - 12	138	172	2000	2500
24	1.1/2"	1 - 7/8 - 12	103	138	1500	2000
32	2"	2 - 1/2 - 12	77	103	1125	1500

DIMENSIONS AND TORQUE INSTALLATION

Dash Size	UNF / UN Thread Size	Male Thread O.D.	Female Thread I.D.	Male Thread O.D.	Female Thread I.D.	SUGGESTED TORQUE	
		mm	mm	inch	inch	N.m	lbs.Ft
03	3/8 - 24	9,4	8,5	0,37	0,34	11 - 12	8 - 9
04	7/16 - 20	11,2	9,9	0,44	0,39	15 - 16	11 - 12
05	1/2 - 20	12,6	11,5	0,49	0,45	19 - 21	14 - 15
06	9/16 - 18	14,1	12,9	0,56	0,51	24 - 28	18 - 20
08	3/4 - 16	18,9	17,5	0,74	0,69	49 - 53	36 - 39
10	7/8 - 14	22,1	20,5	0,87	0,81	77 - 85	57 - 63
12	1 - 1/16	26,9	24,9	1,06	0,98	107 - 119	79 - 88
14	1 - 3/16	30,3	28,1	1,18	1,11	127 - 140	94 - 103
16	1 - 5/16 - 12	33,1	31,3	1,31	1,23	147 - 154	108 - 113
20	1 - 5/8 - 12	41,1	39,2	1,62	1,54	172 - 181	127 - 133
24	1 - 7/8 - 12	47,4	45,6	1,87	1,79	215 - 226	158 - 167
32	2 - 1/2 - 12	63,3	61,4	2,49	2,42	332 - 350	245 - 258

INSTRUCTIONS

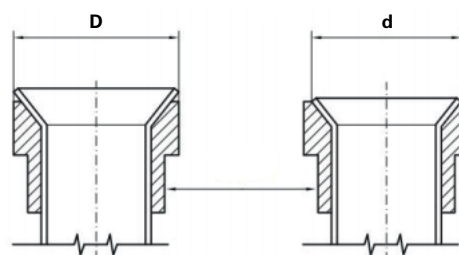
1. Place the flared part of the pipe on the body / bush cone and adjust manually.
2. Tighten with the wrench so as to get a totally enclosed metal / metal joint (see table)
3. A fundamental feature of the SAE 37° fitting is that it is easy and quick to assemble. It can in fact be assembled and removed on different occasions because of its enclosure which remains water and airtight at all times.

A properly done flaring guarantees a longer and more satisfactory life even when subject to critical conditions over extended periods.

The maximum outside flaring diameter must be the same as the outside bush diameter, while the minimum diameter must be the same as the maximum inside diameter of the bush.

Outside Bush diameter D

Inside Bush diameter d



TECHNICAL SPECIFICATIONS

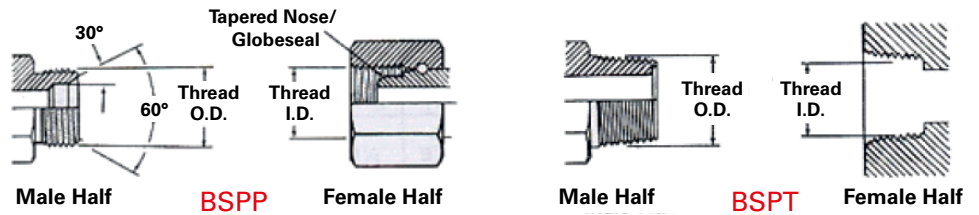
TUBE SIZE	OUT BUSH D mm	INSIDE BUSH d mm	OUT BUSH D inch	INSIDE BUSH d inch
06	9,7	8	0,3819	0,3150
08	11,3	9,5	0,4449	0,3740
10	12,7	11,2	0,5000	0,4409
12	17,3	14,9	0,6811	0,5866
14	20,2	17,9	0,7953	0,7047
15	20,2	17,9	0,7953	0,7047
16	20,2	17,9	0,7953	0,7047
18	24,7	22,3	0,9724	0,8780
20	24,7	22,3	0,9724	0,8780
25	31	28,7	1,2205	1,1299
30	38,9	35,8	1,5315	1,4094
32	38,9	35,8	1,5315	1,4094
38	45,3	41,4	1,7835	1,6299

NUT BUSH COUPLING

TUBE SIZE		BUSH CODE	NUT CODE	JIC THREAD
Metric	Inch			
06	1/4"	ABJ06	DBJ04	7/16 - 20 UNF
08	5/16"	ABJ08	DBJ05	1/2 - 20 UNF
10		ABJ10	DBJ06	9/16 - 18 UNF
	3/8"	ABJ3/8	DBJ06	9/16 - 18 UNF
12		ABJ12	DBJ08	3/4 - 16 UNF
	1/2	ABJ1/2	DBJ08	3/4 - 16 UNF
14		ABJ14	DBJ10	7/8 - 14 UNF
15		ABJ15	DBJ10	7/8 - 14 UNF
16	5/8"	ABJ16	DBJ10	7/8 - 14 UNF
18		ABJ18	DBJ12	1.1/16 - 12 UN
20	3/4"	ABJ20	DBJ12	1.1/16 - 12 UN
22		ABJ22	DBJ14	1.3/16 - 12 UN
25	1"	ABJ25	DBJ16	1.5/16 - 12 UN
30		ABJ30	DBJ20	1.5/8 - 12 UN
32	1" 1/4	ABJ32	DBJ20	1.5/8 - 12 UN
38	1" 1/2	ABJ38	DBJ24	1.7/8 - 12 UN

BSPP - BSPT

BS5200 / ISO 8434-6



TECHNICAL SPECIFICATIONS

Include two types of thread: BSPP, which are straight (or parallel), and BSPT, tapered.

1. The BSPT tapered male will mate with a BSPT tapered female (usually a port) and seals on the thread.
2. The BSPP parallel male has a 30° chamfered seat which seals with a BSPP female on its 30° cone seat.

Note that the BSPT fitting, although similar to the NPTF fitting, is not interchangeable. The thread pitch is different in most sizes and the thread angle is 55° for BSPT instead of the 60° of the NPTF.

BSPT thread are still the most widely type used today in the Fluid Power Industry in Europe.

WORKING PRESSURE

DASH SIZE	THREAD	WORKING PRESSURE With O-Ring		WORKING PRESSURE Without O-Ring	
		Bar	Psi	Bar	Psi
02	1/8 - 28	-	-	350	5087
04	1/4 - 19	400	5814	350	5087
06	3/8 - 19	400	5814	350	5087
08	1/2 - 14	350	5087	315	4578
10	5/8 - 14	350	5087	315	4578
12	3/4 - 14	315	4578	250	3634
16	1 - 11	250	3634	200	2907
20	1.1/4 - 11	200	2907	160	2326
24	1.1/2 - 11	160	2326	125	1817
32	2 - 11	125	1817	80	1163

DIMENSIONS AND TORQUE INSTALLATION

BSPT - Tapered

Dash Size	BSPT Thread Size	Male Thread O.D.	Female Thread I.D.	Male Thread O.D.	Female Thread I.D.
		mm	mm	inch	inch
02	1/8 - 28	9,5	8,4	0,37	0,33
04	1/4 - 19	12,8	11,2	0,50	0,44
06	3/8 - 19	16,3	14,7	0,64	0,59
08	1/2 - 14	20,4	18,3	0,80	0,72
10	5/8 - 14	22,5	20,6	0,89	0,81
12	3/4 - 14	25,9	23,9	1,02	0,94
16	1 - 11	32,6	29,7	1,28	1,17
20	1.1/4 - 11	41,1	38,6	1,62	1,52
24	1.1/2 - 11	47	44,5	1,85	1,75
32	2 - 11	58,6	56,4	2,31	2,22

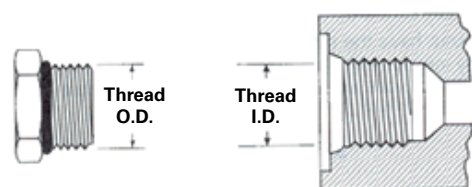
DIMENSIONS AND TORQUE INSTALLATION

BSPP - Parallel

Dash Size	BSPP Thread Size	Male Thread O.D.	Female Thread I.D.	Male Thread O.D.	Female Thread I.D.	MAX TORQUE	
		mm	mm	inch	inch	N.m	lbs.Ft
02	1/8 - 28	9,6	8,6	0,38	0,34	13	10
04	1/4 - 19	13	11,9	0,51	0,47	25	18
06	3/8 - 19	16,5	15,2	0,65	0,60	45	33
08	1/2 - 14	20,8	19,1	0,82	0,75	62	46
10	5/8 - 14	22,8	20,8	0,90	0,82	90	66
12	3/4 - 14	26,3	24,6	1,04	0,97	140	103
16	1 - 11	33,1	30,7	1,30	1,21	170	125
20	1.1/4 - 11	41,8	39,4	1,64	1,55	280	206
24	1.1/2 - 11	47,7	45,5	1,88	1,79	370	173
32	2 - 11	59,5	57,4	2,34	2,26	500	369

O-RING BOSS

SAE JS14



O-Ring Boss Male (MB)

O-Ring Boss Female Port (FB)

TECHNICAL SPECIFICATIONS

Male fittings have a straight thread and O-Ring. The female port has a straight thread and a chamfer to accept the O-Ring.

The application of O-Rings is recommended by the National Fluid Power Association for optional leakage control in medium and high pressure hydraulic systems.

The seal takes place by compressing the O-Ring into the chamfer. The threads hold the connection mechanically.

It is possible only to connect O-Ring boss male with O-Ring boss female.

WORKING PRESSURE

DASH SIZE	TUBE SIZE	THREAD	WORKING PRESSURE		WORKING PRESSURE	
			Non Adjustable		Adjustable	
			Bar	Psi	Bar	Psi
03	3/16"	3/8 - 24	630	9157	420	6105
04	1/4"	7/16 - 20	630	9157	420	6105
05	5/16"	1/2 - 20	630	9157	420	6105
06	3/8"	9/16 - 18	630	9157	420	6105
08	1/2"	3/4 - 16	630	9157	420	6105
10	5/8"	7/8 - 14	630	9157	420	6105
12	3/4"	1 - 1/16	420	6105	420	6105
14	7/8"	1 - 3/16	420	6105	420	6105
16	1"	1 - 5/16 - 12	420	6105	350	5087
20	1.1/4"	1 - 5/8 - 12	280	4070	280	4070
24	1.1/2"	1 - 7/8 - 12	280	4070	210	3052
32	2"	2 - 1/2 - 12	210	3052	175	2544

DIMENSIONS AND TORQUE INSTALLATION

Dash Size	Thread	Male Thread O.D.	Female Thread I.D.	Male Thread O.D.	Female Thread I.D.	MAX TORQUE	
		mm	mm	inch	inch	N.m	lbs.Ft
02	5/16 - 24	7,8	6,9	0,31	0,27	8 - 9	6 - 7
03	3/8 - 24	9,4	8,5	0,37	0,34	11 - 12	8 - 9
04	7/16 - 20	11,2	9,9	0,44	0,39	18 - 20	13 - 15
05	1/2 - 20	12,6	11,5	0,49	0,45	23 - 26	17 - 19
06	9/16 - 18	14,1	12,9	0,566	0,51	29 - 33	22 - 24
08	3/4 - 16	18,9	17,5	0,74	0,69	49 - 53	40 - 43
10	7/8 - 14	22,1	20,5	0,87	0,81	59 - 64	43 - 48
12	1 - 1/16	26,9	24,9	1,06	0,98	93 - 102	68 - 75
14	1 - 3/16	30,3	28,1	1,18	1,11	122 - 134	90 - 99
16	1 - 5/16 - 12	33,1	31,3	1,31	1,23	151 - 166	112 - 123
20	1 - 5/8 - 12	41,1	39,2	1,62	1,54	198 - 218	146 - 161
24	1 - 7/8 - 12	47,4	45,6	1,87	1,79	209 - 231	154 - 170
32	2 - 1/2 - 12	63,3	61,4	2,49	2,42	296 - 325	218 - 240

DIN 2353 24° CONE

DIN 2353 / ISO 8434-1

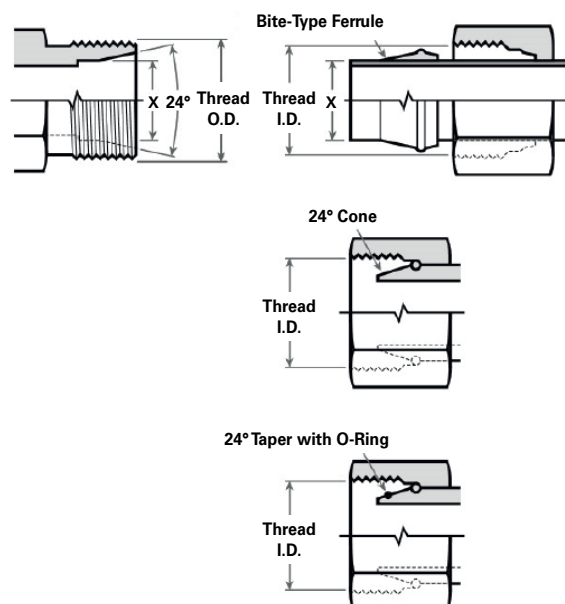
TECHNICAL SPECIFICATIONS

This DIN connection comes in a Light Series (DKL/DKOL) and a Heavy Series (DKS/DKOS). Some thread sizes in each series are the same, but the Tube OD of the Heavy Series is smaller and has a thicker tube wall.

Light and Heavy Series are NOT interchangeable.

SEAL

Sealing takes place between the 24 degree seat in the male and the respective sealin area in the female end.



WORKING PRESSURE

DIN L (DKL/DKOL)

METRIC TUBE	THREAD	WORKING PRESSURE	
		Bar	Psi
06	12x1,5	250	3600
08	14x1,5	250	3600
10	16x1,5	250	3600
12	18x1,5	250	3600
15	22x1,5	250	3600
18	26x1,5	160	2300
22	30x2	160	2300
28	36x2	100	1500
35	45x2	100	1500
42	52x2	100	1500

DIN S (DKS/DKOS)

METRIC TUBE	THREAD	WORKING PRESSURE	
		Bar	Psi
06	14x1,5	620	9000
08	16x1,5	620	9000
10	18x1,5	620	9000
12	20x1,5	620	9000
14	22x1,5	400	5800
16	24x1,5	400	5800
20	30x2	400	5800
25	36x2	400	5800
30	42x2	250	3600
38	52x2	250	3600

DIMENSIONS AND TORQUE INSTALLATION

Metric Thread	FEMALE THREAD		MALE THREAD		LTUBE		STUBE	
	mm	inch	mm	inch	mm	inch	mm	inch
M 12x1,5	10,5	0,41	12	0,47	6	0,24	-	-
M 14x1,5	12,5	0,49	14	0,55	8	0,31	6	0,24
M 16x1,5	14,5	0,57	16	0,63	10	0,39	8	0,31
M 18x1,5	16,5	0,65	18	0,71	12	0,47	10	0,39
M 20x1,5	18,5	0,73	20	0,79	-	-	12	0,47
M 22x1,5	20,5	0,81	22	0,87	15	0,59	14	0,55
M 24x1,5	22,5	0,89	24	0,94	-	-	16	0,63
M 26x1,5	24,5	0,96	26	1,02	18	0,71	-	-
M 30x2	27,9	1,10	30	1,18	22	0,87	20	0,79
M 36x2	33,9	1,33	36	1,42	18	1,10	25	0,98
M 42x2	39,9	1,57	42	1,65	-	-	30	1,18
M 45x2	42,9	1,69	45	1,77	35	1,38	-	-
M 52x2	49,9	1,96	52	2,05	42	1,65	38	1,5

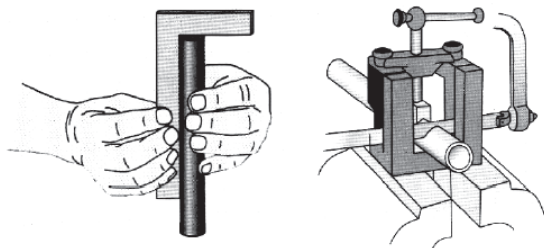
ASSEMBLY INSTRUCTIONS DIN 3859-2

COMPOSITION

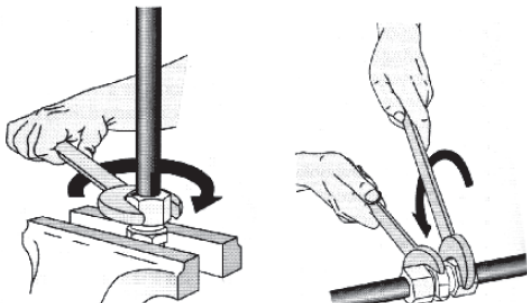
DIN fittings with cutting ring include:

1. Union body
2. Double edge cutting ring
3. Nut

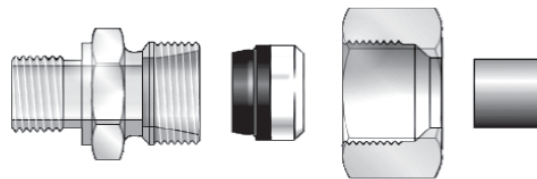
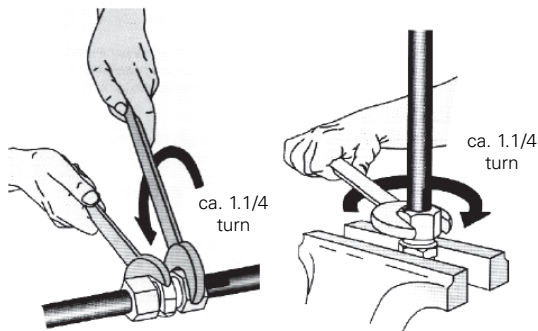
The seal between the union and the tube is obtained by tightening the nut, so that the double edge cutting ring, sliding along the bevel housing of the union will uniformly cut into the tube and, at the same time, anchors between the tube and the bevel wall.



- Slightly debur the inside and outside of the pipe, without damaging the mating surface (max. bevel $0,2 \times 45^\circ$), making sure to remove all the metal particles.
- Lubricate with oil seat, threads and double edge cutting ring. Avoid grease.



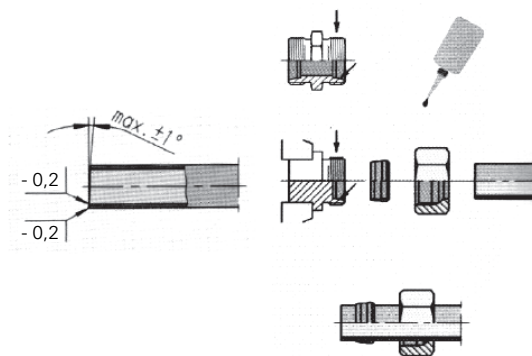
- Loosen nut end inspect cut, checking the penetration of the cutting edge. The ring may rotate now.
- If the cut is not uniform, repeat the operation tightening further.



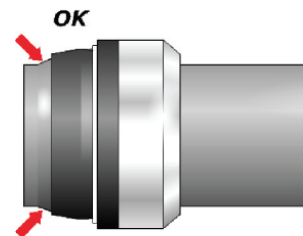
ASSEMBLY

A proper assembly of the fitting is a basic condition to obtain a good performance. Please follow our assembly instructions:

- Rectangular saw off the pipe.
- An angular offset of $1/2^\circ$ is permissible.
- Do not use a tube cutter because this would leave a considerable burr and an angular cut at the tube ends; use a sawing machine.

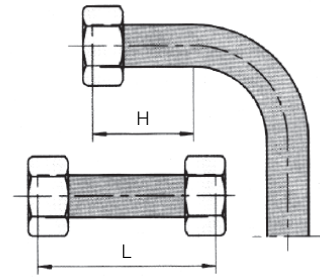
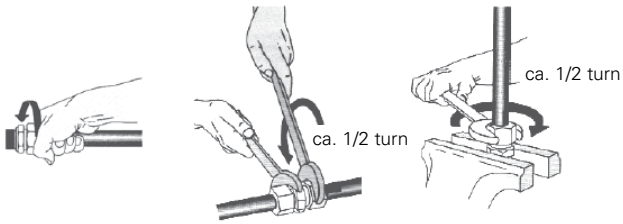


- Place nut and cutting ring on the end side of the pipe.
- ATTENTION: to avoid a faulty assembly, be careful that the cutting edges of the ring face towards the tube end. Insert the pipe into the union until it reaches the stop and fully tighten the nut by hand.
- Tighten the nut with a spanner about 1 and $1/4$ or 1 and $1/2$ turns, putting reference marks on nut and tube if needed. The pipe must no longer turn with the union.



- Every time the fitting is disassembled, and subsequently reassembled, the nut must be re-tightened with the same force as used for the initial installation.
- The ends of dismantled pipes must be refitted to the same unions used for the tightening procedure

- **Minimum length of straight pipe in elbows:** at least twice the thickness of the nut.
- **Minimum length of the pipe between two unions:** at least 2,5 - 3 times the thickness of the nut.

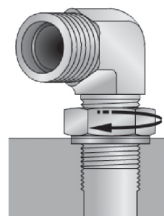
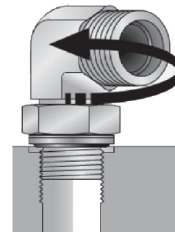
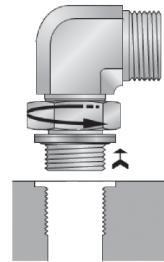


- For final assembly of all the prefitted unions, after appropriate lubrication screw the prefitted nut by hand onto the body of another union until the point of resistance is met, then tighten by a further 1/2 turn.

ASSEMBLY INSTRUCTIONS - ANGULAR ROTARY FITTING

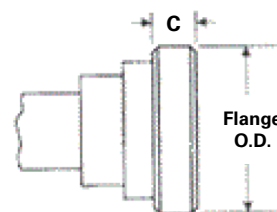
ASSEMBLY

- Screw back bulkhead nut as far as it goes.
 - O-Ring and fixed anti-extrusion should be at the upper end of the notch.
 - Oil the O-Ring.
 - In versions with BSPP, Metric cylindrical thread slip mobile ring over O-Ring.
-
- Manually screw the fitting into the threaded hole until the mobile ring or fixed anti-extrusion comes to rest.
 - To adjust the fitting in the desired position, turn it back for a maximum of one turn.
-
- Tighten bulkhead nut completely while keeping the body in the desired position.



FLANGES

SERIES L CODE 61 / ISO 6162-1
SERIES S CODE 62 / ISO 6162-2
CATERPILLAR



IDENTIFICATION

The female port is an unthreaded hole surrounded with 4 bolt holes in a rectangular pattern.

The male consists of a flanged head, grooved for an O-Ring and a flange with holes to match the port.

APPLICATION

Commonly used in fluid power systems, usually in connection with pumps and motors.

SEAL

The seal takes place on the O-Ring, which is compressed between the flanged head and the flat surface surrounding the port.

The threaded bolt holds the connection mechanically.

WORKING PRESSURE

L SERIES

NOMINAL FLANGE	WORKING PRESSURE	
	Bar	Psi
1/2"	345	5000
3/4"	345	5000
1"	276	4000
1.1/4"	207	3000
1.1/2"	186	2700
2"	171	2475

P SERIES

NOMINAL FLANGE	WORKING PRESSURE	
	Bar	Psi
1/2"	414	6000
3/4"	345	5000
1"	276	4000
1.1/4"	207	3000
1.1/2"	186	2700
2"	171	2480

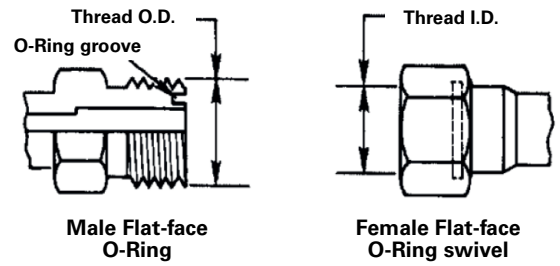
DIMENSIONS

L SERIES			P SERIES		CATERPILLAR	
Nominal Flange	Flange O.D.	C	Flange O.D.	C	Flange O.D.	C
inch	mm	mm	mm	mm	mm	mm
1/2"	30,2	6,7	31,8	7,7		
5/8"	34,0	6,7				
3/4"	38,1	6,7	41,3	8,76	41,3	14,2
1"	44,5	8,0	47,6	9,5	47,6	14,2
1.1/4"	50,8	8,0	54	10,3	54	14,2
1.1/2"	60,3	8,0	63,5	12,6	63,5	14,2
2"	71,4	9,5	79,4	12,6	79,4	14,2

L SERIES			P SERIES		CATERPILLAR	
Nominal Flange	Flange O.D.	C	Flange O.D.	C	Flange O.D.	C
inch	inch	inch	inch	inch	inch	inch
1/2"	1,19	0,265	1,25	0,305		
5/8"	1,34	0,265				
3/4"	1,50	0,265	1,63	0,345	1,63	0,56
1"	1,75	0,315	1,88	0,375	1,88	0,56
1.1/4"	2	0,315	2,13	0,405	2,13	0,56
1.1/2"	2,38	0,315	2,50	0,495	2,50	0,56
2"	2,81	0,375	3,13	0,495	3,13	0,56

ORFS

SAE J1453 / ISO 8434-3



TECHNICAL SPECIFICATIONS

ORFS system consists of a ORFS male with the O-Ring situated in the face which seals against a flat seated ORFS female swivel nut fitting.

The swivel nut can be slipped back to help installation in tight situations.

The prominent position of the O-Ring makes it easy to inspect the condition of the O-Ring itself.

ORFS fittings are becoming the most popular international fitting type used on global OEM machines due to their high level of sealing and their good vibration resistance.

The fittings use the O-Ring compression mechanism to seal.

The female fittings have flat faces and straight threaded UNF swivel nuts. The male fittings have the O-Ring in a groove in the flat face.

WORKING PRESSURE

TUBE SIZE	THREAD	WORKING PRESSURE		WORKING PRESSURE	
		Non Adjustable		Adjustable	
mm		Bar	Psi	Bar	Psi
6	9/16	630	9157	400	5814
10	11/16	630	9157	400	5814
12	13/16	630	9157	400	5814
16	1	400	5814	400	5814
20	1.3/16	400	5814	400	5814
25	1.7/16	400	5814	350	5087
30	1.11/16	250	3634	250	3634
38	2	250	3634	200	2907

DIMENSIONS AND TORQUE INSTALLATION

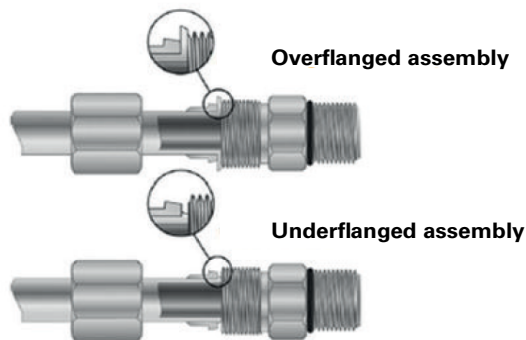
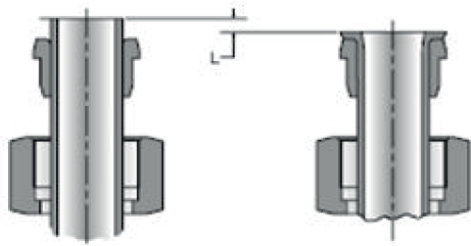
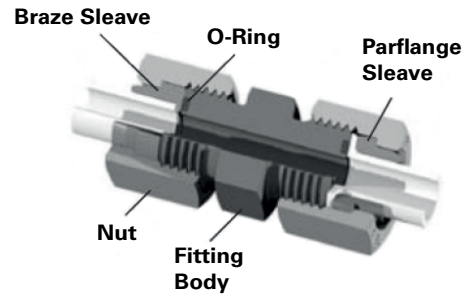
Dash Size	Thread	Male Thread O.D.	Female Thread I.D.	Male Thread O.D.	Female Thread I.D.	MAX TORQUE	
		mm	mm	inch	inch	N.m	lbs.Ft
04	9/16	14,1	12,9	0,56	0,51	10	25
06	11/16	17,3	15,9	0,68	0,63	29	40
08	13/16	20,5	19,1	0,81	0,75	41	55
10	1	25,2	23,6	0,99	0,93	44	60
12	1.3/16	30,0	28,1	1,18	1,11	66	90
16	1.7/16	36,3	34,4	1,43	1,36	92	125
20	1.11/16	42,7	40,8	1,68	1,61	125	170
24	2	50,6	48,7	1,99	1,92	147	200

ASSEMBLY INSTRUCTIONS

The proper assembly of the fitting requires several steps, each one important in guaranteeing a leak-free connection and a long service life:

1. Cutting, deburring and cleaning the tube
2. Flanging or Brazing
3. Sleeve attachment
4. Inspection of sleeve attachment
5. Final installation

The flanging method requires the use of an appropriate forming machine to create the flange or flat face on the tube end.



NUT BUSH COUPLING

TUBE SIZE		BUSH CODE	NUT CODE	ORFS THREAD
Metric	Inch			
06	1/4	ABO06	DBO06	9/16 - 18 UNF
08	5/16	ABO08	DBO09	11/16 - 16 UN
10	3/8	ABO10	DBO09	11/16 - 16 UN
12	1/2	ABO12	DBO11	13/16 - 16 UN
14	-	ABO14	DBO13	1 - 14 UNS
15	-	ABO15	DBO13	1 - 14 UNS
16	5/8	ABO16	DBO13	1 - 14 UNS
18	-	ABO18	DBO14	1.3/16 - 12 UN
20	3/4	ABO20	DBO14	1.3/16 - 12 UN
22	7/8	ABO22	DBO15	1.7/16 - 12 UN
25	1	ABO25	DBO15	1.7/16 - 12 UN
28	-	ABO28	DBO21	1.11/16 - 12 UN
30	1.1/4	ABO30	DBO21	1.11/16 - 12 UN
32		ABO32	DBO21	1.11/16 - 12 UN
35		ABO35	DBO32	2 - 12 UN
38	1.1/2	ABO38	DBO32	2 - 12 UN

SEALING SYSTEMS

The connection in fittings and adapters is made by two elements: the thread and sealing system.

The thread is already described in the previous paragraphs. The following describes the sealing systems.

Generally, fittings and adapters are identified according the combination of sealing and thread. The main sealing systems are:

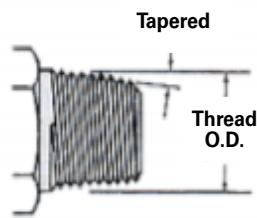
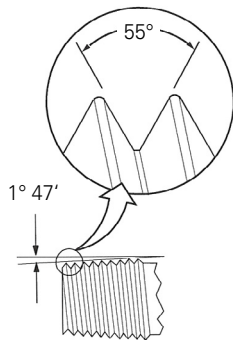
- **Sealing on threads (with or without sealant)**

It's typical of conical threads and it's obtained in dry condition (without sealant) by thread's roots and crests deformation. This system requires accurate thread dimensions. Where suggested, a sealant between male-female is adopted.

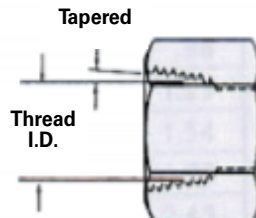
Tapered threads

NPT (ANSI/ASME B1.20.1)

NPTF (ANSI/ASME B1.20.3)

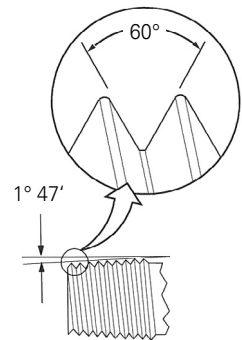


Male Half



Female Half

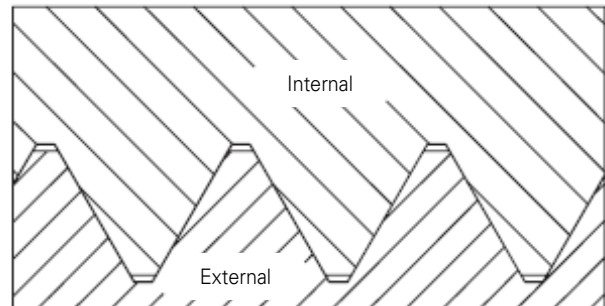
Tapered threads BSPT or GAS (ISO 7/1)



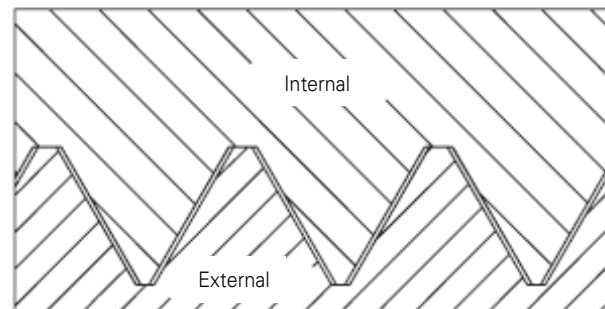
It exists also a tapered metric thread, but it's little in use and it's described in the old standard UNI 7707.

Differences between NPT and NPTF:

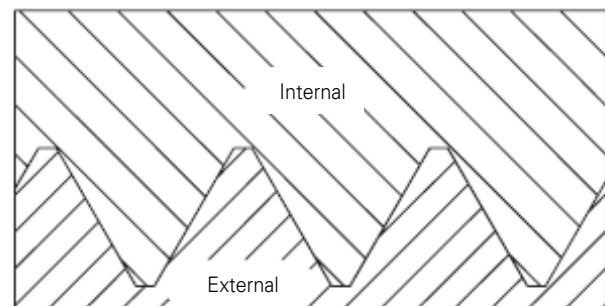
Male/Female **NPT** threads after manual screwing and key tightening.
No crests and roots contact, only contact on the flanks.
Without sealant, a leakage through spiral path is possible



Male/Female **NPTF** after manual screwing.
Still no contact on the flanks, only contact between crests and roots starts.

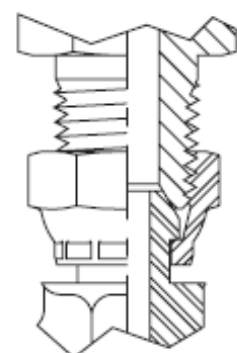
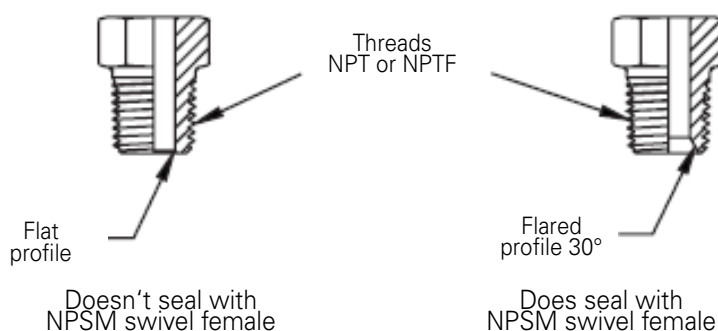


Male/Female **NPTF** threads after key tightening.
Complete contact between crests, roots and flanks.
No leakage detected.

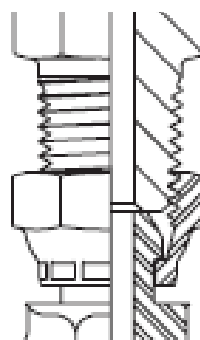


Tapered threads NPT / NPTF (ANSI B1.20.1 / B1.20.3) mating with NPSM parallel female

The tapered **NPT** and **NPTF** males mate on swivel female **NPSM** parallel thread, but the dry sealing is assured only when a 60° flare is present on the male head



Dryseal **OK**
(male head flared)

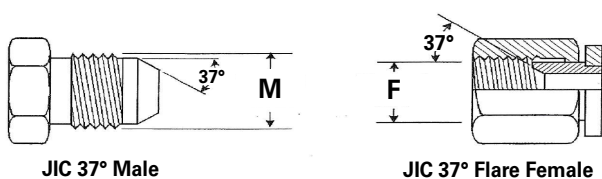


NO Dryseal
(male head flat)

- **Sealing between tapered surfaces** (metal to metal without elastomeric seal)
Obtained by tightening the male female tapered surfaces one against the other.

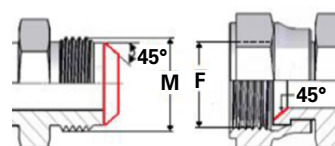
JIC 37° (SAE J514, ISO 8434-2)

The most popular American fittings, known as JIC fittings, have a 37° flare and UNF parallel thread.



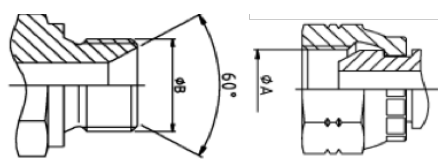
SAE 45° (SAE J516)

Known as SAE fittings, they have a 45° flare and parallel UNF thread. They are applied in the fields of conditioning/ refrigeration and automotive.



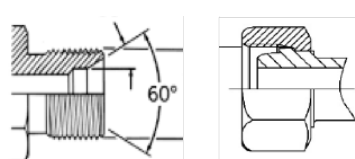
BSPP (BS 5200, ISO 8434-6)

Known as BSPP or GAS fittings, they have a 60° flare and GAS parallel thread.



DIN (light L and heavy S series)

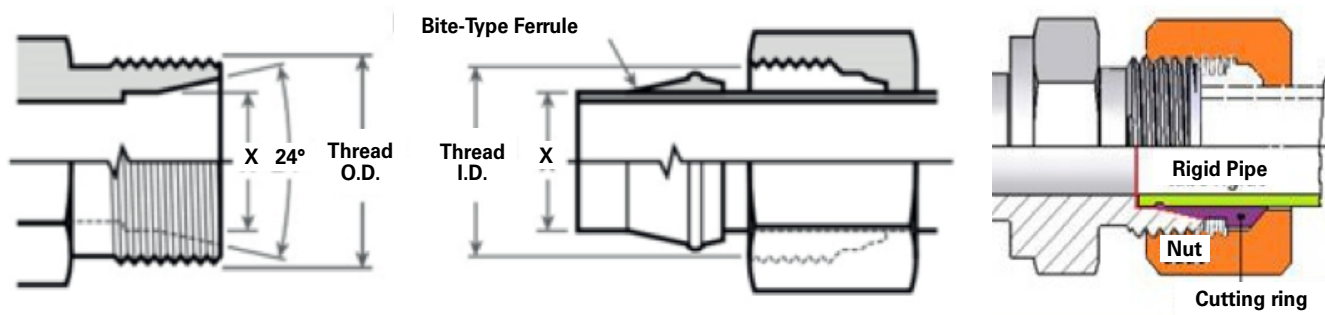
Metric fittings with 60° flare and parallel metric thread. The female rounded nose has 24° or 60° angle (DIN 7631).



- **Other metal to metal sealing connection system**

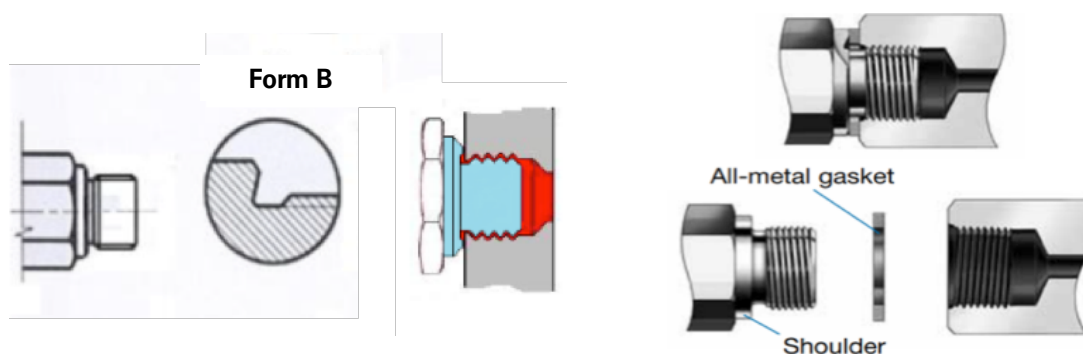
ISO 8434-1 with 24° seat DIN 2353

The mechanical seal for DIN fittings is also obtained by fixing a cutting ring (or bite-type ferrule) with female 24° cone on a tube. the slip-on nut is then tighten to assure the seal against the male 24° flare.



- **DIN male with form B collar (ISO 9974-1, ISO 9974-3)**

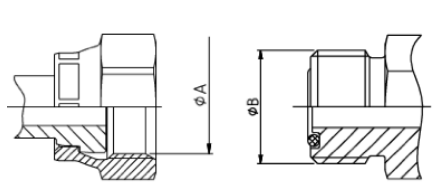
The male collar has a notch on the shoulder (form B) able to press a metal gasket against the seat on the female.



- **Sealing with O-Ring on a plane surface**

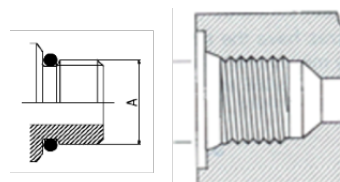
ORFS with O-Ring (ISO 8434-3)

Fittings having UNF / UN / UNS parallel thread and plane sealing surface with mediate O-Ring.



SAE with O-Ring boss

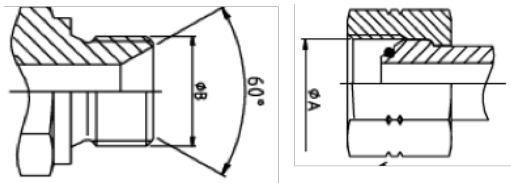
Fittings having UNF parallel thread and O-Ring behind the thread able to seal into a port seat.



- **Sealing between tapered surfaces and mediate O-Ring**

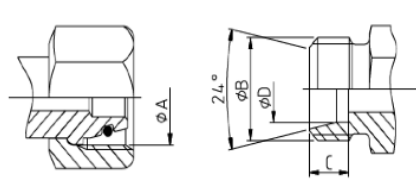
BSPP with O-Ring (ISO 8434-6)

Well known as BSPP or GAS fittings, they have a parallel GAS thread and a 60° flare on both male and female with a mediate O-Ring seal.



DIN with O-Ring (L/S series ISO 8434-1)

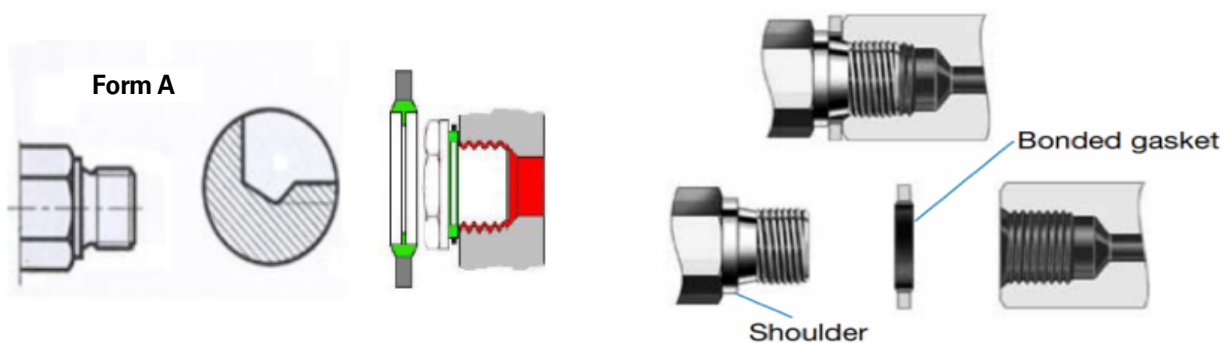
Fittings with METRIC thread, male 24° flare and female 24° cone with O-Ring seal.



- **Other sealing connection system with elastomeric seal**

Bonded gasket

The male collar has flat shoulder (form A) according DIN 3852-1 and a mediate bonded gasket



Eolastic seal

The male stud end collar has a seat (DIN 3852-1 form E) for an elastomeric seal called Eolastic. The seal section complies with ISO 1179-2 standard.

