CARBON STEEL HYDRAULIC FITTINGS

J.I.C. – S.A.E. J514

STANDARD – JUMPSIZE – SPECIAL

AIR-WAY
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O-RING FACE SEAL FITTINGS

provide connections between tubing, Male or Female NPTF pipe and SAE J1926/1/ISO11926-1 O-Ring ports. The ORFS tube end features the SAE-J1453 Style B Dovetail Groove for improved O-Ring retention. Many ORFS fittings are also available in stainless steel.

FLARE-O® HYDRAULIC FITTINGS

offer an electomeric seal for leakproof, drop-in replacement for 37° SAE/JIC flared tube fittings. This bulletin includes carbon steel 37° FLARE-O® tube fittings, Male and Female NPTF pipe, adjustable and O-Ring fittings, adapter unions, braze fittings for tubing and beaded hose connections. All FLARE-O® fittings are also offered in stainless steel.

PATRIOT BRASS HYDRAULIC FITTINGS

include 37° Flare Tube, Pipe, Hose Barb and Push-Lok styles. All shaped Brass elbows and Tees are manufactured with the Forged style construction.

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Construction

Unless otherwise specified, fittings are machined from cold drawn carbon steel barstock and forgings. Standard plating is electrodeposited zinc with a clear trivalent chromate conversion coating in accordance with ASTM B633 (Type V SC2). The minimum salt spray resistance is 240 hours to red corrosion when tested in accordance with ASTM B117.

Threads

BSPP Straight Threads: Internal and external BSPP straight threads conform to ISO 228-1.

Metric Straight Threads: Internal and external metric straight threads conform to ISO 261.

Inch Straight Threads: Internal and external inch straight threads conform to the Unified National Class 2A and Class 2B Series respectively, with modified minor diameters where specified. Plated external threads may conform to Class 3A maximum diameters after plating.

NPTF Threads: Male and female pipe threads conform to the Dryseal American Standard Taper Pipe Thread (SAE J476a, NPTF) Series which will provide pressure tight joints without the use of a lubricant or sealer. Use of these fittings with non-dryseal NPT pipe or hose ends is not recommended for high-pressure applications.

Note: Where not functionally objectionable, use of a compatible lubricant/sealant is recommended for either NPT or NPTF threads to minimize the possibility of galling in assembly.

BSPT Threads: Internal and external BSPT taper threads conform to BS 21 and BS EN 10226-1.

Assembly Information

For assembly instructions, refer to the Technical Data Section for the appropriate fitting end. Also, refer to the Technical Data Section for recommendations regarding tubing pressure ratings, tube flares and hose/tube routing information. Please note the following:

Tubing for single flare tube ends should be either seamless or welded and drawn, fully annealed tubing per SAE J524 or J525. For double flaring, tubing per SAE J356, J524, J525 or J526 may be used.

For proper sealing with 37 degree flared fittings, flares for tubing should conform to the requirements of SAE J533. For heavy wall tubing, the optional tube preparation and single flare configuration specified in SAE J533 is also recommended. This optional configuration provides extended sealing surface contact area versus conventional flares.

In the design and fabrication of tubing or hose runs for any hydraulic system, precautions should be taken to allow for sufficient adjustment of the hose or tubing so that proper alignment can be attained at the fitting connections. Improper fit-up or misalignment should be corrected before final connections are made. Location of fitting connections should be planned to maximize accessibility. Whenever possible, use a torque wrench to tighten connections to the recommended installation torque.

Ordering Information

For fittings with ISO 9974 metric O-Ring/Retaining Ring stud ends, the Retaining Ring may be removed to make the stud end compatible with an SAE J2244-1 or ISO 6149-1 port.

For fittings with ISO 1179-3 BSPP O-Ring/Retaining Ring stud ends, removing the Retaining Ring for use in a JIS B 2351-1 port is not recommended.

If information is needed for jump sizes not shown, please contact customer service for assistance. Dimensions are rounded for brevity. Please contact factory for exact dimensions and tolerances.

Hydraulic Tube Fittings, Pressure Ratings

The information contained in this catalog is subject to change without notice. The most current information can be found on the Air-Way web site – www.air-way.com.

The hydraulic tube fittings represented in this catalog conform to the performance requirements specified in SAE J514, SAE J518, SAE J1453, SAE J1926/ISO 11926 and related standards.

The working pressure ratings listed below are based on a 4:1 design factor for minimum burst. As specified in SAE J514, these are dynamic pressure ratings and the fittings are capable of passing a cyclic endurance (impulse) test for one million cycles at 133% of the corresponding working pressure.

The rated working pressure for any fitting is based on the lowest pressure rated fitting end. For example, a fitting may include one -4 (1/4") male 37 degree tube end and one -6 (3/8") male pipe end. From the tables below, the rated working pressure for the -4 male 37 degree tube end is 34.5 MPa (5,000 psi) and the rated working pressure of the -6 (3/8") male pipe end is 21 MPa (3,000 psi). The rated working pressure of the fitting would be 21 MPa (3,000 psi).

For proper performance, the design of any hydraulic system should take into consideration the rated working pressures for each of the components of the system, including standard ratings for hose and tubing components and assemblies. For any application, sufficient testing should be performed to assure safe and satisfactory performance.

Pressure Ratings for 37 Deg. Flared Tube Ends, 37 Deg. Female Swivels, O-Ring Port Plugs and Straight Thread Stud Ends (Inch)

Nominal Tube Size		Thread Size (Notes 1&2)	Working Pressures							
Nom SAE Dash Size	Nom Inch Tube O.D.	SAE J514 Flared Tube End and SAE J1926/3/ ISO 11926-3 O-Ring Port Thread Size	37 Deg. Flared Tube Ends, Unions and Bulkheads		37 Deg. Female Swivels		SAE J514 (Inch) Port Plugs and Stud Ends Per SAE J1926/3/ISO 11926-3			
							Port Plugs/Non-Adjustable Studs		Adjustable Studs	
			MPa	psi	MPa	psi	MPa	psi	MPa	psi
-2	1/8	5/16-24 UNF	34.5	5,000	34.5	5,000	34.5	5,000	34.5	5,000
-3	3/16	3/8-24 UNF	34.5	5,000	34.5	5,000	34.5	5,000	34.5	5,000
-4	1/4	7/16-20 UNF	34.5	5,000	31	4,500	34.5	5,000	31.5	4,500
-5	5/16	1/2-20 UNF	34.5	5,000	27.5	4,000	34.5	5,000	27.5	4,000
-6	3/8	9/16-18 UNF	34.5	5,000	27.5	4,000	34.5	5,000	27.5	4,000
-8	1/2	3/4-16 UNF	31	4,500	27.5	4,000	31	4,500	27.5	4,000
-10	5/8	7/8-14 UNF	24	3,500	21	3,000	24	3,500	21	3,000
-12	3/4	1-1/16-12 UN	24	3,500	21	3,000	24	3,500	21	3,000
-14	7/8	1-3/16-12 UN	21	3,000	17	2,500	21	3,000	17	2,500
-16	1	1-5/16-12 UN	21	3,000	17	2,500	21	3,000	17	2,500
-20	1 1/4	1-5/8-12 UN	17	2,500	14	2,000	17	2,500	14	2,000
-24	1 1/2	1-7/8-12 UN	14	2,000	10.5	1,500	14	2,000	10.5	1,500
-32	2	2-1/2-12 UN	10.5	1,500	8	1,125	10.5	1,500	8	1,125

1) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)
2) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts

Pressure Ratings for Fittings With NPTF Pipe Threads and Adapter Unions

Nominal Pipe Size		Thread Size		Working Pressures			
Nom SAE Dash Size	Nom Inch Pipe O.D.	Dryseal Pipe Thread (NPTF[1]) Male and Female	Straight Pipe Thread (NPSM[2]) Female Swivels	Fittings With NPTF Pipe Threads		Adapter Unions	
				MPa	psi	MPa	psi
-2	1/8	1/8-27	1/8-27	34.5	5,000	34.5	5,000
-4	1/4	1/4-18	1/4-18	27.5	4,000	34.5	5,000
-6	3/8	3/8-18	3/8-18	21	3,000	27.6	4,000
-8	1/2	1/2-14	1/2-14	21	3,000	24.1	3,500
-12	3/4	3/4-14	3/4-14	17	2,500	15.5	2,250
-16	1	1-11-1/2	1-11-1/2	14	2,000	13.8	2,000
-20	1 1/4	1-1/4-11-1/2	1-1/4-11-1/2	8	1,150	11.2	1,625
-24	1 1/2	1-1/2-11-1/2	1-1/2-11-1/2	7	1,000	8.6	1,250
-32	2	2-11-1/2	2-11-1/2	7	1,000	7.8	1,125

1) Dryseal American Standard Taper Pipe Thread
2) American Standard Straight Pipe Thread for Mechanical Joints

Pressure Ratings for ORFS Male Tube Ends, Female Swivels and Straight Thread Stud Ends (Inch)									
Nominal Tube Size		Thread Size (Notes 1&2)		Working Pressures					
Nom SAE Dash Size	Nom Inch Tube O.D.	SAE J1453 ORFS Tube End	SAE J1926/2/ ISO 11926-2 O-Ring Port Thread Size	ORFS Tube Ends, Unions and Bulkheads		Heavy Duty Stud Ends Per SAE J1453, J1926/2/ISO 11926-2			
						Non-Adjustable Studs		Adjustable Studs	
				MPa	psi	MPa(3)	psi	MPa(3)	psi
-4	1/4	9/16-18 UNF	7/16-20 UNF	41.3	6,000	63	9,000	40	6,000
-5	5/16	5/8-18 UNF	1/2-20 UNF	41.3	6,000	63	9,000	40	6,000
-6	3/8	11/16-16 UNF	9/16-18 UNF	41.3	6,000	63	9,000	40	6,000
-8	1/2	13/16-16 UNF	3/4-16 UNF	41.3	6,000	63	9,000	40	6,000
-10	5/8	1-14 UNF	7/8-14 UNF	41.3	6,000	63	9,000	40	6,000
-12	3/4	1-3/16-12 UN	1-1/16-12 UN	41.3	6,000	40	6,000	40	6,000
-14	7/8	1-5/16-12 UN	1-3/16-12 UN	41.3	6,000	40	6,000	40	6,000
-16	1	1-7/16-12 UN	1-5/16-12 UN	41.3	6,000	40	6,000	31.5	5,000
-20	1 1/4	1-11/16-12 UN	1-5/8-12 UN	27.5	4,000	25	4,000	25	4,000
-24	1 1/2	2-12 UN	1-7/8-12 UN	27.5	4,000	25	4,000	20	3,000

1) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)
2) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts
3) MPa ratings for J1926/2/ISO 11926-2 stud ends are rationalized values as published in those standards.

Pressure Ratings for Code 61 Four-Screw Split Flange Ends								
Nominal Flange Size		Screw Dimensions			Working Pressures @ Recommended Torque (Note: See Below)			
Nom SAE Dash Size	Nom Inch Pipe O.D.	Thread	Length		Maximum Recommended Working Pressure		Recommended Torque Range	
			mm	inch	MPa	psi	Nm	lb-in
-8	1/2	5/16-18	32	1-1/4	34.5	5,000	20-25	175-225
-12	3/4	3/8-16	32	1-1/4	34.5	5,000	28-40	250-350
-16	1	3/8-16	32	1-1/4	34.5	5,000	37-48	325-425
-20	1 1/4	7/16-14	38	1-1/2	27.6	4,000	48-62	425-550
-24	1 1/2	1/2-13	38	1-1/2	20.7	3,000	62-79	550-700
-32	2	1/2-13	38	1-1/2	20.7	3,000	73-90	650-800
-40	2 1/2	1/2-13	44	1-3/4	17.2	2,500	107-124	950-1100
-48	3	5/8-11	44	1-3/4	13.8	2,000	186-203	1650-1800
-56	3 1/2	5/8-11	51	2	3.4	500	158-181	1400-1600
-64	4	5/8-11	51	2	3.4	500	158-181	1400-1600
-80	5	5/8-11	57	2-1/4	3.4	500	158-181	1400-1600

Table JP4. Pressure Ratings for Code 62 Four-Screw Split Flange Ends								
Nominal Flange Size		Screw Dimensions			Working Pressures @ Recommended Torque (Note: See Below)			
Nom SAE Dash Size	Nom Inch Pipe O.D.	Thread	Length		Maximum Recommended Working Pressure		Recommended Torque Range	
			mm	inch	MPa	psi	Nm	lb-in
-8	1/2	5/16-18	32	1-1/4	41.4	6,000	20-25	175-225
-12	3/4	3/8-16	38	1-1/2	41.4	6,000	34-45	300-400
-16	1	7/16-14	44	1-3/4	41.4	6,000	56-68	500-600
-20	1 1/4	1/2-13	44	1-3/4	41.4	6,000	85-102	750-900
-24	1 1/2	5/8-11	57	2-1/4	41.4	6,000	158-181	1400-1600
-32	2	3/4-10	70	2-3/4	41.4	6,000	271-294	2400-2600

Note: SAE J518, Code 61 and Code 62 Four-Screw Split Flange connections are non-threaded port ends which utilize O-Rings for sealing. They are assembled to ports with split flange clamp halves and clamping pressure is provided by screws or socket head cap screws of SAE Grade 8 or ISO Class 10.9 material as specified in SAE J429 and ISO 898-1.

Flanged head ends are incorporated into fittings having suitable means for attachment to tubes, pipes or hoses to provide connection ends.

Assembly Instructions for 37 Degree Tube Fittings and Adapters

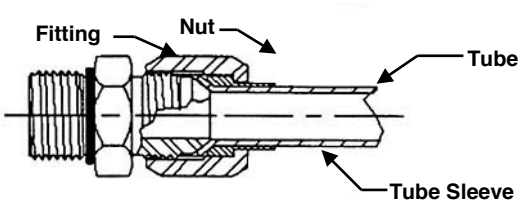


Fig.20 37° Tube Fitting Assembly

Method A. Installation Torque

1. Inspect components for damage or contamination.
2. If O-Ring (**FLARE-O® only)** is not present, install correct O-Ring in FLARE-O® groove, taking care not to cut or nick the O-Ring.
3. Lubricate the O-Ring with a light coat of system fluid or compatible oil.
4. Align tube/hose to mating fitting allowing hand connection. To assure proper alignment, two to three turns of nut should be easily permitted.
5. Tighten tube nut to torque listed in Table K.

Table K. Assembly Torque, 37° Tube Fittings

Tube Size	Thread Size	37° Tube/ Swivel Nut		FLARE-O® Tube/ Swivel Nut	
		Ft. Lbs.	Nm.	Ft. Lbs.	Nm.
-2	5/16-24	6-7	8-9	-	-
-3	3/8-24	8-9	11-12	-	-
-4	7/16-20	11-12	15-16	7-8	9-11
-5	1/2-20	14-15	19-21	10-12	13-16
-6	9/16-18	18-20	24-28	14-16	19-22
-8	3/4-16	36-39	49-53	21-24	28-33
-10	7/8-14	57-63	77-85	28-32	38-43
-12	1 1/16-12	79-88	107-119	52-56	71-76
-14	1 3/16-12	94-103	127-140	60-64	81-87
-16	1 5/16-12	108-113	147-154	63-72	85-98
-20	1 5/8-12	127-133	172-181	84-96	114-130
-24	1 7/8-12	158-167	215-226	91-104	123-141
-32	2 1/2-12	245-258	332-350	210-240	285-325

Method B. Flats From Finger Tight (F.F.F.T.)

1. Inspect components for damage or contamination.
2. Align tube/hose to mating fitting allowing hand connection. To assure proper alignment, two to three turns of nut should be easily permitted.
3. Finger tighten or lightly wrench nut to seat sealing surfaces.
4. Mark nut and adjacent fitting surface to indicate initial seating position. See Fig.21.
5. Finish tightening nut by turning the appropriate F.F.F.T. as indicated in Table L.
6. Mark final tightening position on fitting by extending the existing mark from the nut to the adjacent fitting surface. See Fig.22.

Table L. Flats From Finger Tight Installation Method[1]

Tube Size	Straight Thread Size	37° Tube Nut F.F.F.T.	FLARE-O® Tube Nut F.F.F.T.	Swivel Nut F.F.F.T.	FLARE-O® Swivel Nut F.F.F.T.
-2	5/16-24	---	---	---	---
-3	3/8-24	---	---	---	---
-4	7/16-20	2	2	1.5	1
-5	1/2-20	2	2	2	1.5
-6	9/16-18	1.5	1.5	1.5	1.25
-8	3/4-16	1.5	1.5	1.25	1.25
-10	7/8-14	1.5	1.5	1	1
-12	1 1/16-12	1.25	1.25	1	1
-14	1 3/16-12	1.25	1.25	1	1
-16	1 5/16-12	1	1	1	1
-20	1 5/8-12	1	1	1	1
-24	1 7/8-12	1	1	1	1
-32	2 1/2-12	1	1	1	1

1) Recommended for use only when installation by torque method is not practical.

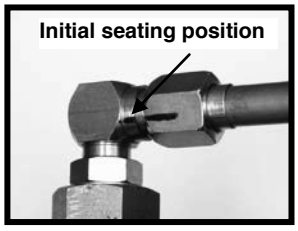


Fig.21 Mark finger tight position

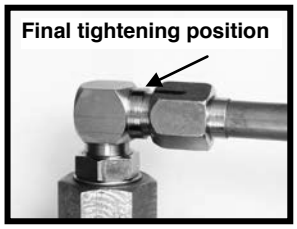


Fig.22 Mark final tightening position

Assembly Instructions for O-Ring Port Non-Adjustable Stud Ends

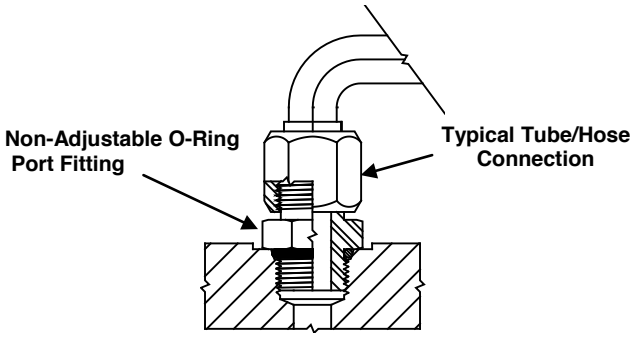


Fig. 13 Typical Non-Adjustable Stud End O-Ring Port Installation

1. Inspect components for damage or contamination.
2. If O-Ring is not present, install O-Ring on the port end of the connector using a proper O-Ring installation tool, taking care not to cut or nick the O-Ring.
3. Lubricate the O-Ring with a light coat of system fluid or compatible oil.
4. Screw stud into the O-Ring port and tighten to recommended torque listed in the following tables.

Assembly Torque, SAE J1926-3 Light Duty (L series) Stud Ends (Ref. SAE J514 Tube Fittings and Port Plugs)

Tube Size	Thread Size	Ft. Lbs.	Nm.
-2	5/16-24	6-7	8-9
-3	3/8-24	8-9	11-12
-4	7/16-20	13-15	18-20
-5	1/2-20	17-19	23-26
-6	9/16-18	22-24	29-33
-8	3/4-16	40-43	49-53
-10	7/8-14	43-48	59-64
-12	1-1/16-12	68-75	93-102
-14	1-3/16-12	90-99	122-134
-16	1-5/16-12	112-123	151-166
-20	1-5/8-12	146-161	198-218
-24	1-7/8-12	154-170	209-231
-32	2-1/2-12	218-240	296-325

Assembly Torque, SAE J1926-2 Heavy Duty (S series) Stud Ends (Ref. SAE J1453 ORFS Fittings)

Tube Size	Thread Size	Ft. Lbs.	Nm.
-3	3/8-24	8-10	11-13
-4	7/16-20	14-16	20-22
-5	1/2-20	18-20	24-27
-6	9/16-18	24-26	33-35
-8	3/4-16	50-60	68-78
-10	7/8-14	72-80	98-110
-12	1-1/16-12	125-135	170-183
-14	1-3/16-12	170-190	230-260
-16	1-5/16-12	200-220	270-300
-20	1-5/8-12	210-280	285-380
-24	1-7/8-12	270-360	370-490

Assembly Torque, ISO 1179-3 Light Duty (L series) Stud Ends – Types G & H

Dash Size	Thread Size	Ft. Lbs.	Nm.
-2	G 1/8	18-20	25-28
-4	G 1/4	37-41	50-55
-6	G 3/8	59-65	80-88
-8	G 1/2	77-85	105-116
-12	G 3/4	162-178	200-242
-16	G 1	273-300	370-407
-20	G 1-1/4	369-405	500-550
-24	G 1-1/2	442-486	600-660

Assembly Torque, ISO 6149-3 Light Duty (L Series) Stud Ends

Tube Size mm	Thread Size	Ft. Lbs.	Nm.
-4	M8 x 1	6-7	8-9
-5	M10 x 1	11-12	15-17
-6	M12 x 1.5	18-20	25-28
-8	M14 x 1.5	26-28	35-39
-10	M16 x 1.5	29-32	40-44
-12	M18 x 1.5	33-36	45-50
-16	M22 x 1.5	44-49	60-66
-20	M27 x 2	74-81	100-110
-22	M30 x 2	96-105	130-143
-25	M33 x 2	118-130	160-176
-30	M42 x 2	155-170	210-231
-38	M48 x 2	192-211	260-286
-50	M60 x 2	232-255	315-347

Assembly Torque, ISO 6149-2 Heavy Duty (S Series) Stud Ends

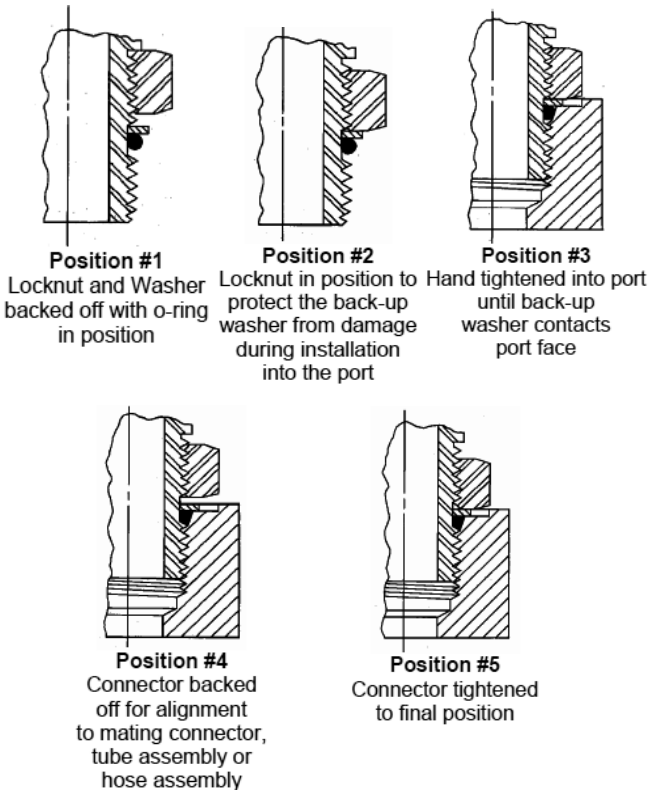
Tube Size mm	Thread Size	Ft. Lbs.	Nm.
-4	M8 x 1	7-8	10-11
-5	M10 x 1	15-16	20-22
-6	M12 x 1.5	26-28	35-39
-8	M14 x 1.5	33-36	45-50
-10	M16 x 1.5	41-45	55-61
-12	M18 x 1.5	52-57	70-77
-16	M22 x 1.5	74-81	100-110
-20	M27 x 2	125-138	170-187
-22	M30 x 2	158-174	215-237
-25	M33 x 2	228-251	310-341
-30	M42 x 2	243-268	330-363
-38	M48 x 2	310-340	420-462
-50	M60 x 2	369-405	500-550

Assembly Torque, ISO 9974 Light Duty Stud Ends (O-Ring/Retaining Ring Type)

Tube Size mm	Thread Size	Ft. Lbs.	Nm.
-5	M10 x 1	15-16	20-22
-6	M12 x 1.5	22-24	30-33
-8	M14 x 1.5	37-41	50-55
-10	M16 x 1.5	44-49	60-66
-12	M18 x 1.5	59-65	80-88
-16	M22 x 1.5	103-113	140-154
-20	M27 x 2	147-162	200-220
-25	M33 x 2	280-308	380-418
-30	M42 x 2	369-405	500-550
-38	M48 x 2	442-486	600-660

Assembly Instructions for Adjustable Stud End O-Ring Port Fittings

1. To protect the sealing surfaces and prevent dirt and other contaminants from entering the system, do not remove the protective caps and/or plugs until it is time to assemble the components.
2. Prior to assembly, remove protective caps and/or plugs and inspect the connector and the port to ensure both mating parts are free of burrs, nicks, scratches or any foreign material.
3. If O-Ring is not present, install O-Ring on the port end of the connector using a proper O-Ring installation tool, taking care not to cut or nick the O-Ring.
4. Lubricate the O-Ring with a light coat of system fluid or compatible oil.
5. Position #1 - The O-Ring should be located in the groove adjacent to the face of the back-up washer. The washer and O-Ring should be positioned at the extreme top end of the groove as shown.
6. Position #2 - Position the locknut to just touch the back-up washer as shown. The locknut in this position will eliminate potential back-up washer damage during the next step.
7. Position #3 - Install the connector into the straight thread port until the metal back-up washer contacts the face of the port as shown.
Caution: Over tightening beyond contact can cause washer damage, if the washer is not supported by the locknut.
8. Position #4 – Adjust the connector to the proper position by turning out (counterclockwise) up to a maximum of one turn as shown to provide proper alignment with the mating connector, tube assembly or hose assembly.
9. Position #5 - Using two wrenches, use the backup wrench to hold the connector in the desired position and then use the torque wrench to the tighten the locknut to the appropriate torque level shown in the following tables.
10. Visually inspect the joint, where possible, to ensure the O-Ring is not pinched or bulging out from under the washer and that the backup washer is properly seated flat against the face of the port.



Assembly Torque, SAE J1926-2 Heavy Duty (S series) Stud Ends (Ref. SAE J1453 ORFS Fittings)

Tube Size	Thread Size	Ft. Lbs.	Nm.
-3	3/8-24	8-10	11-13
-4	7/16-20	14-16	20-22
-5	1/2-20	18-20	24-27
-6	9/16-18	24-26	33-35
-8	3/4-16	50-60	68-78
-10	7/8-14	72-80	98-110
-12	1-1/16-12	125-135	170-183
-14	1-3/16-12	170-190	230-260
-16	1-5/16-12	200-220	270-300
-20	1-5/8-12	210-280	285-380
-24	1-7/8-12	270-360	370-490

Assembly Torque, SAE J1926-3 Light Duty (L series) Stud Ends (Ref. SAE J514 Tube Fittings and Port Plugs)

Tube Size	Thread Size	Ft. Lbs.	Nm.
-2	5/16-24	6-7	8-9
-3	3/8-24	8-9	11-12
-4	7/16-20	13-15	18-20
-5	1/2-20	17-19	23-26
-6	9/16-18	22-24	29-33
-8	3/4-16	40-43	49-53
-10	7/8-14	43-48	59-64
-12	1-1/16-12	68-75	93-102
-14	1-3/16-12	90-99	122-134
-16	1-5/16-12	112-123	151-166
-20	1-5/8-12	146-161	198-218
-24	1-7/8-12	154-170	209-231
-32	2-1/2-12	218-240	296-325

Assembly Torque, ISO 1179-3 Light Duty (L series) Stud Ends – Types G & H

Dash Size	Thread Size	Ft. Lbs.	Nm.
-2	G 1/8	18-20	25-28
-4	G 1/4	37-41	50-55
-6	G 3/8	59-65	80-88
-8	G 1/2	77-85	105-116
-12	G 3/4	162-178	200-242
-16	G 1	273-300	370-407
-20	G 1-1/4	369-405	500-550
-24	G 1-1/2	442-486	600-660

Assembly Torque, ISO 6149-3 Light Duty (L Series) Stud Ends			
Tube Size mm	**Thread Size**	**Ft. Lbs.**	**Nm.**
-4	M8 x 1	6-7	8-9
-5	M10 x 1	11-12	15-17
-6	M12 x 1.5	18-20	25-28
-8	M14 x 1.5	26-28	35-39
-10	M16 x 1.5	29-32	40-44
-12	M18 x 1.5	33-36	45-50
-16	M22 x 1.5	44-49	60-66
-20	M27 x 2	74-81	100-110
-22	M30 x 2	96-105	130-143
-25	M33 x 2	118-130	160-176
-30	M42 x 2	155-170	210-231
-38	M48 x 2	192-211	260-286
-50	M60 x 2	232-255	315-347

Assembly Torque, ISO 6149-2 Heavy Duty (S Series) Stud Ends			
Tube Size mm	**Thread Size**	**Ft. Lbs.**	**Nm.**
-4	M8 x 1	7-8	10-11
-5	M10 x 1	15-16	20-22
-6	M12 x 1.5	26-28	35-39
-8	M14 x 1.5	33-36	45-50
-10	M16 x 1.5	41-45	55-61
-12	M18 x 1.5	52-57	70-77
-16	M22 x 1.5	74-81	100-110
-20	M27 x 2	125-138	170-187
-22	M30 x 2	158-174	215-237
-25	M33 x 2	228-251	310-341
-30	M42 x 2	243-268	330-363
-38	M48 x 2	310-340	420-462
-50	M60 x 2	369-405	500-550

Assembly Torque, ISO 9974 Light Duty Stud Ends (O-Ring/Retaining Ring Type)			
Tube Size mm	**Thread Size**	**Ft. Lbs.**	**Nm.**
-5	M10 x 1	15-16	20-22
-6	M12 x 1.5	22-24	30-33
-8	M14 x 1.5	37-41	50-55
-10	M16 x 1.5	44-49	60-66
-12	M18 x 1.5	59-65	80-88
-16	M22 x 1.5	103-113	140-154
-20	M27 x 2	147-162	200-220
-25	M33 x 2	280-308	380-418
-30	M42 x 2	369-405	500-550
-38	M48 x 2	442-486	600-660

Assembly Instructions for NPTF and BSPT Pipe Threads

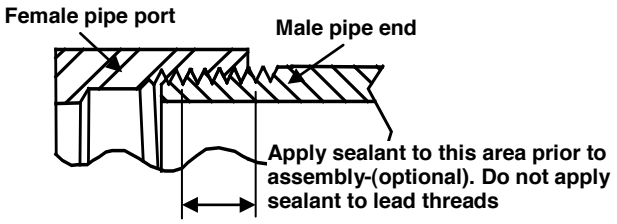


Fig.18 NPTF Pipe Assembly

Method A. Installation Torque

1. Inspect components for damage or contamination.
2. Lubricate or apply compatible sealant to male pipe thread. See Fig.18.
3. Screw fitting into port until hand tight. For shape fittings, take note of the intended alignment of the mating connectors.
4. For straight fittings, tighten to recommended torque listed in the following table. For shape fittings, approximately 1/2 turns should be made and then torque to the desired orientation without exceeding maximum recommended torque.

Assembly Torque, Adapter Unions and Pipe Fittings. (T.F.F.T. for Tapered Pipe Only)[1]					
	Adapter Unions		Pipe		
Pipe Size	Ft. Lbs. Max.	Nm. Max.	Ft. Lbs. Max.	Nm. Max.	Tapered Pipe T.F.F.T.[2] (Turns)
1/8	13	18	12	16	3/4-1 3/4
1/4	20	27	25	34	3/4-1 3/4
3/8	25	34	40	54	3/4-1 3/4
1/2	47	64	54	73	1/2-1 1/2
3/4	84	114	78	106	1/2-1 1/2
1	129	175	112	152	1/2-1 1/2
1-1/4	152	206	154	209	1/2-1 1/2
1-1/2	152	206	211	286	1/2-1 1/2
2	300	407	300	407	1/2-1 1/2

1) Lubricated assembly.
2) Tapered pipe connections use turns from finger tight. Turn past minimum for alignment of shape fittings.

Method B. Turns From Finger Tight (T.F.F.T.)

Note: Due to the variety of factors which affect the turns method, the values indicated are approximate and should be used only for initial installation, by experienced installation personnel.

1. Inspect components for damage or contamination.
2. Lubricate or apply compatible sealant to male pipe thread.
3. Screw fitting into port and lightly wrench to seat threads.
4. Mark fitting and adjacent surface to indicate initial seating position.
5. For straight fittings, tighten using mean to maximum recommended T.F.F.T. listed in Table I.
6. For shape fittings, tighten to minimum T.F.F.T., and turn past to desired orientation.
7. Mark final tightening position by extending the existing mark from the fitting to the adjacent surface.

Assembly Instructions for Adapter Unions/ Female NPSM Pipe Swivel Ends

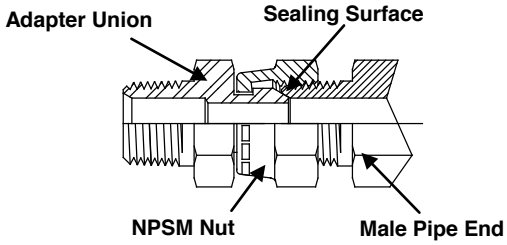


Fig.JA10 Adapter Union Assembly

1. Inspect components for damage or contamination.
2. Check for 30 degree female seat on male pipe end.
3. Align tube/hose to mating swivel allowing hand connection. To assure proper alignment, two to three turns of nut should be easily permitted.
4. Tighten swivel nut to recommended torque listed in the following table.

Notes: 1. Refer to the appropriate assembly instruction for adapter union port ends, i.e.: male pipe, female pipe or O-Ring straight thread.
2. Female NPSM pipe swivels seal on the male nose of the female swivel end and the 30 degree female seat on the male pipe end. The NPSM swivel nut uses a straight mechanical pipe thread and is not a sealing member.
3. Ensure that the male pipe end to be assembled has been machined with the optional 30 degree female seat. A standard 45 degree chamfer will not seal properly.

Assembly Torque, Adapter Unions and Pipe Fittings (T.F.F.T. for Tapered Pipe Only)[1]			
	Adapter Unions		Pipe
Pipe Size	Ft. Lbs. Max.	Nm. Max.	Tapered Pipe T.F.F.T. [2] (Turns)
1/16	----	----	3/4-1 3/4
1/8	13	18	3/4-1 3/4
1/4	20	27	3/4-1 3/4
3/8	25	34	1/2-1 1/2
1/2	47	64	1/2-1 1/2
3/4	84	114	1/2-1 1/2
1	129	175	1/2-1 1/2
1-1/4	152	206	1/2-1 1/2
1-1/2	152	206	1/2-1 1/2
2	300	407	1/2-1 1/2

1) Lubricated assembly.
2) Tapered pipe connections use turns from finger tight. Turn past for alignment of shape fittings.

Assembly Instructions for SAE J518-1 Code 61 and SAE J518-2 Code 62- Four Screw Split Flange Connections

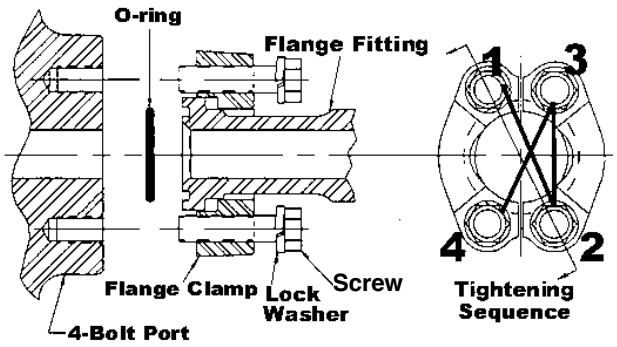


Fig.11 Four Screw Flange Fitting Assembly

1. Inspect components for damage or contamination.
2. Install correct O-Ring in flange groove.
3. Lubricate O-Ring and screw threads
4. Align flange and clamp halves to port.
5. Install screws, hand tighten evenly to seat O-Ring on port face.
6. Gradually tighten screws in equal increments, alternating in a diagonal pattern, to recommended torque listed in the following tables.

Assembly Torque, SAE J518-1 Code 61 Inch Flange Ends				
Dash Size	**Flange Size**	**Screw Size[1]**	**Ft. Lbs.**	**Nm.**
-8	**1/2**	5/16-18 x 1-1/4	18	24
-12	**3/4**	3/8-16 x 1-1/4	32	43
-16	**1**	3/8-16 x 1-1/4	32	43
-20	**1-1/4**	7/16-14 x 1-1/2	52	70
-24	**1-1/2**	1/2-13 x 1-1/2	77	105
-32	**2**	1/2-13 x 1-1/2	77	105

1) Lubricated assembly, Grade 8 Screws.

Assembly Torque, SAE J518-2 Code 62 Inch Flange Ends				
Dash Size	**Flange Size**	**Screw Size[1]**	**Ft. Lbs.**	**Nm.**
-8	**1/2**	5/16-18 x 1-1/4	24	32
-12	**3/4**	3/8-16 x 1-1/2	44	60
-16	**1**	7/16-14 x 1-3/4	68	92
-20	**1-1/4**	1/2-13 x 1-3/4	111	150
-24	**1-1/2**	5/8-11 x 2-1/4	217	295
-32	**2**	3/4-10 x 2-3/4	332	450

1) Lubricated assembly, Grade 8 Screws

Assembly Torque, SAE J518-1 Code 61 Metric Flange Ends				
Metric Size	**Flange Size**	**Screw Size[1]**	**Ft. Lbs.**	**Nm.**
13	**1/2**	M8 x 25	24	32
19	**3/4**	M10 x 30	52	70
25	**1**	M10 x 30	52	70
32	**1-1/4**	M10 x 30	52	70
38	**1-1/2**	M12 x 35	96	130
51	**2**	M12 x 35	96	130
64	**2-1/2**	M12 x 40	96	130

1) Lubricated assembly, Class 10.9 Screws.

Assembly Torque, SAE J518-2 Code 62 Metric Flange Ends				
Metric Size	**Flange Size**	**Screw Size[1]**	**Ft. Lbs.**	**Nm.**
13	**1/2**	M8 x 30	24	32
19	**3/4**	M10 x 35	52	70
25	**1**	M12 x 45	96	130
32	**1-1/4**	M12 x 45	96	130
38	**1-1/2**	M16 x 55	217	295
51	**2**	M20 x 70	405	550

1) Lubricated assembly, Class 10.9 Screws

Assembly Instructions for Beaded Hose Stem Connections

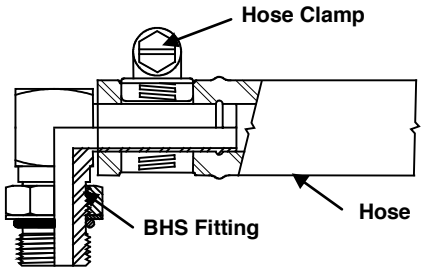


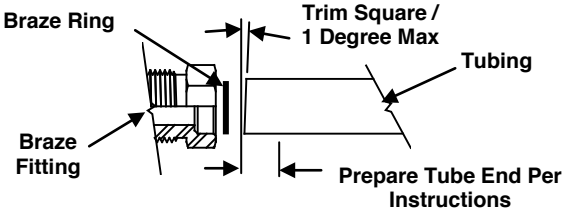
Fig.JA12 Typical Beaded Hose Stem Fitting Connection

1. Inspect components for damage or contamination.
2. Install hose clamp(s) on hose.
3. Lubricate hose I.D. if permissible.
4. Install hose to fitting.
5. Following hose and clamp manufacturers' instructions, tighten hose clamp(s).

Note: Beaded hose stem fittings are intended for use in suction or low pressure lines, typically less than 300 psi. Follow hose and hose clamp manufacturers instructions for specific application requirements.

Assembly Instructions for Silver Brazed Tube Connections

NOTE: The following instructions are not intended to replace detailed brazing procedures or process plans. Only qualified personnel should attempt to braze hydraulic system assemblies. For any application, sufficient testing should be conducted and reviewed by the user and manufacturer to assure safe and satisfactory performance.



Typical Silver Braze Joint Assembly

1. Inspect components for damage or contamination.
2. Tube end to be brazed should be trimmed square to within +/- 1 degree.
3. Prepare tube end by sizing (if required) to achieve the recommended filler metal gap. Refer to braze alloy suppliers recommendations.
4. De-burr tube O.D. and I.D.. Typical chamfer size should not exceed .020 x 45 degree.
5. Clean all components with suitable degreasing solution to remove all oil/grease and loose contaminants. Following this degreasing step, avoid touching the braze joint surfaces with bare hands. Oil from your skin may contaminate the joint and cause voids and inclusions.
6. Mechanically clean or pickle surfaces to be brazed and braze filler material to remove surface oxides. Silicon carbide emery cloth may be used to polish joint surfaces, do not use abrasives containing aluminum oxide.
7. Final degrease all components.
8. Clamp or fixture tube assembly as required.
9. Apply suitable flux to all components, following flux manufacturers recommendations.
10. Assemble tube, braze ring (if used) and fitting components, reflux as required. Inspect to confirm proper placement of components prior to braze.
11. Apply heat uniformly to bring the joint area up to brazing temperature. Follow accepted industry practices for high quality braze joints. If specific brazing procedures have not been established for the fitting configurations being joined, refer to the flux and braze alloy manufacturers for recommendations.
12. Allow braze alloy to solidify completely before quenching.
13. Remove flux, following flux manufacturers instructions.
14. Inspect joint. Joint should show no evidence of voids in the fillet and should have no excess braze on the flange sealing surface area. Fillets should be smooth and continuous around the entire joint.
15. Proof test the assembly. Recommended proof pressure is two times the system operating pressure. Note: System operating pressure should not exceed the rated operating pressure of the end connections, tubing and/or hose components.

Assembly Instructions, Flares for Tubing

1. Select proper tubing for the application, including material compatibility, system fluid, operating pressure, mechanical loading, etc. For single flaring to SAE J533, SAE J524 or J525 tubing is recommended. For double flaring applications, tubing to SAE J524, J525, J526 or J356 may be used. For applications using stainless steel fittings, fully annealed tubing per ASTM A213, ASTM A249 or ASTM A269 is recommended
2. Prepare tube end by cutting to required length. End should be trimmed square within +/- 1°.
3. Deburr O.D. and I.D. of tube. Refer to Fig.24 and Table M for recommended tube chamfers for heavy wall tubing.
4. Clean tube to remove all dirt and grit from both O.D. and I.D. of tube.
5. Assemble tube nut and sleeve on tube. The threaded end of nut and flared end of sleeve must point toward the end of the tube to be flared.
6. Using the correct flaring tool for the tube size and desired flare angle, flare the tube end. Refer to Fig.23 for thin wall tubing flares and to Fig.24 for typical hydraulic system pressure line tubing flares.
7. Inspect flare to the dimensions indicated in Fig.23, Fig.24 and Table M. In addition, flare should be checked for concentricity, thin out, cracks, nicks, loose slivers, burrs, pits or other defects which may prevent sealing.

Table M. Dimensions of Single and Double 37° Flares for Tubing (Ref. SAE J533)							
Dash Size	Nom. Tube Dia.	A and A1 Single and Double Flare Dia.	B Radius +/- 0.02	D Single Flare Tube Wall Max.	D1 Double Flare Tube Wall Max.	E Optional Tube Chamfer Face Width	F1 Dia. +/-.01
-2	1/8	.200-.180	0.03	0.035	0.025	.02+/-.005	.191
-3	3/16	.280-.260	0.03	0.035	0.028	.02+/-.005	.244
-4	1/4	.360-.340	0.03	0.065	0.035	.03+/-.005	.289
-5	5/16	.430-.400	0.03	0.065	0.035	.03+/-.005	.350
-6	3/8	.490-.460	0.04	0.065	0.049	.03+/-.005	.429
-8	1/2	.660-.630	0.06	0.083	0.049	.05+/-.010	.565
-10	5/8	.790-.760	0.06	0.095	0.049	.05+/-.010	.675
-12	3/4	.950-.920	0.08	0.109	0.049	.05+/-.010	.844
-14	7/8	1.070-1.040	0.08	0.109	0.065	.05+/-.010	.970
-16	1	1.200-1.170	0.09	0.120	0.065	.05+/-.010	1.094
-20	1-1/4	1.510-1.480	0.09	0.120	0.065	.05+/-.010	1.405
-24	1-1/2	1.730-1.700	0.11	0.120	0.065	.05+/-.010	1.620
-32	2	2.360-2.330	0.11	0.134	0.065	.06+/-.010	2.234

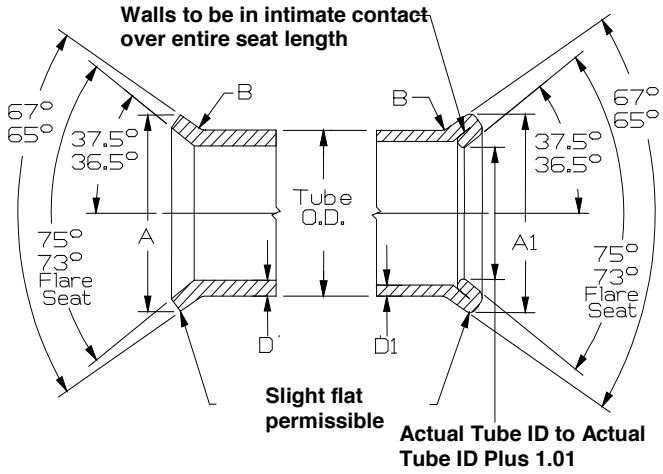


Fig.23 Single and Double 37° Flares for Tubing
1) Recommended for thin wall tubing flares

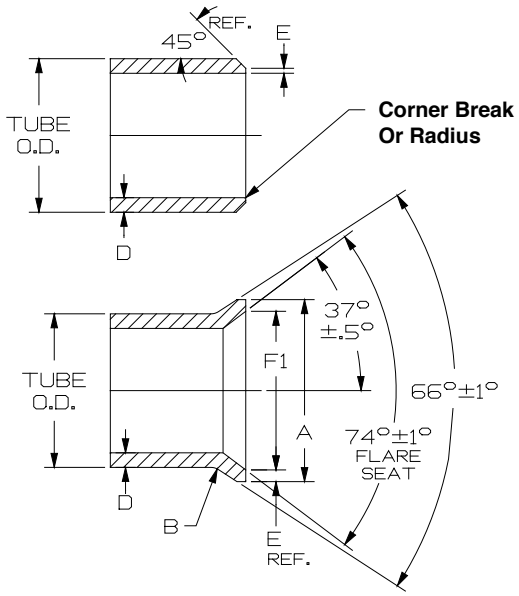


Fig.24 Optional Tube Preparation and Single 37° Flare for Tubing
1) Recommended for typical hydraulic system pressure line flares.

Assembly Instructions for O-Ring Face Seal Fittings and Adapters

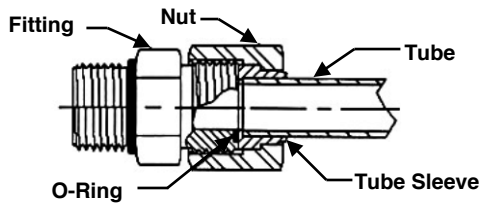
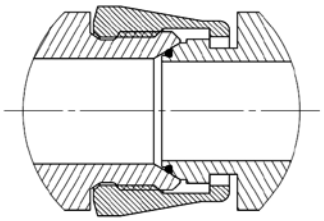


Fig.19 ORFS Fitting Assembly

1. Inspect components for damage or contamination.
2. If O-Ring is not present, install correct O-Ring in face groove taking care not to cut or nick the O-Ring.
3. Lubricate the O-Ring with a light coat of system fluid or compatible oil.
4. Align tube/hose to mating fitting allowing hand connection. Mating flat face end should fully contact O-Ring.
5. Tighten tube nut to recommended torque listed in the following table.

Assembly Torque, O-Ring Face Seal Fittings			
Tube Size	**Thread Size**	**Ft. Lbs.**	**Nm.**
-4	9/16-18	10-12	14-16
-6	11/16-16	18-20	24-27
-8	13/16-16	32-35	43-47
-10	1-14	46-50	60-68
-12	1-3/16-12	65-70	90-95
-14	1-3/16-12	65-70	90-95
-16	1-7/16-12	92-100	125-135
-20	1-11/16-12	125-140	170-190
-24	2-12	150-165	200-225

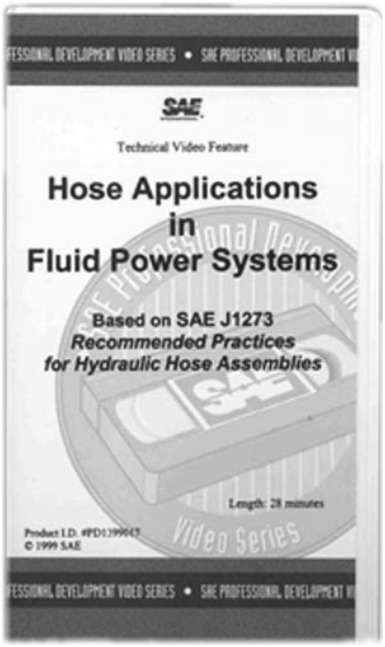
Assembly Instructions for 60° Cone Connectors



1. Inspect components for damage or contamination.
2. If O-Ring is not present, install correct O-Ring in groove.
3. Lubricate the O-Ring with a light coat of system fluid or compatible oil.
4. Align tube/hose to mating fitting allowing hand connection. To assure proper alignment, two to three turns of nut should be easily permitted.
5. Tighten tube nut to torque listed in the following table.

Assembly Torque, ISO 8434-6 60° Cone Connectors			
Tube Size mm	**Thread Size**	**Ft. Lbs.**	**Nm.**
6	G 1/8	7-8	10-11
8	G 1/4	15-16	10-22
10	G 3/8	26-28	35-39
12	G 1/2	37-41	50-55
16	G 5/8	44-49	60-66
20	G 3/4	63-69	85-94
25	G 1	85-93	115-127
32	G 1-1/4	140-154	190-209
38	G 1-1/2	177-195	240-264
50	G 2	221-243	300-330

Note: Air-Way is proud to be an active participant in the development of the text and the video format versions of SAE J1273 - Recommended Practices for Hydraulic Hose Assemblies. These SAE documents are intended as guides to consider when selecting, routing, fabricating, installing, replacing, maintaining, and storing hose for fluid power systems. Proper consideration of these factors can have a direct impact on the satisfactory performance of hose/tube assemblies and the fittings to which they are attached. Following the recommended practices outlined in SAE J1273 can reduce the likelihood of component or system failure. Air-Way supports these recommendations and can make a copy of the videotape version available to you on request. Please contact customer service for details.



Hose and Tube Routing

The following figures provide a summary of commonly accepted best practices for hose and tube routing. These figures are not intended to be all-inclusive, but represent situations frequently encountered in routing hydraulic system conductors. In addition to these figures, several general guidelines should be observed in the planning of a fluid power system layout.

1. Hydraulic system hose/tube assemblies and connectors are designed for the internal forces of conducted fluids. They are not designed to carry significant external loads. The routing and appropriate use of guards for these assemblies should protect them from external forces that could damage the hose/tube assembly or the fittings to which they are connected. Special attention should be given in areas where the assemblies are likely to be used as a step or are in exposed areas subject to impact, abrasion or snagging.

2. The pressurized fluids contained by the connectors and conductors in a fluid power system can cause property damage or personal injury. Some of the potential conditions to consider include:

a. Fluid Injection - Pinhole leaks in high-pressure circuits can allow the release of pressurized fluid that can penetrate through the skin. ***Fluid injection injuries can cause severe injury and potential loss of limb.*** System planning should minimize the potential for fluid injections through careful routing, and the appropriate use of guards, shields and warnings in areas normally occupied by operators or maintenance personnel. ***In the event of a fluid injection type injury, immediately seek medical treatment. Do not delay or treat as a simple cut.***

b. Burns - Hydraulic system fluids can reach temperatures high enough to burn skin. Component placement and system routing should be planned to minimize operator exposure to hot surfaces as well as potential contact with escaping fluids. Appropriate use of guards, shields and warnings should be considered in areas normally occupied by operators or maintenance personnel.

c. Physical Damage - In the event of a failure of a system component, physical damage can result from contact with ejected components, whipping hose or falling mechanisms. Loss of system control functions may result, such as sudden retraction of self-return mechanisms or loss of steering or brakes.

3. Proper alignment and assembly of components in a fluid power system is a major factor in the elimination of leaks and other system problems. Adequate space should be provided for access in all areas where connections need to be made during assembly or maintenance.

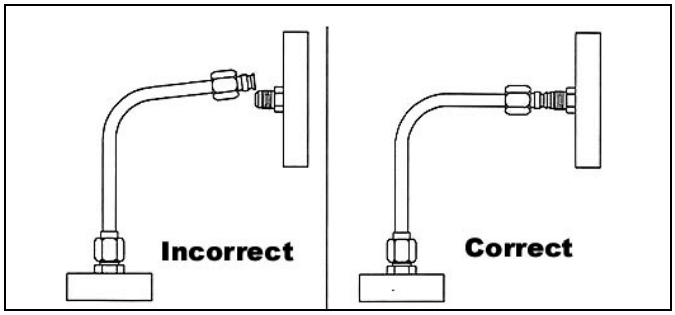


Fig.1 Check for proper component alignment. Correct misalignment prior to final assembly. Align hose/tube assembly allowing hand connection. To assure proper alignment, two to three turns of nut should be easily permitted by hand.

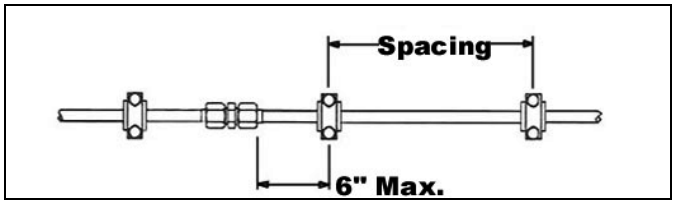


Fig.2 Use proper clamping to reduce strain due to vibration. See Table A for recommended clamp spacing. Final tightening of hose/tube connections should be completed before tightening of supports and clamps.

Table A. Clamp Spacing	
Tube O.D.	Spacing
1/4” - 1/2" (6.4 - 12.7 mm)	3 ft. (0.9 m)
5/8" - 7/8" (15.9 - 22.2 mm)	4 ft. (1.2 m)
1" (25.4 mm)	5 ft. (1.5 m)
1 1/4" and up (31.8 mm and up)	6 ft. (1.8 m)

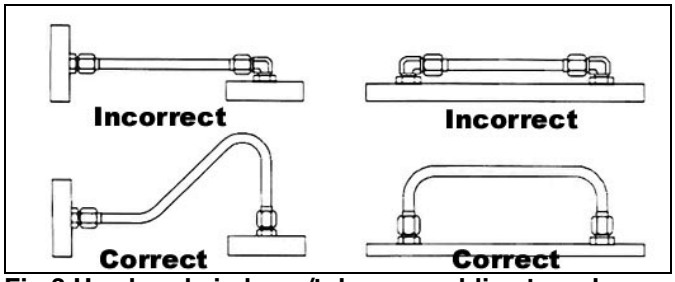


Fig.3 Use bends in hose/tube assemblies to reduce strain on components and to compensate for tolerance stack-up in assemblies.

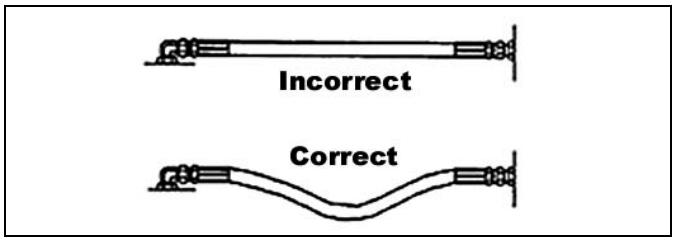


Fig.4 Allow extra hose length to reduce strain on components, to compensate for tolerance stack-up in assemblies and to allow for hose length changes when pressurized.

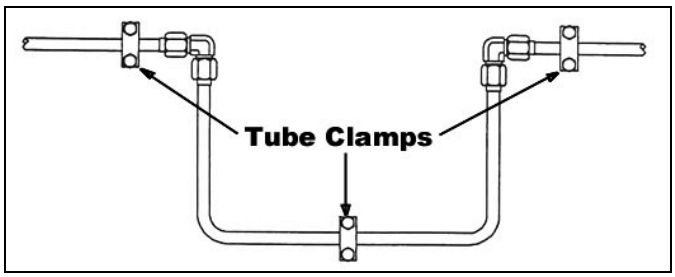


Fig.5 Use U-Bends to allow for expansion and contraction of rigid lines.

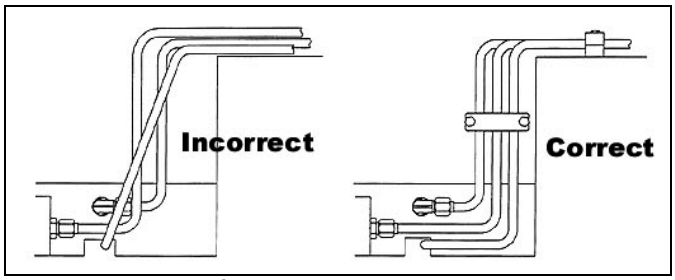


Fig.6 Route hose/tube assemblies to allow ease in assembly, maintenance and proper clamping.

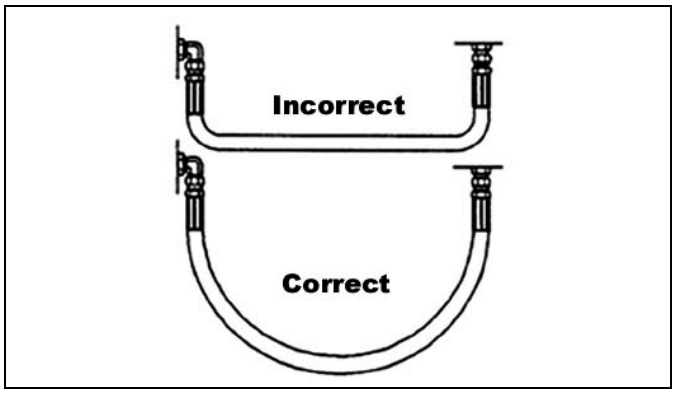


Fig.7 Hose manufacturers minimum bend radius recommendations should be observed for both static connections and for connections to moveable mechanisms. Bend radius for connections with moveable mechanisms should be checked over the entire range of motion to prevent damage to the hose/tube assembly or connectors.

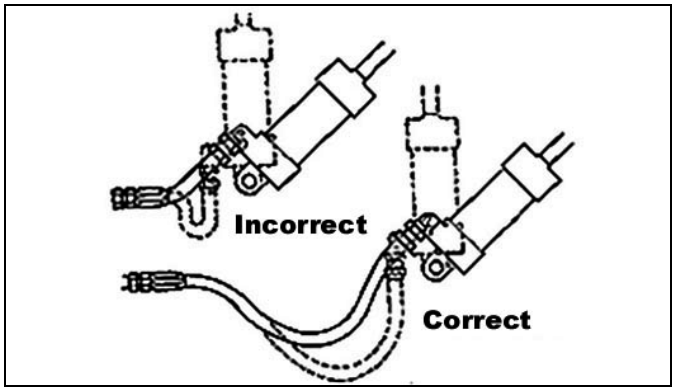


Fig.8 Provide adequate hose length to allow for movement of mechanisms. System design should provide sufficient hose length to prevent strain on connections at extreme extension and to prevent kinking of hose at any point throughout the entire range of motion. Either tensile strain or kinking can cause premature failure of hose/tube assemblies and connectors.

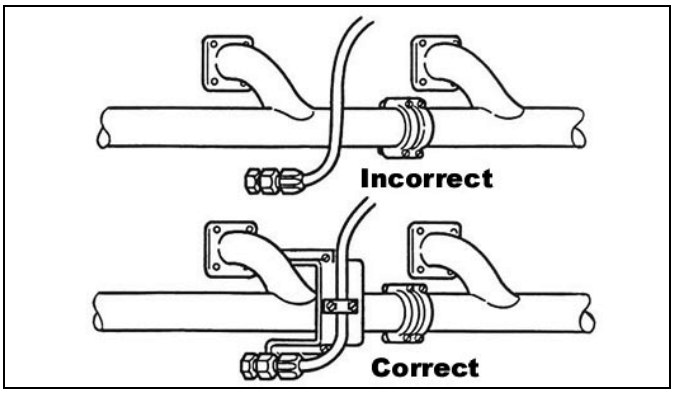


Fig.9 Provide shields/guards to protect hose/tube assemblies from potential damage. Examples include; heat sources such as exhaust manifolds/mufflers, abrasion/rubbing contact, contact with external objects.

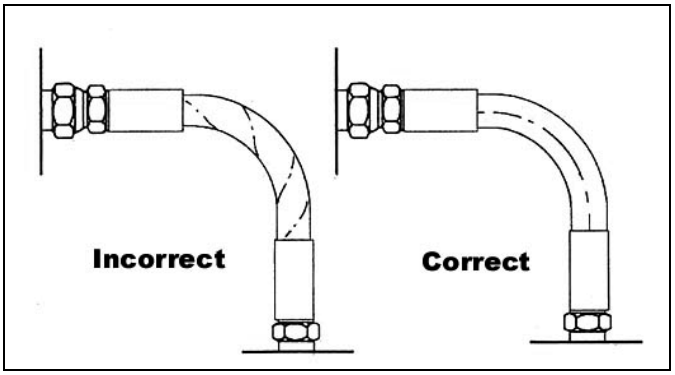


Fig.10 Use two wrenches when making hose connections to prevent hose twist. The hose lay-line may be used for visual reference. Twisting of the hose will result in reduced pressure capability and can cause loosening of the fitting when the hose is pressurized.

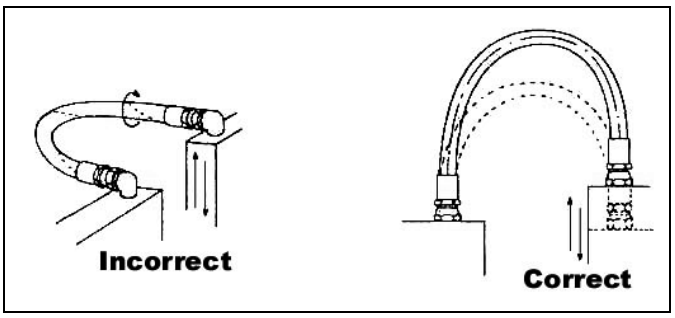


Fig.11 When routing hose assemblies between components that move in a single plane relative to each other, provide connections that result in movement of the hose in the same plane of motion without twisting. Evaluate the total range of motion of the hose assembly to ensure that the minimum bend radius is not violated. Twisting of the hose will result in reduced pressure capability and can cause loosening of the fitting when the hose is pressurized. Bending the hose tighter than the minimum bend radius can exert excessive force on the connections and will reduce the hose service life.

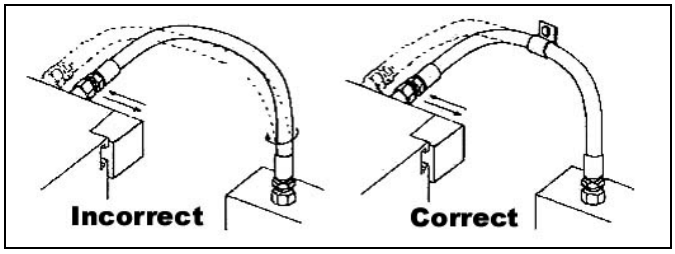


Fig.12 When routing hose assemblies between components which move in more than one plane relative to each other, provide clamping as required to isolate the motion to a single plane of bend for the hose. In installations where it is impossible to adequately clamp the hose assembly, use of live swivel joints in conjunction with proper clamping is recommended. Evaluate the total range of motion of the hose assembly to ensure that the minimum bend radius is not violated. Twisting of the hose will result in reduced pressure capability and can cause loosening of the fitting when the hose is pressurized. Live swivels permit rotational movement of the components under pressure without twisting of the hose. Bending the hose tighter than the minimum bend radius can exert excessive force on the connections and will reduce the hose service life.

Pressure Ratings, Steel Tubing for General Hydraulic System Applications

The following chart lists the nominal pressure ratings of tubing products which conform to SAE J524, SAE J525, SAE J526 and SAE J365. These pressure ratings are derived from the Lamé formula with 12,500 psi (86 MPa) allowable stress factors and approximately 4:1 design factor. Pressure values shown in bold are for tubing wall thickness normally considered suitable for 37 degree single flaring to SAE J533. Many factors influence the pressure at which a hydraulic system will perform satisfactorily. The values shown below should not be used as a standard or specification and are not to be construed as guaranteed minimums.

Note: For single flaring to SAE J533, SAE J524 or J525 tubing is recommended. For double flaring applications, tubing to SAE J 524, J525, J526 or J356 can be used.

Nominal Tube O.D. inch	mm	Nominal Tube Wall Thickness											
		0.028	0.035	0.049	0.065	0.083	0.093	0.109	0.120	0.134	0.148	0.156	0.188
		0.71mm	0.89mm	1.24mm	1.65mm	2.11mm	2.41mm	2.77mm	3.05mm	3.40mm	3.76mm	3.96mm	4.78mm
		Reference Working Pressures at 4:1 Design Factor(psi/MPa)											
0.125		6650	8450										
	3.18	46.0	58.5										
0.188		4250	5450										
	4.77	29.5	37.5										
0.250		3100	3950	5750	7800								
	6.35	21.5	27.0	39.5	54.0								
0.312		2450	3100	4500	6150								
	7.92	16.8	21.5	31.0	42.5								
0.375		2000	2550	3650	5000	6550	7600						
	9.53	13.8	17.6	25.0	34.5	45.0	52.5						
0.500			1850	2700	3650	4800	5550	6450	7200				
	12.70		12.8	18.6	25.0	33.0	38.5	44.5	49.5				
0.625			1500	2100	2850	3750	4350	5050	5600				
	15.88		10.4	14.5	19.6	26.0	30.0	35.0	38.5				
0.750			1200	1750	2350	3050	3550	4150	4600				
	19.05		8.3	12.0	16.2	21.0	24.5	28.5	31.5				
0.875			1050	1500	2000	2600	3000	3500	3900				
	22.23		7.2	10.4	13.8	18.0	20.5	24.0	27.0				
1.000			900	1300	1750	2250	2600	3000	3350	3800	4200		
	25.40		6.2	9.0	12.0	15.5	18.0	20.5	23.0	26.0	29.0		
1.125				1150	1550	2000	2300	2650	2950	3300	3700		
	28.58			7.9	10.6	13.8	15.8	18.2	20.5	23.0	25.5		
1.250				1000	1350	1750	2050	2350	2650	2950	3300	3500	4300
	31.75			6.9	9.3	12.0	14.2	16.2	18.2	20.5	23.0	24.0	29.5
1.500					1150	1450	1700	1950	2150	2450	2700	2850	3500
	38.10				7.9	10.0	11.8	13.5	14.8	16.8	18.6	19.6	24.0
1.750					950	1250	1450	1650	1850	2050	2300	2400	2950
	44.45				6.6	8.6	10.0	11.4	12.8	14.2	15.8	16.6	20.5
2.000					850	1100	1250	1450	1600	1800	2000	2100	2550
	50.80				5.9	7.6	8.6	10.0	11.0	12.4	13.8	14.5	17.6

Calculation of Design Pressures for Alternate Tubing Materials

Design pressures for alternate tubing materials may be calculated using the Lamé formula as follows:

$P=S((D^2-d^2)/(D^2+d^2))$ where:

D= nominal outside diameter of tubing
d= nominal inside diameter of tubing
P= design pressure
S= allowable fiber stress of material at 4:1 design factor

Design stress and temperature derating factors for typical hydraulic system tubing materials and temperature ranges are listed below. Derating factors for SS-304 and SS-316 are derived from ASME B31.1-2012 Edition. Carbon steel tubing in these temperature ranges does not require derating.

Tubing Material	S= Allowable Fiber Stress@ 25% UTS Design Factor=4:1	Temperature Derating Factors		
		Temp.	SS304	SS316
C-1010	12,500 psi / 86MPa	100°F	1.00	1.00
C-1021	15,000 psi / 103 MPa	200°F	0.84	0.86
8630 GR	17,800 psi / 123 MPa	300°F	0.75	0.78
SS-304	18,800 psi / 130MPa	400°F	0.69	0.71
SS-316	18,800 psi / 130MPa	500°F	0.65	0.66

Note: This chart is intended as a guide only and is not a guarantee. Values shown are typical of generally available industry data and can be influenced by specific manufacturers' formulations or other factors. Suitability of materials is also influenced by many application specific factors including pressure, temperature, ambient conditions, concentration and anticipated service exposure. For any application, sufficient testing should be conducted and reviewed by the user and manufacturer to assure safe and satisfactory performance.

FLUID	SEALS				METAL		
Codes: **E = Excellent** **G = Good** **C = Conditional** **U = Unsatisfactory**	**Buna-N**	**Neoprene**	**EPR/EPDM**	**Viton**	**Carbon Steel**	**Brass**	**316 SS**
Acetaldehyde	U	C	G	U	G	E	E
Acetamide	G	G	E	G	-	-	E
Acetate Solvent	C	U	E	U	-	E	E
Acetic Acid, 5%-20%	U	U	E	G	U	U	C
Acetic Acid, Glacial	U	U	C	U	U	U	C
Acetic Anhydride	U	E	G	U	-	U	E
Acetone	U	U	G	U	E	E	E
Acetophenone	U	U	E	U	E	E	E
Acetyl Acetone	U	U	G	U	U	C	C
Acetyl Chloride	U	U	U	E	C	C	C
Acetylene	U	U	G	E	E	E	E
Air, Hot (Up to +160° F.)	E	E	E	E	E	E	E
Air, Hot (161°F –200° F.)	G	G	E	E	E	E	E
Air, Hot (201°F –300° F.)	U	U	G	E	E	E	E
Air Wet	E	E	E	E	U	G	E
Alcohols:							
Amyl Alcohol	G	G	E	G	G	G	E
Benzyl Alcohol	U	G	G	E	E	G	E
Butyl Alcohol	E	E	G	E	G	G	G
Diacetone Alcohol (Acetol)	U	U	E	U	E	E	E
Ethyl Alcohol (Ethanol)	E	E	E	E	E	E	E
Hexyl Alcohol (Hexanol)	E	G	C	C	E	G	E
Isobutyl Alcohol	G	G	E	E	E	G	E
Isoproply Alcohol	G	G	E	E	E	E	E
Methyl Alcohol (Methanol)	G	G	E	U	G	G	E
Octyl Alcohol	E	E	E	E	E	E	E
Propyl Alcohol	E	E	E	E	E	E	E
Aluminum Chloride	E	E	E	E	U	U	U
Aluminum Fluoride	E	E	E	E	U	U	U
Aluminum Nitrate	E	E	E	E	U	U	C
Aluminum Sulfate	E	E	E	E	U	C	E
Alums	E	E	E	E	U	C	E
Ammonia, Cold	E	E	E	U	E	U	E
Ammonia, Hot	U	G	G	U	E	U	E
Ammonia, Anhydrous	E	E	E	U	E	U	E
Ammonia, Aqueous	E	E	E	U	E	U	E
Ammonium Carbonate	U	E	E	U	C	U	C
Ammonium Chloride	E	E	E	U	U	U	C
Ammonium Hydroxide	C	C	E	C	G	U	C
Ammonium Nitrate	E	G	E	U	G	U	G
Ammonium Phosphate	E	E	E	-	U	C	G
Ammonium Sulfate	E	E	E	U	U	U	G
Ammonium Sulfite (to +72°F)	E	E	E	U	-	-	G
Amyl Acetate	U	U	G	U	E	E	E
Aniline Oil	U	U	G	U	E	U	E

FLUID	SEALS				METAL		
Codes: **E = Excellent** **G = Good** **C = Conditional** **U = Unsatisfactory**	**Buna-N**	**Neoprene**	**EPR/EPDM**	**Viton**	**Carbon Steel**	**Brass**	**316 SS**
Aniline Dyes	U	G	G	G	U	C	G
Arsenic Acid	E	E	E	E	U	U	G
Asphalt	G	C	U	E	E	G	E
ASTM Oil # 1	E	E	C	E	E	E	E
ASTM Oil # 2	E	G	U	E	E	E	E
ASTM Oil # 3	E	G	U	E	E	E	E
Automatic Trans. Fluid	E	G	U	E	E	E	E
Barium Chloride	E	E	E	E	U	G	G
Barium Hydroxide	E	E	E	E	G	U	G
Barium Sulfide	E	E	E	E	C	U	G
Benzene, Benzol	U	U	U	E	G	E	E
Benzin	E	U	U	E	E	E	E
Benzoic Acid	U	U	U	E	U	G	G
Black Sulfate Liquor	C	C	C	E	E	C	E
Blast Furnace Gas	U	U	U	E	E	C	E
Borax	G	G	E	E	E	E	E
Boric Acid	G	G	G	E	U	G	C
Brine	E	G	E	E	U	G	G
Bromine	U	U	U	E	U	C	U
Butane	E	E	U	E	E	E	E
Butyl Acetate	U	U	G	U	E	E	E
Butyl Cellosolve	U	U	G	U	E	E	E
Butylene	C	U	U	E	E	E	E
Butyl Stearate	G	U	U	E	G	G	G
Butyraldehyde	U	U	G	U	E	E	E
Calcium Acetate	G	G	E	U	G	G	G
Calcium Bisulfate	E	E	U	E	U	C	C
Calcium Chloride	E	E	E	E	G	G	G
Calcium Hydroxide	E	E	E	E	G	G	G
Calcium Hypochlorite	U	U	E	E	U	G	C
Calcium Nitrate	E	E	E	E	G	G	G
Cane Sugar Liquors	E	E	E	E	E	G	E
Carbitol	G	G	G	G	E	E	E
Carbolic Acid	U	U	G	E	U	E	E
Carbonic Acid	G	E	E	E	U	C	E
Carbon Dioxide	G	G	E	E	E	E	E
Carbon Disulfide	U	U	U	E	G	G	G
Carbon Monoxide	G	G	E	E	E	E	E
Carbon Tetrachloride	U	U	U	E	U	G	G
Castor Oil	E	E	G	E	E	E	E
Chlorine	U	U	U	G	C	C	C
Chloroacetic Acid	U	U	G	U	U	U	U
Chloroacetone	U	U	E	U	G	G	G
Chlorobenzene	U	U	U	G	G	G	G
Chloroform	U	U	U	E	G	G	G
Chlorosulfonic Acid	U	U	U	U	-	U	G
Chrome Plating Solution	U	U	G	E	C	U	U
Chromic Acid	U	U	C	E	C	U	U
Citric Acid	E	E	E	E	C	C	C
Coke Oven Gas	U	U	U	E	E	C	E
Copper Chloride	E	E	E	E	U	U	U
Copper Cyanide	E	E	E	E	E	U	G
Copper Sulfate	E	E	E	E	U	C	G
Cotton Seed Oil	E	G	C	E	E	E	E
Creosote (Coal Tar)	G	C	U	E	E	C	E
Crude Oil	E	G	U	E	G	U	G
Cyclohexanol	E	G	U	E	E	E	E
Cyclohexanone	U	U	G	U	E	E	E
Detergent/Water Solution	E	E	E	E	G	E	E
Dibenzyl Ether	U	U	G	U	G	G	G
Diesel Oil	E	C	U	E	E	E	E

Diethylamine	G	G	G	U	E	U	E
Dioctyl Phthalate (DOP)	U	U	G	G	E	E	E
Dowtherm A, Dowtherm E	U	U	U	E	G	U	E
Ethane (to +72°F)	E	G	U	E	-	-	E
Ether (to +72°F)	U	U	C	C	-	G	E
Ethanolamine	G	G	G	U	-	-	E
Ethyl Acetate	U	U	G	U	E	E	E
Ethyl Benzene	U	U	U	E	E	G	G
Ethyl Cellulose	G	G	G	U	E	G	G
Ethyl Chloride	U	U	U	E	E	E	E
Ethylene Dichloride	U	U	U	G	G	C	G
Ethylene Glycol	E	E	E	E	E	G	E
Ferric Chloride	E	G	E	E	U	U	U
Ferric Nitrate	E	E	E	E	U	U	G
Ferric Sulfate	G	G	G	E	U	U	E
Formaldehyde	C	C	G	G	E	E	E
Formic Acid	C	G	E	U	U	C	C
Fuel Oil	E	G	U	E	E	E	E
Furfural	C	C	G	U	G	G	G
Gallic Acid	G	G	G	E	U	-	G
Gasoline	E	C	U	E	E	E	E
Gasohol	G	G	U	E	E	E	E
Glycerine/Glycerol	E	E	E	E	E	G	E
Green Sulfate Liquor	G	G	E	E	U	U	E
Helium	E	E	E	E	E	E	E
Heptane	E	G	U	E	E	E	E
Hexaldehyde	U	G	G	U	G	G	E
Hexane	E	G	U	E	E	E	E
Hydraulic Oils:							
Straight Petroleum Base	E	G	U	E	E	E	E
Water Petroleum Emulsion	E	G	U	E	C	E	E
Water Glycol	E	E	E	E	E	E	E
Straight Phosphate Ester	U	U	G	C	E	E	E
Phos. Ester/Petroleum Blend	U	U	U	C	E	E	E
Ester Blend	E	U	U	E	E	E	E
Silicone Oils	E	E	E	E	E	E	E
Hydrobromic Acid	U	U	E	E	E	U	E
Hydrochloric Acid	U	U	G	E	U	U	U
Hydrocyanic Acid	C	C	E	E	E	E	G
Hydrofluoric Acid	U	U	C	U	U	U	U
Hydrofluorosilic Acid	G	G	E	E	U	U	U
Hydrogen	E	E	E	E	E	E	E
Hydrogen Peroxide	G	G	G	E	U	U	G
Hydrogen Sulfide, Dry	U	G	E	U	E	G	G
Isocyanate	U	U	G	E	G	-	G
Iso Octane	E	G	U	E	E	E	E
Isoproply Acetate	U	U	G	U	E	-	E
Isoproply Ether	G	U	U	U	G	G	G
JP-4, JP-5	E	U	U	E	E	E	E
Kerosene	E	U	U	E	E	E	E
Ketones	U	U	E	U	-	-	E
Lacquer/Lacquer Solvents	U	U	U	U	U	E	E
Lime Sulfur	U	E	E	E	G	U	G
Linseed Oil	E	G	U	E	E	E	E
LPG	E	G	U	E	E	E	E
Lubricating Oils: **See Hydraulic Oils**							
Magnesium Chloride	E	E	E	E	E	C	C
Magnesium Hydroxide	G	G	E	E	E	G	E
Magnesium Sulfate	E	E	E	E	E	E	E
Maleic Acid	U	U	U	E	E	G	G
Maleic Anhydride	U	U	U	E	G	U	E
Malic Acid	G	G	U	G	U	-	E
Mercuric Chloride	E	E	E	E	U	U	U
Mercury	E	E	E	E	E	U	E
Methyl Bromide	G	U	U	E	E	E	G
Methyl Chloride	U	U	U	E	E	E	E
Methyl Butyl Ketone	U	U	E	U	E	E	E
Methyl Ethyl Ketone	U	U	E	U	G	G	G

Methylene Chloride	U	U	U	G	G	G	G
Methyl Isobutyl Ketone	U	U	U	U	G	G	G
Methyl Isopropyl Ketone	U	U	U	U	G	G	G
Methyl Salicylate	U	U	C	U	E	G	G
MIL-L-2104	E	G	U	E	E	E	E
MIL-O-5606	E	G	U	E	E	E	E
MIL-H-6083	E	E	U	E	E	E	E
MIL- L-7808	G	U	U	E	G	G	E
MIL-L-23699	G	U	U	E	E	E	E
MIL-H-46170	E	G	U	E	E	E	E
MIL-H-83282	E	E	U	E	E	E	E
Mineral Oils	E	G	U	E	E	E	E
Naphtha	C	U	U	E	-	E	E
Naphthalene	U	U	U	E	E	G	E
Naphthenic Acid	C	U	U	E	-	G	E
Natural Gas	E	E	U	E	G	G	G
Nickel Acetate	C	C	E	G	G	C	E
Nickel Chloride	E	G	E	E	U	U	G
Nickel Sulfate	E	E	E	E	U	G	G
Nitric Acid, to 10%	U	U	U	E	U	U	E
Nitric Acid, over 10%	U	U	U	G	U	U	E
Nitrobenzene	U	U	U	G	E	G	E
Nitrogen	E	E	E	E	E	E	E
Oleic Acid	U	U	C	G	C	E	G
Oleum (Mineral Spirits)	E	G	U	E	E	E	E
Ortho- Diochlorobenzene	U	U	U	E	G	G	G
Oxalic Acid	G	G	E	E	U	C	C
Oxygen	-	-	-	-	G	G	G
Palmitic Acid	E	G	G	E	G	U	E
Para-Diohlorobenzene	U	U	U	E	G	G	G
Pentane	E	E	U	E	G	G	G
Perchloric Acid	E	G	G	E	U	U	U
Perchloroethylene	U	U	U	E	C	G	G
Phenol (Carbolic Acid)	U	U	U	E	U	U	G
Phosphoric Acid	U	U	G	E	U	E	E
Phosphorous Trichloride	U	U	E	E	C	U	C
Potassium Acetate	G	G	E	U	C	G	C
Potassium Chloride	E	E	E	E	E	C	E
Potassium Cyanide	E	E	E	E	C	U	G
Potassium Dichromate	E	E	E	E	C	C	C
Potassium Hydroxide (to 10%)	G	G	E	G	G	G	G
Potassium Hydroxide (over 10%)	C	C	E	U	G	G	G
Potassium Nitrate	E	E	E	E	G	G	E
Potassium Sulfate	E	E	E	E	-	U	E
Propane	E	C	U	E	E	E	E
Propyl Acetate	U	U	G	U	E	-	E
Propylene	U	U	U	E	E	E	E
Refrigerant R-12	G	E	C	E	E	E	E
Refrigerant R-13	G	E	C	E	E	E	E
Refrigerant R-22	U	E	C	U	E	E	E
Sewage	E	E	E	E	G	G	G
Soap (Water Solutions)	E	E	E	E	E	E	E
Sodium Acetate (to +72°F)	G	G	E	U	-	G	G
Sodium Bicarbonate	E	E	E	E	G	G	E
Sodium Borate	E	E	E	E	E	E	E
Sodium Carbonate	E	E	E	E	E	G	E
Sodium Chloride	E	E	E	E	U	C	C
Sodium Cyanide	E	E	E	E	E	-	C
Sodium Hydroxide (to 10%)	U	G	E	E	C	G	C
Sodium Hydroxide (over 10%)	U	U	G	E	C	C	C
Sodium Hypochlorite	C	C	E	C	U	U	U
Sodium Metaphosphate	E	E	E	E	E	G	G
Sodium Nitrate (to +72°F)	G	G	E	G	E	C	G
Sodium Perborate	G	G	E	E	C	U	C
Sodium Peroxide	G	G	E	E	U	U	C
Sodium Phosphates	E	E	E	E	U	E	G
Sodium Silicate	E	E	E	E	E	E	E

Sodium Sulfate	E	E	E	E	G	G	G
Sodium Sulfide	E	E	E	E	C	U	C
Sodium Thiosulfate	G	E	E	E	U	U	C
Soy Bean Oil	E	G	U	E	E	E	E
Stannic Chloride	E	G	E	E	U	U	U
Stannous Chloride (to 72°F)	E	E	C	E	-	-	E
Steam (up to 388° F)	U	U	C	C	E	E	E
Stearic Acid	G	G	G	E	C	C	E
Stoddard Solvent	E	G	U	E	E	E	E
Styrene	U	U	U	G	E	E	E
Sulfur	U	E	E	E	E	U	G
Sulfur Chloride	U	U	U	E	-	U	U
Sulfur Dioxide	U	U	G	E	E	G	G
Sulfur Trioxide	U	U	G	E	G	C	G
Sulfuric Acid (to 10%)	U	G	U	E	U	G	C
Sulfuric Acid (over 10%)	U	U	U	G	C	C	U
Sulfurous Acid	C	C	U	U	U	C	C
Tannic Acid	E	E	E	E	E	E	E
Tar (Bituminous)	G	U	U	E	E	G	E
Tartaric Acid	E	G	G	E	U	C	C
Tertiary Butyl Alcohol	G	G	G	E	G	G	G
Titanium Tetrachloride	C	U	U	E	E	U	G
Toluene (Toluol))	U	U	U	E	E	E	E

Trichloroethane	U	U	U	E	E	-	E
Trichloroethylene	U	U	U	E	E	G	E
Tricresylphosphate (to 120°F)	U	C	E	G	E	-	G
Triethanolamine	U	G	E	U	E	U	E
Tung Oil	G	G	U	E	E	G	E
Turpentine	G	U	U	E	G	G	G
Varnish	G	U	U	E	E	G	E
Vinyl Chloride	U	U	U	E	E	U	C
Water:							
Water (to +150°F)	E	E	E	E	C	G	E
Water (+151°F to +200°F)	E	E	E	E	C	G	E
Water (+201°F to +350°F)	U	U	U	G	C	G	E
Water, Deionized (to 72°F)	E	E	E	E	U	E	E
Water, Deionized (to 120°F)	-	E	-	-	U	E	E
Water, Distilled	E	E	E	E	C	E	E
Water, Salt	E	E	E	E	U	U	G
Xylene	U	U	U	E	E	E	E
Zinc Chloride	E	E	E	E	E	U	U
Zinc Sulfate	E	E	E	E	U	C	G

Features, 37 Degree Tube Fittings

37 degree flared tube fittings provide leakproof, full flow connections in hydraulic systems operating at working pressures as specified in the tables below. A large variety of fitting styles are available to allow connection of flared tube ends, machined male or female 37 degree ends or male or female NPTF pipe or hose ends. Also included in this section are low-pressure beaded hose stem fittings.

37 degree flared fittings are the most commonly used tube connection in worldwide use today. Tube preparation and flaring processes are easily accomplished with either hand or power tools. The large variety of fitting configurations and jump sizes available provide for simplified fabrication requirements and reduced parts count in complex systems.

The design of the 37 degree flared fitting tube end is identical for either inch or metric tubing. With the exception of stock size, the flared tube fittings described in this section are interchangeable with equivalent fitting styles (unions, bulkheads, tees, etc.) per ISO 8434-2.

All 37 degree fitting styles are also available with the optional **FLARE-O®** tube end design. Call for details.

Performance

Where applicable, fittings are designed and qualified to the requirements of SAE J514.

Construction

Unless otherwise specified, fittings are machined from cold drawn carbon steel barstock and forgings. Standard plating is electrodeposited zinc with a clear trivalent chromate conversion coating in accordance with ASTM B633 (Type V SC2). The minimum salt spray resistance is 240 hours to red corrosion when tested in accordance with ASTM B117

Threads

Straight Threads: Internal and external straight threads conform to the Unified National Class 2A and Class 2B Series respectively, with modified minor diameters where specified. Plated external threads may conform to Class 3A maximum diameters after plating.

NPTF Threads: Male and female pipe threads conform to the Dryseal American Standard Taper Pipe Thread (SAE J476a, NPTF) Series which will provide pressure tight joints without the use of a lubricant or sealer. Use of these fittings with non-dryseal NPT pipe or hose ends is not recommended for high-pressure applications.

Note: Where not functionally objectionable, use of a compatible lubricant/sealant is recommended for either NPT or NPTF threads to minimize the possibility of galling in assembly.

Assembly Information

For assembly instructions, refer to the Technical Data Section for the appropriate fitting end. Also, refer to the Technical Data Section for recommendations regarding tubing pressure ratings, tube flares and hose/tube routing information. Please note the following:

Tubing for single flare tube ends should be either seamless or welded and drawn, fully annealed tubing per SAE J524 or J525. For double flaring, tubing per SAE J356, J524, J525 or J526 may be used.

For proper sealing with 37 degree flared fittings, flares for tubing should conform to the requirements of SAE J533. For heavy wall tubing, the optional tube preparation and single flare configuration specified in SAE J533 is also recommended. This optional configuration provides extended sealing surface contact area versus conventional flares.

In the design and fabrication of tubing or hose runs for any hydraulic system, precautions should be taken to allow for sufficient adjustment of the hose or tubing so that proper alignment can be attained at the fitting connections. Improper fit-up or misalignment should be corrected before final connections are made. Location of fitting connections should be planned to maximize accessibility. Whenever possible, use a torque wrench to tighten connections to the recommended installation torque.

Ordering Information

Size of fittings are indicated by dash number relating to sixteenths of an inch for the nominal O.D. of the tube size used. Example: 1/2 inch tube = 8/16 or (-8) size.

Order standard fittings from appropriate chart indicating required dash numbers. For example, 2501-8-6 is 1/2" tube end with 3/4-16 straight thread and 3/8" male pipe thread. Jump size 2501-8-12 is 1/2" tube end with 3/4-16 straight thread and 3/4" male pipe thread. Pictorial views for each fitting style indicate the correct numbering sequence for fitting ends.

Bulkhead fittings may be ordered with or without lock nuts. To order fittings with lock nut, add (-LN) suffix to base catalog part number.

If information is needed for jump sizes not shown, please contact customer service for engineering assistance. Dimensions are rounded for brevity. Please contact factory for exact dimensions and tolerances.

Table JT1. Pressure Ratings for 37 Deg. Flared Tube Ends, Unions, Bulkheads and 37 Deg. Female Swivels						
Nominal Tube Size		Thread Size	Working Pressures			
Nom SAE Dash Size	Nom Inch Tube O.D.	SAE J514 Flared Tube End and SAE J1926/3/ ISO 11926-3 O-Ring Port Thread Size (Notes 1&2)	37 Deg. Flared Tube Ends, Unions and Bulkheads		37 Deg. Female Swivels	
			MPa	psi	MPa	psi
-2	1/8	5/16-24 UNF	34.5	5,000	34.5	5,000
-3	3/16	3/8-24 UNF	34.5	5,000	34.5	5,000
-4	1/4	7/16-20 UNF	34.5	5,000	31	4,500
-5	5/16	1/2-20 UNF	34.5	5,000	27.5	4,000
-6	3/8	9/16-18 UNF	34.5	5,000	27.5	4,000
-8	1/2	3/4-16 UNF	31	4,500	27.5	4,000
-10	5/8	7/8-14 UNF	24	3,500	21	3,000
-12	3/4	1-1/16-12 UN	24	3,500	21	3,000
-14	7/8	1-3/16-12 UN	21	3,000	17	2,500
-16	1	1-5/16-12 UN	21	3,000	17	2,500
-20	1 1/4	1-5/8-12 UN	17	2,500	14	2,000
-24	1 1/2	1-7/8-12 UN	14	2,000	10.5	1,500
-32	2	2-1/2-12 UN	10.5	1,500	8	1,125

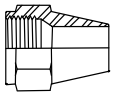
1) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)
2) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts

Table JT2. Pressure Ratings for Fittings With NPTF Pipe Threads				
Nominal Pipe Size		Thread Size	Working Pressures	
Nom SAE Dash Size	Nom Inch Pipe O.D.	Dryseal Pipe Thread (NPTF[1]) Male and Female	Fittings With NPTF Pipe Threads	
			MPa	psi
-2	1/8	1/8-27	34.5	5,000
-4	1/4	1/4-18	27.5	4,000
-6	3/8	3/8-18	21	3,000
-8	1/2	1/2-14	21	3,000
-12	3/4	3/4-14	17	2,500
-16	1	1-11-1/2	14	2,000
-20	1 1/4	1-1/4-11-1/2	8	1,150
-24	1 1/2	1-1/2-11-1/2	7	1,000
-32	2	2-11-1/2	7	1,000

1) Dryseal American Standard Taper Pipe Thread

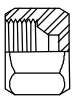
302-
Short Nut

(070111)



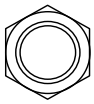
304-
Standard Nut

(070112)



304-C-
Cap Nut

(070118)



306-LN-
Bulkhead Lock Nut

(070117)

306-N-
Adjustable Lock Nut

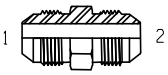
(070110)

318-
Tube Nut

(070115)

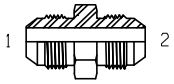
319-
Tube Sleeve

(070101)



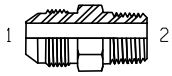
2403-
(1&2)Male Tube

(070119)

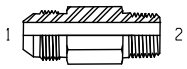


2403-LH-
(1&2)Male Tube Large Hex

(070102)

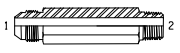


2404-
(1)Male Tube
(2)Male Pipe



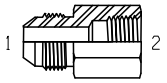
2404-L-
(1)Male Tube
(2)Male Pipe-Long

2404-LL-
(1)Male Tube
(2)Male Pipe-X-Long

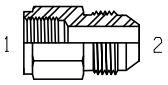


2404-LLL-
(1)Male Tube
(2)Male Pipe-XX-Long

(070103)

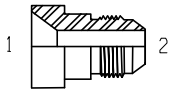


2405-
(1)Male Tube
(2)Female Pipe



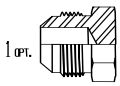
2406-
(1)37° Female
(2)Male Tube

(070123)



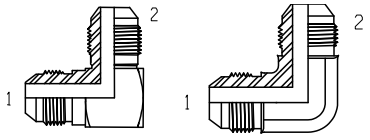
2407-
(1)37° Female
(2)MaleTube

(070109)



2408-
(1)Male Tube

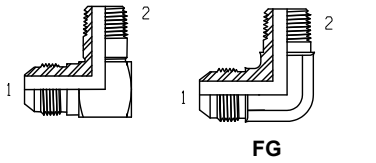
(070201)



FG

2500-
(1&2)Male Tube

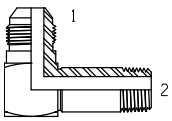
(070202)



FG

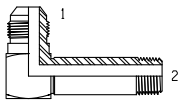
2501-
(1)Male Tube
(2)Male Pipe

(071502)



2501-L-
(1)Male Tube
(2)Male Pipe-Long

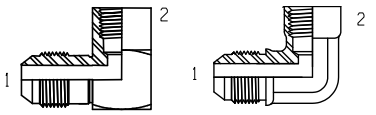
(071602)



2501-LL-
(1)Male Tube
(2)Male Pipe-X-Long

2501-LLL-
(1)Male Tube
(2)Male Pipe-XXX-Long

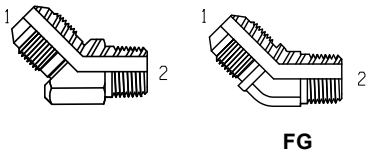
(070203)



FG

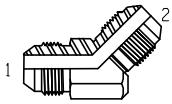
2502-
(1)Male Tube
(2)Female Pipe

(070302)

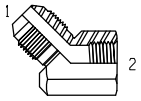


FG

2503-
(1)Male Tube
(2)Male Pipe

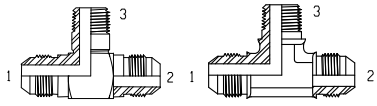


2504-
(1)Male Tube
(2)Male Tube



2505-
(1)Male Tube
(2)Female Pipe

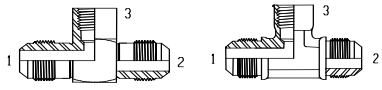
(070425)



FG

2601-
(1&2)Male Tube
(3)Male Pipe

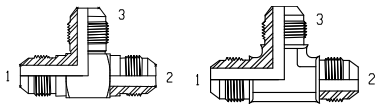
(070427)



FG

2602-
(1&2)Male Tube
(3)Female Pipe

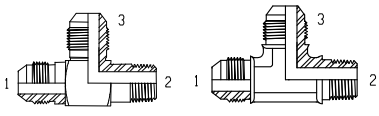
(070401)



FG

2603-Tee
(1,2&3)Male Tube

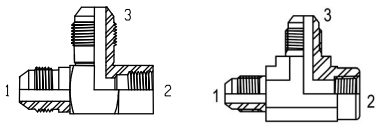
(070424)



FG

2605-
(1&3)Male Tube
(2)Male Pipe

(070426)



FG

2606-
(1&3)Male Tube
(2)Female Pipe

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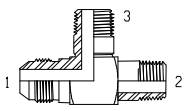
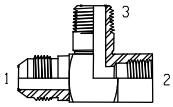
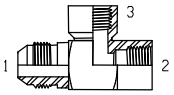


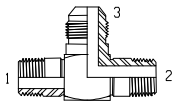
2607-
(1)Male Tube
(2&3)Male Pipe



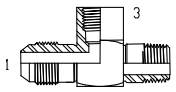
2608-
(1)Male Tube
(2)Female Pipe
(3)Male Pipe



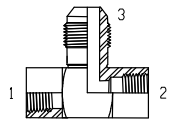
2609-
(1)Male Tube
(2&3)Female Pipe



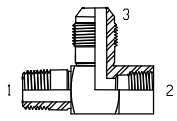
2610-
(1&2)Male Pipe
(3)Male Tube



2611-
(1)Male Tube
(2)Male Pipe
(3)Female Pipe

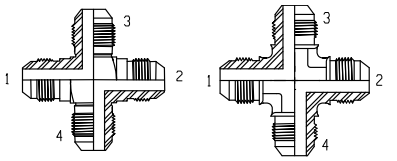


2612-
(1&2)Female Tube
(3)Male Tube



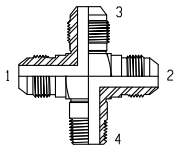
2613-
(1)Male Pipe
(2)Female Pipe
(3)Male Tube

(070501)

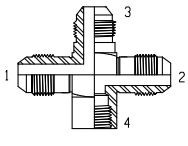


FG

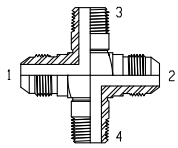
2650-
(1,2,3&4)Male Tube



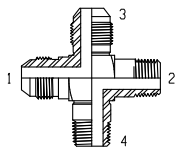
2651-
(1,2&3)Male Tube
(4)Male Pipe



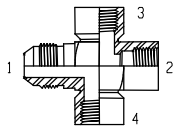
2652-
(1,2&3)Male Tube
(4)Female Pipe



2653-
(1&2)Male Tube
(3&4)Male Pipe

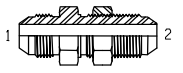


2654-
(1&3)Male Tube
(2&4)Male Pipe



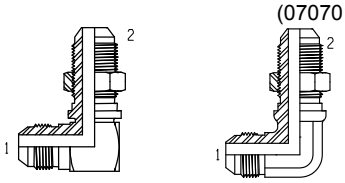
2658-
(1)Male Tube
(2,3&4)Female Pipe

(070601)



2700-LN-
(1)Male Tube
(2)Bulkhead

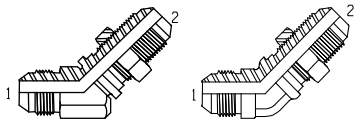
(070701)



FG

2701-LN-
(1)Male Tube
(2)Bulkhead

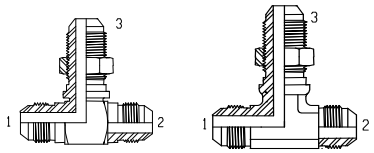
(070801)



FG

2702-LN-
(1)Male Tube
(2)Bulkhead

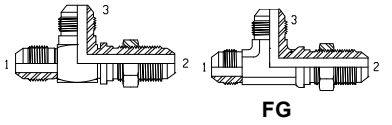
(070959)



FG

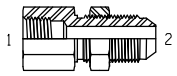
2703-LN-
(1&2)Male Tube
(3)Bulkhead

(070958)

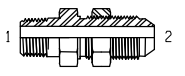


FG

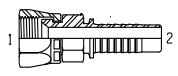
2704-LN-
(1)Male Tube
(2)Bulkhead



2705-LN-
(1)Female Pipe
(2)Bulkhead

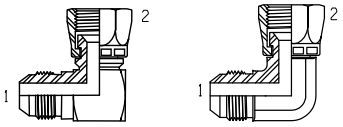


2706-LN-
(1)Male Pipe
(2)Bulkhead



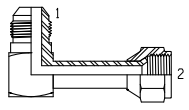
4305-
(1)Female Swivel
(2)Barbed Hose

(070221)

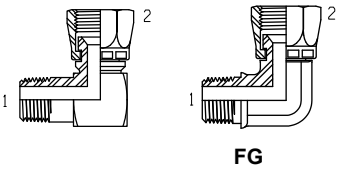


FG

6500-
(1)Male Tube
(2)37° Female Swivel



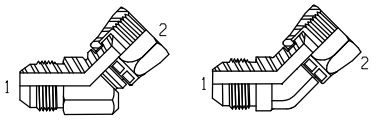
6500-L-
(1)Male Tube
(2)37° Fem. Swivel-Long



FG

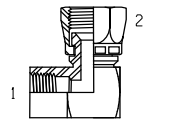
6501-
(1)Male Tube
(2)37° Female Swivel

(070321)

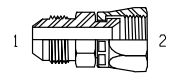


FG

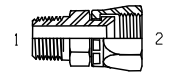
6502-
(1)Male Tube
(2)37° Female Swivel



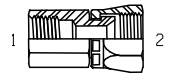
6503-
(1)Female Pipe
(2)37° Female Swivel



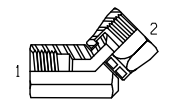
6504-
(1)Male Tube
(2)37° Female Swivel



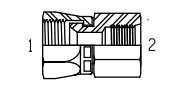
6505-
(1)Male Pipe
(2)37° Female Swivel



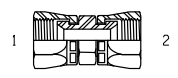
6506-
(1)Female Pipe
(2)37° Female Swivel



6507-
(1)Female Pipe
(2)37° Female Swivel

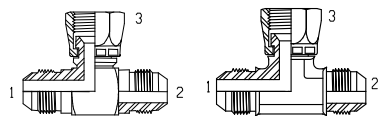


6509-
(1)37° Female Swivel
(2)Female O-Ring



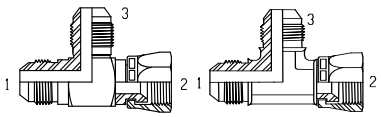
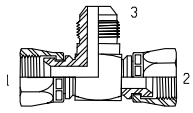
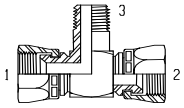
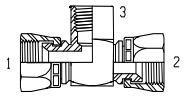
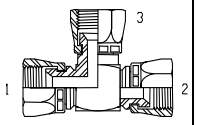
6565-
(1&2)37° Female Swivel

(070433)

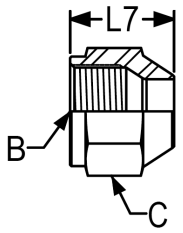


FG

6600-
(1&2)Male Tube
(3)37° Female Swivel

(070432)  **FG** **6602-** (1&3)Male Tube (2)37° Female Swivel	 **6603-** (1&2)37° Female Swivel (3)Male Tube	 **6604-** (1&2)37° Female Swivel (3)Male Pipe	 **6605-** (1&2)37° Female Swivel (3)Female Pipe	 **6606-** (1,2&3) 37° Female Swivel	

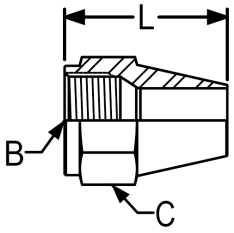
302 SHORT NUT



PART NO	TUBE OD	B UN/UNF-2B	L7	C
302-4	1/4	7/16-20	0.60	0.56
302-5	5/16	1/2-20	0.59	0.63
302-6	3/8	9/16-18	0.66	0.69
302-8	1/2	3/4-16	0.81	0.88
302-10	5/8	7/8-14	0.94	1.00
302-12	3/4	1 1/16-12	1.14	1.25
302-14	7/8	1 3/16-12	1.20	1.38
302-16	1	1 5/16-12	1.28	1.50
302-20	1 1/4	1 5/8-12	1.44	2.00
302-24	1 1/2	1 7/8-12	1.56	2.25
302-32	2	2 1/2-12	2.00	2.88

304 STANDARD NUT

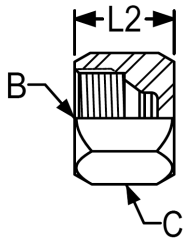
SAE J514 070111



PART NO	TUBE OD	B UN/UNF-2B	L	C
304-4	1/4	7/16-20	1.00	0.56
304-5	5/16	1/2-20	1.06	0.63
304-6	3/8	9/16-18	1.09	0.69
304-8	1/2	3/4-16	1.28	0.88
304-10	5/8	7/8-14	1.48	1.00
304-12	3/4	1 1/16-12	1.66	1.25
304-14	7/8	1 3/16-12	1.81	1.38
304-16	1	1 5/16-12	1.94	1.50
304-20	1 1/4	1 5/8-12	2.19	2.00
304-24	1 1/2	1 7/8-12	2.31	2.25
304-32	2	2 1/2-12	2.75	2.88

304-C CAP NUT

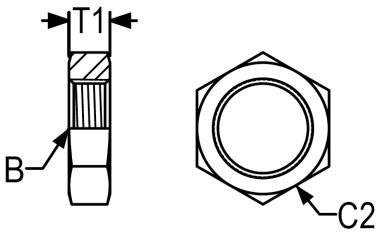
SAE J514 070112
MS51532



PART NO	TUBE OD	B UN/UNF-2B	L2	C
304-C-2	1/8	5/16-24	0.50	0.38
304-C-3	3/16	3/8-24	0.56	0.44
304-C-4	1/4	7/16-20	0.59	0.56
304-C-5	5/16	1/2-20	0.60	0.63
304-C-6	3/8	9/16-18	0.63	0.69
304-C-8	1/2	3/4-16	0.75	0.88
304-C-10	5/8	7/8-14	0.84	1.00
304-C-12	3/4	1 1/16-12	0.91	1.25
304-C-14	7/8	1 3/16-12	0.97	1.38
304-C-16	1	1 5/16-12	1.02	1.50
304-C-20	1 1/4	1 5/8-12	1.06	2.00
304-C-24	1 1/2	1 7/8-12	1.19	2.25
304-C-32	2	2 1/2-12	1.44	2.88

306-LN BULKHEAD LOCK NUT

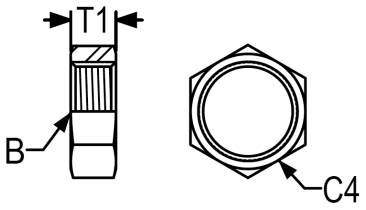
SAE J514 070118
MS51860



PART NO	TUBE OD	B UN/UNF-2B	T1	C2
306-2 LN	1/8	5/16-24	0.22	0.56
306-4 LN	1/4	7/16-20	0.28	0.69
306-5 LN	5/16	1/2-20	0.28	0.75
306-6 LN	3/8	9/16-18	0.27	0.81
306-8 LN	1/2	3/4-16	0.31	1.00
306-10 LN	5/8	7/8-14	0.36	1.13
306-12 LN	3/4	1 1/16-12	0.41	1.38
306-14 LN	7/8	1 3/16-12	0.41	1.50
306-16 LN	1	1 5/16-12	0.41	1.63
306-20 LN	1 1/4	1 5/8-12	0.41	1.88
306-24 LN	1 1/2	1 7/8-12	0.41	2.13
306-32 LN	2	2 1/2-12	0.41	2.75

306-N ADJUSTABLE LOCK NUT

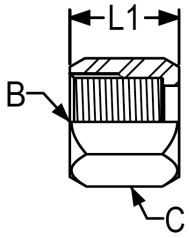
SAE J514 070117
MS51888



PART NO	TUBE OD	B UN/UNF-2B	T1	C4
306-N-3	3/16	3/8-24	0.22	0.50
306-N-4	1/4	7/16-20	0.25	0.56
306-N-5	5/16	1/2-20	0.25	0.63
306-N-6	3/8	9/16-18	0.27	0.69
306-N-8	1/2	3/4-16	0.34	0.88
306-N-10	5/8	7/8-14	0.39	1.00
306-N-12	3/4	1 1/16-12	0.41	1.25
306-N-14	7/8	1 3/16-12	0.41	1.38
306-N-16	1	1 5/16-12	0.41	1.50

318 TUBE NUT

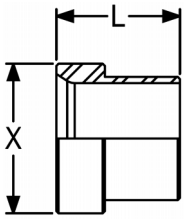
SAE J514 070110
MS51531



PART NO	TUBE OD	B UN/UNF-2B	L1	C
318-2	1/8	5/16-24	0.54	0.38
318-3	3/16	3/8-24	0.60	0.44
318-4	1/4	7/16-20	0.61	0.56
318-5	5/16	1/2-20	0.67	0.63
318-6	3/8	9/16-18	0.72	0.69
318-8	1/2	3/4-16	0.84	0.88
318-10	5/8	7/8-14	0.97	1.00
318-12	3/4	1 1/16-12	1.02	1.25
318-14	7/8	1 3/16-12	1.08	1.38
318-16	1	1 5/16-12	1.12	1.50
318-20	1 1/4	1 5/8-12	1.22	2.00
318-24	1 1/2	1 7/8-12	1.42	2.25
318-32	2	2 1/2-12	1.74	2.88
318-40	2 1/2	3-12	1.63	3.50

319 TUBE SLEEVE

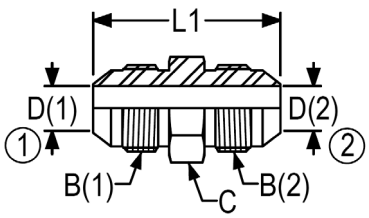
SAE J514 070115
MS51533



PART NO	TUBE OD	L	X
319-2	1/8	0.34	0.27
319-3	3/16	0.34	0.33
319-4	1/4	0.41	0.38
319-5	5/16	0.44	0.44
319-6	3/8	0.50	0.50
319-8	1/2	0.56	0.68
319-10	5/8	0.66	0.80
319-12	3/4	0.68	0.97
319-14	7/8	0.76	1.10
319-16	1	0.78	1.22
319-20	1 1/4	0.91	1.53
319-24	1 1/2	1.12	1.78
319-32	2	1.19	2.41

2403 MALE TUBE UNION

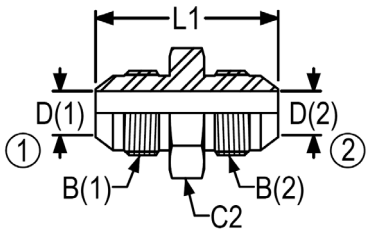
SAE J514 070101
MS51501



PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	L1	C	D (1)	D (2)
2403-2-2	1/8-1/8	5/16-24	5/16-24	1.17	0.44	0.06	0.06
2403-3-3	3/16-3/16	3/8-24	3/8-24	1.23	0.44	0.13	0.13
2403-4-2	1/4-1/8	7/16-20	5/16-24	1.27	0.50	0.17	0.06
2403-4-3	1/4-3/16	7/16-20	3/8-24	1.30	0.50	0.17	0.13
2403-4-4	1/4-1/4	7/16-20	7/16-20	1.37	0.50	0.17	0.17
2403-5-4	5/16-1/4	1/2-20	7/16-20	1.37	0.56	0.23	0.17
2403-5-5	5/16-5/16	1/2-20	1/2-20	1.37	0.56	0.23	0.23
2403-6-4	3/8-1/4	9/16-18	7/16-20	1.40	0.63	0.30	0.17
2403-6-5	3/8-5/16	9/16-18	1/2-20	1.40	0.63	0.30	0.23
2403-6-6	3/8-3/8	9/16-18	9/16-18	1.41	0.63	0.30	0.30
2403-8-4	1/2-1/4	3/4-16	7/16-20	1.51	0.81	0.39	0.17
2403-8-6	1/2-3/8	3/4-16	9/16-18	1.52	0.81	0.39	0.30
2403-8-8	1/2-1/2	3/4-16	3/4-16	1.62	0.81	0.39	0.39
2403-10-6	5/8-3/8	7/8-14	9/16-18	1.68	0.94	0.48	0.30
2403-10-8	5/8-1/2	7/8-14	3/4-16	1.78	0.94	0.48	0.39
2403-10-10	5/8-5/8	7/8-14	7/8-14	1.88	0.94	0.48	0.48
2403-12-4	3/4-1/4	1 1/16-12	7/16-20	1.85	1.13	0.61	0.17
2403-12-6	3/4-3/8	1 1/16-12	9/16-18	1.85	1.13	0.61	0.30
2403-12-8	3/4-1/2	1 1/16-12	3/4-16	1.95	1.13	0.61	0.39
2403-12-10	3/4-5/8	1 1/16-12	7/8-14	2.05	1.13	0.61	0.48
2403-12-12	3/4-3/4	1 1/16-12	1 1/16-12	2.16	1.13	0.61	0.61
2403-14-12	7/8-3/4	1 3/16-12	1 1/16-12	2.18	1.25	0.72	0.61
2403-14-14	7/8-7/8	1 3/16-12	1 3/16-12	2.21	1.25	0.72	0.72
2403-16-8	1-1/2	1 5/16-12	3/4-16	2.00	1.38	0.84	0.39
2403-16-12	1-3/4	1 5/16-12	1 1/16-12	2.20	1.38	0.84	0.61
2403-16-16	1-1	1 5/16-12	1 5/16-12	2.25	1.38	0.84	0.84
2403-20-12	1 1/4-3/4	1 5/8-12	1 1/16-12	2.34	1.69	1.08	0.61
2403-20-16	1 1/4-1	1 5/8-12	1 5/16-12	2.38	1.69	1.08	0.84
2403-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.43	1.69	1.08	1.08
2403-24-12	1 1/2-3/4	1 7/8-12	1 1/16-12	2.53	2.00	1.31	0.61
2403-24-16	1 1/2-1	1 7/8-12	1 5/16-12	2.58	2.00	1.31	0.84
2403-24-20	1 1/2-1 1/4	1 7/8-12	1 5/8-12	2.62	2.00	1.31	1.08
2403-24-24	1 1/2-1 1/2	1 7/8-12	1 7/8-12	2.75	2.00	1.31	1.31
2403-32-16	2-1	2 1/2-12	1 5/16-12	2.98	2.63	1.78	0.84
2403-32-20	2-1 1/4	2 1/2-12	1 5/8-12	3.02	2.63	1.78	1.08
2403-32-24	2-1 1/2	2 1/2-12	1 7/8-12	3.15	2.63	1.78	1.31
2403-32-32	2-2	2 1/2-12	2 1/2-12	3.40	2.63	1.78	1.78

2403-LH LARGE HEX UNION

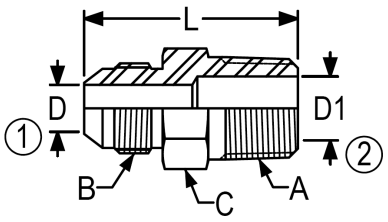
SAE J514 070119
MS51519



PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	L1	C2	D (1)	D (2)
2403-LH-4-4	1/4-1/4	7/16-20	7/16-20	1.37	0.69	0.17	0.17
2403-LH-5-5	5/16-5/16	1/2-20	1/2-20	1.37	0.75	0.23	0.23
2403-LH-6-6	3/8-3/8	9/16-18	9/16-18	1.41	0.81	0.30	0.30
2403-LH-8-4	1/2-1/4	3/4-16	7/16-20	1.51	1.00	0.39	0.17
2403-LH-8-6	1/2-3/8	3/4-16	9/16-18	1.52	1.00	0.39	0.30
2403-LH-8-8	1/2-1/2	3/4-16	3/4-16	1.62	1.00	0.39	0.39
2403-LH-10-8	5/8-1/2	7/8-14	3/4-16	1.78	1.13	0.48	0.39
2403-LH-10-10	5/8-5/8	7/8-14	7/8-14	1.88	1.13	0.48	0.48
2403-LH-12-8	3/4-1/2	1 1/16-12	3/4-16	1.95	1.38	0.61	0.39
2403-LH-12-10	3/4-5/8	1 1/16-12	7/8-14	2.05	1.38	0.61	0.48
2403-LH-12-12	3/4-3/4	1 1/16-12	1 1/16-12	2.16	1.38	0.61	0.61
2403-LH-16-16	1-1	1 5/16-12	1 5/16-12	2.25	1.63	0.84	0.84
2403-LH-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.43	1.88	1.08	1.08
2403-LH-24-24	1 1/2-1 1/2	1 7/8-12	1 7/8-12	2.75	2.13	1.31	1.31

2404 MALE CONNECTOR

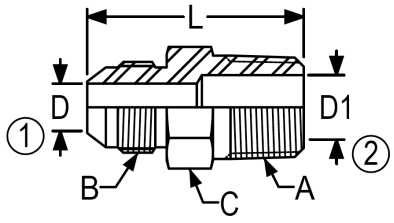
SAE J514 070102
MS51500



PART NO	TUBE OD	B UN/UNF-2A	A NPTF	L	C	D	D1
2404-2-2	1/8	5/16-24	1/8-27	1.11	0.44	0.06	0.19
2404-2-8	1/8	5/16-24	1/2-14	1.58	0.88	0.06	0.53
2404-3-2	3/16	3/8-24	1/8-27	1.14	0.44	0.13	0.19
2404-4-2	1/4	7/16-20	1/8-27	1.22	0.50	0.17	0.19
2404-4-4	1/4	7/16-20	1/4-18	1.42	0.56	0.17	0.28
2404-4-6	1/4	7/16-20	3/8-18	1.42	0.75	0.17	0.41
2404-4-8	1/4	7/16-20	1/2-14	1.68	0.88	0.17	0.53
2404-4-12	1/4	7/16-20	3/4-14	1.75	1.13	0.17	0.72
2404-5-2	5/16	1/2-20	1/8-27	1.22	0.56	0.23	0.19
2404-5-4	5/16	1/2-20	1/4-18	1.42	0.56	0.23	0.28
2404-5-6	5/16	1/2-20	3/8-18	1.42	0.75	0.23	0.41
2404-6-2	3/8	9/16-18	1/8-27	1.24	0.63	0.30	0.19
2404-6-4	3/8	9/16-18	1/4-18	1.43	0.63	0.30	0.28
2404-6-6	3/8	9/16-18	3/8-18	1.43	0.75	0.30	0.41
2404-6-8	3/8	9/16-18	1/2-14	1.69	0.88	0.30	0.53
2404-6-12	3/8	9/16-18	3/4-14	1.75	1.13	0.30	0.72
2404-6-16	3/8	9/16-18	1-11 1/2	1.94	1.38	0.30	0.94
2404-8-4	1/2	3/4-16	1/4-18	1.53	0.81	0.39	0.28
2404-8-6	1/2	3/4-16	3/8-18	1.53	0.81	0.39	0.41
2404-8-8	1/2	3/4-16	1/2-14	1.79	0.88	0.39	0.53
2404-8-12	1/2	3/4-16	3/4-14	1.85	1.13	0.39	0.72
2404-8-16	1/2	3/4-16	1-11 1/2	2.05	1.38	0.39	0.94
2404-10-4	5/8	7/8-14	1/4-18	1.70	0.94	0.48	0.28
2404-10-6	5/8	7/8-14	3/8-18	1.70	0.94	0.48	0.41
2404-10-8	5/8	7/8-14	1/2-14	1.89	0.94	0.48	0.53
2404-10-12	5/8	7/8-14	3/4-14	1.95	1.13	0.48	0.72
2404-10-16	5/8	7/8-14	1-11 1/2	2.15	1.38	0.48	0.94
2404-12-6	3/4	1 1/16-12	3/8-18	1.87	1.13	0.61	0.41
2404-12-8	3/4	1 1/16-12	1/2-14	2.06	1.13	0.61	0.53
2404-12-12	3/4	1 1/16-12	3/4-14	2.06	1.13	0.61	0.72
2404-12-16	3/4	1 1/16-12	1-11 1/2	2.25	1.38	0.61	0.94
2404-12-20	3/4	1 1/16-12	1 1/4-11 1/2	2.36	1.69	0.61	1.25
2404-12-24	3/4	1 1/16-12	1 1/2-11 1/2	2.46	2.00	0.61	1.50
2404-14-8	7/8	1 3/16-12	1/2-14	2.09	1.25	0.72	0.53
2404-14-12	7/8	1 3/16-12	3/4-14	2.09	1.25	0.72	0.72
2404-16-8	1	1 5/16-12	1/2-14	2.11	1.38	0.84	0.53

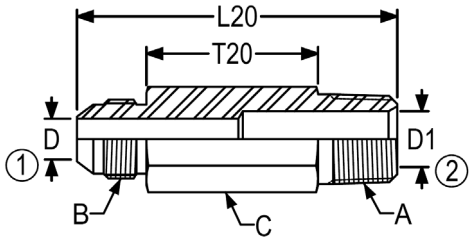
2404 MALE CONNECTOR (Con't)

SAE J514 070102
MS51500



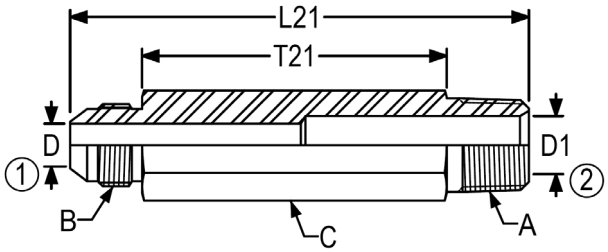
PART NO	TUBE OD	B UN/UNF-2A	A NPTF	L	C	D	D1
2404-16-12	1	1 5/16-12	3/4-14	2.11	1.38	0.84	0.72
2404-16-16	1	1 5/16-12	1-11 1/2	2.30	1.38	0.84	0.94
2404-16-20	1	1 5/16-12	1 1/4-11 1/2	2.40	1.69	0.84	1.25
2404-16-24	1	1 5/16-12	1 1/2-11 1/2	2.51	2.00	0.84	1.50
2404-20-12	1 1/4	1 5/8-12	3/4-14	2.23	1.69	1.08	0.72
2404-20-16	1 1/4	1 5/8-12	1-11 1/2	2.42	1.69	1.08	0.94
2404-20-20	1 1/4	1 5/8-12	1 1/4-11 1/2	2.45	1.69	1.08	1.25
2404-20-24	1 1/4	1 5/8-12	1 1/2-11 1/2	2.55	2.00	1.08	1.50
2404-20-32	1 1/4	1 5/8-12	2-11 1/2	2.73	2.50	1.08	1.94
2404-24-12	1 1/2	1 7/8-12	3/4-14	2.43	2.00	1.32	0.72
2404-24-16	1 1/2	1 7/8-12	1-11 1/2	2.62	2.00	1.31	0.94
2404-24-20	1 1/2	1 7/8-12	1 1/4-11 1/2	2.65	2.00	1.31	1.25
2404-24-24	1 1/2	1 7/8-12	1 1/2-11 1/2	2.68	2.00	1.31	1.50
2404-24-32	1 1/2	1 7/8-12	2-11 1/2	2.86	2.63	1.31	1.94
2404-32-16	2	2 1/2-12	1-11 1/2	3.02	2.63	1.78	0.94
2404-32-20	2	2 1/2-12	1 1/4-11 1/2	3.05	2.63	1.78	1.25
2404-32-24	2	2 1/2-12	1 1/2-11 1/2	3.08	2.63	1.78	1.50
2404-32-32	2	2 1/2-12	2-11 1/2	3.11	2.63	1.78	1.94

2404-L MALE LONG CONNECTOR



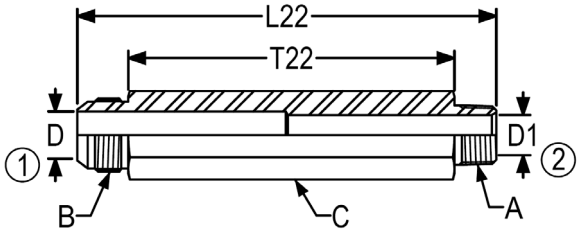
PART NO	TUBE OD	B UN/UNF-2A	A NPTF	L20	T20 REF.	C	D	D1
2404-L-4-2	1/4	7/16-20	1/8-27	1.81	0.88	0.50	0.17	0.19
2404-L-4-4	1/4	7/16-20	1/4-18	2.25	1.14	0.56	0.17	0.28
2404-L-5-4	5/16	1/2-20	1/4-18	2.25	1.14	0.56	0.23	0.28
2404-L-6-4	3/8	9/16-18	1/4-18	2.25	1.13	0.63	0.30	0.28
2404-L-6-6	3/8	9/16-18	3/8-18	2.50	1.38	0.75	0.30	0.41
2404-L-8-6	1/2	3/4-16	3/8-18	2.75	1.53	0.81	0.39	0.41
2404-L-8-8	1/2	3/4-16	1/2-14	3.03	1.63	0.88	0.39	0.53
2404-L-10-8	5/8	7/8-14	1/2-14	3.13	1.62	0.94	0.48	0.53
2404-L-12-12	3/4	1 1/16-12	3/4-14	3.50	1.89	1.13	0.61	0.72
2404-L-16-16	1	1 5/16-12	1-11 1/2	4.00	2.15	1.38	0.84	0.94
2404-L-20-20	1 1/4	1 5/8-12	1 1/4-11 1/2	4.50	2.57	1.69	1.08	1.25

2404-LL MALE EXTRA LONG CONNECTOR



PART NO	TUBE OD	B UN/UNF-2A	A NPTF	L21	T21 REF.	C	D	D1
2404-LL-4-2	1/4	7/16-20	1/8-27	2.56	1.63	0.50	0.17	0.19
2404-LL-4-4	1/4	7/16-20	1/4-18	3.25	2.14	0.56	0.17	0.28
2404-LL-5-2	5/16	1/2-20	1/8-27	2.81	1.88	0.56	0.23	0.19
2404-LL-6-4	3/8	9/16-18	1/4-18	3.25	2.13	0.63	0.30	0.28
2404-LL-6-6	3/8	9/16-18	3/8-18	3.50	2.37	0.75	0.30	0.41
2404-LL-8-6	1/2	3/4-16	3/8-18	4.00	2.78	0.81	0.39	0.41
2404-LL-8-8	1/2	3/4-16	1/2-14	4.19	2.78	0.88	0.39	0.53
2404-LL-10-8	5/8	7/8-14	1/2-14	4.38	2.87	0.94	0.48	0.53
2404-LL-12-12	3/4	1 1/16-12	3/4-14	5.00	3.39	1.13	0.61	0.72
2404-LL-16-16	1	1 5/16-12	1-11 1/2	5.75	3.90	1.38	0.84	0.94

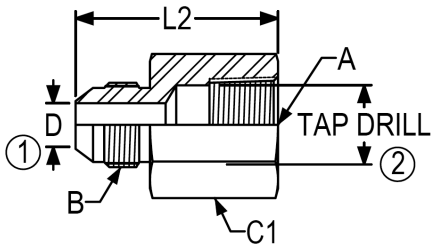
2404-LLL MALE EXTRA EXTRA LONG CONNECTOR



INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.

2405 FEMALE CONNECTOR

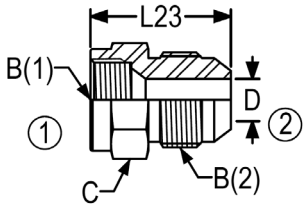
SAE J514 070103
MS51503



PART NO	TUBE OD	B UN/UNF-2A	A NPTF	L2	C1	D	TAP DRILL
2405-2-2	1/8	5/16-24	1/8-27	1.12	0.56	0.06	0.33
2405-3-4	3/16	3/8-24	1/4-18	1.32	0.75	0.13	0.43
2405-4-2	1/4	7/16-20	1/8-27	1.19	0.56	0.17	0.33
2405-4-4	1/4	7/16-20	1/4-18	1.39	0.75	0.17	0.43
2405-4-6	1/4	7/16-20	3/8-18	1.45	0.88	0.17	0.57
2405-4-8	1/4	7/16-20	1/2-14	1.68	1.13	0.17	0.70
2405-5-2	5/16	1/2-20	1/8-27	1.17	0.56	0.23	0.33
2405-5-4	5/16	1/2-20	1/4-18	1.39	0.75	0.23	0.43
2405-5-6	5/16	1/2-20	3/8-18	1.45	0.88	0.23	0.57
2405-6-2	3/8	9/16-18	1/8-27	1.19	0.63	0.30	0.33
2405-6-4	3/8	9/16-18	1/4-18	1.40	0.75	0.30	0.43
2405-6-6	3/8	9/16-18	3/8-18	1.46	0.88	0.30	0.57
2405-6-8	3/8	9/16-18	1/2-14	1.69	1.13	0.30	0.70
2405-8-4	1/2	3/4-16	1/4-18	1.55	0.81	0.39	0.43
2405-8-6	1/2	3/4-16	3/8-18	1.56	0.88	0.39	0.57
2405-8-8	1/2	3/4-16	1/2-14	1.79	1.13	0.39	0.70
2405-8-12	1/2	3/4-16	3/4-14	1.85	1.38	0.39	0.91
2405-10-4	5/8	7/8-14	1/4-18	1.66	0.94	0.48	0.43
2405-10-6	5/8	7/8-14	3/8-18	1.50	0.94	0.48	0.57
2405-10-8	5/8	7/8-14	1/2-14	1.89	1.13	0.48	0.70
2405-10-12	5/8	7/8-14	3/4-14	1.95	1.38	0.48	0.91
2405-12-8	3/4	1 1/16-12	1/2-14	2.05	1.13	0.61	0.70
2405-12-12	3/4	1 1/16-12	3/4-14	2.06	1.38	0.61	0.91
2405-12-16	3/4	1 1/16-12	1-11 1/2	2.30	1.63	0.61	1.14
2405-14-12	7/8	1 3/16-12	3/4-14	2.06	1.38	0.72	0.91
2405-16-12	1	1 5/16-12	3/4-14	2.12	1.38	0.84	0.91
2405-16-16	1	1 5/16-12	1-11 1/2	2.35	1.63	0.84	1.14
2405-16-20	1	1 5/16-12	1 1/4-11 1/2	2.44	2.00	0.84	1.48
2405-20-16	1 1/4	1 5/8-12	1-11 1/2	2.47	1.69	1.08	1.14
2405-20-20	1 1/4	1 5/8-12	1 1/4-11 1/2	2.49	2.00	1.08	1.48
2405-20-24	1 1/4	1 5/8-12	1 1/2-11 1/2	2.49	2.38	1.08	1.72
2405-24-20	1 1/2	1 7/8-12	1 1/4-11 1/2	2.62	2.00	1.31	1.48
2405-24-24	1 1/2	1 7/8-12	1 1/2-11 1/2	2.62	2.38	1.31	1.72
2405-32-24	2	2 1/2-12	1 1/2-11 1/2	2.05	2.63	1.72	1.72
2405-32-32	2	2 1/2-12	2-11 1/2	2.97	2.88	1.78	2.19

2406 REDUCING ADAPTER (ONE PIECE)

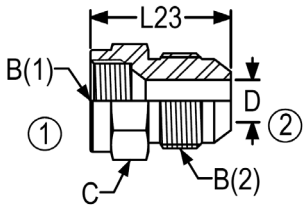
MS39323



PART NO	TUBE OD	B (1) UN/UNF-2B	B (2) UN/UNF-2A	L23	C	D
2406-4-6	1/4-3/8	7/16-20	9/16-18	1.00	0.63	0.17
2406-5-4	5/16-1/4	1/2-20	7/16-20	1.19	0.63	0.17
2406-5-6	5/16-3/8	1/2-20	9/16-18	1.19	0.63	0.30
2406-5-8	5/16-1/2	1/2-20	3/4-16	1.16	0.81	0.39
2406-6-4	3/8-1/4	9/16-18	7/16-20	1.19	0.69	0.17
2406-6-5	3/8-5/16	9/16-18	1/2-20	1.19	0.69	0.23
2406-6-6	3/8-3/8	9/16-18	9/16-18	1.13	0.69	0.30
2406-6-8	3/8-1/2	9/16-18	3/4-16	1.16	0.81	0.30
2406-8-4	1/2-1/4	3/4-16	7/16-20	1.33	0.88	0.17
2406-8-5	1/2-5/16	3/4-16	1/2-20	1.33	0.88	0.23
2406-8-6	1/2-3/8	3/4-16	9/16-18	1.33	0.88	0.30
2406-8-10	1/2-5/8	3/4-16	7/8-14	1.29	0.94	0.39
2406-8-12	1/2-3/4	3/4-16	1 1/16-12	1.44	1.13	0.39
2406-8-16	1/2-1	3/4-16	1 5/16-12	1.61	1.38	0.39
2406-10-4	5/8-1/4	7/8-14	7/16-20	1.47	1.00	0.17
2406-10-6	5/8-3/8	7/8-14	9/16-18	1.41	1.00	0.30
2406-10-8	5/8-1/2	7/8-14	3/4-16	1.41	1.00	0.39
2406-10-12	5/8-3/4	7/8-14	1 1/16-12	1.49	1.13	0.48
2406-12-4	3/4-1/4	1 1/16-12	7/16-20	1.50	1.25	0.17
2406-12-6	3/4-3/8	1 1/16-12	9/16-18	1.46	1.25	0.30
2406-12-8	3/4-1/2	1 1/16-12	3/4-16	1.56	1.25	0.39
2406-12-10	3/4-5/8	1 1/16-12	7/8-14	1.64	1.25	0.48
2406-12-12	3/4-3/4	1 1/16-12	1 1/16-12	1.56	1.25	0.61
2406-12-16	3/4-1	1 1/16-12	1 5/16-12	1.61	1.38	0.61
2406-14-6	7/8-3/8	1 3/16-12	9/16-18	1.59	1.38	0.30
2406-14-8	7/8-1/2	1 3/16-12	3/4-16	1.69	1.38	0.39
2406-14-10	7/8-5/8	1 3/16-12	7/8-14	1.73	1.38	0.48
2406-14-12	7/8-3/4	1 3/16-12	1 1/16-12	1.80	1.38	0.61
2406-16-4	1-1/4	1 5/16-12	7/16-20	1.67	1.50	0.17
2406-16-6	1-3/8	1 5/16-12	9/16-18	1.65	1.50	0.30
2406-16-8	1-1/2	1 5/16-12	3/4-16	1.72	1.50	0.39
2406-16-10	1-5/8	1 5/16-12	7/8-14	1.79	1.50	0.48
2406-16-12	1-3/4	1 5/16-12	1 1/16-12	1.82	1.50	0.61
2406-16-14	1-7/8	1 5/16-12	1 3/16-12	1.86	1.50	0.72
2406-16-20	1-1 1/4	1 5/16-12	1 5/8-12	1.71	1.69	0.84

2406 REDUCING ADAPTER (ONE PIECE) (Con't)

MS39323

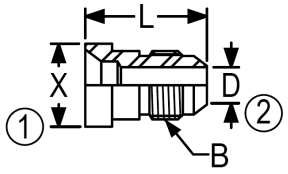


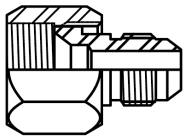
PART NO	TUBE OD	B (1) UN/UNF-2B	B (2) UN/UNF-2A	L23	C	D
2406-16-24	1-1 1/2	1 5/16-12	1 7/8-12	1.81	2.00	0.84
2406-20-6	1 1/4-3/8	1 5/8-12	9/16-18	1.77	2.00	0.30
2406-20-8	1 1/4-1/2	1 5/8-12	3/4-16	1.84	2.00	0.39
2406-20-10	1 1/4-5/8	1 5/8-12	7/8-14	1.91	2.00	0.48
2406-20-12	1 1/4-3/4	1 5/8-12	1 1/16-12	2.02	2.00	0.61
2406-20-14	1 1/4-7/8	1 5/8-12	1 3/16-12	2.03	2.00	0.72
2406-20-16	1 1/4-1	1 5/8-12	1 5/16-12	2.01	2.00	0.84
2406-20-24	1 1/4-1 1/2	1 5/8-12	1 7/8-12	2.14	2.00	1.08
2406-24-8	1 1/2-1/2	1 7/8-12	3/4-16	2.09	2.25	0.39
2406-24-10	1 1/2-5/8	1 7/8-12	7/8-14	2.19	2.25	0.48
2406-24-12	1 1/2-3/4	1 7/8-12	1 1/16-12	2.19	2.25	0.61
2406-24-16	1 1/2-1	1 7/8-12	1 5/16-12	2.22	2.25	0.84
2406-24-20	1 1/2-1 1/4	1 7/8-12	1 5/8-12	2.14	2.25	1.08
2406-24-32	1 1/2-2	1 7/8-12	2 1/2-12	2.14	2.63	1.31
2406-32-8	2-1/2	2 1/2-12	3/4-16	2.10	2.88	0.39
2406-32-12	2-3/4	2 1/2-12	1 1/16-12	2.31	2.88	0.61
2406-32-16	2-1	2 1/2-12	1 5/16-12	2.58	2.88	0.84
2406-32-20	2-1 1/4	2 1/2-12	1 5/8-12	2.58	2.88	1.08
2406-32-24	2-1 1/2	2 1/2-12	1 7/8-12	2.61	2.88	1.31

2407 REDUCING ADAPTER

SAE J514 070123
MS51534 / MS39323

AVAILABLE WITH OR WITHOUT NUT. CALL CUSTOMER SERVICE FOR AVAILABILITY.



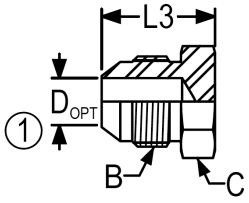


PART NO	TUBE OD	B UN/UNF-2A	L	X	D
2407-6-4	3/8-1/4	7/16-20	0.97	0.50	0.17
2407-8-4	1/2-1/4	7/16-20	1.00	0.68	0.17
2407-8-6	1/2-3/8	9/16-18	1.00	0.68	0.30
2407-10-4	5/8-1/4	7/16-20	1.03	0.80	0.17
2407-10-6	5/8-3/8	9/16-18	1.03	0.80	0.30
2407-12-4	3/4-1/4	7/16-20	1.09	0.97	0.17
2407-12-6	3/4-3/8	9/16-18	1.09	0.97	0.30
2407-12-8	3/4-1/2	3/4-16	1.19	0.97	0.39
2407-16-4	1-1/4	7/16-20	1.16	1.22	0.17
2407-16-6	1-3/8	9/16-18	1.16	1.22	0.30
2407-16-8	1-1/2	3/4-16	1.28	1.22	0.39
2407-16-10	1-5/8	7/8-14	1.37	1.22	0.48
2407-16-12	1-3/4	1 1/16-12	1.47	1.22	0.61
2407-20-12	1 1/4-3/4	1 1/16-12	1.50	1.53	0.61
2407-20-16	1 1/4-1	1 5/16-12	1.55	1.53	0.84

2408 MALE TUBE PLUG

SAE J514 070109
MS51518

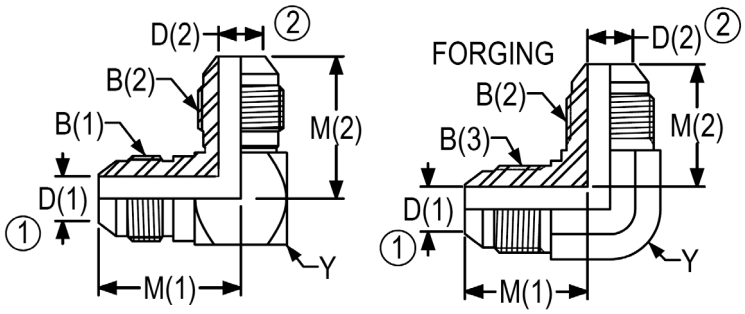
AVAILABLE WITH OR WITHOUT HOLE. CALL CUSTOMER SERVICE FOR AVAILABILITY.



PART NO	TUBE OD	B UN/UNF-2A	L3	C	D (OPT)
2408-2	1/8	5/16-24	0.70	0.44	0.06
2408-3	3/16	3/8-24	0.73	0.44	0.13
2408-4	1/4	7/16-20	0.80	0.50	0.17
2408-5	5/16	1/2-20	0.80	0.56	0.23
2408-6	3/8	9/16-18	0.84	0.63	0.30
2408-8	1/2	3/4-16	0.94	0.81	0.39
2408-10	5/8	7/8-14	1.10	0.94	0.48
2408-12	3/4	1 1/16-12	1.28	1.13	0.61
2408-14	7/8	1 3/16-12	1.31	1.25	0.72
2408-16	1	1 5/16-12	1.33	1.38	0.84
2408-20	1 1/4	1 5/8-12	1.45	1.69	1.08
2408-24	1 1/2	1 7/8-12	1.65	2.00	1.31
2408-32	2	2 1/2-12	2.05	2.63	1.78

2500 90 DEGREE UNION ELBOW

SAE J514 070201
MS51505



*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M (1)	M (2)	Y	D (1)	D (2)
2500-4-4	1/4-1/4	7/16-20	7/16-20	0.89	0.89	0.50	0.17	0.17
2500-4-4-FG	1/4-1/4	7/16-20	7/16-20	0.89	0.89	0.44	0.17	0.17
2500-5-4	5/16-1/4	1/2-20	7/16-20	0.95	0.92	0.56	0.23	0.17
2500-5-5	5/16-5/16	1/2-20	1/2-20	0.95	0.95	0.56	0.23	0.23
2500-5-5-FG	5/16-5/16	1/2-20	1/2-20	0.95	0.95	0.56	0.23	0.23
2500-6-4	3/8-1/4	9/16-18	7/16-20	1.06	0.95	0.63	0.30	0.17
2500-6-5	3/8-5/16	9/16-18	1/2-20	1.06	0.98	0.63	0.30	0.23
2500-6-6	3/8-3/8	9/16-18	9/16-18	1.06	1.06	0.63	0.30	0.30
2500-6-6-FG	3/8-3/8	9/16-18	9/16-18	1.06	1.06	0.56	0.30	0.30
2500-8-6	1/2-3/8	3/4-16	9/16-18	1.25	1.15	0.81	0.39	0.30
2500-8-8	1/2-1/2	3/4-16	3/4-16	1.25	1.25	0.81	0.39	0.39
2500-8-8-FG	1/2-1/2	3/4-16	3/4-16	1.25	1.25	0.75	0.39	0.39
2500-10-6	5/8-3/8	7/8-14	9/16-18	1.45	1.22	0.94	0.48	0.30
2500-10-8	5/8-1/2	7/8-14	3/4-16	1.45	1.31	0.94	0.48	0.39
2500-10-8-FG	5/8-1/2	7/8-14	3/4-16	1.45	1.33	0.88	0.48	0.39
2500-10-10	5/8-5/8	7/8-14	7/8-14	1.45	1.45	0.94	0.48	0.48
2500-10-10-FG	5/8-5/8	7/8-14	7/8-14	1.45	1.45	0.88	0.48	0.48
2500-12-8	3/4-1/2	1 1/16-12	3/4-16	1.66	1.40	1.13	0.61	0.39
2500-12-10	3/4-5/8	1 1/16-12	7/8-14	1.66	1.55	1.13	0.61	0.48
2500-12-12	3/4-3/4	1 1/16-12	1 1/16-12	1.66	1.66	1.13	0.61	0.61
2500-12-12-FG	3/4-3/4	1 1/16-12	1 1/16-12	1.66	1.66	1.06	0.61	0.61
2500-14-14	7/8-7/8	1 3/16-12	1 3/16-12	1.80	1.80	1.25	0.72	0.72
2500-16-12	1-3/4	1 5/16-12	1 1/16-12	1.81	1.78	1.38	0.84	0.61
2500-16-12-FG	1-3/4	1 5/16-12	1 1/16-12	1.81	1.76	1.31	0.84	0.61
2500-16-16	1-1	1 5/16-12	1 5/16-12	1.81	1.81	1.38	0.84	0.84
2500-16-16-FG	1-1	1 5/16-12	1 5/16-12	1.81	1.81	1.31	0.84	0.84
2500-20-16	1 1/4-1	1 5/8-12	1 5/16-12	2.06	2.00	1.75	1.08	0.84
2500-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.06	2.06	1.75	1.08	1.08
2500-20-20-FG	1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.06	2.06	1.63	1.08	1.08
2500-24-24	1 1/2-1 1/2	1 7/8-12	1 7/8-12	2.33	2.33	2.00	1.31	1.31
2500-24-24-FG	1 1/2-1 1/2	1 7/8-12	1 7/8-12	2.33	2.33	1.88	1.31	1.31
2500-32-32	2-2	2 1/2-12	2 1/2-12	3.06	3.06	2.63	1.78	1.78
2500-32-32-FG	2-2	2 1/2-12	2 1/2-12	3.06	3.06	2.50	1.78	1.78

2501 90 DEGREE MALE ELBOW

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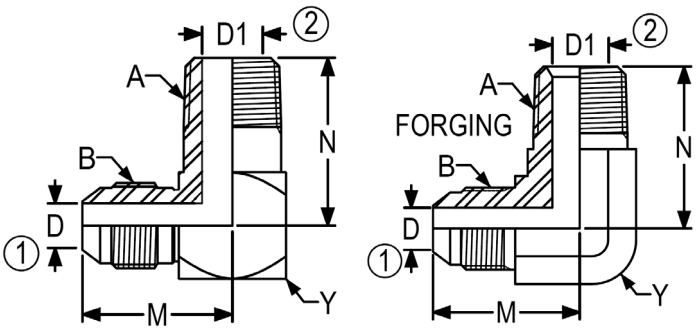

*Non forging parts are brazed construction

PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M	N	Y	D	D1
2501-2-2	1/8	5/16-24	1/8-27	0.81	0.78	0.50	0.06	0.19
2501-2-2-FG	1/8	5/16-24	1/8-27	0.77	0.72	0.44	0.06	0.19
2501-2-4	1/8	5/16-24	1/4-18	0.87	1.09	0.63	0.06	0.28
2501-3-2	3/16	3/8-24	1/8-27	0.86	0.78	0.50	0.13	0.19
2501-3-2-FG	3/16	3/8-24	1/8-27	0.83	0.72	0.44	0.13	0.19
2501-4-2	1/4	7/16-20	1/8-27	0.89	0.78	0.50	0.17	0.19
2501-4-2-FG	1/4	7/16-20	1/8-27	0.89	0.76	0.44	0.17	0.19
2501-4-4	1/4	7/16-20	1/4-18	0.95	1.09	0.63	0.17	0.28
2501-4-4-FG	1/4	7/16-20	1/4-18	1.05	1.09	0.56	0.17	0.28
2501-4-6	1/4	7/16-20	3/8-18	1.05	1.22	0.81	0.17	0.41
2501-4-6-FG	1/4	7/16-20	3/8-18	1.12	1.22	0.75	0.17	0.41
2501-4-8	1/4	7/16-20	1/2-14	1.11	1.47	0.94	0.17	0.53
2501-4-8-FG	1/4	7/16-20	1/2-14	1.21	1.47	0.88	0.17	0.53
2501-4-12	1/4	7/16-20	3/4-14	1.20	1.59	1.13	0.17	0.72
2501-5-2	5/16	1/2-20	1/8-27	0.95	0.81	0.56	0.23	0.19
2501-5-2-FG	5/16	1/2-20	1/8-27	0.95	0.78	0.56	0.23	0.19
2501-5-4	5/16	1/2-20	1/4-18	0.98	1.09	0.63	0.23	0.28
2501-5-4-FG	5/16	1/2-20	1/4-18	1.05	1.09	0.56	0.23	0.28
2501-5-6	5/16	1/2-20	3/8-18	1.08	1.22	0.81	0.23	0.41
2501-5-8	5/16	1/2-20	1/2-14	1.14	1.47	0.94	0.23	0.53
2501-6-2	3/8	9/16-18	1/8-27	1.06	0.84	0.63	0.30	0.19
2501-6-2-FG	3/8	9/16-18	1/8-27	1.06	0.90	0.56	0.30	0.19
2501-6-4	3/8	9/16-18	1/4-18	1.06	1.09	0.63	0.30	0.28
2501-6-4-FG	3/8	9/16-18	1/4-18	1.06	1.09	0.56	0.30	0.28
2501-6-6	3/8	9/16-18	3/8-18	1.15	1.22	0.81	0.30	0.41
2501-6-6-FG	3/8	9/16-18	3/8-18	1.14	1.22	0.75	0.30	0.41
2501-6-8	3/8	9/16-18	1/2-14	1.22	1.47	0.94	0.30	0.53
2501-6-8-FG	3/8	9/16-18	1/2-14	1.22	1.47	0.88	0.30	0.53
2501-6-12	3/8	9/16-18	3/4-14	1.31	1.59	1.13	0.30	0.72
2501-6-16	3/8	9/16-18	1-11 1/2	1.44	1.97	1.38	0.30	0.94
2501-8-2	1/2	3/4-16	1/8-27	1.25	0.94	0.81	0.39	0.19
2501-8-4	1/2	3/4-16	1/4-18	1.25	1.19	0.81	0.39	0.28
2501-8-4-FG	1/2	3/4-16	1/4-18	1.25	1.22	0.75	0.39	0.28

2501 90 DEGREE MALE ELBOW (Con't)

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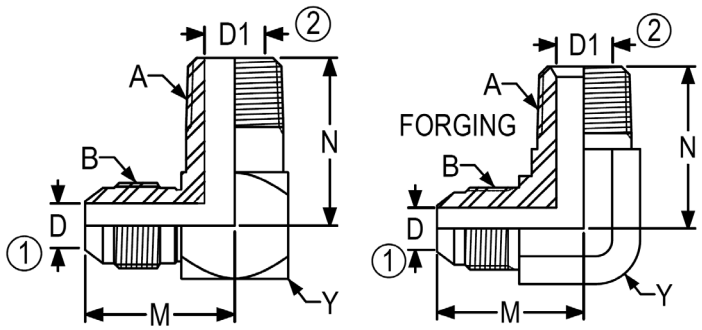

*Non forging parts are brazed construction

PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M	N	Y	D	D1
2501-8-6	1/2	3/4-16	3/8-18	1.25	1.22	0.81	0.39	0.41
2501-8-6-FG	1/2	3/4-16	3/8-18	1.25	1.22	0.75	0.39	0.41
2501-8-8	1/2	3/4-16	1/2-14	1.31	1.47	0.94	0.39	0.53
2501-8-8-FG	1/2	3/4-16	1/2-14	1.33	1.47	0.88	0.39	0.53
2501-8-12	1/2	3/4-16	3/4-14	1.40	1.59	1.13	0.39	0.72
2501-8-12-FG	1/2	3/4-16	3/4-14	1.42	1.59	1.06	0.39	0.72
2501-8-16	1/2	3/4-16	1-11 1/2	1.53	1.97	1.38	0.39	0.94
2501-10-4	5/8	7/8-14	1/4-18	1.45	1.25	0.94	0.48	0.28
2501-10-6	5/8	7/8-14	3/8-18	1.45	1.28	0.94	0.48	0.41
2501-10-6-FG	5/8	7/8-14	3/8-18	1.45	1.28	0.88	0.48	0.41
2501-10-8	5/8	7/8-14	1/2-14	1.45	1.47	0.94	0.48	0.53
2501-10-8-FG	5/8	7/8-14	1/2-14	1.45	1.47	0.88	0.48	0.53
2501-10-12	5/8	7/8-14	3/4-14	1.55	1.59	1.13	0.48	0.72
2501-10-12-FG	5/8	7/8-14	3/4-14	1.54	1.59	1.06	0.48	0.72
2501-10-16	5/8	7/8-14	1-11 1/2	1.67	1.97	1.38	0.48	0.94
2501-10-16-FG	5/8	7/8-14	1-11 1/2	1.64	1.97	1.31	0.48	0.94
2501-12-6	3/4	1 1/16-12	3/8-18	1.66	1.38	1.13	0.61	0.41
2501-12-8	3/4	1 1/16-12	1/2-14	1.66	1.56	1.13	0.61	0.53
2501-12-8-FG	3/4	1 1/16-12	1/2-14	1.66	1.59	1.06	0.61	0.53
2501-12-12	3/4	1 1/16-12	3/4-14	1.66	1.59	1.13	0.61	0.72
2501-12-12-FG	3/4	1 1/16-12	3/4-14	1.66	1.59	1.06	0.61	0.72
2501-12-16	3/4	1 1/16-12	1-11 1/2	1.78	1.97	1.38	0.61	0.94
2501-12-16-FG	3/4	1 1/16-12	1-11 1/2	1.76	1.97	1.31	0.61	0.94
2501-12-20	3/4	1 1/16-12	1 1/4-11 1/2	1.97	2.38	1.75	0.61	1.25
2501-14-12	7/8	1 3/16-12	3/4-14	1.80	1.66	1.25	0.72	0.72
2501-14-16	7/8	1 3/16-12	1-11 1/2	1.86	1.97	1.38	0.72	0.94
2501-16-8	1	1 5/16-12	1/2-14	1.81	1.69	1.38	0.84	0.53
2501-16-12	1	1 5/16-12	3/4-14	1.81	1.72	1.38	0.84	0.72
2501-16-12-FG	1	1 5/16-12	3/4-14	1.81	1.78	1.31	0.84	0.72
2501-16-16	1	1 5/16-12	1-11 1/2	1.81	1.97	1.38	0.84	0.94
2501-16-16-FG	1	1 5/16-12	1-11 1/2	1.81	1.97	1.31	0.84	0.94
2501-16-20	1	1 5/16-12	1 1/4-11 1/2	2.00	2.38	1.75	0.84	1.25
2501-16-20-FG	1	1 5/16-12	1 1/4-11 1/2	2.01	2.38	1.63	0.84	1.25
2501-16-24	1	1 5/16-12	1 1/2-11 1/2	2.13	2.64	2.00	0.84	1.50

2501 90 DEGREE MALE ELBOW (Con't)

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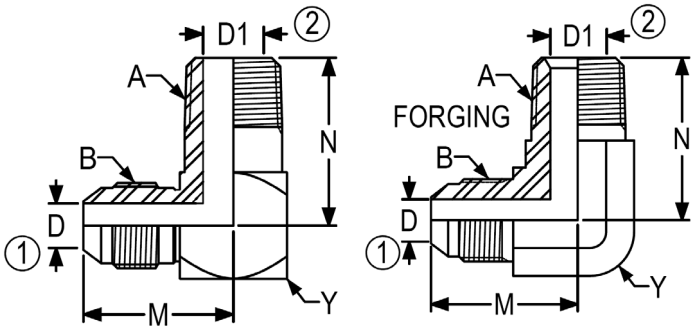

*Non forging parts are brazed construction

PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M	N	Y	D	D1
2501-20-12	1 1/4	1 5/8-12	3/4-14	2.06	1.91	1.75	1.08	0.72
2501-20-16	1 1/4	1 5/8-12	1-11 1/2	2.06	2.16	1.75	1.08	0.94
2501-20-16-FG	1 1/4	1 5/8-12	1-11 1/2	2.06	2.35	1.63	1.08	0.94
2501-20-20	1 1/4	1 5/8-12	1 1/4-11 1/2	2.06	2.38	1.75	1.08	1.25
2501-20-20-FG	1 1/4	1 5/8-12	1 1/4-11 1/2	2.06	2.38	1.63	1.08	1.25
2501-20-24	1 1/4	1 5/8-12	1 1/2-11 1/2	2.19	2.64	2.00	1.08	1.50
2501-20-24-FG	1 1/4	1 5/8-12	1 1/2-11 1/2	2.30	2.64	1.88	1.08	1.50
2501-24-16	1 1/2	1 7/8-12	1-11 1/2	2.33	2.28	2.00	1.31	0.94
2501-24-20	1 1/2	1 7/8-12	1 1/4-11 1/2	2.33	2.50	2.00	1.31	1.25
2501-24-20-FG	1 1/2	1 7/8-12	1 1/4-11 1/2	2.33	2.61	1.88	1.31	1.25
2501-24-24	1 1/2	1 7/8-14	1 1/2-11 1/2	2.33	2.64	2.00	1.31	1.50
2501-24-24-FG	1 1/2	1 7/8-12	1 1/2-11 1/2	2.33	2.64	1.81	1.31	1.50
2501-32-24	2	2 1/2-12	1 1/2-11 1/2	3.06	2.95	2.63	1.78	1.50
2501-32-32	2	2 1/2-12	2-11 1/2	3.06	3.00	2.63	1.78	1.94
2501-32-32-FG	2	2 1/2-12	2-11 1/2	3.06	3.00	2.50	1.78	1.86

2501-L 90 DEGREE MALE LONG ELBOW

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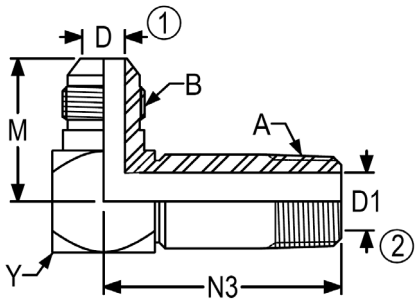
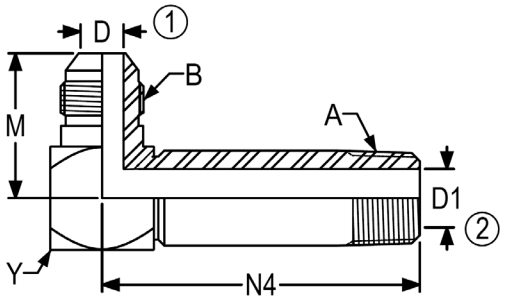


PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M	N3	Y	D	D1
2501-L-4-2	1/4	7/16-20	1/8-27	0.89	1.17	0.50	0.17	0.19
2501-L-4-4	1/4	7/16-20	1/4-18	0.95	1.58	0.63	0.17	0.28
2501-L-5-2	5/16	1/2-20	1/8-27	0.95	1.20	0.56	0.23	0.19
2501-L-5-4	5/16	1/2-20	1/4-18	0.95	1.55	0.56	0.23	0.28
2501-L-6-2	3/8	9/16-18	1/8-27	1.06	1.23	0.63	0.30	0.19
2501-L-6-4	3/8	9/16-18	1/4-18	1.06	1.58	0.63	0.30	0.28
2501-L-6-6	3/8	9/16-18	3/8-18	1.16	1.83	0.81	0.30	0.41
2501-L-6-8	3/8	9/16-18	1/2-14	1.22	2.17	0.94	0.30	0.53
2501-L-8-4	1/2	3/4-16	1/4-18	1.25	1.67	0.81	0.39	0.28
2501-L-8-6	1/2	3/4-16	3/8-18	1.25	1.83	0.81	0.39	0.41
2501-L-8-8	1/2	3/4-16	1/2-14	1.31	2.17	0.94	0.39	0.53
2501-L-8-12	1/2	3/4-16	3/4-14	1.41	2.44	1.13	0.39	0.72
2501-L-10-6	5/8	7/8-14	3/8-18	1.45	1.89	0.94	0.48	0.41
2501-L-10-8	5/8	7/8-14	1/2-14	1.45	2.17	0.94	0.48	0.53
2501-L-10-12	5/8	7/8-14	3/4-14	1.55	2.44	1.13	0.48	0.72
2501-L-12-8	3/4	1 1/16-12	1/2-14	1.66	2.27	1.13	0.61	0.53
2501-L-12-12	3/4	1 1/16-12	3/4-14	1.66	2.44	1.13	0.61	0.72
2501-L-12-16	3/4	1 1/16-12	1-11 1/2	1.78	3.02	1.38	0.61	0.94
2501-L-14-12	7/8	1 3/16-12	3/4-14	1.80	2.50	1.25	0.72	0.72
2501-L-16-12	1	1 5/16-12	3/4-14	1.81	2.56	1.38	0.84	0.72
2501-L-16-16	1	1 5/16-12	1-11 1/2	1.81	3.02	1.38	0.84	0.94
2501-L-20-20	1 1/4	1 5/8-12	1 1/4-11 1/2	2.06	3.69	1.75	1.08	1.25
2501-L-24-24	1 1/2	1 7/8-12	1 1/2-11 1/2	2.33	4.11	2.00	1.31	1.50

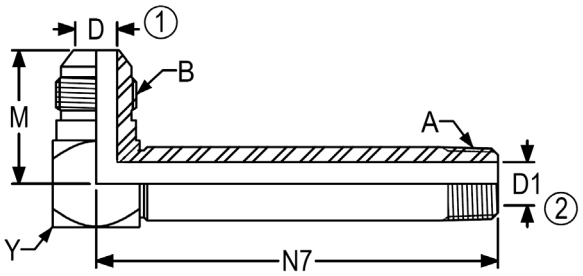
2501-LL 90 DEGREE MALE EXTRA LONG ELBOW

SAE J514 071602



PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M	N4	Y	D	D1
2501-LL-3-2	3/16	3/8-24	1/8-27	0.83	1.56	0.50	0.13	0.19
2501-LL-4-2	1/4	7/16-20	1/8-27	0.89	1.56	0.50	0.17	0.19
2501-LL-4-4	1/4	7/16-20	1/4-18	0.95	2.07	0.63	0.17	0.28
2501-LL-5-2	5/16	1/2-20	1/8-27	0.95	1.59	0.56	0.23	0.19
2501-LL-5-4	5/16	1/2-20	1/4-18	0.95	2.04	0.56	0.23	0.28
2501-LL-6-2	3/8	9/16-18	1/8-27	1.06	1.62	0.63	0.30	0.19
2501-LL-6-4	3/8	9/16-18	1/4-18	1.06	2.07	0.63	0.30	0.28
2501-LL-6-6	3/8	9/16-18	3/8-18	1.16	2.42	0.81	0.30	0.41
2501-LL-6-8	3/8	9/16-18	1/2-14	1.22	2.88	0.94	0.30	0.53
2501-LL-8-4	1/2	3/4-16	1/4-18	1.25	2.16	0.81	0.39	0.28
2501-LL-8-6	1/2	3/4-16	3/8-18	1.25	2.42	0.81	0.39	0.41
2501-LL-8-8	1/2	3/4-16	1/2-14	1.31	2.88	0.94	0.39	0.53
2501-LL-10-8	5/8	7/8-14	1/2-14	1.45	2.87	0.94	0.48	0.53
2501-LL-10-12	5/8	7/8-14	3/4-14	1.55	3.28	1.13	0.48	0.72
2501-LL-12-8	3/4	1 1/16-12	1/2-14	1.66	2.98	1.13	0.61	0.53
2501-LL-12-12	3/4	1 1/16-12	3/4-14	1.66	3.28	1.13	0.61	0.72
2501-LL-14-12	7/8	1 3/16-12	3/4-14	1.80	3.34	1.25	0.72	0.72
2501-LL-16-12	1	1 5/16-12	3/4-14	1.81	3.41	1.38	0.84	0.72
2501-LL-16-16	1	1 5/16-12	1-11 1/2	1.81	4.05	1.38	0.84	0.94
2501-LL-20-20	1 1/4	1 5/8-12	1 1/4-11 1/2	2.06	5.00	1.75	1.08	1.25
2501-LL-24-24	1 1/2	1 7/8-12	1 1/2-11 1/2	2.33	5.55	2.00	1.31	1.50

2501-LLL 90 DEGREE MALE EXTRA EXTRA LONG ELBOW



PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M	N7	Y	D	D1
2501-LLL-4-2	1/4	7/16-20	1/8-27	0.89	2.31	0.50	0.17	0.19
2501-LLL-4-4	1/4	7/16-20	1/4-18	0.95	3.06	0.63	0.17	0.28
2501-LLL-5-2	5/16	1/2-20	1/8-27	0.95	2.34	0.56	0.23	0.19
2501-LLL-6-4	3/8	9/16-18	1/4-18	1.06	3.06	0.63	0.30	0.28
2501-LLL-6-6	3/8	9/16-18	3/8-18	1.16	3.75	0.81	0.30	0.41
2501-LLL-8-6	1/2	3/4-16	3/8-18	1.25	3.75	0.81	0.39	0.41
2501-LLL-10-8	5/8	7/8-14	1/2-14	1.45	4.50	0.94	0.48	0.53
2501-LLL-12-12	3/4	1 1/16-12	3/4-14	1.66	5.03	1.13	0.61	0.72
2501-LLL-16-16	1	1 5/16-12	1-11 1/2	1.81	6.34	1.38	0.84	0.94
2501-LLL-20-20	1 1/4	1 5/8-12	1 1/4-11 1/2	2.06	7.34	1.75	1.08	1.25

2502 90 DEGREE FEMALE ELBOW

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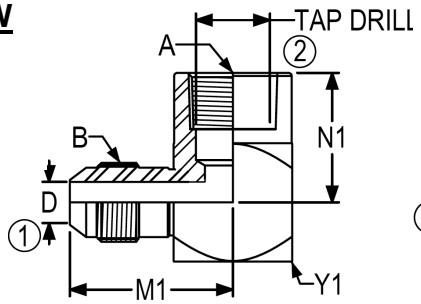
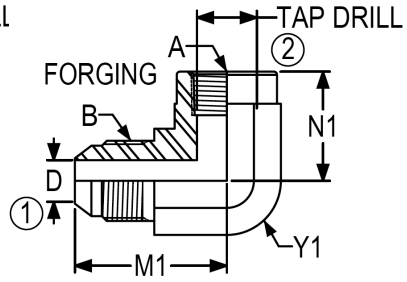
MS51506





*Non forging parts are brazed construction

PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M1	N1	Y1	D	TAP DRILL
2502-3-2	3/16	3/8-24	1/8-27	1.03	0.66	0.63	0.13	0.33
2502-4-2	1/4	7/16-20	1/8-27	1.08	0.66	0.63	0.17	0.33
2502-4-2-FG	1/4	7/16-20	1/8-27	1.08	0.66	0.56	0.17	0.33
2502-4-4	1/4	7/16-20	1/4-18	1.14	0.88	0.75	0.17	0.43
2502-4-4-FG	1/4	7/16-20	1/4-18	1.22	0.88	0.75	0.17	0.43
2502-4-6	1/4	7/16-20	3/8-18	1.20	1.02	0.88	0.17	0.57
2502-4-8	1/4	7/16-20	1/2-14	1.33	1.23	1.13	0.17	0.70
2502-5-2	5/16	1/2-20	1/8-27	1.08	0.66	0.63	0.23	0.33
2502-5-4	5/16	1/2-20	1/4-18	1.14	0.88	0.75	0.23	0.43
2502-5-6	5/16	1/2-20	3/8-18	1.20	1.02	0.88	0.23	0.57
2502-6-2	3/8	9/16-18	1/8-27	1.06	0.66	0.63	0.30	0.33
2502-6-4	3/8	9/16-18	1/4-18	1.23	0.88	0.75	0.30	0.43
2502-6-4-FG	3/8	9/16-18	1/4-18	1.23	0.88	0.75	0.30	0.43
2502-6-6	3/8	9/16-18	3/8-18	1.30	1.02	0.88	0.30	0.57
2502-6-6-FG	3/8	9/16-18	3/8-18	1.31	1.02	0.88	0.30	0.57
2502-6-8	3/8	9/16-18	1/2-14	1.42	1.23	1.13	0.30	0.70
2502-8-4	1/2	3/4-16	1/4-18	1.25	0.91	0.81	0.39	0.43
2502-8-6	1/2	3/4-16	3/8-18	1.42	1.02	0.88	0.39	0.57
2502-8-6-FG	1/2	3/4-16	3/8-18	1.42	1.02	0.88	0.39	0.57
2502-8-8	1/2	3/4-16	1/2-14	1.55	1.23	1.13	0.39	0.70
2502-8-8-FG	1/2	3/4-16	1/2-14	1.52	1.23	1.06	0.39	0.70
2502-8-12	1/2	3/4-16	3/4-14	1.67	1.36	1.38	0.39	0.91
2502-10-6	5/8	7/8-14	3/8-18	1.45	1.05	0.94	0.48	0.57
2502-10-8	5/8	7/8-14	1/2-14	1.64	1.23	1.13	0.48	0.70
2502-10-8-FG	5/8	7/8-14	1/2-14	1.64	1.23	1.06	0.48	0.70
2502-10-12	5/8	7/8-14	3/4-14	1.77	1.36	1.38	0.48	0.91
2502-12-8	3/4	1 1/16-12	1/2-14	1.76	1.23	1.13	0.61	0.70
2502-12-12	3/4	1 1/16-12	3/4-14	1.89	1.36	1.38	0.61	0.91
2502-12-12-FG	3/4	1 1/16-12	3/4-14	1.89	1.36	1.31	0.61	0.91
2502-12-16	3/4	1 1/16-12	1-11 1/2	2.02	1.62	1.63	0.61	1.14
2502-14-12	7/8	1 3/16-12	3/4-14	1.86	1.42	1.38	0.72	0.91
2502-16-12	1	1 5/16-12	3/4-14	2.05	1.36	1.38	0.84	0.91

2502 90 DEGREE FEMALE ELBOW (Con')

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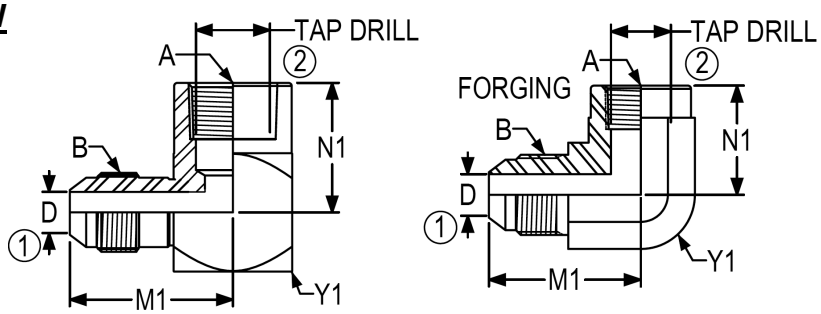

*Non forging parts are brazed construction

PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M1	N1	Y1	D	TAP DRILL
2502-16-16	1	1 5/16-12	1-11 1/2	2.17	1.62	1.63	0.84	1.14
2502-16-16-FG	1	1 5/16-12	1-11 1/2	2.17	1.62	1.63	0.84	1.14
2502-16-20	1	1 5/16-12	1 1/4-11 1/2	2.36	1.70	2.00	0.84	1.48
2502-20-16	1 1/4	1 5/8-12	1-11 1/2	1.62	2.15	1.63	1.08	1.14
2502-20-20	1 1/4	1 5/8-12	1 1/4-11 1/2	2.33	1.70	2.00	1.08	1.48
2502-20-20-FG	1 1/4	1 5/8-12	1 1/4-11 1/2	2.33	1.70	1.88	1.08	1.48
2502-24-24	1 1/2	1 7/8-12	1 1/2-11 1/2	2.89	2.08	2.38	1.31	1.72
2502-32-32	2	2 1/2-12	2-11 1/2	3.30	2.39	2.88	1.78	2.19
2502-32-32-FG	2	2 1/2-12	2-11 1/2	3.30	2.39	2.50	1.78	2.05

2503 45 DEGREE MALE ELBOW

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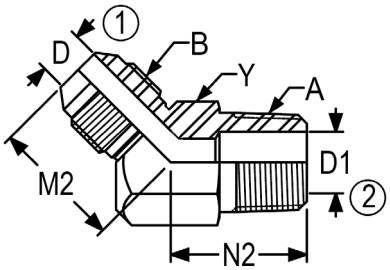
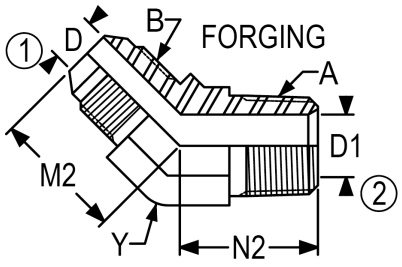
MS51508





*Non forging parts are brazed construction

PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M2	N2	Y	D	D1
2503-2-2	1/8	5/16-24	1/8-27	0.68	0.64	0.50	0.06	0.19
2503-2-2-FG	1/8	5/16-24	1/8-27	0.69	0.52	0.44	0.06	0.19
2503-3-2	3/16	3/8-24	1/8-27	0.75	0.64	0.50	0.13	0.19
2503-3-2-FG	3/16	3/8-14	1/8-24	0.69	0.52	0.44	0.13	0.19
2503-4-2	1/4	7/16-20	1/8-27	0.72	0.64	0.50	0.17	0.19
2503-4-2-FG	1/4	7/16-20	1/8-27	0.72	0.64	0.44	0.17	0.19
2503-4-4	1/4	7/16-20	1/4-18	0.81	0.84	0.63	0.17	0.28
2503-4-4-FG	1/4	7/16-20	1/4-18	0.82	0.86	0.56	0.17	0.28
2503-4-6	1/4	7/16-20	3/8-18	0.76	0.95	0.81	0.17	0.41
2503-4-8	1/4	7/16-20	1/2-14	0.90	1.17	0.94	0.17	0.53
2503-4-12	1/4	7/16-20	3/4-14	0.87	1.20	1.13	0.17	0.72
2503-5-2	5/16	1/2-20	1/8-27	0.77	0.64	0.56	0.23	0.19
2503-5-2-FG	5/16	1/2-20	1/8-27	0.77	0.64	0.56	0.23	0.19
2503-5-4	5/16	1/2-20	1/4-18	0.82	0.88	0.63	0.23	0.28
2503-5-4-FG	5/16	1/2-20	1/4-18	0.82	0.88	0.56	0.23	0.28
2503-5-6	5/16	1/2-20	3/8-18	0.85	0.95	0.81	0.23	0.41
2503-6-2	3/8	9/16-18	1/8-27	0.83	0.65	0.63	0.30	0.19
2503-6-2-FG	3/8	9/16-18	1/8-27	0.83	0.67	0.56	0.30	0.19
2503-6-4	3/8	9/16-18	1/4-18	0.83	0.86	0.63	0.30	0.30
2503-6-4-FG	3/8	9/16-18	1/4-18	0.83	0.86	0.56	0.30	0.28
2503-6-6	3/8	9/16-18	3/8-18	0.91	0.95	0.81	0.30	0.41
2503-6-6-FG	3/8	9/16-18	3/8-18	0.91	0.95	0.75	0.30	0.41
2503-6-8	3/8	9/16-18	1/2-14	1.03	1.17	0.94	0.30	0.53
2503-6-8-FG	3/8	9/16-18	1/2-14	0.88	1.17	0.88	0.30	0.53
2503-6-12	3/8	9/16-18	3/4-14	0.92	1.20	1.13	0.30	0.72
2503-8-4	1/2	3/4-16	1/4-18	0.98	1.01	0.81	0.39	0.28
2503-8-4-FG	1/2	3/4-16	1/4-18	0.98	0.95	0.75	0.39	0.28
2503-8-6	1/2	3/4-16	3/8-18	0.98	0.95	0.81	0.39	0.41
2503-8-6-FG	1/2	3/4-16	3/8-18	0.98	0.95	0.75	0.39	0.41
2503-8-8	1/2	3/4-16	1/2-14	1.13	1.17	0.94	0.39	0.53
2503-8-8-FG	1/2	3/4-16	1/2-14	1.11	1.17	0.88	0.39	0.53
2503-8-12	1/2	3/4-16	3/4-14	1.19	1.20	1.13	0.39	0.72
2503-8-12-FG	1/2	3/4-16	3/4-14	1.04	1.20	1.06	0.39	0.72

2503 45 DEGREE MALE ELBOW (Con't)

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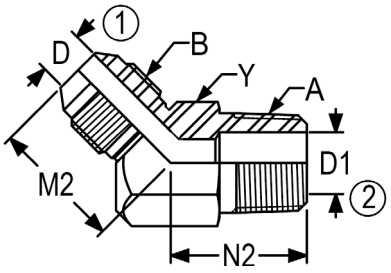
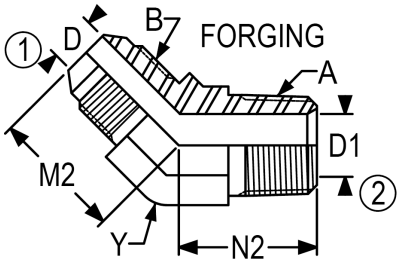
MS51508

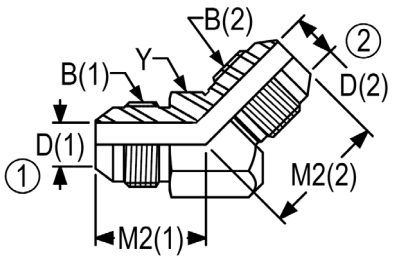




*Non forging parts are brazed construction

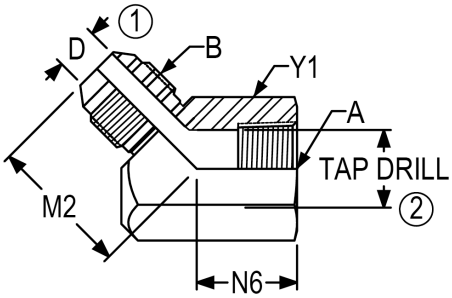
PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M2	N2	Y	D	D1
2503-10-4	5/8	1/4-18	7/8-14	1.01	1.11	0.94	0.48	0.28
2503-10-6	5/8	7/8-14	3/8-18	1.11	1.06	0.94	0.48	0.41
2503-10-6-FG	5/8	7/8-14	3/8-18	1.11	0.98	0.88	0.48	0.41
2503-10-8	5/8	7/8-14	1/2-14	1.11	1.17	0.94	0.48	0.53
2503-10-8-FG	5/8	7/8-14	1/2-14	1.11	1.17	0.88	0.48	0.53
2503-10-12	5/8	7/8-14	3/4-14	1.26	1.20	1.13	0.48	0.64
2503-10-12-FG	5/8	7/8-14	3/4-14	1.08	1.20	1.06	0.48	0.72
2503-12-8	3/4	1 1/16-12	1/2-14	1.28	1.19	1.13	0.61	0.53
2503-12-8-FG	3/4	1 1/16-12	1/2-14	1.28	1.20	1.06	0.61	0.53
2503-12-12	3/4	1 1/16-12	3/4-14	1.28	1.20	1.13	0.61	0.72
2503-12-12-FG	3/4	1 1/16-12	3/4-14	1.28	1.20	1.06	0.61	0.72
2503-12-16	3/4	1 1/16-12	1-11 1/2	1.42	1.48	1.38	0.61	0.94
2503-12-16-FG	3/4	1 1/16-12	1-11 1/2	1.42	1.48	1.31	0.61	0.94
2503-14-12	7/8	1 3/16-12	3/4-14	1.39	1.25	1.38	0.72	0.72
2503-14-12-FG	7/8	1 3/16-12	3/4-14	1.45	1.26	1.31	0.72	0.72
2503-16-8	1	1 5/16-12	1/2-14	1.47	1.49	1.38	0.84	0.53
2503-16-12	1	1 5/16-12	3/4-14	1.47	1.28	1.38	0.84	0.72
2503-16-12-FG	1	1 5/16-12	3/4-14	1.47	1.29	1.31	0.84	0.72
2503-16-16	1	1 5/16-12	1-11 1/2	1.47	1.48	1.38	0.84	0.94
2503-16-16-FG	1	1 5/16-12	1-11 1/2	1.47	1.48	1.31	0.84	0.94
2503-16-20	1	1 5/16-12	1 1/4-11 1/2	1.53	1.66	1.75	0.84	1.25
2503-20-16	1 1/4	1 5/8-12	1-11 1/2	1.59	1.63	1.75	1.08	0.94
2503-20-20	1 1/4	1 5/8-12	1 1/4-11 1/2	1.59	1.67	1.75	1.08	1.25
2503-20-20-FG	1 1/4	1 5/8-12	1 1/4-11 1/2	1.59	1.67	1.63	1.08	1.25
2503-20-24	1 1/4	1 5/8-12	1 1/2-11 1/2	1.63	1.75	2.00	1.08	1.50
2503-24-24	1 1/2	1 7/8-12	1 1/2-11 1/2	1.78	1.77	2.00	1.31	1.50
2503-24-24-FG	1 1/2	1 7/8-12	1 1/2-11 1/2	1.78	1.77	1.88	1.31	1.50
2503-32-32	2	2 1/2-12	2-11 1/2	2.22	2.11	2.50	1.78	1.94
2503-32-32-FG	2	2 1/2-12	2-11 1/2	2.22	2.11	2.50	1.78	1.94

2504 45 DEGREE UNION ELBOW



PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M2 (1)	M2 (2)	Y	D (1)	D (2)
2504-4-4	1/4-1/4	7/16-20	7/16-20	0.72	0.80	0.50	0.17	0.17
2504-6-6	3/8-3/8	9/16-18	9/16-18	0.83	0.88	0.63	0.30	0.30
2504-8-6	1/2-3/8	3/4-16	9/16-18	0.98	1.07	0.81	0.39	0.30
2504-8-8	1/2-1/2	3/4-16	3/4-16	0.98	1.10	0.81	0.39	0.39
2504-10-10	5/8-5/8	7/8-14	7/8-14	1.11	1.11	0.94	0.48	0.48
2504-12-12	3/4-3/4	1 1/16-12	1 1/16-12	1.28	1.40	1.13	0.61	0.61
2504-16-16	1-1	1 5/16-12	1 5/16-12	1.47	1.54	1.38	0.84	0.84

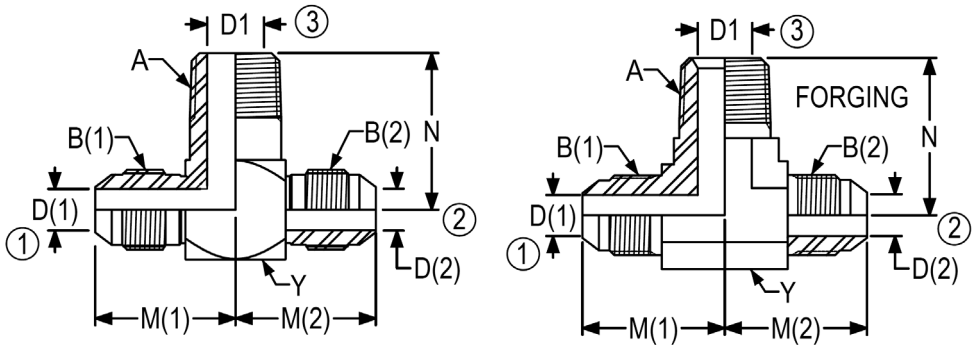
2505 45 DEGREE FEMALE ELBOW



PART NO	TUBE OD	B UN/UNF-2A	A NPTF	M2	N6	Y1	D	TAP DRILL
2505-4-2	1/4	7/16-20	1/8-27	0.86	0.80	0.63	0.17	0.33
2505-4-4	1/4	7/16-20	1/4-18	0.88	0.63	0.75	0.17	0.43
2505-6-4	3/8	9/16-18	1/4-18	1.13	0.63	0.75	0.30	0.43
2505-6-6	3/8	9/16-18	3/8-18	1.06	0.72	0.88	0.30	0.57
2505-8-6	1/2	3/4-16	3/8-18	1.08	0.75	0.88	0.39	0.70
2505-8-8	1/2	3/4-16	1/2-14	1.28	0.91	1.13	0.39	0.70
2505-10-8	5/8	7/8-14	1/2-14	1.31	0.91	1.13	0.48	0.70
2505-12-12	3/4	1 1/16-12	3/4-14	1.54	0.97	1.38	0.61	0.91
2505-16-16	1	1 5/16-12	1-11 1/2	1.69	1.13	1.63	0.84	1.14

2601 MALE BRANCH TEE

SAE J514 070425
MS51512

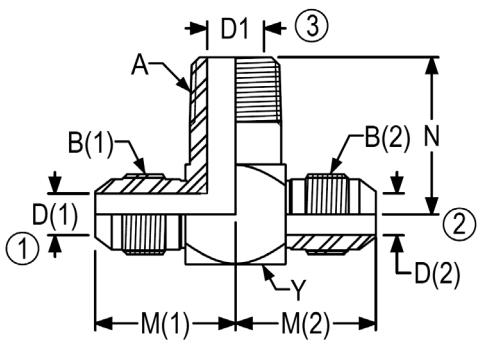


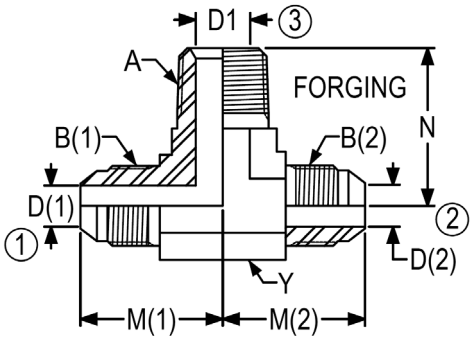
*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	A NPTF	M (1)	M (2)	N	Y	D (1)	D (2)	D1
2601-3-3-2	3/16-3/16	3/8-24	3/8-24	1/8-27	0.83	0.83	0.72	0.44	0.13	0.13	0.19
2601-4-4-2	1/4-1/4	7/16-20	7/16-20	1/8-27	0.89	0.89	0.78	0.50	0.17	0.17	0.19
2601-4-4-2-FG	1/4-1/4	7/16-20	7/16-20	1/8-27	0.89	0.89	0.78	0.44	0.17	0.17	0.19
2601-4-4-4	1/4-1/4	7/16-20	7/16-20	1/4-18	0.95	0.95	1.09	0.63	0.17	0.17	0.28
2601-4-4-4-FG	1/4-1/4	7/16-20	7/16-20	1/4-18	1.05	1.05	1.09	0.56	0.17	0.17	0.28
2601-4-4-6	1/4-1/4	7/16-20	7/16-20	3/8-18	1.05	1.05	1.22	0.81	0.17	0.17	0.41
2601-5-5-2	5/16-5/16	1/2-20	1/2-20	1/8-27	0.95	0.95	0.81	0.56	0.23	0.23	0.19
2601-5-5-4	5/16-5/16	1/2-20	1/2-20	1/4-18	0.98	0.98	1.09	0.63	0.23	0.23	0.28
2601-6-6-2	3/8-3/8	9/16-18	9/16-18	1/8-27	1.06	1.06	0.81	0.63	0.30	0.30	0.19
2601-6-6-4	3/8-3/8	9/16-18	9/16-18	1/4-18	1.06	1.06	1.09	0.63	0.30	0.30	0.28
2601-6-6-4-FG	3/8-3/8	9/16-18	9/16-18	1/4-18	1.06	1.06	1.09	0.56	0.30	0.30	0.28
2601-6-6-6	3/8-3/8	9/16-18	9/16-18	3/8-18	1.16	1.16	1.22	0.81	0.30	0.30	0.41
2601-6-6-6-FG	3/8-3/8	9/16-18	9/16-18	3/8-18	1.14	1.14	1.22	0.75	0.30	0.30	0.41
2601-6-6-8	3/8-3/8	9/16-18	9/16-18	1/2-14	1.22	1.22	1.47	0.94	0.30	0.30	0.53
2601-8-6-8	1/2-3/8	3/4-16	9/16-18	1/2-14	1.31	1.22	1.47	0.94	0.39	0.30	0.53
2601-8-8-4	1/2-1/2	3/4-16	3/4-16	1/4-18	1.25	1.25	1.19	0.81	0.39	0.39	0.28
2601-8-8-6	1/2-1/2	3/4-16	3/4-16	3/8-18	1.25	1.25	1.22	0.81	0.39	0.39	0.41
2601-8-8-6-FG	1/2-1/2	3/4-16	3/4-16	3/8-18	1.25	1.25	1.22	0.75	0.39	0.39	0.41
2601-8-8-8	1/2-1/2	3/4-16	3/4-16	1/2-14	1.31	1.31	1.47	0.94	0.39	0.39	0.53
2601-8-8-8-FG	1/2-1/2	3/4-16	3/4-16	1/2-14	1.33	1.33	1.47	0.88	0.39	0.39	0.53
2601-8-8-12	1/2-1/2	3/4-16	3/4-16	3/4-14	1.41	1.41	1.59	1.13	0.39	0.39	0.72
2601-10-10-6	5/8-5/8	7/8-14	7/8-14	3/8-18	1.45	1.45	1.28	0.94	0.48	0.48	0.41

2601 MALE BRANCH TEE Con't)

SAE J514 070425
MS51512



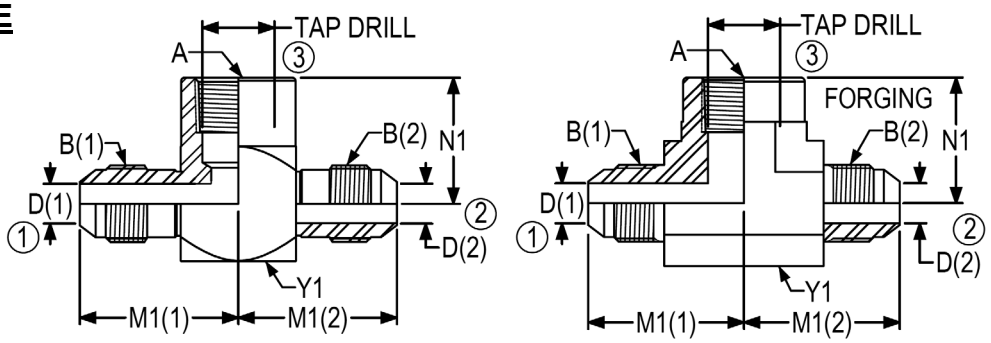


*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	A NPTF	M (1)	M (2)	N	Y	D (1)	D (2)	D1
2601-10-10-8	5/8-5/8	7/8-14	7/8-14	1/2-14	1.45	1.45	1.47	0.94	0.48	0.48	0.53
2601-10-10-8-FG	5/8-5/8	7/8-14	7/8-14	1/2-14	1.45	1.45	1.47	0.88	0.48	0.48	0.53
2601-10-10-12	5/8-5/8	7/8-14	7/8-14	3/4-14	1.55	1.55	1.59	1.13	0.48	0.48	0.72
2601-12-10-12	3/4-5/8	1 1/16-12	7/8-14	3/4-14	1.66	1.55	1.59	1.13	0.61	0.48	0.72
2601-12-12-8	3/4-3/4	1 1/16-12	1 1/16-12	1/2-14	1.66	1.66	1.56	1.13	0.61	0.61	0.53
2601-12-12-12	3/4-3/4	1 1/16-12	1 1/16-12	3/4-14	1.66	1.66	1.59	1.13	0.61	0.61	0.72
2601-12-12-12-FG	3/4-3/4	1 1/16-12	1 1/16-12	3/4-14	1.66	1.66	1.59	1.06	0.61	0.61	0.72
2601-12-12-16	3/4-3/4	1 1/16-12	1 1/16-12	1-11 1/2	1.78	1.78	1.97	1.38	0.61	0.61	0.94
2601-14-14-12	7/8-7/8	1 3/16-12	1 3/16-12	3/4-14	1.80	1.80	1.66	1.25	0.72	0.72	0.72
2601-16-10-12	1-5/8	1 5/16-12	7/8-14	3/4-14	1.81	1.67	1.69	1.38	0.84	0.48	0.72
2601-16-10-12-FG	1-5/8	1 5/16-12	7/8-14	3/4-14	1.81	1.64	1.78	1.31	0.84	0.48	0.72
2601-16-12-16	1-3/4	1 5/16-12	1 1/16-12	1-11 1/2	1.81	1.78	1.97	1.38	0.84	0.61	0.94
2601-16-12-20	1-3/4	1 5/16-12	1 1/16-12	1 1/4-11	2.00	1.97	2.38	1.75	0.84	0.61	1.25
2601-16-16-12	1-1	1 5/16-12	1 5/16-12	3/4-14	1.81	1.81	1.72	1.38	0.84	0.84	0.72
2601-16-16-16	1-1	1 5/16-12	1 5/16-12	1-11 1/2	1.81	1.81	1.97	1.38	0.84	0.84	0.94
2601-16-16-16-FG	1-1	1 5/16-12	1 5/16-12	1-11 1/2	1.81	1.81	1.97	1.31	0.84	0.84	0.94
2601-20-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 1/4-11	2.06	2.06	2.38	1.75	1.08	1.08	1.25
2601-24-16-12	1 1/2-1	1 7/8-12	1 5/16-12	3/4-14	2.33	2.13	2.03	2.00	1.31	0.84	0.72
2601-24-24-24	1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 1/2-11	2.33	2.33	2.64	2.00	1.31	1.31	1.50
2601-32-32-32	2-2	2 1/2-12	2 1/2-12	2-11 1/2	3.06	3.06	3.00	2.63	1.78	1.78	1.94
2601-32-32-32-FG	2-2	2 1/2-12	2 1/2-12	2-11 1/2	3.06	3.06	3.00	2.50	1.78	1.78	1.94

2602 FEMALE BRANCH TEE

SAE J514 070427
MS51513

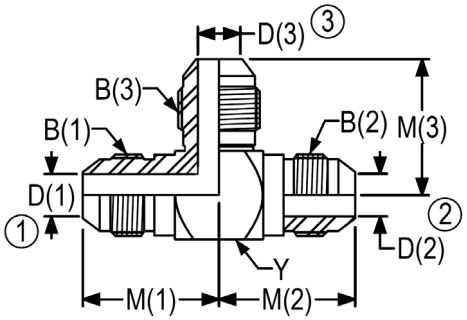


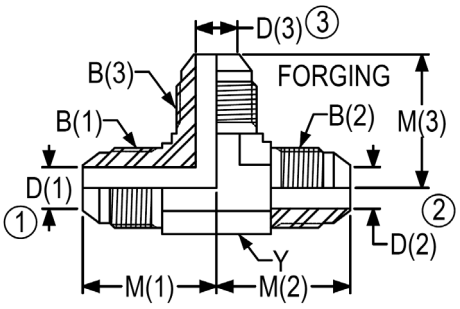
*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	A NPTF	M1 (1)	M1 (2)	N1	Y1	D (1)	D (2)	TAP DRILL
2602-3-3-2	3/16-3/16	3/8-24	3/8-24	1/8-27	1.03	1.03	0.66	0.63	0.13	0.13	0.33
2602-4-4-2	1/4-1/4	7/16-20	7/16-20	1/8-27	1.08	1.08	0.66	0.63	0.17	0.17	0.33
2602-4-4-2-FG	1/4-1/4	7/16-20	7/16-20	1/8-27	1.08	1.08	0.66	0.56	0.17	0.17	0.33
2602-4-4-4	1/4-1/4	7/16-20	7/16-20	1/4-18	1.14	1.14	0.88	0.75	0.17	0.17	0.43
2602-4-4-4-FG	1/4-1/4	7/16-20	7/16-20	1/4-18	1.22	1.22	0.88	0.75	0.17	0.17	0.43
2602-5-5-2	5/16-5/16	1/2-20	1/2-20	1/8-27	1.08	1.08	0.66	0.63	0.23	0.23	0.33
2602-5-5-4	5/16-5/16	1/2-20	1/2-20	1/4-18	1.14	1.14	0.88	0.75	0.23	0.23	0.43
2602-6-6-4	3/8-3/8	9/16-18	9/16-18	1/4-18	1.23	1.23	0.88	0.75	0.30	0.30	0.43
2602-6-6-4-FG	3/8-3/8	9/16-18	9/16-18	1/4-18	1.23	1.23	0.88	0.75	0.30	0.30	0.43
2602-6-6-6	3/8-3/8	9/16-18	9/16-18	3/8-18	1.30	1.30	1.02	0.88	0.30	0.30	0.57
2602-6-6-6-FG	3/8-3/8	9/16-18	9/16-18	3/8-18	1.31	1.31	1.02	0.88	0.30	0.30	0.57
2602-8-8-4	1/2-1/2	3/4-16	3/4-16	1/4-18	1.36	1.36	0.91	0.81	0.39	0.39	0.43
2602-8-8-6	1/2-1/2	3/4-16	3/4-16	3/8-18	1.42	1.42	1.02	0.88	0.39	0.39	0.57
2602-8-8-6-FG	1/.2-1/2	3/4-16	3/4-16	3/8-18	1.42	1.42	1.02	0.88	0.39	0.39	0.57
2602-8-8-8	1/2-1/2	3/4-16	3/4-16	1/2-14	1.55	1.55	1.23	1.13	0.39	0.39	0.70
2602-10-10-4	5/8-5/8	7/8-14	7/8-14	1/4-18	1.45	1.45	0.97	0.94	0.48	0.48	0.43
2602-10-10-8	5/8-5/8	7/8-14	7/8-14	1/2-14	1.64	1.64	1.23	1.13	0.48	0.48	0.70
2602-10-10-12	5/8-5/8	7/8-14	7/8-14	3/4-14	1.77	1.77	1.36	1.38	0.48	0.48	0.91
2602-12-12-8	3/4-3/4	1 1/16-12	1 1/16-12	1/2-14	1.76	1.76	1.23	1.13	0.61	0.61	0.70
2602-12-12-12	3/4-3/4	1 1/16-12	1 1/16-12	3/4-14	1.89	1.89	1.36	1.38	0.61	0.61	0.91
2602-12-12-12-FG	3/4-3/4	1 1/16-12	1 1/16-12	3/4-14	1.89	1.89	1.36	1.31	0.61	0.61	0.91
2602-12-12-16	3/4-3/4	1 1/16-12	1 1/16-12	1-11 1/2	2.02	2.02	1.62	1.63	0.61	0.61	1.14
2602-14-14-12	7/8-7/8	1 3/16-12	1 3/16-12	3/4-14	1.86	1.86	1.42	1.38	0.72	0.72	0.91
2602-16-16-12	1-1	1 5/16-12	1 5/16-12	3/4-14	2.05	2.05	1.36	1.38	0.84	0.84	0.91
2602-16-16-16	1-1	1 5/16-12	1 5/16-12	1-11 1/2	2.17	2.17	1.62	1.63	0.84	0.84	1.14
2602-16-16-16-FG	1-1	1 5/16-12	1 5/16-12	1-11 1/2	2.17	2.17	1.62	1.63	0.84	0.84	1.14
2602-20-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 1/4-11 1/2	2.33	2.33	1.70	2.00	1.08	1.08	1.48
2602-24-24-24	1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 1/2-11 1/2	2.89	2.89	2.08	2.38	1.31	1.31	1.72
2602-24-24-24-FG	1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 1/2-11 1/2	2.89	2.89	2.08	2.57	1.31	1.31	1.72
2602-32-32-32	2-2	2 1/2-12	2 1/2-12	2-11 1/2	3.30	3.30	2.39	2.88	1.78	1.78	2.19

2603 UNION TEE

SAE J514 070401
MS51510





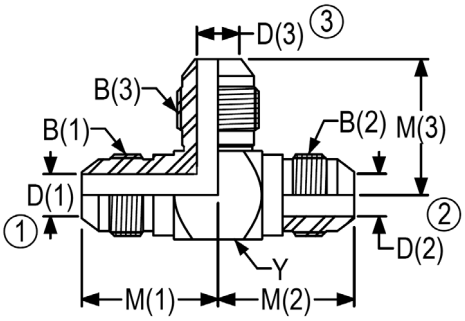
*Non forging parts are brazed construction

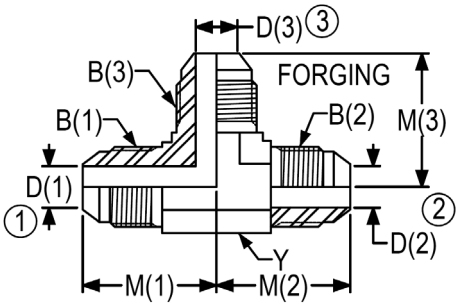
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M (2)	M (3)
2603-4-4-4	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	0.89	0.89	0.89
2603-4-4-4-FG	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	7/16-	0.89	0.89
2603-4-4-6	1/4-1/4-3/8	7/16-20	7/16-20	9/16-18	0.95	0.95	1.06
2603-5-5-4	5/16-5/16-1/4	1/2-20	1/2-20	7/16-20	0.95	0.95	0.92
2603-5-5-5	5/16-5/16-5/16	1/2-20	1/2-20	1/2-20	0.95	0.95	0.95
2603-5-5-5-FG	5/16-5/16-5/16	1/2-20	1/2-20	1/2-20	0.95	0.95	0.95
2603-5-5-6	5/16-5/16-3/8	1/2-20	1/2-20	9/16-18	0.98	0.98	1.06
2603-6-6-4	3/8-3/8-1/4	9/16-18	9/16-18	7/16-20	1.06	1.06	0.95
2603-6-6-6	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.06	1.06
2603-6-6-6-FG	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.06	1.06
2603-6-6-8	3/8-3/8-1/2	9/16-18	9/16-18	3/4-16	1.16	1.16	1.25
2603-6-6-10	3/8-3/8-5/8	9/16-18	9/16-18	7/8-14	1.22	1.22	1.45
2603-8-6-6	1/2-3/8-3/8	3/4-16	9/16-18	9/16-18	1.25	1.16	1.16
2603-8-8-4	1/2-1/2-1/4	3/4-16	3/4-16	7/16-20	1.25	1.25	1.05
2603-8-8-6	1/2-1/2-3/8	3/4-16	3/4-16	9/16-18	1.25	1.25	1.16
2603-8-8-8	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.25	1.25	1.25
2603-8-8-8-FG	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.25	1.25	1.25

PART NO	Y	D (1)	D (2)	D (3)
2603-4-4-4	0.50	0.17	0.17	0.17
2603-4-4-4-FG	0.44	0.17	0.17	0.17
2603-4-4-6	0.63	0.17	0.17	0.30
2603-5-5-4	0.56	0.23	0.23	0.17
2603-5-5-5	0.56	0.23	0.23	0.23
2603-5-5-5-FG	0.56	0.23	0.23	0.23
2603-5-5-6	0.63	0.23	0.23	0.30
2603-6-6-4	0.63	0.30	0.30	0.17
2603-6-6-6	0.63	0.30	0.30	0.30
2603-6-6-6-FG	0.56	0.30	0.30	0.30
2603-6-6-8	0.81	0.30	0.30	0.39
2603-6-6-10	0.94	0.30	0.30	0.48
2603-8-6-6	0.81	0.39	0.30	0.30
2603-8-8-4	0.81	0.39	0.39	0.17
2603-8-8-6	0.81	0.39	0.39	0.30
2603-8-8-8	0.81	0.39	0.39	0.39
2603-8-8-8-FG	0.75	0.39	0.39	0.39

2603 UNION TEE (Con't)

SAE J514 070401
MS51510





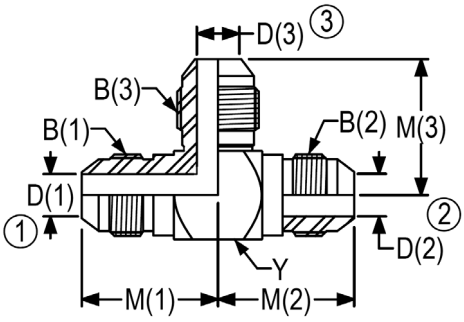
*Non forging parts are brazed

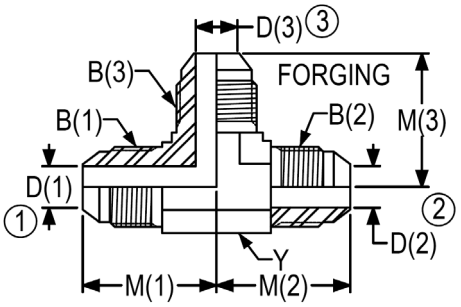
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M (2)	M (3)
2603-8-8-10	1/2-1/2-5/8	3/4-16	3/4-16	7/8-14	1.31	1.31	1.45
2603-8-8-10-FG	1/2-1/2-5/8	3/4-16	3/4-16	7/8-14	1.33	1.33	1.45
2603-8-8-12	1/2-1/2-3/4	3/4-16	3/4-16	1 1/16-12	1.41	1.41	1.66
2603-10-8-8	5/8-1/2-1/2	7/8-14	3/4-16	3/4-16	1.45	1.31	1.31
2603-10-8-8-FG	5/8-1/2-1/2	7/8-14	3/4-16	3/4-16	1.45	1.33	1.33
2603-10-8-10	5/8-1/2-5/8	7/8-14	3/4-16	7/8-14	1.45	1.31	1.45
2603-10-8-10-FG	5/8-1/2-5/8	7/8-14	3/4-16	7/8-14	1.45	1.33	1.45
2603-10-10-4	5/8-5/8-1/4	7/8-14	7/8-14	7/16-20	1.45	1.45	1.11
2603-10-10-8	5/8-5/8-1/2	7/8-14	7/8-14	3/4-16	1.45	1.45	1.31
2603-10-10-8-FG	5/8-5/8-1/2	7/8-14	7/8-14	3/4-16	1.45	1.45	1.33
2603-10-10-10	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.45	1.45	1.45
2603-10-10-10-FG	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.45	1.45	1.45
2603-10-10-12	5/8-5/8-3/4	7/8-14	7/8-14	1 1/16-12	1.55	1.55	1.66
2603-12-8-10	3/4-1/2-5/8	1 1/16-12	3/4-16	7/8-14	1.66	1.41	1.55
2603-12-8-12	3/4-1/2-3/4	1 1/16-12	3/4-16	1 1/16-12	1.66	1.40	1.66

PART NO	Y	D (1)	D (2)	D (3)
2603-8-8-10	0.94	0.39	0.39	0.48
2603-8-8-10-FG	0.88	0.39	0.39	0.48
2603-8-8-12	1.13	0.39	0.39	0.61
2603-10-8-8	0.94	0.48	0.39	0.39
2603-10-8-8-FG	0.75	0.48	0.39	0.39
2603-10-8-10	0.94	0.48	0.39	0.48
2603-10-8-10-FG	0.88	0.48	0.39	0.48
2603-10-10-4	0.94	0.48	0.48	0.17
2603-10-10-8	0.94	0.48	0.48	0.39
2603-10-10-8-FG	0.88	0.48	0.48	0.39
2603-10-10-10	0.94	0.48	0.48	0.48
2603-10-10-10-FG	0.88	0.48	0.48	0.48
2603-10-10-12	1.13	0.48	0.48	0.61
2603-12-8-10	1.13	0.61	0.39	0.48
2603-12-8-12	1.13	0.61	0.39	0.61

2603 UNION TEE (Con't)

SAE J514 070401
MS51510





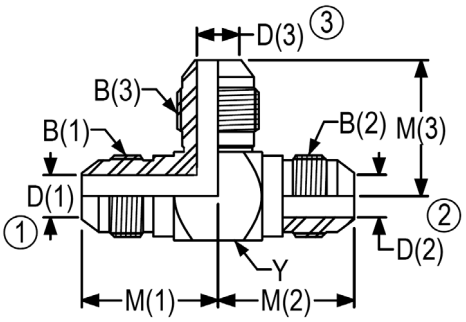
Non forging parts are brazed construction

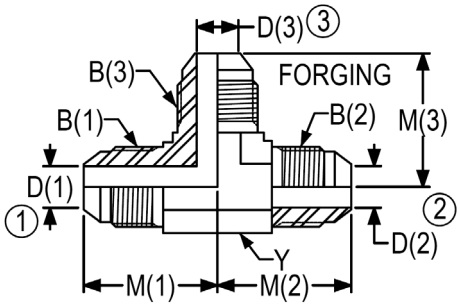
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M (2)	M (3)
2603-12-10-10	3/4-5/8-5/8	1 1/16-12	7/8-14	7/8-14	1.66	1.55	1.55
2603-12-10-12	3/4-5/8-3/4	1 1/16-12	7/8-14	1 1/16-12	1.66	1.55	1.66
2603-12-10-12-FG	3/4-5/8-3/4	1 1/16-12	7/8-14	1 1/16-12	1.66	1.54	1.66
2603-12-12-6	3/4-3/4-3/8	1 1/16-12	1 1/16-12	9/16-18	1.66	1.66	1.31
2603-12-12-8	3/4-3/4-1/2	1 1/16-12	1 1/16-12	3/4-16	1.66	1.66	1.41
2603-12-12-8-FG	3/4-3/4-1/2	1 1/16-12	1 1/16-12	3/4-16	1.66	1.66	1.42
2603-12-12-10	3/4-3/4-5/8	1 1/16-12	1 1/16-12	7/8-14	1.66	1.66	1.55
2603-12-12-12	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.66	1.66	1.66
2603-12-12-12-FG	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.66	1.66	1.66
2603-12-12-16	3/4-3/4-1	1 1/16-12	1 1/16-12	1 5/16-12	1.78	1.78	1.81
2603-12-12-20	3/4-3/4-1 1/4	1 1/16-12	1 1/16-12	1 5/8-12	1.97	1.97	2.06
2603-14-14-14	7/8-7/8-7/8	1 3/16-12	1 3/16-12	1 3/16-12	1.80	1.80	1.80
2603-14-14-14-FG	7/8-7/8-7/8	1 3/16-12	1 3/16-12	1 3/16-12	1.80	1.80	1.80
2603-16-12-12	1-3/4-3/4	1 5/16-12	1 1/16-12	1 1/16-12	1.81	1.78	1.78
2603-16-12-16	1-3/4-1	1 5/16-12	1 1/16-12	1 5/16-12	1.81	1.78	1.81
2603-16-16-12	1-1-3/4	1 5/16-12	1 5/16-12	1 1/16-12	1.81	1.81	1.78
2603-16-16-12-FG	1-1-3/4	1 5/16-12	1 5/16-12	1 5/16-12	1.81	1.81	1.76

PART NO	Y	D (1)	D (2)	D (3)
2603-12-10-10	1.13	0.61	0.48	0.48
2603-12-10-12	1.13	0.61	0.48	0.61
2603-12-10-12-FG	1.06	0.61	0.48	0.61
2603-12-12-6	1.13	0.61	0.61	0.30
2603-12-12-8	1.13	0.61	0.61	0.39
2603-12-12-8-FG	1.06	0.61	0.61	0.39
2603-12-12-10	1.13	0.61	0.61	0.48
2603-12-12-12	1.13	0.61	0.61	0.61
2603-12-12-12-FG	1.06	0.61	0.61	0.61
2603-12-12-16	1.38	0.61	0.61	0.84
2603-12-12-20	1.75	0.61	0.61	1.08
2603-14-14-14	1.25	0.72	0.72	0.72
2603-14-14-14-FG	1.31	0.72	0.72	0.72
2603-16-12-12	1.38	0.84	0.61	0.61
2603-16-12-16	1.38	0.84	0.61	0.84
2603-16-16-12	1.38	0.84	0.84	0.61
2603-16-16-12-FG	1.31	0.84	0.84	0.61

2603 UNION TEE (Con't)

SAE J514 070401
MS51510





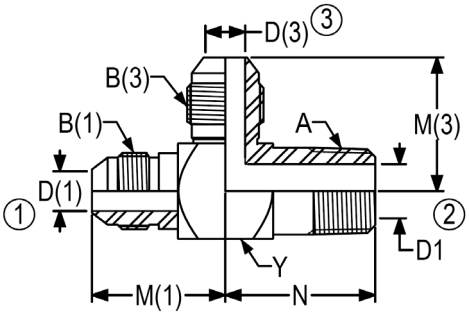
*Non forging parts are brazed construction

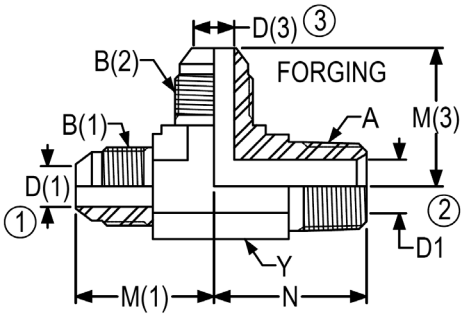
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M (2)	M (3)
2603-16-16-16	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	1.81	1.81
2603-16-16-16-FG	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	1.81	1.81
2603-16-16-20	1-1-1 1/4	1 5/16-12	1 5/16-12	1 5/8-12	2.00	2.00	2.06
2603-20-12-16	1 1/4-3/4-1	1 5/8-12	1 1/16-12	1 5/16-12	2.06	1.97	2.00
2603-20-16-12	1 1/4-1-3/4	1 5/8-12	1 5/16-12	1 1/16-12	2.06	2.00	1.97
2603-20-16-16	1 1/4-1-1	1 5/8-12	1 5/16-12	1 5/16-12	2.06	2.00	2.00
2603-20-20-8	1 1/4-1 1/4-1/2	1 5/8-12	1 5/8-12	3/4-16	2.06	2.06	1.72
2603-20-20-12	1 1/4-1 1/4-3/4	1 5/8-12	1 5/8-12	1 1/16-12	2.06	2.06	1.97
2603-20-20-20	1 1/4-1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.06	2.06	2.06
2603-20-20-20-FG	1 1/4-1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.06	2.06	2.06
2603-24-10-16	1 1/2-5/8-1	1 7/8-12	7/8-14	1 5/16-12	2.33	1.98	2.13
2603-24-10-24	1 1/2-5/8-1 1/2	1 7/8-12	7/8-14	1 7/8-12	2.33	1.98	2.33
2603-24-24-24	1 1/2-1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 7/8-12	2.33	2.33	2.33
2603-24-24-24-FG	1 1/2-1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 7/8-12	2.33	2.33	2.33
2603-32-32-32	2-2-2	2 1/2-12	2 1/2-12	2 1/2-12	3.06	3.06	3.06
2603-32-32-32-FG	2-2-2	2 1/2-12	2 1/2-12	2 1/2-12	3.06	3.06	3.06

PART NO	Y	D (1)	D (2)	D (3)
2603-16-16-16	1.38	0.84	0.84	0.84
2603-16-16-16-FG	1.31	0.84	0.84	0.84
2603-16-16-20	1.75	0.84	0.84	1.08
2603-20-12-16	1.75	1.08	0.61	0.84
2603-20-16-12	1.75	1.08	0.84	0.61
2603-20-16-16	1.75	1.08	0.84	0.84
2603-20-20-8	1.75	1.08	1.08	0.39
2603-20-20-12	1.75	1.08	1.08	0.61
2603-20-20-20	1.75	1.08	1.08	1.08
2603-20-20-20-FG	1.63	1.08	1.08	1.08
2603-24-10-16	2.00	1.31	0.48	0.84
2603-24-10-24	2.00	1.31	0.48	1.31
2603-24-24-24	2.00	1.31	1.31	1.31
2603-24-24-24-FG	1.88	1.31	1.31	1.31
2603-32-32-32	2.63	1.78	1.78	1.78
2603-32-32-32-FG	2.50	1.78	1.78	1.78

2605 MALE RUN TEE

SAE J514 070424
MS51511





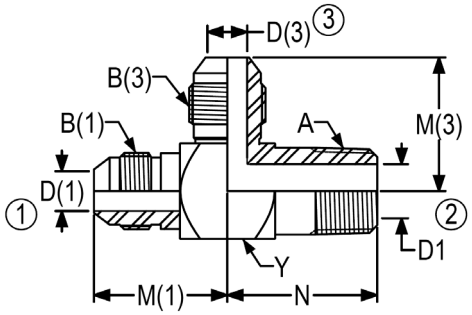
*Non forging parts are brazed construction

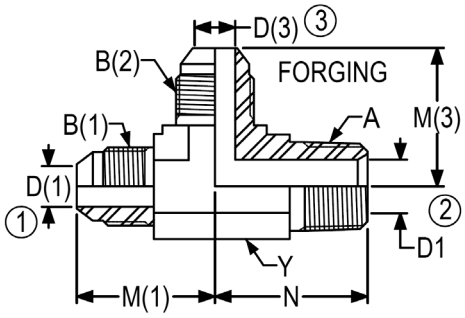
PART NO	TUBE OD	B (1) UN/UNF-2A	A NPTF	B (3) UN/UNF-2A	M (1)	N	M (3)
2605-3-2-3	3/16-3/16	3/8-24	1/8-27	3/8-24	0.83	0.75	0.83
2605-4-2-4	1/4-1/4	7/16-20	1/8-27	7/16-20	0.89	0.78	0.89
2605-4-2-4-FG	1/4-1/4	7/16-20	1/8-27	7/16-20	0.89	0.78	0.89
2605-4-4-4	1/4-1/4	7/16-20	1/4-18	7/16-20	0.95	1.09	0.95
2605-4-4-4-FG	1/4-1/4	7/16-20	1/4-18	7/16-20	1.05	1.09	1.05
2605-5-2-5	5/16-5/16	1/2-20	1/8-27	1/2-20	0.95	0.78	0.95
2605-5-4-5	5/16-5/16	1/2-20	1/4-18	1/2-20	0.95	1.06	0.95
2605-6-2-6	3/8-3/8	9/16-18	1/8-27	9/16-18	1.06	0.84	1.06
2605-6-4-6	3/8-3/8	9/16-18	1/4-18	9/16-18	1.06	1.09	1.06
2605-6-4-6-FG	3/8-3/8	9/16-18	1/4-18	9/16-18	1.06	1.09	1.06
2605-6-6-4	3/8-1/4	9/16-18	3/8-18	7/16-20	1.16	1.22	1.05
2605-6-6-6	3/8-3/8	9/16-18	3/8-18	9/16-18	1.16	1.22	1.16
2605-6-6-6-FG	3/8-3/8	9/16-18	3/8-18	9/16-18	1.06	1.22	1.06
2605-6-8-6	3/8-3/8	9/16-18	1/2-14	9/16-18	1.22	1.47	1.22
2605-6-16-16	3/8-1	9/16-18	1-11 1/2	1 5/16-12	1.44	1.97	1.81
2605-6-20-16	3/8-1	9/16-18	1 1/4-11 1/2	1 5/16-12	1.63	2.38	2.00

PART NO	Y	D (1)	D1	D (3)
2605-3-2-3	0.44	0.13	0.19	0.13
2605-4-2-4	0.50	0.17	0.19	0.17
2605-4-2-4-FG	0.44	0.17	0.19	0.17
2605-4-4-4	0.63	0.17	0.28	0.17
2605-4-4-4-FG	0.56	0.17	0.28	0.17
2605-5-2-5	0.56	0.23	0.19	0.23
2605-5-4-5	0.56	0.23	0.28	0.23
2605-6-2-6	0.63	0.30	0.19	0.30
2605-6-4-6	0.63	0.30	0.28	0.30
2605-6-4-6-FG	0.56	0.30	0.28	0.30
2605-6-6-4	0.81	0.30	0.41	0.17
2605-6-6-6	0.81	0.30	0.41	0.30
2605-6-6-6-FG	0.75	0.30	0.41	0.30
2605-6-8-6	0.94	0.30	0.53	0.30
2605-6-16-16	1.38	0.30	0.94	0.84
2605-6-20-16	1.75	0.30	1.25	0.84

2605 MALE RUN TEE (Con't)

SAE J514 070424
MS51511





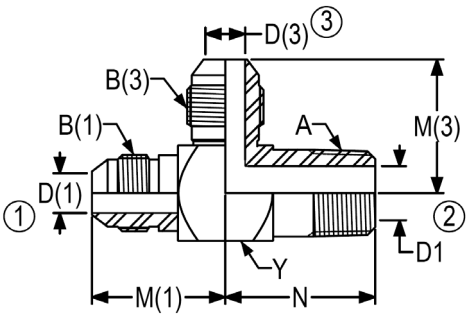
*Non forging parts are brazed construction

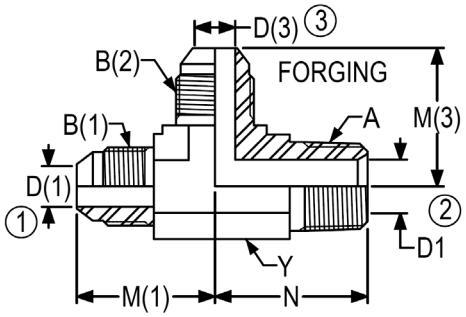
PART NO	TUBE OD	B (1) UN/UNF-2A	A NPTF	B (3) UN/UNF-2A	M (1)	N	M (3)
2605-8-4-8	1/2-1/2	3/4-16	1/4-18	3/4-16	1.25	1.19	1.25
2605-8-6-6	1/2-3/8	3/4-16	3/8-18	9/16-18	1.25	1.22	1.16
2605-8-6-8	1/2-1/2	3/4-16	3/8-18	3/4-16	1.25	1.22	1.25
2605-8-6-8-FG	1/2-1/2	3/4-16	3/8-18	3/4-16	1.25	1.22	1.25
2605-8-8-6	1/2-3/8	3/4-16	1/2-14	9/16-18	1.31	1.47	1.22
2605-8-8-8	1/2-1/2	3/4-16	1/2-14	3/4-16	1.31	1.47	1.31
2605-8-8-8-FG	1/2-1/2	3/4-16	1/2-14	3/4-16	1.33	1.47	1.33
2605-8-12-8	1/2-1/2	3/4-16	3/4-14	3/4-16	1.41	1.59	1.41
2605-10-8-10	5/8-5/8	7/8-14	1/2-14	7/8-14	1.45	1.47	1.45
2605-10-12-10	5/8-5/8	7/8-14	3/4-14	7/8-14	1.55	1.59	1.55
2605-12-8-8	3/4-1/2	1 1/16-12	1/2-14	3/4-16	1.66	1.56	1.41
2605-12-8-12	3/4-3/4	1 1/16-12	1/2-14	1 1/16-12	1.66	1.56	1.66
2605-12-12-4	3/4-1/4	1 1/16-12	3/4-14	7/16-20	1.66	1.59	1.20
2605-12-12-12	3/4-3/4	1 1/16-12	3/4-14	1 1/16-12	1.66	1.59	1.66
2605-12-12-12-FG	3/4-3/4	1 1/16-12	3/4-14	1 1/16-12	1.66	1.59	1.66

PART NO	Y	D (1)	D1	D (3)
2605-8-4-8	0.81	0.39	0.28	0.39
2605-8-6-6	0.81	0.39	0.41	0.30
2605-8-6-8	0.81	0.39	0.41	0.39
2605-8-6-8-FG	0.75	0.39	0.41	0.39
2605-8-8-6	0.94	0.39	0.53	0.30
2605-8-8-8	0.94	0.39	0.53	0.39
2605-8-8-8-FG	0.88	0.39	0.53	0.39
2605-8-12-8	1.13	0.39	0.72	0.39
2605-10-8-10	0.94	0.48	0.53	0.48
2605-10-12-10	1.13	0.48	0.72	0.48
2605-12-8-8	1.13	0.61	0.53	0.39
2605-12-8-12	1.13	0.61	0.53	0.61
2605-12-12-4	1.13	0.61	0.72	0.17
2605-12-12-12	1.13	0.61	0.72	0.61
2605-12-12-12-FG	1.06	0.61	0.72	0.61

2605 MALE RUN TEE (Con't)

SAE J514 070424
MS51511





*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	A NPTF	B (3) UN/UNF-2A	M (1)	N	M (3)
2605-12-16-12	3/4-3/4	1 1/16-12	1-11 1/2	1 1/16-12	1.78	1.97	1.78
2605-12-20-12	3/4-3/4	1 1/16-12	1 1/4-11 1/2	1 1/16-12	1.97	2.38	1.97
2605-14-12-14	7/8-7/8	1 3/16-12	3/4-14	1 3/16-12	1.80	1.66	1.80
2605-16-12-16	1-1	1 5/16-12	3/4-14	1 5/16-12	1.81	1.72	1.81
2605-16-16-10	1-5/8	1 5/16-12	1-11 1/2	7/8-14	1.81	1.97	1.67
2605-16-16-16	1-1	1 5/16-12	1-11 1/2	1 5/16-12	1.81	1.97	1.81
2605-16-16-16-FG	1-1	1 5/16-12	1-11 1/2	1 5/16-12	1.81	1.97	1.81
2605-16-20-10	1-5/8	1 5/16-12	1 1/4-11 1/2	7/8-14	2.00	2.38	1.86
2605-20-20-20	1 1/4-1 1/4	1 5/8-12	1 1/4-11 1/2	1 5/8-12	2.06	2.38	2.06
2605-20-20-20-FG	1 1/4-1 1/4	1 5/8-12	1 1/4-11 1/2	1 5/8-12	2.06	2.38	2.06
2605-24-24-24	1 1/2-1 1/2	1 7/8-12	1 1/2-11 1/2	1 7/8-12	2.33	2.64	2.33
2605-24-24-24-FG	1 1/2-1 1/2	1 7/8-12	1 1/2-11 1/2	1 7/8-12	2.33	2.64	2.33
2605-32-32-32	2-2	2 1/2-12	2-11 1/2	2 1/2-12	3.06	3.00	3.06
2605-32-32-32-FG	2-2	2 1/2-12	2-11 1/2	2 1/2-12	3.06	3.00	3.06

PART NO	Y	D (1)	D1	D (3)
2605-12-16-12	1.38	0.61	0.94	0.61
2605-12-20-12	1.75	0.61	1.25	0.61
2605-14-12-14	1.25	0.72	0.72	0.72
2605-16-12-16	1.38	0.84	0.72	0.84
2605-16-16-10	1.38	0.84	0.94	0.48
2605-16-16-16	1.38	0.84	0.94	0.84
2605-16-16-16-FG	1.31	0.84	0.94	0.84
2605-16-20-10	1.75	0.84	1.25	0.48
2605-20-20-20	1.75	1.08	1.25	1.08
2605-20-20-20-FG	1.63	1.08	1.25	1.08
2605-24-24-24	2.00	1.31	1.50	1.31
2605-24-24-24-FG	1.88	1.31	1.50	1.31
2605-32-32-32	2.63	1.78	1.94	1.78
2605-32-32-32-FG	2.50	1.78	1.94	1.78

2606 FEMALE RUN TEE

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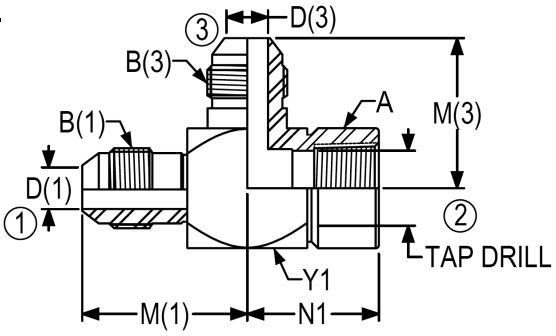
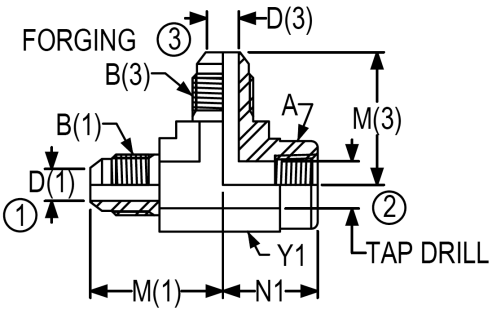
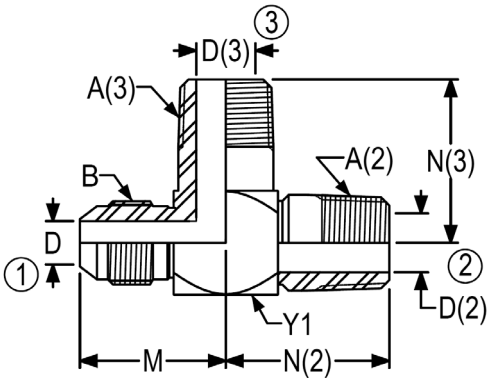




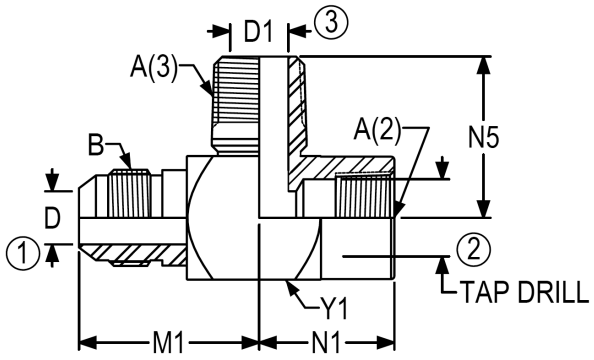
PART NO	TUBE OD	B (1) UN/UNF-2A	A NPTF	B (3) UN/UNF-2A	M1 (1)	N1	M1 (3)	Y1	D (1)	TAP DRILL	D (3)
2606-4-2-4	1/4-1/4	7/16-20	1/8-27	7/16-20	1.08	0.66	1.08	0.63	0.17	0.33	0.17
2606-4-4-4	1/4-1/4	7/16-20	1/4-18	7/16-20	1.02	0.88	1.02	0.75	0.17	0.43	0.17
2606-5-2-5	5/16-5/16	1/2-20	1/8-27	1/2-20	1.08	0.66	1.08	0.63	0.23	0.33	0.23
2606-6-4-6	3/8-3/8	9/16-18	1/4-18	9/16-18	1.23	0.88	1.23	0.75	0.30	0.43	0.30
2606-6-4-6-FG	3/8-3/8	9/16-18	14-18	9/16-18	1.23	0.88	1.23	0.75	0.30	0.43	0.30
2606-6-6-6	3/8-3/8	9/16-18	3/8-18	9/16-18	1.30	1.02	1.30	0.88	0.30	0.57	0.30
2606-8-6-8	1/2-1/2	3/4-16	3/8-18	3/4-16	1.42	1.02	1.42	0.88	0.39	0.57	0.39
2606-8-8-8	1/2-1/2	3/4-16	1/2-14	3/4-16	1.55	1.23	1.55	1.13	0.39	0.70	0.39
2606-10-8-10	5/8-5/8	7/8-14	1/2-14	7/8-14	1.64	1.23	1.64	1.13	0.48	0.70	0.48
2606-12-12-12	3/4-3/4	1 1/16-12	3/4-14	1 1/16-12	1.89	1.36	1.89	1.38	0.61	0.91	0.61
2606-14-12-14	7/8-7/8	1 3/16-12	3/4-14	1 3/16-12	1.86	1.42	1.86	1.38	0.72	0.91	0.72
2606-16-16-16	1-1	1 5/16-12	1-11 1/2	1 5/16-12	2.17	1.62	2.17	1.63	0.84	1.14	0.84
2606-20-20-20	1 1/4-1 1/4	1 5/8-12	1 1/4-11 1/2	1 5/8-12	2.33	1.70	2.33	2.00	1.08	1.48	1.08

2607 MALE RUN/BRANCH TEE



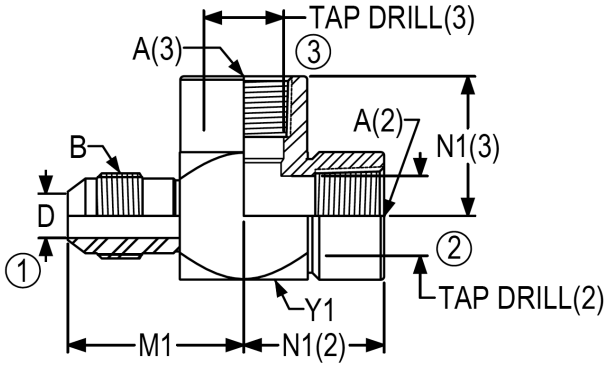
PART NO	TUBE OD	B UN/UNF-2A	A (2) NPTF	A (3) NPTF	M	N (2)	N (3)	Y	D	D1 (2)	D1 (3)
2607-4-2-2	1/4	7/16-20	1/8-27	1/8-27	0.89	0.78	0.78	0.50	0.17	0.19	0.19
2607-6-4-4	3/8	9/16-18	1/4-18	1/4-18	1.06	1.09	1.09	0.63	0.30	0.28	0.28
2607-6-6-6	3/8	9/16-18	3/8-18	3/8-18	1.16	1.22	1.22	0.81	0.30	0.41	0.41
2607-8-8-8	1/2	3/4-16	1/2-14	1/2-14	1.31	1.47	1.47	0.94	0.39	0.53	0.53
2607-10-8-8	5/8	7/8-14	1/2-14	1/2-14	1.45	1.47	1.47	0.94	0.48	0.53	0.53
2607-12-12-8	3/4	1-1/16-12	3/4-14	1/2-14	1.10	1.03	1.56	1.13	0.61	0.72	0.53
2607-12-12-12	3/4	1 1/16-12	3/4-14	3/4-14	1.66	1.59	1.59	1.13	0.61	0.72	0.72
2607-16-16-16	1	1 5/16-12	1-11 1/2	1-11 1/2	1.81	1.97	1.97	1.38	0.84	0.94	0.94

2608 FEMALE RUN/MALE BRANCH TEE



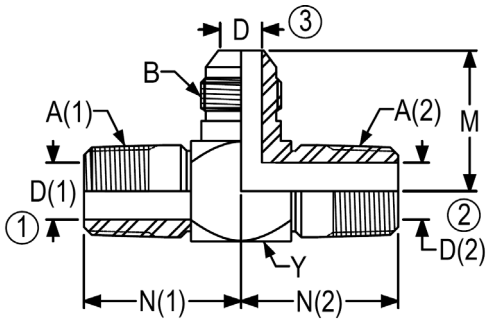
PART NO	TUBE OD	B UN/UNF-2A	A (2) NPTF	A (3) NPTF	M1	N1	N5	Y1	D	TAP DRILL	D1
2608-4-2-2	1/4	7/16-20	1/8-27	1/8-27	1.08	0.66	0.84	0.63	0.17	0.33	0.19
2608-4-4-6	1/4	7/16-20	1/4-18	3/8-18	1.05	0.91	1.22	0.81	0.17	0.43	0.41
2608-6-4-4	3/8	9/16-18	1/4-18	1/4-18	1.23	0.88	1.16	0.75	0.30	0.43	0.28
2608-6-6-6	3/8	9/16-18	3/8-18	3/8-18	1.30	1.02	1.25	0.88	0.30	0.57	0.41
2608-8-6-6	1/2	3/4-16	3/8-18	3/8-18	1.42	1.02	1.25	0.88	0.39	0.57	0.41
2608-10-8-8	5/8	7/8-14	1/2-14	1/2-14	1.64	1.23	1.47	1.13	0.48	0.70	0.53
2608-12-12-12	3/4	1 1/16-12	3/4-14	3/4-14	1.89	1.36	1.72	1.38	0.61	0.91	0.72
2608-16-16-16	1	1 5/16-12	1-11 1/2	1-11 1/2	2.17	1.62	2.09	1.63	0.84	1.14	0.94

2609 FEMALE RUN/BRANCH TEE



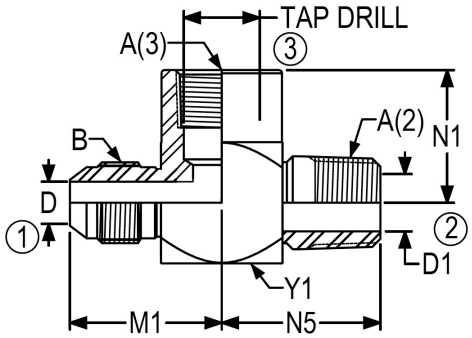
PART NO	TUBE OD	B UN/UNF-2A	A (2) NPTF	A (3) NPTF	M1	N1 (2)	N1 (3)	Y1	D	TAP DRILL (2)	TAP DRILL (3)
2609-4-2-2	1/4	7/16-20	1/8-27	1/8-27	1.08	0.66	0.66	0.63	0.17	0.33	0.33
2609-4-4-4	1/4	7/16-20	1/4-18	1/4-18	1.14	0.88	0.88	0.75	0.17	0.43	0.43
2609-5-4-4	5/16	1/2-20	1/4-18	1/4-18	1.14	0.88	0.88	0.75	0.23	0.43	0.43
2609-6-4-4	3/8	9/16-18	1/4-18	1/4-18	1.23	0.88	0.88	0.75	0.30	0.43	0.43
2609-8-6-6	1/2	3/4-16	3/8-18	3/8-18	1.42	1.02	1.02	0.88	0.39	0.57	0.57
2609-10-8-8	5/8	7/8-14	1/2-14	1/2-14	1.64	1.23	1.23	1.13	0.48	0.70	0.70
2609-12-12-12	3/4	1 1/16-12	3/4-14	3/4-14	1.89	1.36	1.36	1.38	0.61	0.91	0.91
2609-16-12-8	1	1 5/16-12	3/4-14	1/2-14	2.05	1.36	1.36	1.38	0.84	0.91	0.70
2609-16-16-16	1	1 5/16-12	1-11 1/2	1-11 1/2	2.17	1.62	1.63	1.63	0.84	1.14	1.14
2609-20-20-20	1 1/4	1 5/8-12	1 1/4-11 1/2	1 1/4-11 1/2	2.32	1.70	1.70	2.00	1.08	1.48	1.48

2610 MALE RUN/RUN TEE



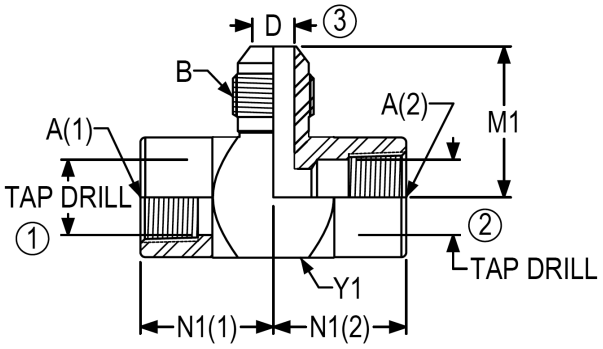
PART NO	TUBE OD	A (1) NPTF	A (2) NPTF	B UN/UNF-2A	N (1)	N (2)	M	Y	D1 (1)	D1 (2)	D
2610-4-4-4	1/4	1/4-18	1/4-18	7/16-20	1.09	1.09	0.95	0.63	0.28	0.28	0.17
2610-4-4-6	3/8	1/4-18	1/4-18	9/16-18	1.09	1.09	1.06	0.63	0.28	0.28	0.30
2610-6-6-6	3/8	3/8-18	3/8-18	9/16-18	1.22	1.22	1.16	0.81	0.41	0.41	0.30
2610-6-6-8	1/2	3/8-18	3/8-18	3/4-16	1.22	1.22	1.25	0.81	0.41	0.41	0.39
2610-8-8-8	1/2	1/2-14	1/2-14	3/4-16	1.47	1.47	1.31	0.94	0.53	0.53	0.39
2610-8-8-10	5/8	1/2-14	1/2-14	7/8-14	1.47	1.47	1.45	0.94	0.53	0.53	0.48
2610-12-12-12	3/4	3/4-14	3/4-14	1 1/16-12	1.59	1.59	1.66	1.13	0.72	0.72	0.61
2610-12-12-16	1	3/4-14	3/4-14	1 5/16-12	1.72	1.72	1.81	1.38	0.72	0.72	0.84
2610-16-16-16	1	1-11 1/2	1 11 1/2	1 5/16-12	1.97	1.97	1.81	1.38	0.94	0.94	0.84
2610-20-20-16	1	1 1/4-11 1/2	1 1/4-11 1/2	1 5/16-12	2.38	2.38	2.00	1.75	1.25	1.25	0.84
2610-20-20-20	1 1/4	1 1/4-11 1/2	1 1/4-11 1/2	1 5/8-12	2.38	2.38	2.00	1.75	1.25	1.25	1.08

2611 MALE RUN/FEMALE BRANCH TEE



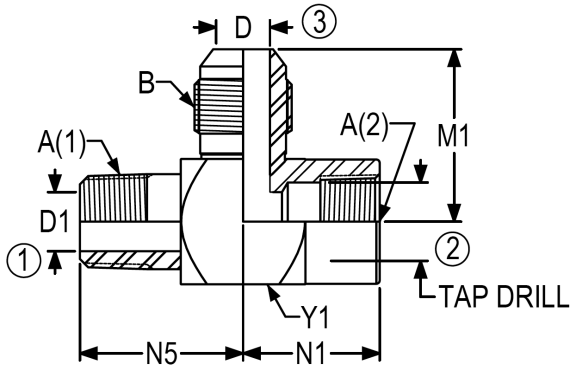
PART NO	TUBE OD	B UN/UNF-2A	A (2) NPTF	A (3) NPTF	M1	N5	N1	Y1	D	D1	TAP DRILL
2611-4-2-2	1/4	7/16-20	1/8-27	1/8-27	0.95	0.84	0.66	0.63	0.17	0.19	0.33
2611-4-4-2	1/4	7/16-20	1/4-18	1/8-27	0.95	1.03	0.66	0.63	0.17	0.28	0.33
2611-4-4-4	1/4	7/16-20	1/4-18	1/4-18	1.01	1.09	0.88	0.75	0.17	0.28	0.43
2611-5-4-2	5/16	1/2-20	1/4-18	1/8-27	1.08	1.03	0.66	0.63	0.23	0.28	0.33
2611-5-4-6	5/16	1/2-20	1/4-18	3/8-18	1.11	1.22	1.02	0.88	0.23	0.28	0.57
2611-6-4-4	3/8	9/16-18	1/4-18	1/4-18	1.13	1.16	0.88	0.75	0.30	0.28	0.43
2611-6-6-6	3/8	9/16-18	3/8-18	3/8-18	1.19	1.25	1.02	0.88	0.30	0.41	0.57
2611-8-6-6	1/2	3/4-16	3/8-18	3/8-18	1.28	1.25	1.02	0.88	0.39	0.41	0.57
2611-8-8-8	1/2	3/4-16	1/2-14	1/2-14	1.41	1.47	1.23	1.13	0.39	0.53	0.70
2611-8-12-12	1/2	3/4-16	3/4-14	3/4-14	1.53	1.72	1.36	1.38	0.39	0.72	0.91
2611-10-8-8	5/8	7/8-14	1/2-14	1/2-14	1.55	1.56	1.23	1.13	0.48	0.53	0.70
2611-12-12-12	3/4	1 1/16-12	3/4-14	3/4-14	1.89	1.59	1.36	1.38	0.61	0.72	0.91
2611-16-16-16	1	1 5/16-12	1-11 1/2	1-11 1/2	1.94	1.97	1.62	1.63	0.84	0.94	1.14

2612 FEMALE RUN/RUN TEE



PART NO	TUBE OD	A (1) NPTF	A (2) NPTF	B UN/UNF-2A	N1 (1)	N1 (2)	M1	Y1	TAP DRILL (1)	TAP DRILL (2)	D
2612-2-2-4	1/4	1/8-27	1/8-27	7/16-20	0.66	0.66	1.08	0.63	0.33	0.33	0.17
2612-2-2-5	5/16	1/8-27	1/8-27	1/2-20	0.66	0.66	1.08	0.63	0.33	0.33	0.23
2612-4-4-6	3/8	1/4-18	1/4-18	9/16-18	0.88	0.88	1.23	0.75	0.43	0.43	0.30
2612-6-6-8	1/2	3/8-18	3/8-18	3/4-16	1.02	1.02	1.42	0.88	0.57	0.57	0.39
2612-8-8-8	1/2	1/2-14	1/2-14	3/4-16	1.23	1.23	1.41	1.13	0.70	0.70	0.39
2612-8-8-10	5/8	1/2-14	1/2-14	7/8-14	1.23	1.23	1.64	1.13	0.70	0.70	0.48
2612-12-12-12	3/4	3/4-14	3/4-14	1 1/16-12	1.36	1.36	1.89	1.38	0.91	0.91	0.61
2612-16-16-16	1	1-11 1/2	1-11 1/2	1 5/16-12	1.62	1.62	2.17	1.63	1.14	1.14	0.84

2613 MALE RUN/FEMALE RUN TEE



PART NO	TUBE OD	A (1) NPTF	A (2) NPTF	B UN/UNF-2A	N5	N1	M1	Y1	D1	TAP DRILL	D
2613-2-2-4	1/4	1/8-27	1/8-27	7/16-20	0.78	0.66	0.95	0.63	0.19	0.33	0.17
2613-2-2-5	5/16	1/8-27	1/8-27	1/2-20	0.78	0.66	0.98	0.63	0.19	0.33	0.23
2613-4-4-4	1/4	1/4-18	1/4-18	7/16-20	1.09	0.88	1.01	0.75	0.28	0.43	0.17
2613-4-4-6	3/8	1/4-18	1/4-18	9/16-18	1.09	0.88	1.13	0.75	0.28	0.43	0.30
2613-6-4-6	3/8	3/8-18	1/4-18	9/16-18	1.22	0.90	1.16	0.81	0.41	0.43	0.30
2613-6-6-6	3/8	3/8-18	3/8-18	9/16-18	1.22	1.02	1.19	0.88	0.41	0.57	0.30
2613-6-6-8	1/2	3/8-18	3/8-18	3/4-16	1.22	1.02	1.28	0.88	0.41	0.57	0.39
2613-8-8-10	5/8	1/2-14	1/2-14	7/8-14	1.47	1.23	1.55	1.13	0.53	0.70	0.48
2613-12-4-8	1/2	3/4-14	1/4-18	3/4-16	1.59	1.06	1.40	1.13	0.72	0.43	0.39
2613-12-12-12	3/4	3/4-14	3/4-14	1 1/16-12	1.59	1.36	1.89	1.38	0.72	0.91	0.61
2613-16-16-16	1	1-11 1/2	1-11 1/2	1 5/16-12	1.97	1.62	2.17	1.63	0.94	1.14	0.84
2613-20-20-20	1 1/4	1 1/4-11 1/2	1 1/4-11 1/2	1 5/8-12	2.38	1.70	2.33	2.00	1.25	1.48	1.08

2650 UNION CROSS

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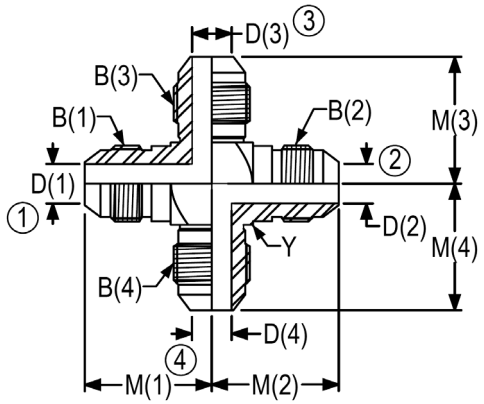
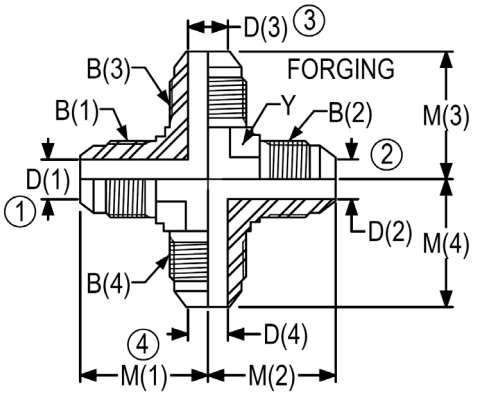
MS51517





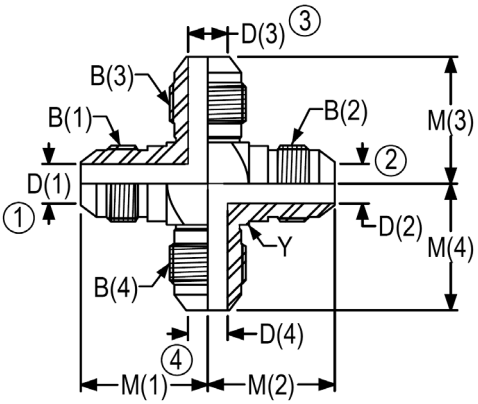
*Non forging parts are brazed construction

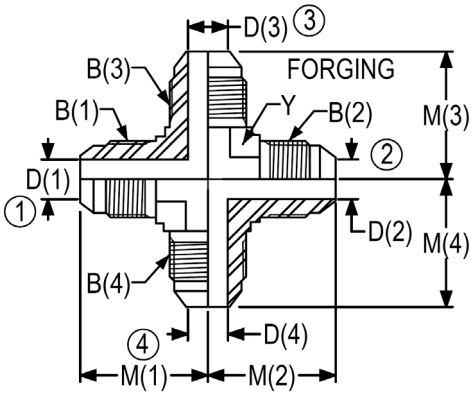
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	B (4) UN/UNF-2A	M (1)	M (2)
2650-4-4-4-4	1/4-1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	7/16-20	0.89	0.89
2650-4-4-4-4-FG	1/4-1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	7/16-20	0.89	0.89
2650-5-5-5-5	5/16-5/16-5/16-5/16	1/2-20	1/2-20	1/2-20	1/2-20	0.95	0.95
2650-6-6-6-6	3/8-3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	9/16-18	1.06	1.06
2650-6-6-6-6-FG	3/8-3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	9/16-18	1.06	1.06
2650-8-8-6-6	1/2-1/2-3/8-3/8	3/4-16	3/4-16	9/16-18	9/16-18	1.25	1.25
2650-8-8-8-8	1/2-1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	3/4-16	1.25	1.25
2650-8-8-8-8-FG	1/2-1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	3/4-16	1.25	1.25
2650-10-10-6-6	5/8-5/8-3/8-3/8	7/8-14	7/8-14	9/16-18	9/16-18	1.45	1.45
2650-10-10-8-8	5/8-5/8-1/2-1/2	7/8-14	7/8-14	3/4-16	3/4-16	1.45	1.45
2650-10-10-10-8	5/8-5/8-5/8-1/2	7/8-14	7/8-14	7/8-14	3/4-16	1.45	1.45
2650-10-10-10-10	5/8-5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	7/8-14	1.45	1.45
2650-10-10-10-10-FG	5/8-5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	7/8-14	1.45	1.45

PART NO	M (3)	M (4)	Y	D (1)	D (2)	D (3)	D (4)
2650-4-4-4-4	0.89	0.89	0.50	0.17	0.17	0.17	0.17
2650-4-4-4-4-FG	0.89	0.89	0.44	0.17	0.17	0.17	0.17
2650-5-5-5-5	0.95	0.95	0.56	0.23	0.23	0.23	0.23
2650-6-6-6-6	1.06	1.06	0.63	0.30	0.30	0.30	0.30
2650-6-6-6-6-FG	1.06	1.06	0.56	0.30	0.30	0.30	0.30
2650-8-8-6-6	1.15	1.15	0.81	0.39	0.39	0.30	0.30
2650-8-8-8-8	1.25	1.25	0.81	0.39	0.39	0.39	0.39
2650-8-8-8-8-FG	1.25	1.25	0.75	0.39	0.39	0.39	0.39
2650-10-10-6-6	1.22	1.22	0.94	0.48	0.48	0.30	0.30
2650-10-10-8-8	1.31	1.31	0.94	0.48	0.48	0.39	0.39
2650-10-10-10-8	1.45	1.31	0.94	0.48	0.48	0.48	0.39
2650-10-10-10-10	1.45	1.45	0.94	0.48	0.48	0.48	0.48
2650-10-10-10-10-FG	1.45	1.45	0.88	0.48	0.48	0.48	0.48

2650 UNION CROSS (Con't)

SAE J514 070501
MS51517



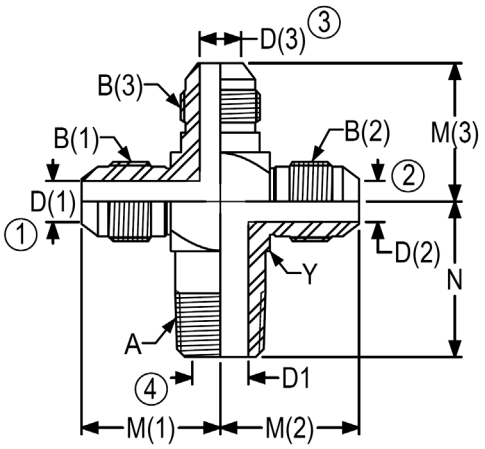


*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	B (4) UN/UNF-2A	M (1)	M (2)
2650-12-8-8-8	3/4-1/2-1/2-1/2	1 1/16-12	3/4-16	3/4-16	3/4-16	1.66	1.40
2650-12-12-12-12	3/4-3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1 1/16-12	1.66	1.66
2650-12-12-12-12-FG	3/4-3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1 1/16-12	1.66	1.66
2650-14-14-14-14	7/8-7/8-7/8-7/8	1 3/16-12	1 3/16-12	1 3/16-12	1 3/16-12	1.80	1.80
2650-16-16-12-12	1-1-3/4-3/4	1 5/16-12	1 5/16-12	1 1/16-12	1 1/16-12	1.81	1.81
2650-16-16-16-16	1-1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1 5/16-12	1.81	1.81
2650-16-16-16-16-FG	1-1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1 5/16-12	1.81	1.81
2650-20-20-20-20	1 1/4-1 1/4-1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	1 5/8-12	2.06	2.06
2650-24-24-24-24	1 1/2-1 1/2-1 1/2-1 1/2	1 7/8-14	1 7/8-14	1 7/8-14	1 7/8-14	2.33	2.33
2650-32-32-32-32	2-2-2-2	2 1/2-12	2 1/2-12	2 1/2-12	2 1/2-12	3.06	3.06

PART NO	M (3)	M (4)	Y	D (1)	D (2)	D (3)	D (4)
2650-12-8-8-8	1.40	1.40	1.13	0.61	0.39	0.39	0.39
2650-12-12-12-12	1.66	1.66	1.13	0.61	0.61	0.61	0.61
2650-12-12-12-12-FG	1.66	1.66	1.06	0.61	0.61	0.61	0.61
2650-14-14-14-14	1.80	1.80	1.25	0.72	0.72	0.72	0.72
2650-16-16-12-12	1.78	1.78	1.38	0.84	0.84	0.61	0.61
2650-16-16-16-16	1.81	1.81	1.38	0.84	0.84	0.84	0.84
2650-16-16-16-16-FG	1.81	1.81	1.31	0.84	0.84	0.84	0.84
2650-20-20-20-20	2.06	2.06	1.75	1.08	1.08	1.08	1.08
2650-24-24-24-24	2.33	2.33	2.00	1.31	1.31	1.31	1.31
2650-32-32-32-32	3.06	3.06	2.63	1.78	1.78	1.78	1.78

2651 MALE BRANCH CROSS

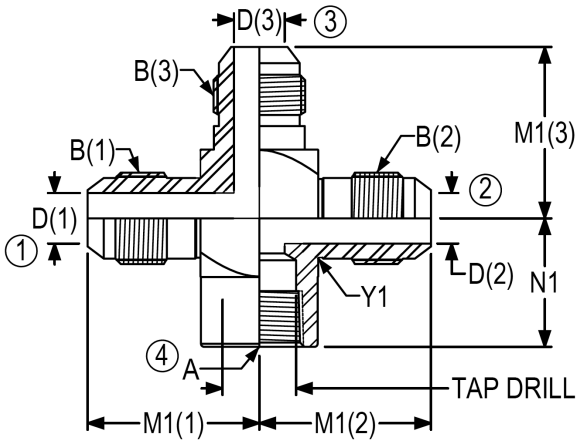


PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	A NPTF	M (1)	M (2)	M (3)
2651-5-5-5-4	5/16-5/16-5/16	1/2-20	1/2-20	1/2-20	1/4-18	0.95	0.95	0.95
2651-6-6-6-4	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1/4-18	1.06	1.06	1.06
2651-6-6-6-6	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	3/8-18	1.16	1.16	1.16
2651-8-8-8-6	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	3/8-18	1.25	1.25	1.25
2651-8-8-8-8	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1/2-14	1.31	1.31	1.31
2651-12-12-12-12	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	3/4-14	1.66	1.66	1.66
2651-16-6-16-16	1-3/8-1	1 5/16-12	9/16-18	1 5/16-12	1-11 1/2	1.81	1.44	1.81
2651-16-12-12-16	1-3/4-3/4	1 5/16-12	1 1/16-12	1 1/16-12	1-11 1/2	1.81	1.78	1.78
2651-16-16-16-16	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1-11 1/2	1.81	1.81	1.81

PART NO	N	Y	D (1)	D (2)	D (3)	D1
2651-5-5-5-4	1.06	0.56	0.23	0.23	0.23	0.28
2651-6-6-6-4	1.09	0.63	0.30	0.30	0.30	0.28
2651-6-6-6-6	1.22	0.81	0.30	0.30	0.30	0.41
2651-8-8-8-6	1.22	0.81	0.39	0.39	0.39	0.41
2651-8-8-8-8	1.47	0.94	0.39	0.39	0.39	0.53
2651-12-12-12-12	1.59	1.13	0.61	0.61	0.61	0.72
2651-16-6-16-16	1.97	1.38	0.84	0.30	0.84	0.94
2651-16-12-12-16	1.97	1.38	0.84	0.61	0.61	0.94
2651-16-16-16-16	1.97	1.38	0.84	0.84	0.84	0.94

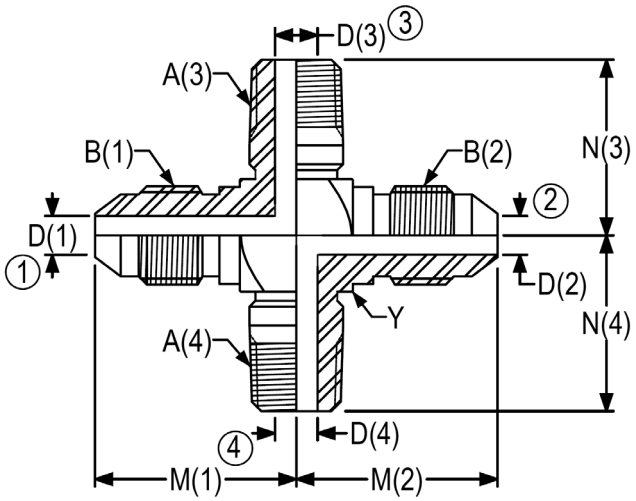
2652 FEMALE BRANCH CROSS

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



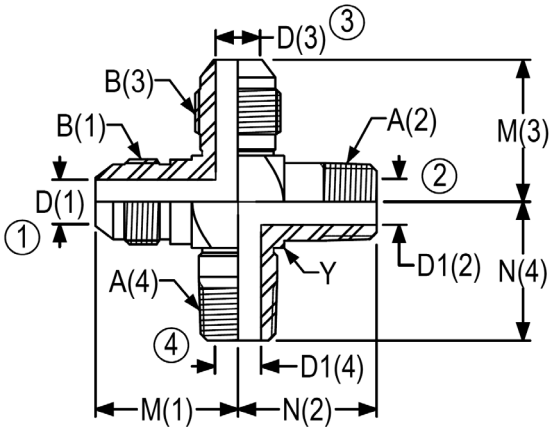
2653 MALE BRANCH/BRANCH CROSS

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



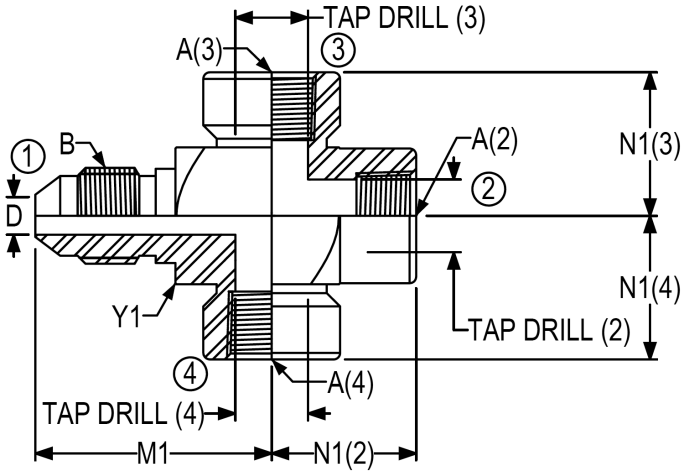
2654 MALE RUN/BRANCH CROSS

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



2658 FEMALE RUN/BRANCH/BRANCH CROSS

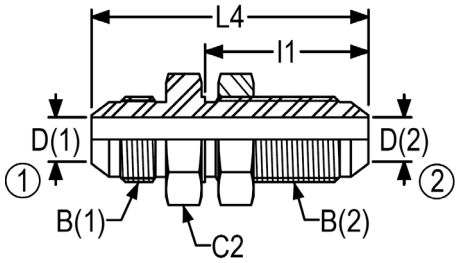
INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



2700-LN BULKHEAD UNION

SAE J514 070601
MS51520

BASE PART DOES NOT INCLUDE LOCKNUT.
TO ORDER WITH LOCKNUT, ADD –LN TO PART NUMBER.

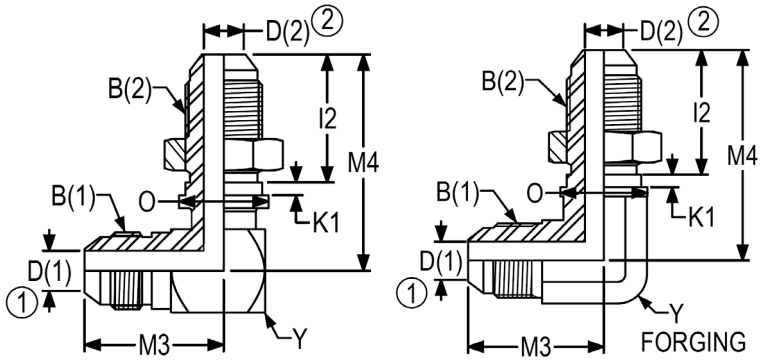


PART N0	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	L4	I1	C2	D (1)	D (2)
2700-2-2	1/8-1/8	5/16-24	5/16-24	1.87	1.11	0.56	0.08	0.08
2700-4-4	1/4-1/4	7/16-20	7/16-20	2.07	1.20	0.69	0.17	0.17
2700-5-5	5/16-5/16	1/2-20	1/2-20	2.07	1.20	0.75	0.23	0.23
2700-5-6	5/16-3/8	1/2-20	9/16-18	2.17	1.28	0.81	0.23	0.30
2700-6-4	3/8-1/4	9/16-18	7/16-20	2.10	1.20	0.69	0.30	0.17
2700-6-6	3/8-3/8	9/16-18	9/16-18	2.18	1.28	0.81	0.30	0.30
2700-8-8	1/2-1/2	3/4-16	3/4-16	2.44	1.44	1.00	0.39	0.39
2700-10-10	5/8-5/8	7/8-14	7/8-14	2.74	1.58	1.13	0.48	0.48
2700-12-12	3/4-3/4	1 1/16-12	1 1/16-12	3.09	1.75	1.38	0.61	0.61
2700-14-14	7/8-7/8	1 3/16-12	1 3/16-12	3.12	1.75	1.50	0.72	0.72
2700-16-12	1-3/4	1 5/16-12	1 1/16-12	3.14	1.75	1.63	0.84	0.61
2700-16-16	1-1	1 5/16-12	1 5/16-12	3.14	1.75	1.63	0.84	0.84
2700-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	3.31	1.80	1.88	1.08	1.08
2700-24-24	1 1/2-1 1/2	1 7/8-12	1 7/8-12	3.52	1.81	2.13	1.31	1.31

2701-LN 90 DEGREE BULKHEAD ELBOW

SAE J514 070701
MS51507

BASE PART DOES NOT INCLUDE LOCKNUT. TO ORDER WITH LOCKNUT, ADD –LN TO PART



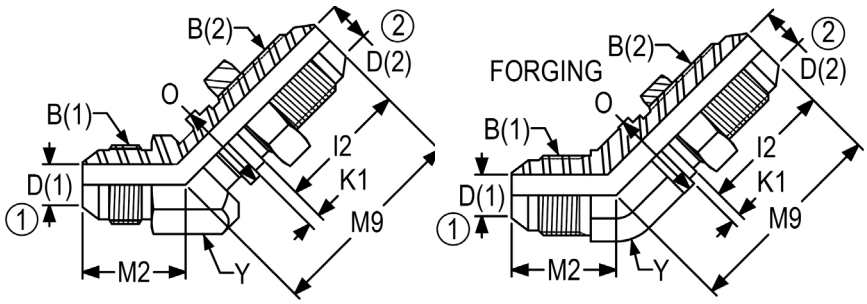
*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M3	M4	I2	K1	O	Y	D (1)	D (2)
2701-2-2	1/8-1/8	5/16-24	5/16-24	0.88	1.50	0.92	0.09	0.44	0.44	0.06	0.06
2701-4-4	1/4-1/4	7/16-20	7/16-20	0.97	1.59	1.02	0.09	0.56	0.50	0.17	0.17
2701-4-4-FG	1/4-1/4	7/16-20	7/16-20	0.97	1.59	1.02	0.09	0.56	0.44	0.17	0.17
2701-5-5	5/16-5/16	1/2-20	1/2-20	1.03	1.61	1.02	0.09	0.63	0.56	0.23	0.23
2701-5-5-FG	5/16-5/16	1/2-20	1/2-20	1.06	1.72	1.02	0.09	0.63	0.56	0.23	0.23
2701-6-5	3/8-5/16	9/16-18	1/2-20	1.09	1.64	1.02	0.09	0.63	0.63	0.30	0.23
2701-6-6	3/8-3/8	9/16-18	9/16-18	1.09	1.81	1.09	0.09	0.69	0.63	0.30	0.30
2701-6-6-FG	3/8-3/8	9/16-18	9/16-18	1.09	1.81	1.09	0.09	0.56	0.56	0.30	0.30
2701-8-6	1/2-3/8	3/4-16	9/16-18	1.36	1.91	1.09	0.09	0.69	0.81	0.39	0.30
2701-8-8	1/2-1/2	3/4-16	3/4-16	1.36	2.11	1.25	0.13	0.88	0.81	0.39	0.39
2701-8-8-FG	1/2-1/2	3/4-16	3/4-16	1.36	2.11	1.25	0.09	0.88	0.75	0.39	0.39
2701-10-8-FG	5/8-1/2	7/8-14	3/4-16	1.56	2.27	1.25	0.13	0.88	0.88	0.48	0.39
2701-10-10	5/8-5/8	7/8-14	7/8-14	1.56	2.39	1.39	0.13	1.00	0.94	0.48	0.48
2701-10-10-FG	5/8-5/8	7/8-14	7/8-14	1.56	2.39	1.39	0.13	0.88	0.88	0.48	0.48
2701-12-10	3/4-5/8	1 1/16-12	7/8-14	1.78	2.47	1.39	0.13	1.00	1.13	0.61	0.48
2701-12-12	3/4-3/4	1 1/16-12	1 1/16-12	1.78	2.67	1.56	0.13	1.19	1.13	0.61	0.61
2701-12-12-FG	3/4-3/4	1 1/16-12	1 1/16-12	1.78	2.67	1.56	0.13	1.06	1.06	0.61	0.61
2701-16-16	1-1	1 5/16-12	1 5/16-12	1.94	2.80	1.56	0.13	1.44	1.38	0.84	0.84
2701-16-16-FG	1-1	1 5/16-12	1 5/16-12	1.94	2.80	1.56	0.13	1.30	1.31	0.84	0.84
2701-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.17	3.12	1.61	0.13	1.75	1.75	1.08	1.08
2701-20-20-FG	1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.17	3.12	1.61	0.13	1.62	1.63	1.08	1.08
2701-24-24	1 1/2-1 1/2	1 7/8-12	1 7/8-12	2.34	3.42	1.62	0.13	2.00	2.00	1.31	1.31
2701-32-32	2-2	2 1/2-12	2 1/2-12	2.89	4.11	1.91	0.13	2.63	2.63	1.78	1.78

2702-LN 45 DEGREE BULKHEAD ELBOW

SAE J514 070801
MS51509

BASE PART DOES NOT INCLUDE LOCKNUT. TO ORDER WITH LOCKNUT, ADD –LN TO PART NUMBER



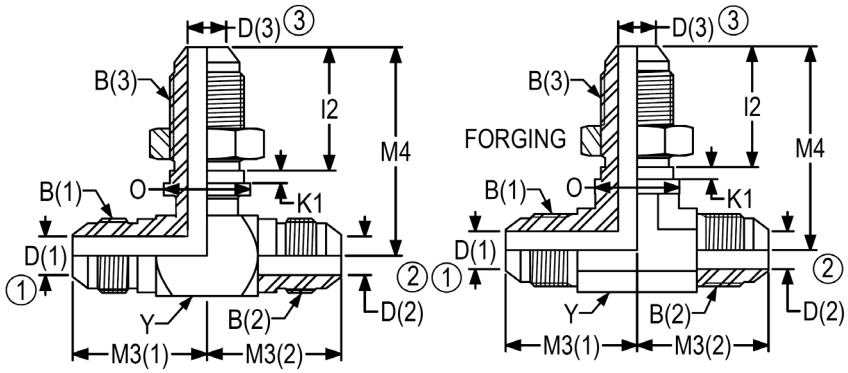
*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M2	M9	I2	K1	O	Y	D (1)	D (2)
2702-2-2	1/8-1/8	5/16-24	5/16-24	0.69	1.42	0.92	0.09	0.44	0.44	0.06	0.06
2702-4-4	1/4-1/4	7/16-20	7/16-20	0.72	1.53	1.02	0.09	0.56	0.50	0.17	0.17
2702-4-4-FG	1/4-1/4	7/16-20	7/16-20	0.72	1.53	1.02	0.09	0.56	0.44	0.17	0.17
2702-5-5	5/16-5/16	1/2-20	1/2-20	0.80	1.53	1.02	0.09	0.63	0.56	0.23	0.23
2702-5-5-FG	5/16-5/16	1/2-20	1/2-20	0.77	1.66	1.02	0.09	0.63	0.56	0.23	0.23
2702-6-6	3/8-3/8	9/16-18	9/16-18	0.83	1.67	1.09	0.09	0.69	0.63	0.30	0.30
2702-6-6-FG	3/8-3/8	9/16-18	9/16-18	0.83	1.67	1.09	0.09	0.69	0.56	0.30	0.30
2702-8-8	1/2-1/2	3/4-16	3/4-16	0.98	1.94	1.25	0.13	0.88	0.81	0.39	0.39
2702-8-8-FG	1/2-1/2	3/4-16	3/4-16	0.98	1.94	1.25	0.09	0.88	0.75	0.39	0.39
2702-10-10	5/8-5/8	7/8-14	7/8-14	1.11	2.17	1.39	0.13	1.00	0.94	0.48	0.48
2702-10-10-FG	5/8-5/8	7/8-14	7/8-14	1.11	2.17	1.39	0.13	1.00	0.88	0.48	0.48
2702-12-12	3/4-3/4	1 1/16-12	1 1/16-12	1.28	2.44	1.56	0.13	1.19	1.13	0.61	0.61
2702-12-12-FG	3/4-3/4	1 1/16-12	1 1/16-12	1.28	2.44	1.56	0.13	1.19	1.06	0.61	0.61
2702-14-14	7/8-7/8	1 3/16-12	1 3/16-12	1.39	2.50	1.56	0.13	1.31	1.25	0.72	0.72
2702-16-16	1-1	1 5/16-12	1 5/16-12	1.47	2.53	1.56	0.13	1.44	1.38	0.84	0.84
2702-16-16-FG	1-1	1 5/16-12	1 5/16-12	1.47	2.56	1.56	0.13	1.44	1.31	0.84	0.84
2702-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1.59	2.65	1.61	0.13	1.75	1.75	1.08	1.08
2702-24-24	1 1/2-1 1/2	1 7/8-12	1 7/8-12	1.78	2.67	1.62	0.13	2.00	2.00	1.31	1.31

2703-LN BULKHEAD BRANCH TEE

SAE J514 070959
MS51515

BASE PART DOES NOT INCLUDE LOCKNUT. TO ORDER WITH LOCKNUT, ADD –LN TO PART NUMBER



*Non forging parts are brazed construction

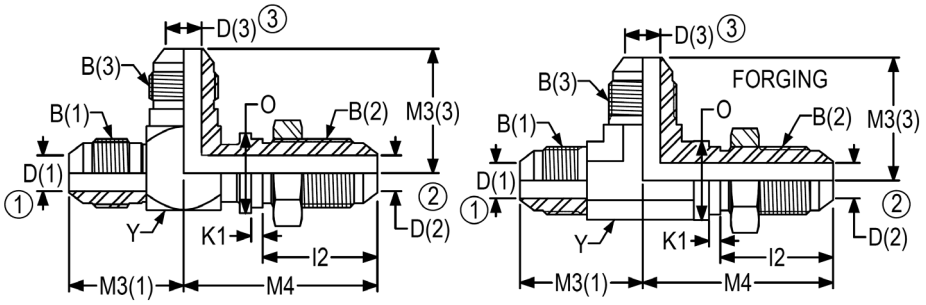
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M3 (1)	M3 (2)	M4	I2
2703-4-4-4	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	0.97	0.97	1.59	1.02
2703-4-4-4-FG	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	0.97	0.97	1.59	1.02
2703-5-5-5	5/16-5/16-5/16	1/2-20	1/2-20	1/2-20	1.06	1.06	1.61	1.02
2703-6-6-6	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.09	1.09	1.81	1.09
2703-6-6-6-FG	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.09	1.09	1.81	1.09
2703-8-8-8	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.36	1.36	2.11	1.25
2703-8-8-8-FG	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.36	1.36	2.11	1.25
2703-10-10-10	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.56	1.56	2.39	1.39
2703-10-10-10-FG	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.56	1.56	2.39	1.39
2703-12-12-12	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.78	1.78	2.67	1.56
2703-12-12-12-FG	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.78	1.78	2.67	1.56
2703-16-16-16	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.94	1.94	2.80	1.56
2703-16-16-16-FG	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.94	1.94	2.80	1.56
2703-20-20-20	1 1/4-1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.17	2.17	3.12	1.61
2703-24-24-24	1 1/2-1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 7/8-12	2.34	2.34	3.42	1.62

PART NO	K1	O	Y	D (1)	D (2)	D (3)
2703-4-4-4	0.09	0.56	0.50	0.17	0.17	0.17
2703-4-4-4-FG	0.09	0.56	0.44	0.17	0.17	0.17
2703-4-4-6	0.09	0.69	0.63	0.17	0.17	0.30
2703-5-5-5	0.09	0.63	0.56	0.23	0.23	0.23
2703-6-6-6	0.09	0.69	0.63	0.30	0.30	0.30
2703-6-6-6-FG	0.09	0.69	0.56	0.30	0.30	0.30
2703-8-8-8	0.13	0.88	0.81	0.39	0.39	0.39
2703-8-8-8-FG	0.09	0.88	0.75	0.39	0.39	0.39
2703-10-10-10	0.13	1.00	0.94	0.48	0.48	0.48
2703-10-10-10-FG	0.13	0.87	0.88	0.48	0.48	0.48
2703-12-12-12	0.13	1.19	1.13	0.61	0.61	0.61
2703-12-12-12-FG	0.13	1.19	1.06	0.61	0.61	0.61
2703-16-16-16	0.13	1.44	1.38	0.84	0.84	0.84
2703-16-16-16-FG	0.13	1.44	1.31	0.84	0.84	0.84
2703-20-20-20	0.13	1.75	1.75	1.08	1.08	1.08
2703-24-24-24	0.13	2.00	2.00	1.31	1.31	1.31

2704-LN BULKHEAD RUN TEE

SAE J514 070958
MS51516

BASE PART DOES NOT INCLUDE LOCKNUT. TO ORDER WITH LOCKNUT, ADD –LN TO PART NUMBER

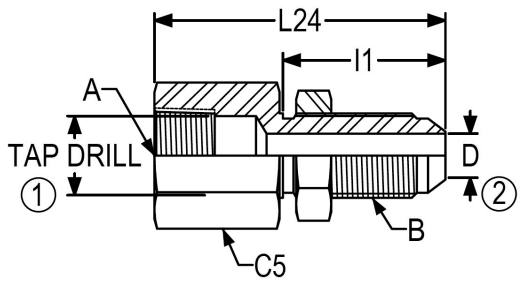


*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M3 (1)	M4	M3 (3)	I2
2704-4-4-4	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	0.89	1.59	0.97	1.02
2704-4-4-4-FG	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	0.97	1.59	0.97	1.02
2704-6-6-6	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.81	1.09	1.09
2704-6-6-6-FG	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.09	1.81	1.09	1.09
2704-8-8-8	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.25	2.11	1.36	1.25
2704-8-8-8-FG	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.36	2.11	1.36	1.25
2704-8-10-8	1/2-5/8-1/2	3/4-16	7/8-14	3/4-16	1.31	2.39	1.31	1.39
2704-10-10-10	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.55	2.39	1.56	1.39
2704-10-10-10-FG	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.56	2.39	1.56	1.39
2704-12-12-12	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.78	2.67	1.78	1.56
2704-12-12-12-FG	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.78	2.67	1.78	1.56
2704-12-12-16	3/4-3/4-1	1 1/16-12	1 1/16-12	1 5/16-12	1.89	2.8	1.94	1.56
2704-16-12-12	1-3/4-3/4	1 5/16-12	1 1/16-12	1 1/16-12	1.81	2.80	1.78	1.56
2704-16-16-16	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	2.80	1.94	1.56
2704-16-16-16-FG	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.94	2.80	1.94	1.56
2704-20-20-20	1 1/4-1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.06	3.12	2.17	1.61
2704-24-24-24	1 1/2-1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 7/8-12	2.34	3.42	2.34	1.62

PART NO	K1	O	Y	D (1)	D (2)	D (3)
2704-4-4-4	0.09	0.56	0.50	0.17	0.17	0.17
2704-4-4-4-FG	0.09	0.56	0.44	0.17	0.17	0.17
2704-6-6-6	0.09	0.69	0.63	0.30	0.30	0.30
2704-6-6-6-FG	0.09	0.69	0.56	0.30	0.30	0.30
2704-8-8-8	0.13	0.88	0.81	0.39	0.39	0.39
2704-8-8-8-FG	0.13	0.88	0.75	0.39	0.39	0.39
2704-8-10-8	0.13	1.00	0.94	0.39	0.48	0.39
2704-10-10-10	0.13	1.00	0.94	0.48	0.48	0.48
2704-10-10-10-FG	0.13	1.00	0.88	0.48	0.48	0.48
2704-12-12-12	0.13	1.19	1.13	0.61	0.61	0.61
2704-12-12-12-FG	0.13	1.19	1.06	0.61	0.61	0.61
2704-12-12-16	0.13	1.19	1.38	0.61	0.61	0.84
2704-16-12-12	0.13	1.19	1.38	0.84	0.61	0.61
2704-16-16-16	0.13	1.44	1.38	0.84	0.84	0.84
2704-16-16-16-FG	0.13	1.44	1.31	0.84	0.84	0.84
2704-20-20-20	0.13	1.75	1.75	1.08	1.08	1.08
2704-24-24-24	0.13	2.00	2.00	1.31	1.31	1.31

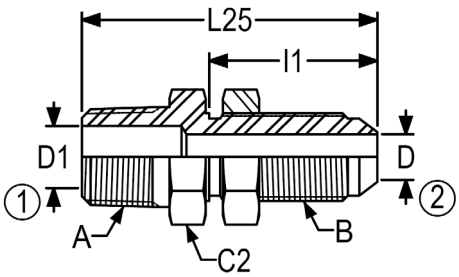
2705-LN FEMALE PIPE/BULKHEAD CONNECTOR



BASE PART DOES NOT INCLUDE LOCKNUT.
TO ORDER WITH LOCKNUT, ADD –LN TO PART NUMBER

PART NO	TUBE OD	A NPTF	B UN/UNF-2A	L24	I1	C5	TAP DRILL	D
2705-2-4	1/4	1/8-27	7/16-20	1.84	1.20	0.69	0.33	0.17
2705-4-4	1/4	1/4-18	7/16-20	2.00	1.20	0.75	0.43	0.17
2705-4-6	3/8	1/4-18	9/16-18	2.08	1.28	0.81	0.43	0.30
2705-6-6	3/8	3/8-18	9/16-18	2.18	1.28	1.00	0.57	0.30
2705-6-8	1/2	3/8-18	3/4-16	2.34	1.44	1.00	0.57	0.39
2705-8-8	1/2	1/2-14	3/4-16	2.58	1.44	1.13	0.70	0.39
2705-8-10	5/8	1/2-14	7/8-14	2.66	1.58	1.13	0.70	0.48
2705-12-12	3/4	3/4-14	1 1/16-12	2.92	1.75	1.38	0.91	0.61
2705-16-16	1	1-11 1/2	1 5/16-12	3.09	1.75	1.63	1.14	0.84
2705-20-20	1 1/4	1 1/4-11 1/2	1 5/8-12	3.22	1.61	2.00	1.48	1.08
2705-24-24	1 1/2	1 1/2-11 1/2	1 7/8-12	3.33	1.84	2.38	1.72	1.31

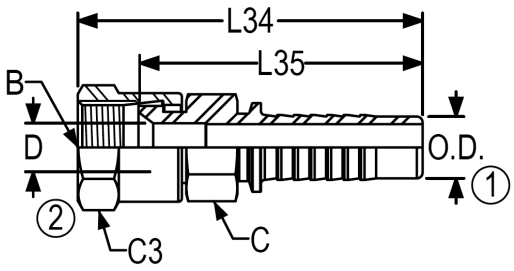
2706-LN MALE PIPE/BULKHEAD CONNECTOR



BASE PART DOES NOT INCLUDE LOCKNUT.
TO ORDER WITH LOCKNUT, ADD –LN TO PART NUMBER

PART NO	TUBE OD	A NPTF	B UN/UNF-2A	L25	I1	C2	D1	D
2706-2-4	1/4	1/8-27	7/16-20	1.84	1.20	0.69	0.19	0.17
2706-4-4	1/4	1/4-18	7/16-20	2.03	1.20	0.69	0.28	0.17
2706-4-6	3/8	1/4-18	9/16-18	2.19	1.28	0.81	0.28	0.30
2706-6-6	3/8	3/8-18	9/16-18	2.19	1.28	0.81	0.41	0.30
2706-6-8	1/2	3/8-18	3/4-16	2.36	1.44	1.00	0.41	0.39
2706-8-8	1/2	1/2-14	3/4-16	2.53	1.44	1.00	0.53	0.39
2706-8-10	5/8	1/2-14	7/8-14	2.72	1.58	1.13	0.53	0.48
2706-8-12	3/4	1/2-14	1 1/16-12	2.93	1.75	1.38	0.53	0.61
2706-12-12	3/4	3/4-14	1 1/16-12	2.92	1.75	1.38	0.72	0.61
2706-16-16	1	1-11 1/2	1 5/16-12	3.11	1.75	1.63	0.94	0.84
2706-20-20	1 1/4	1 1/4-11	1 5/8-12	3.25	1.80	1.88	1.25	1.08
2706-24-24	1 1/2	1 1/2-11	1 7/8-12	3.44	1.81	2.13	1.50	1.31

4305 BARBED HOSE/SWIVEL CONNECTOR

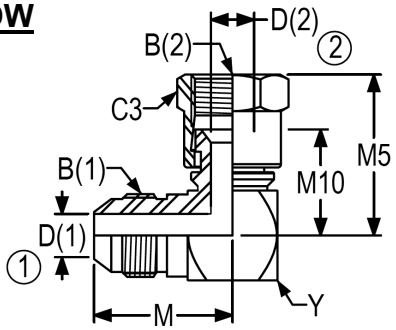


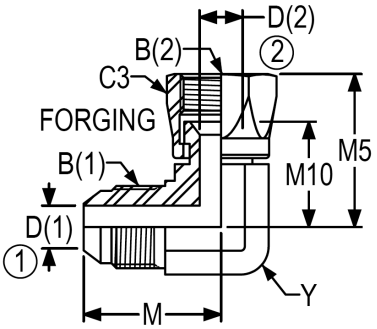
*C=Round Stock Size

PART NO	TUBE OD	B UN/UNF-2B	L34	L35	C	C3	D1	D
4305-4-4	1/4	7/16-20	2.26	1.90	0.44	0.56	0.16	0.17
4305-4-6	1/4	9/16-18	2.40	2.01	0.56	0.69	0.16	0.30
4305-6-6	3/8	9/16-18	2.49	2.10	0.56	0.69	0.28	0.30
4305-6-8	3/8	3/4-16	2.59	2.11	0.69	0.88	0.28	0.39
4305-8-6	1/2	9/16-18	2.62	2.23	0.75	0.69	0.38	0.30
4305-8-8	1/2	3/4-16	2.78	2.29	0.75	0.88	0.38	0.39
4305-8-10	1/2	7/8-14	2.92	2.43	0.81	1.00	0.38	0.48
4305-12-12	3/4	1 1/16-12	3.38	2.82	1.00	1.25	0.57	0.61
4305-16-16	1	1 5/16-12	4.12	3.53	1.25	1.50	0.78	0.84
4305-20-20*	1 1/4	1 5/8-12	3.26	2.63	1.63	2.00	1.08	1.08
4305-24-24*	1 1/2	1 7/8-12	3.63	2.91	2.00	2.25	1.31	1.31
4305-32-32*	2	2 1/2-12	4.14	3.19	2.50	2.88	1.66	1.66

6500 90 DEGREE SWIVEL ELBOW

SAE J514 070221
MS51521



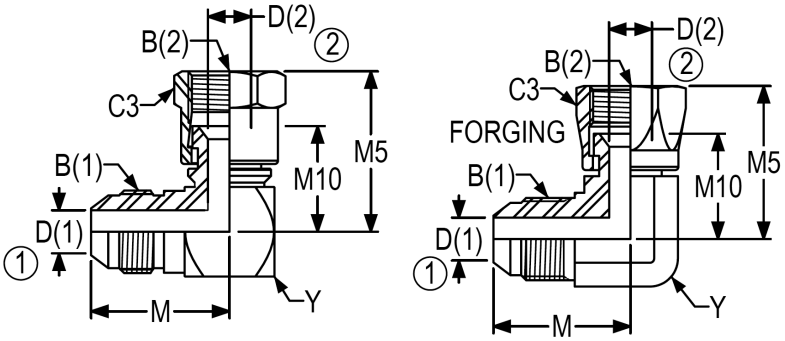


*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	M	M5	M10	C3	Y	D (1)	D (2)
6500-3-3-FG	3/16-3/16	3/8-24	3/8-24	0.83	0.96	0.64	0.56	0.44	0.13	0.13
6500-4-4	1/4-1/4	7/16-20	7/16-20	0.89	1.00	0.66	0.56	0.50	0.17	0.17
6500-4-4-FG	1/4-1/4	7/16-20	7/16-20	0.89	1.00	0.66	0.56	0.44	0.17	0.17
6500-4-6	1/4-3/8	7/16-20	9/16-18	0.95	1.25	0.88	0.69	0.63	0.17	0.30
6500-5-5	5/16-5/16	1/2-20	1/2-20	0.95	1.06	0.69	0.63	0.56	0.23	0.23
6500-5-5-FG	5/16-5/16	1/2-20	1/2-20	0.95	1.06	0.69	0.63	0.56	0.23	0.23
6500-5-6	5/16-3/8	1/2-20	9/16-18	0.95	1.22	0.84	0.69	0.56	0.23	0.30
6500-6-4	3/8-1/4	9/16-18	7/16-20	1.06	1.06	0.72	0.56	0.63	0.30	0.17
6500-6-5	3/8-5/16	9/16-18	1/2-20	1.06	1.09	0.72	0.63	0.63	0.30	0.23
6500-6-6	3/8-3/8	9/16-18	9/16-18	1.06	1.25	0.88	0.69	0.63	0.30	0.30
6500-6-6-FG	3/8-3/8	9/16-18	9/16-18	1.06	1.25	0.88	0.69	0.56	0.30	0.30
6500-6-8	3/8-1/2	9/16-18	3/4-16	1.16	1.38	0.96	0.88	0.81	0.30	0.39
6500-6-8-FG	3/8-1/2	9/16-18	3/4-16	1.14	1.38	0.96	0.88	0.75	0.30	0.39
6500-8-6	1/2-3/8	3/4-16	9/16-18	1.25	1.35	0.97	0.69	0.81	0.39	0.30
6500-8-6-FG	1/2-3/8	3/4-16	9/16-18	1.25	1.33	0.95	0.69	0.75	0.39	0.30
6500-8-8	1/2-1/2	3/4-16	3/4-16	1.25	1.38	0.96	0.88	0.81	0.39	0.39
6500-8-8-FG	1/2-1/2	3/4-16	3/4-16	1.25	1.38	0.96	0.88	0.75	0.39	0.39
6500-8-10	1/2-5/8	3/4-16	7/8-14	1.31	1.62	1.12	1.00	0.94	0.39	0.48
6500-8-10-FG	1/2-5/8	3/4-16	7/8-14	1.33	1.62	1.12	1.00	0.88	0.39	0.48
6500-8-12	1/2-3/4	3/4-16	1 1/16-12	1.41	1.75	1.19	1.25	1.13	0.39	0.61
6500-8-12-FG	1/2-3/4	3/4-16	1 1/16-12	1.42	1.75	1.19	1.25	1.06	0.39	0.85
6500-10-8	5/8-1/2	7/8-14	3/4-16	1.45	1.44	1.02	0.88	0.94	0.48	0.39
6500-10-8-FG	5/8-1/2	7/8-14	3/4-16	1.45	1.51	1.09	0.88	0.88	0.48	0.39
6500-10-10	5/8-5/8	7/8-14	7/8-14	1.45	1.62	1.12	1.00	0.94	0.48	0.48
6500-10-10-FG	5/8-5/8	7/8-14	7/8-14	1.45	1.62	1.12	1.00	0.88	0.48	0.48

6500 90 DEGREE SWIVEL ELBOW (Con't)

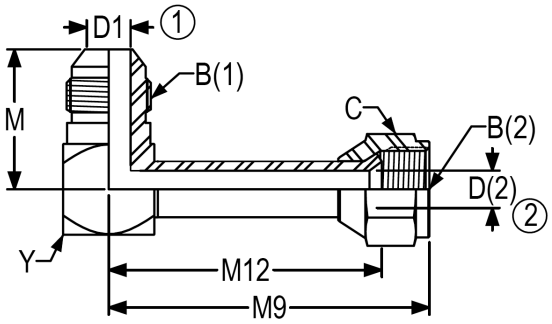
SAE J514 070221
MS51521



*Non forging parts are brazed construction

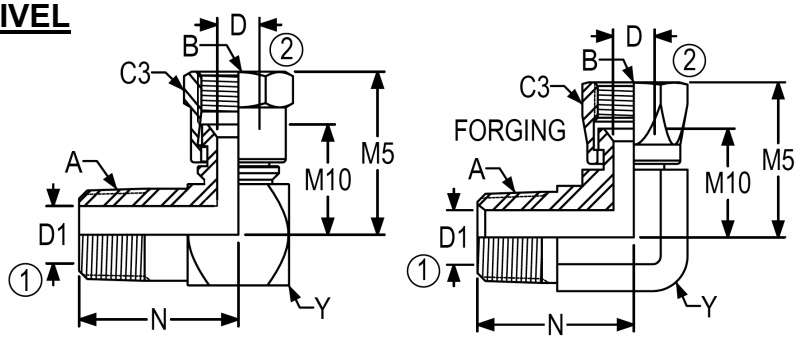
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	M	M5	M10	C3	Y	D (1)	D (2)
6500-10-12	5/8-3/4	7/8-14	1 1/16-12	1.55	1.75	1.19	1.25	1.13	0.48	0.61
6500-10-12-FG	5/8-3/4	7/8-14	1 1/16-12	1.54	1.75	1.19	1.25	1.06	0.48	0.61
6500-12-8	3/4-1/2	1 1/16-12	3/4-16	1.66	1.53	1.11	0.88	1.13	0.61	0.39
6500-12-10	3/4-5/8	1 1/16-12	7/8-14	1.66	1.71	1.21	1.00	1.13	0.61	0.48
6500-12-10-FG	3/4-5/8	1 1/16-12	7/8-14	1.66	1.69	1.19	1.00	1.06	0.61	0.48
6500-12-12	3/4-3/4	1 1/16-12	1 1/16-12	1.66	1.75	1.19	1.25	1.13	0.61	0.61
6500-12-12-FG	3/4-3/4	1 1/16-12	1 1/16-12	1.66	1.75	1.19	1.25	1.06	0.61	0.61
6500-12-16	3/4-1	1 1/16-12	1 5/16-12	1.78	2.00	1.41	1.50	1.38	0.61	0.84
6500-14-14	7/8-7/8	1 3/16-12	1 3/16-12	1.80	1.78	1.22	1.38	1.25	0.72	0.72
6500-14-14-FG	7/8-7/8	1 3/16-12	1 3/16-12	1.80	1.81	1.23	1.38	1.31	0.72	0.72
6500-16-12	1-3/4	1 5/16-12	1 1/16-12	1.81	1.88	1.31	1.25	1.38	0.84	0.61
6500-16-16	1-1	1 5/16-12	1 5/16-12	1.81	2.00	1.41	1.50	1.38	0.84	0.84
6500-16-16-FG	1-1	1 5/16-12	1 5/16-12	1.81	2.00	1.41	1.50	1.31	0.84	0.84
6500-16-20	1-1 1/4	1 5/16-12	1 5/8-12	2.00	2.31	1.68	2.00	1.75	0.84	1.08
6500-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.06	2.31	1.68	2.00	1.75	1.08	1.08
6500-20-20-FG	1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.06	2.31	1.69	2.00	1.62	1.08	1.08
6500-24-20	1 1/2-1 1/4	1 7/8-12	1 5/8-12	2.33	2.44	1.81	2.00	2.00	1.31	1.08
6500-24-24	1 1/2-1 1/2	1 7/8-12	1 7/8-12	2.33	2.59	1.86	2.25	2.00	1.31	1.31
6500-24-24-FG	1 1/2-1 1/2	1 7/8-12	1 7/8-12	2.33	2.59	1.86	2.25	1.88	1.31	1.31
6500-32-32	2-2	2 1/2-12	2 1/2-12	3.06	3.38	2.44	2.88	2.63	1.78	1.78
6500-32-32-FG	2-2	2 1/2-12	2 1/2-12	3.06	3.38	2.44	2.88	2.50	1.78	1.78

6500-L 90 DEGREE LONG SWIVEL ELBOW



PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	M	M9	M12	C	Y	D (1)	D (2)
6500-L-4-4	1/4	7/16-20	7/16-20	0.89	2.17	1.80	0.56	0.50	0.17	0.12
6500-L-6-6	3/8	9/16-18	9/16-18	1.06	2.54	2.18	0.69	0.63	0.30	0.25
6500-L-8-8	1/2	3/4-16	3/4-16	1.25	2.87	2.43	0.88	0.81	0.39	0.33
6500-L-10-10	5/8	7/8-14	7/8-14	1.45	3.03	2.57	1.00	0.94	0.48	0.46
6500-L-12-12	3/4	1 1/16-12	1 1/16-12	1.66	4.31	3.73	1.25	1.13	0.61	0.58
6500-L-16-16	1	1 5/16-12	1 5/16-12	1.81	4.94	4.33	1.50	1.38	0.84	0.81

6501 90 DEGREE MALE PIPE/SWIVEL ELBOW



*Non forging parts are brazed construction

PART NO	TUBE OD	A NPTF	B UN/UNF-2B	N	M5	M10	C3	Y	D1	D
6501-2-4	1/4	1/8-27	7/16-20	0.78	1.00	0.66	0.56	0.50	0.19	0.17
6501-2-4-FG	1/4	1/8-27	7/16-20	0.78	1.00	0.66	0.56	0.44	0.19	0.17
6501-2-5	5/16	1/8-27	1/2-20	0.78	1.03	0.66	0.63	0.50	0.19	0.23
6501-4-4	1/4	1/4-18	7/16-20	1.09	1.06	0.72	0.56	0.63	0.28	0.17
6501-4-4-FG	1/4	1/4-18	7/16-20	1.09	1.11	0.77	0.56	0.56	0.28	0.17
6501-4-5	5/16	1/4-18	1/2-20	1.09	1.09	0.72	0.63	0.63	0.28	0.23
6501-4-6	3/8	1/4-18	9/16-18	1.09	1.25	0.88	0.69	0.63	0.28	0.30
6501-6-6	3/8	3/8-18	9/16-18	1.22	1.34	0.97	0.69	0.81	0.41	0.30
6501-6-8	1/2	3/8-18	3/4-16	1.22	1.38	0.96	0.88	0.81	0.41	0.39
6501-8-6	3/8	1/2-14	9/16-18	1.47	1.41	1.03	0.69	0.94	0.53	0.30
6501-8-8	1/2	1/2-14	3/4-16	1.47	1.44	1.02	0.88	0.94	0.53	0.39
6501-8-10	5/8	1/2-14	7/8-14	1.47	1.62	1.12	1.00	0.94	0.53	0.48
6501-8-12	3/4	1/2-14	1 1/16-12	1.56	1.78	1.22	1.25	1.13	0.53	0.61
6501-12-8	1/2	3/4-14	3/4-16	1.59	1.54	1.11	0.88	1.13	0.72	0.39
6501-12-12	3/4	3/4-14	1 1/16-12	1.59	1.75	1.19	1.25	1.13	0.72	0.61
6501-12-14	7/8	3/4-14	1 3/16-12	1.59	1.74	1.16	1.38	1.13	0.72	0.72
6501-16-16	1	1 -11 1/2	1 5/16-12	1.97	2.00	1.41	1.50	1.38	0.94	0.84
6501-20-20	1 1/4	1 1/4-11 1/2	1 5/8-12	2.38	2.31	1.68	2.00	1.75	1.25	1.08
6501-24-24	1 1/2	1 1/2-11 1/2	1 7/8-14	2.64	2.59	1.86	2.25	2.00	1.50	1.31
6501-32-32-FG	2	2-11 1/2	2 1/2-12	2.44	3.94	3.00	2.88	2.50	1.94	1.78

6502 45 DEGREE SWIVEL ELBOW

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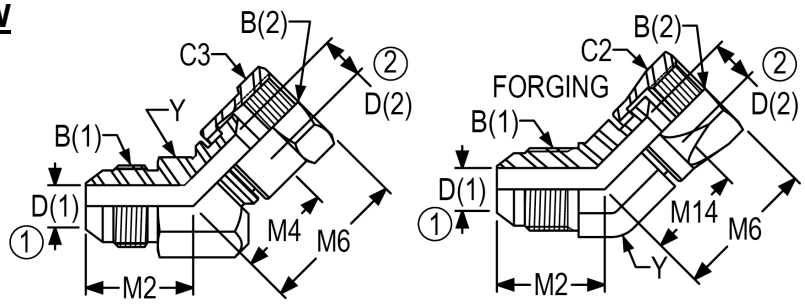
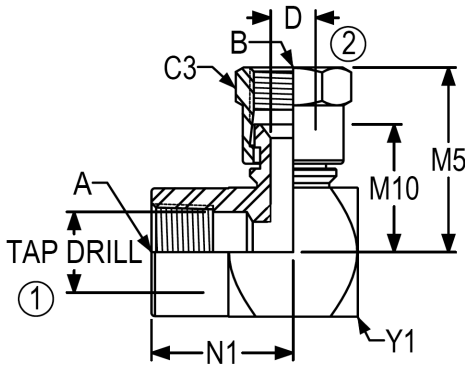
MS51522



*Non forging parts are brazed construction

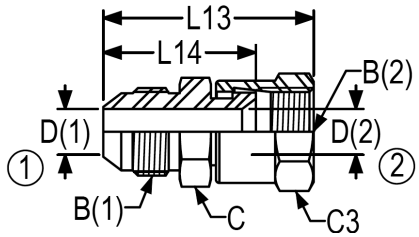
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	M2	M6	M14	C3	Y	D (1)	D (2)
6502-4-4	1/4-1/4	7/16-20	7/16-20	0.72	0.94	0.60	0.56	0.50	0.17	0.17
6502-4-4-FG	1/4-1/4	7/16-20	7/16-20	0.72	0.94	0.60	0.56	0.44	0.17	0.17
6502-5-5	5/16-5/16	1/2-20	1/2-20	0.77	1.00	0.63	0.63	0.56	0.23	0.23
6502-5-5-FG	5/16-5/16	1/2-20	1/2-20	0.77	1.00	0.63	0.63	0.56	0.23	0.23
6502-6-4	3/8-1/4	9/16-18	7/16-20	0.83	0.98	0.64	0.56	0.63	0.30	0.17
6502-6-6	3/8-3/8	9/16-18	9/16-18	0.83	1.12	0.75	0.69	0.63	0.30	0.30
6502-6-6-FG	3/8-3/8	9/16-18	9/16-18	0.83	1.12	0.75	0.69	0.56	0.30	0.30
6502-8-8	1/2-1/12	3/4-16	3/4-16	0.98	1.28	0.86	0.88	0.81	0.39	0.39
6502-8-8-FG	1/2-1/2	3/4-16	3/4-16	0.98	1.25	0.86	0.88	0.75	0.39	0.39
6502-10-8	5/8-1/2	7/8-14	3/4-16	1.11	1.23	0.81	0.88	0.94	0.48	0.39
6502-10-10	5/8-5/8	7/8-14	7/8-14	1.11	1.44	0.94	1.00	0.94	0.48	0.48
6502-10-10-FG	5/8-5/8	7/8-14	7/8-14	1.11	1.44	0.94	1.00	0.88	0.48	0.48
6502-12-12	3/4-3/4	1 1/16-12	1 1/16-12	1.28	1.50	0.94	1.25	1.13	0.61	0.61
6502-12-12-FG	3/4-3/4	1 1/16-12	1 1/16-12	1.28	1.50	0.94	1.25	1.06	0.61	0.61
6502-14-12	7/8-3/4	1 3/16-12	1 1/16-12	1.39	1.59	1.03	1.25	1.25	0.72	0.61
6502-14-14	7/8-7/8	1 3/16-12	1 3/16-12	1.39	1.59	1.01	1.38	1.25	0.72	0.72
6502-16-16	1-1	1 5/16-12	1 5/16-12	1.47	1.75	1.16	1.50	1.38	0.84	0.84
6502-16-16-FG	1-1	1 5/16-12	1 5/16-12	1.47	1.75	1.16	1.50	1.31	0.84	0.84
6502-16-20	1-1 1/4	1 5/16-12	1 5/8-12	1.54	2.03	1.40	2.00	1.75	0.84	1.08
6502-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1.59	1.96	1.34	2.00	1.75	1.08	1.08
6502-20-20-FG	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1.59	2.03	1.40	2.00	1.63	1.08	1.08
6502-20-32	1 1/4-2	1 5/8-12	2 1/2-12	1.84	2.71	1.77	2.88	2.63	1.08	1.78
6502-24-24	1 1/2-1 1/2	1 7/8-14	1 7/8-14	1.78	2.25	1.52	2.25	2.00	1.31	1.31
6502-24-24-FG	1 1/2-1 1/2	1 7/8-12	1 7/8-12	1.78	2.25	1.52	2.25	1.88	1.31	1.31
6502-32-32	2-2	2 1/2-12	2 1/2-12	2.22	2.91	1.97	2.88	2.63	1.78	1.78
6502-32-32-FG	2-2	2 1/2-12	2 1/2-12	2.22	2.91	1.97	2.88	2.50	1.78	1.78

6503 90 DEGREE FEMALE PIPE/SWIVEL ELBOW



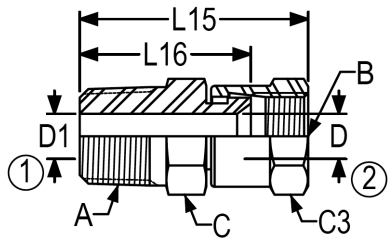
PART NO	TUBE OD	A NPTF	B UN/UNF-2B	N1	M5	M10	C3	Y1	TAP DRILL	D
6503-2-4	1/4	1/8-27	7/16-20	0.66	1.06	0.72	0.56	0.63	0.33	0.17
6503-4-4	1/4	1/4-18	7/16-20	0.88	1.13	0.78	0.56	0.75	0.43	0.17
6503-4-6	3/8	1/4-18	9/16-18	0.88	1.31	0.94	0.69	0.75	0.43	0.30
6503-6-6	3/8	3/8-18	9/16-18	1.02	1.38	1.00	0.69	0.88	0.57	0.30
6503-6-8	1/2	3/8-18	3/4-16	1.02	1.41	0.99	0.88	0.88	0.57	0.39
6503-8-6	3/8	1/2-14	9/16-18	1.23	1.50	1.13	0.69	1.13	0.70	0.30
6503-8-8	1/2	1/2-14	3/4-16	1.23	1.53	1.11	0.88	1.13	0.70	0.39
6503-8-10	5/8	1/2-14	7/8-14	1.23	1.71	1.21	1.00	1.13	0.70	0.48
6503-12-12	3/4	3/4-14	1 1/16-12	1.36	1.88	1.31	1.25	1.38	0.91	0.61
6503-16-16	1	1-11 1/2	1 5/16-12	1.62	2.15	1.56	1.50	1.63	1.14	0.84

6504 TUBE/SWIVEL UNION



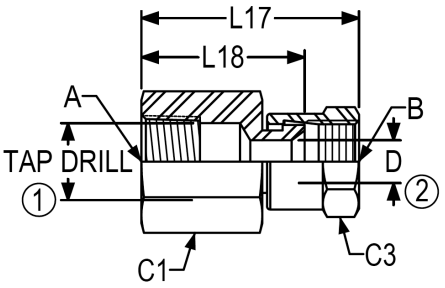
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	L13	L14	C	C3	D (1)	D (2)
6504-4-4	1/4-1/4	7/16-20	7/16-20	1.42	1.08	0.50	0.56	0.17	0.17
6504-5-5	5/16-5/16	1/2-20	1/2-20	1.48	1.10	0.56	0.63	0.23	0.23
6504-6-6	3/8-3/8	9/16-18	9/16-18	1.60	1.23	0.63	0.69	0.30	0.30
6504-8-8	1/2-1/2	3/4-16	3/4-16	1.73	1.31	0.81	0.88	0.39	0.39
6504-10-10	5/8-5/8	7/8-14	7/8-14	2.16	1.66	0.94	1.00	0.48	0.48
6504-12-10	3/4-5/8	1 1/16-12	7/8-14	2.24	1.74	1.13	1.00	0.61	0.48
6504-12-12	3/4-3/4	1 1/16-12	1 1/16-12	2.33	1.77	1.13	1.25	0.61	0.61
6504-12-14	3/4-7/8	1 1/16-12	1 3/16-12	2.31	1.74	1.38	1.38	0.61	0.72
6504-16-16	1-1	1 5/16-12	1 5/16-12	2.48	1.89	1.38	1.50	0.84	0.84
6504-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.69	2.07	1.69	2.00	1.08	1.08
6504-24-24	1 1/2-1 1/2	1 7/8-12	1 7/8-12	3.09	2.36	2.00	2.25	1.38	1.31
6504-32-32	2-2	2 1/2-12	2 1/2-12	3.46	2.70	2.75	2.88	1.78	1.78

6505 MALE PIPE/SWIVEL CONNECTOR



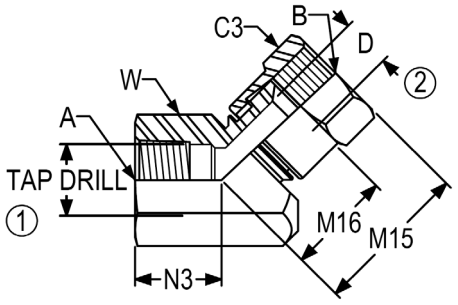
PART NO	TUBE OD	A NPTF	B UN/UNF-2B	L15	L16	C	C3	D1	D
6505-2-4	1/4	1/8-27	7/16-20	1.34	1.00	0.44	0.56	-----	0.17
6505-4-4	1/4	1/4-18	7/16-20	1.53	1.19	0.56	0.56	-----	0.17
6505-4-5	5/16	1/4-18	1/2-20	1.63	1.26	0.56	0.63	-----	0.23
6505-4-6	3/8	1/4-18	9/16-18	1.72	1.34	0.56	0.69	0.28	0.30
6505-6-6	3/8	3/8-18	9/16-18	1.72	1.34	0.75	0.69	-----	0.30
6505-6-8	1/2	3/8-18	3/4-16	1.73	1.31	0.81	0.88	-----	0.39
6505-6-10	5/8	3/8-18	7/8-14	1.91	1.41	0.88	1.00	0.41	0.48
6805-8-6	3/8	1/2-14	9/16-18	1.86	1.48	0.88	0.69	0.53	0.30
6505-8-8	1/2	1/2-14	3/4-16	1.90	1.48	0.88	0.88	-----	0.39
6505-8-10	5/8	1/2-14	7/8-14	2.28	1.78	0.94	1.00	-----	0.48
6505-8-12	3/4	1/2-14	1 1/16-12	2.26	1.70	1.13	1.25	0.53	0.61
6505-12-12	3/4	3/4-14	1 1/16-12	2.26	1.70	1.13	1.25	-----	0.61
6505-16-16	1	1-11 1/2	1 5/16-12	2.56	1.97	1.38	1.50	-----	0.84
6505-20-20	1 1/4	1 1/4-11 1/2	1 5/8-12	2.66	2.03	1.69	2.00	-----	1.08
6505-24-24	1 1/2	1 1/2-11 1/2	1 7/8-12	2.94	2.21	2.00	2.25	-----	1.31
6505-32-32	2	2-11 1/2	2 1/2-12	3.59	2.65	2.50	2.88	-----	1.78

6506 FEMALE PIPE/SWIVEL CONNECTOR



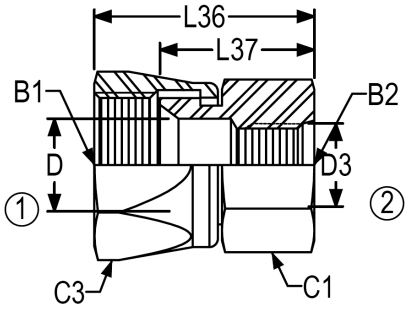
PART NO	TUBE OD	A NPTF	B UN/UNF-2B	L17	L18	C1	C3	TAP DRILL	D
6506-2-4	1/4	1/8-27	7/16-20	1.19	0.85	0.56	0.56	0.33	0.17
6506-4-4	1/4	1/4-18	7/16-20	1.44	1.09	0.75	0.56	0.43	0.17
6506-4-6	3/8	1/4-18	9/16-18	1.50	1.13	0.75	0.69	0.43	0.30
6506-4-8	1/2	1/4-18	3/4-16	1.60	1.18	0.88	0.88	0.43	0.39
6506-6-6	3/8	3/8-18	9/16-18	1.63	1.25	0.88	0.69	0.57	0.30
6506-6-8	1/2	3/8-18	3/4-16	1.61	1.19	0.88	0.88	0.57	0.39
6506-8-6	3/8	1/2-14	9/16-18	1.87	1.49	1.13	0.69	0.70	0.30
6506-8-8	1/2	1/2-14	3/4-16	1.91	1.49	1.13	0.88	0.70	0.39
6506-8-10	5/8	1/2-14	7/8-14	2.08	1.58	1.13	1.00	0.70	0.48
6506-8-12	3/4	1/2-14	1 1/16-12	2.08	1.51	1.13	1.25	0.70	0.61
6506-8-16	1	1/2-14	1 5/16-12	2.19	1.60	1.38	1.50	0.70	1.10
6506-12-10	5/8	3/4-14	7/8-14	2.11	1.62	1.38	1.00	0.91	0.48
6506-12-12	3/4	3/4-14	1 1/16-12	2.13	1.57	1.38	1.25	0.91	0.61
6506-12-14	7/8	3/4-14	1 3/16-12	2.09	1.51	1.38	1.38	0.91	0.72
6506-12-16	1	3/4-14	1 5/16-12	2.20	1.61	1.38	1.50	0.91	0.84
6506-16-16	1	1-11 1/2	1 5/16-12	2.63	2.03	1.63	1.50	1.14	0.84
6506-20-20	1 1/4	1 1/4-11 1/2	1 5/8-12	2.76	2.13	2.00	2.00	1.48	1.08
6506-24-24	1 1/2	1 1/2-11 1/2	1 7/8-12	2.98	2.25	2.38	2.25	1.72	1.31

6507 45 DEGREE FEMALE PIPE/SWIVEL ELBOW



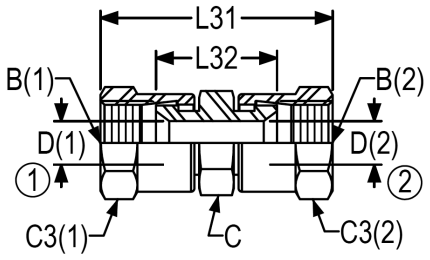
PART NO	TUBE OD	A NPTF	B UN/UNF-2B	N3	M15	M16	C3	W	TAP DRILL	D
6507-4-4	1/4	1/4-18	7/16-20	0.62	1.03	0.69	0.56	0.75	0.43	0.17
6507-4-6	3/8	1/4-18	9/16-18	0.62	1.21	0.83	0.69	0.75	0.43	0.30
6507-8-6	3/8	1/2-14	9/16-18	0.91	1.43	1.05	0.69	1.13	0.70	0.30
6507-8-10	5/8	1/2-14	7/8-14	0.91	1.48	0.98	1.00	1.13	0.70	0.48

6509 SWIVEL/ FEMALE STRAIGHT THREAD CONNECTOR



PART NO	B (1) UN/UNF-2B	B (2) UN/UNF-2B	L36	L37	C1	C3	D	D3
6509-16-8	3/4-16	1 5/16-12	2.00	1.40	1.38	1.50	0.84	0.813
6509-24-20	1 5/8-12	1 7/8-12	2.86	2.13	2.00	2.25	1.72	1.312

6565 DOUBLE SWIVEL UNION



PART NO	TUBE OD	B(1) UN/UNF-2B	B(2) UN/UNF-2B	L31	L32	C	C3 (1)	C3 (2)	D (1)	D (2)
6565-4-4	1/4-1/4	7/16-20	7/16-20	1.51	0.83	0.43	0.56	0.56	0.17	0.17
6565-6-6	3/8-3/8	9/16-18	9/16-18	1.78	1.03	0.56	0.69	0.69	0.29	0.29
6565-8-8	1/2-1/2	3/4-16	3/4-16	1.92	1.08	0.81	0.88	0.88	0.39	0.39
6565-10-10	5/8-5/8	7/8-14	7/8-14	2.40	1.40	0.87	0.94	0.94	0.48	0.48
6565-12-12	3/4-3/4	1 1/16-12	1 1/16-12	2.54	1.42	1.12	1.25	1.25	0.60	0.60
6565-16-16	1-1	1 5/16-12	1 5/16-12	2.72	1.54	1.37	1.50	1.50	0.84	0.84
6565-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.89	1.64	1.68	2.00	2.00	1.07	1.07

6600 SWIVEL BRANCH TEE

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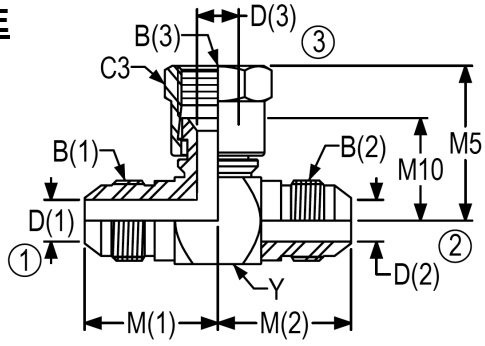

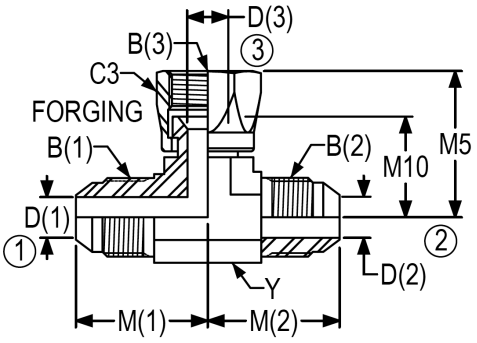

*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2B	M (1)	M (2)	M5	M10
6600-4-4-4	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	0.89	0.89	1.00	0.66
6600-4-4-4-FG	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	0.89	0.89	1.00	0.66
6600-5-5-5	5/16-5/16-5/16	1/2-20	1/2-20	1/2-20	0.95	0.95	1.06	0.69
6600-5-5-5-FG	5/16-5/16-5/16	1/2-20	1/2-20	1/2-20	0.95	0.95	1.06	0.69
6600-6-6-6	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.06	1.25	0.88
6600-6-6-6-FG	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.06	1.25	0.88
6600-6-6-8	3/8-3/8-1/2	9/16-18	9/16-18	3/4-16	1.16	1.16	1.38	0.96
6600-8-8-8	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.25	1.25	1.38	0.96
6600-8-8-10	1/2-1/2-5/8	3/4-16	3/4-16	7/8-14	1.31	1.31	1.62	1.12
6600-8-8-12	1/2-1/2-3/4	3/4-16	3/4-16	1 1/16-12	1.40	1.40	1.75	1.19
66008-8-8-16	1/2-1/2-1	3/4-16	3/4-16	1 5/16-12	1.53	1.53	2.02	1.43
6600-10-8-10	5/8-1/2-5/8	7/8-14	3/4-16	7/8-14	1.45	1.31	1.62	1.12
6600-10-10-10	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.45	1.45	1.62	1.12
6600-10-10-10-FG	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.45	1.45	1.62	1.12
6600-12-12-10	3/4-3/4-5/8	1 1/16-12	1 1/16-12	7/8-14	1.66	1.66	1.71	1.21
6600-12-12-12	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.66	1.66	1.75	1.19
6600-12-12-12-FG	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.66	1.66	1.75	1.19
6600-12-12-16	3/4-3/4-1	1 1/16-12	1 1/16-12	1 5/16-12	1.78	1.78	2.02	1.43
6600-14-14-14	7/8-7/8-7/8	1 3/16-12	1 3/16-12	1 3/16-12	1.80	1.80	1.78	1.22
6600-16-12-12	1-3/4-3/4	1 5/16-12	1 1/16-12	1 1/16-12	1.81	1.78	1.88	1.31
6600-16-12-16	1-3/4-1	1 5/16-12	1 1/16-12	1 5/16-12	1.81	1.78	2.00	1.41
6600-16-16-8	1-1-1/2	1 5/16-12	1 5/16-12	3/4-16	1.81	1.81	1.66	1.24
6600-16-16-16	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	1.81	2.00	1.41
6600-16-16-16-FG	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	1.81	2.00	1.41
6600-20-12-16	1 1/4-3/4-1	1 5/8-12	1 1/16-12	1 5/16-12	2.06	1.97	2.21	1.62
6600-20-20-20	1 1/4-1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.06	2.06	2.31	1.68
6600-20-20-20-FG	1 1/4-1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.06	2.06	2.31	1.69
6600-24-24-24	1 1/2-1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 7/8-12	2.33	2.33	2.59	1.86
6600-24-24-24-FG	1 1/2-1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 7/8-12	2.33	2.33	2.59	1.86
6600-32-32-32	2-2-2	2 1/2-12	2 1/2-12	2 1/2-12	3.06	3.06	3.38	2.44
6600-32-32-32-FG	2-2-2	2 1/2-12	2 1/2-12	2 1/2-12	3.06	3.06	3.38	2.44

6600 SWIVEL BRANCH TEE (Con't)

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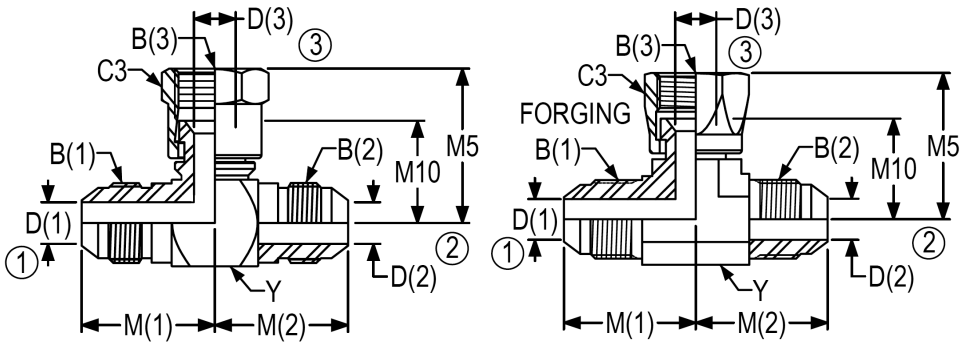

*Non forging parts are brazed construction

PART NO	C3	Y	D (1)	D (2)	D (3)
6600-4-4-4	0.56	0.50	0.17	0.17	0.17
6600-4-4-4-FG	0.56	0.44	0.17	0.17	0.17
6600-5-5-5	0.63	0.56	0.23	0.23	0.23
6600-5-5-5-FG	0.63	0.56	0.23	0.23	0.23
6600-6-6-6	0.69	0.63	0.30	0.30	0.30
6600-6-6-6-FG	0.69	0.56	0.30	0.30	0.30
6600-6-6-8	0.88	0.81	0.30	0.30	0.39
6600-8-8-8	0.88	0.81	0.39	0.39	0.39
6600-8-8-8-FG	0.88	0.75	0.39	0.39	0.39
6600-8-8-10	1.00	0.94	0.39	0.39	0.48
6600-8-8-12	1.25	1.13	0.39	0.39	0.61
66008-8-8-16	1.50	1.38	0.39	0.39	0.84
6600-10-8-10	1.00	0.94	0.48	0.39	0.48
6600-10-10-10	1.00	0.94	0.48	0.48	0.48
6600-10-10-10-FG	1.00	0.88	.0.48	0.48	0.48
6600-12-12-10	1.00	1.13	0.61	0.61	0.48
6600-12-12-12	1.25	1.13	0.61	0.61	0.61
6600-12-12-12-FG	1.25	1.06	0.61	0.61	0.61
6600-12-12-16	1.50	1.38	0.61	0.61	0.84
6600-14-14-14	1.38	1.25	0.72	0.72	0.72
6600-16-12-12	1.25	1.38	0.84	0.61	0.61
6600-16-12-16	1.50	1.38	0.84	0.61	0.84
6600-16-16-8	0.88	1.38	0.84	0.84	0.39
6600-16-16-16	1.50	1.38	0.84	0.84	0.84
6600-16-16-16-FG	1.50	1.31	0.84	0.84	0.84
6600-20-12-16	1.50	1.75	1.08	0.61	0.84
6600-20-20-20	2.00	1.75	1.08	1.08	1.08
6600-20-20-20-FG	2.00	1.63	1.08	1.08	1.08
6600-24-24-24	2.25	2.00	1.31	1.31	1.31
6600-24-24-24-FG	2.25	1.88	1.31	1.31	1.31
6600-32-32-32	2.88	2.50	1.78	1.78	1.78
6600-32-32-32-FG	2.88	2.50	1.78	1.78	1.78

6602 SWIVEL RUN TEE

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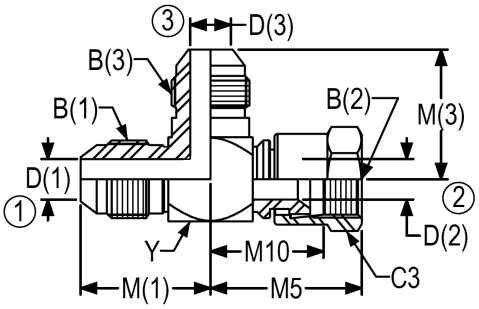

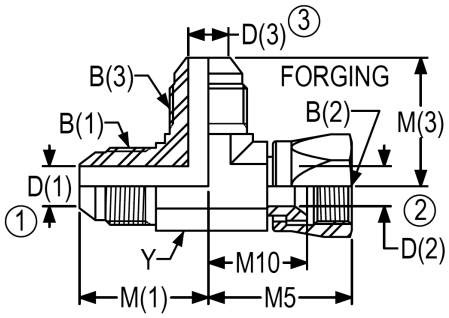

*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	B (3) UN/UNF-2A	M (1)	M5	M10	M (3)
6602-4-4-4	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	0.89	1.00	0.66	0.89
6602-4-4-4-FG	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	0.89	1.00	0.66	0.89
6602-4-4-6	1/4-1/4-3/8	7/16-20	7/16-20	9/16-18	0.95	1.06	0.72	1.06
6602-4-6-4	1/4-3/8-1/4	7/16-20	9/16-18	7/16-20	0.95	1.25	0.88	0.95
6602-4-20-20	1/4-1 1/4-1 1/4	7/16-20	1 5/8-12	1 5/8-12	1.51	2.31	1.68	2.06
6602-5-5-5	5/16-5/16-5/16	1/2-20	1/2-20	1/2-20	0.95	1.06	0.69	0.95
6602-5-5-5-FG	5/16-5/16-5/16	1/2-20	1/2-20	1/2-20	0.95	1.06	0.69	0.95
6602-6-6-4	3/8-3/8-1/4	9/16-18	9/16-18	7/16-20	1.06	1.25	0.88	0.95
6602-6-6-6	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.25	0.88	1.06
6602-6-6-6-FG	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.25	0.88	1.06
6602-6-6-8-FG	3/8-3/8-1/2	9/16-18	9/16-18	3/4-16	1.22	1.33	0.95	1.22
6602-6-8-8	3/8-1/2-1/2	9/16-18	3/4-16	3/4-16	1.16	1.38	0.96	1.25
6602-8-8-4	1/2-1/2-1/4	3/4-16	3/4-16	7/16-20	1.25	1.38	0.96	1.05
6602-8-8-6	1/2-1/2-3/8	3/4-16	3/4-16	9/16-18	1.25	1.38	0.96	1.15
6602-8-8-6-FG	1/2-1/2-3/8	3/4-16	3/4-16	9/16-18	1.25	1.38	0.96	1.14

PART NO	C3	Y	D (1)	D (2)	D (3)
6602-4-4-4	0.56	0.50	0.17	0.17	0.17
6602-4-4-4-FG	0.56	0.44	0.17	0.17	0.17
6602-4-4-6	0.56	0.63	0.17	0.17	0.30
6602-4-6-4	0.69	0.63	0.17	0.30	0.17
6602-4-20-20	2.00	1.75	0.17	1.08	1.08
6602-5-5-5	0.63	0.56	0.23	0.23	0.23
6602-5-5-5-FG	0.63	0.56	0.23	0.23	0.23
6602-6-6-4	0.69	0.63	0.30	0.30	0.17
6602-6-6-6	0.69	0.63	0.30	0.30	0.30
6602-6-6-6-FG	0.69	0.56	0.30	0.30	0.30
6602-6-6-8-FG	0.69	0.75	0.32	0.30	0.39
6602-6-8-8	0.39	0.81	0.30	0.39	0.39
6602-8-8-4	0.88	0.81	0.39	0.39	0.17
6602-8-8-6	0.88	0.81	0.39	0.39	0.30
6602-8-8-6-FG	0.88	0.75	0.43	0.39	0.30

6602 SWIVEL RUN TEE (Con't)

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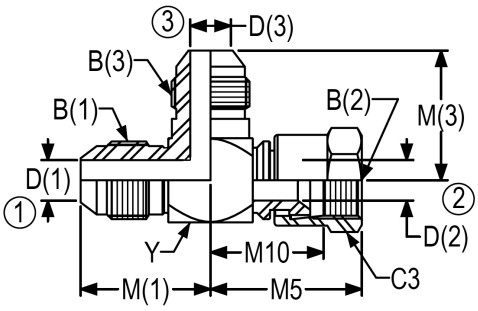
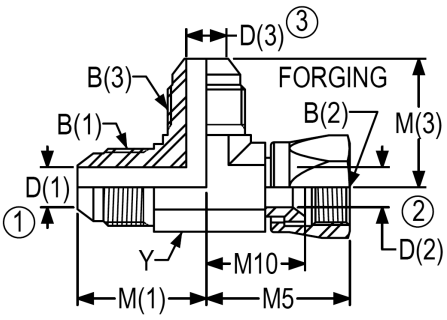




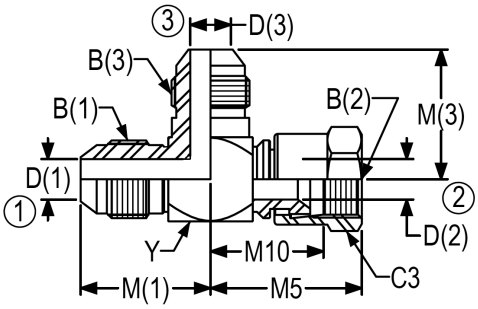
*Non forging parts are brazed construction

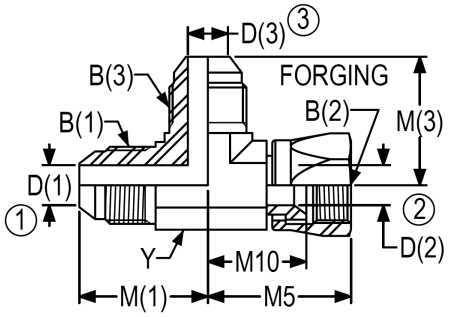
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	B (3) UN/UNF-2A	M (1)	M5	M10	M (3)
6602-8-8-8	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.25	1.38	0.96	1.25
6602-8-8-8-FG	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.25	1.38	0.96	1.25
6602-8-8-12	1/2-1/2-3/4	3/4-16	3/4-16	1 1/16-12	1.41	1.54	1.11	1.66
6602-8-12-8	1/2-3/4-1/2	3/4-16	1 1/16-12	3/4-16	1.40	1.75	1.19	1.40
6602-8-12-12	1/2-3/4-3/4	3/4-16	1 1/16-12	1 1/16-12	1.41	1.75	1.19	1.66
6602-10-8-8	5/8-1/2-1/2	7/8-14	3/4-16	3/4-16	1.45	1.44	1.02	1.31
6602-10-8-10	5/8-1/2-5/8	7/8-14	3/4-16	7/8-14	1.45	1.44	1.02	1.45
6602-10-8-10-FG	5/8-1/2-5/8	7/8-14	3/4-16	7/8-14	1.45	1.38	0.96	1.45
6602-10-10-4	5/8-5/8-1/4	7/8-14	7/8-14	7/16-20	1.45	1.62	1.12	1.11
6602-10-10-6	5/8-5/8-3/8	7/8-14	7/8-14	9/16-18	1.45	1.62	1.12	1.22
6602-10-10-6-FG	5/8-5/8-3/8	7/8-14	7/8-14	9/16-18	1.45	1.62	1.12	1.22
6602-10-10-8	5/8-5/8-1/2	7/8-14	7/8-14	3/4-16	1.45	1.62	1.12	1.31
6602-10-10-10	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.45	1.62	1.12	1.45
6602-10-10-10-FG	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.45	1.62	1.12	1.45
6602-10-10-12	5/8-5/8-3/4	7/8-14	7/8-14	1 1/16-12	1.55	1.71	1.21	1.66

PART NO	C3	Y	D (1)	D (2)	D (3)
6602-8-8-8	0.88	0.81	0.39	0.39	0.39
6602-8-8-8-FG	0.88	0.75	0.39	0.39	0.39
6602-8-8-12	0.88	1.13	0.39	0.39	0.61
6602-8-12-8	1.25	1.13	0.39	0.61	0.39
6602-8-12-12	1.25	1.13	0.39	0.61	0.61
6602-10-8-8	0.88	0.94	0.48	0.39	0.39
6602-10-8-10	0.88	0.94	0.48	0.39	0.48
6602-10-8-10-FG	0.88	0.88	0.48	0.39	0.48
6602-10-10-4	1.00	0.94	0.48	0.48	0.17
6602-10-10-6	1.00	0.94	0.48	0.48	0.30
6602-10-10-6-FG	1.00	0.88	0.48	0.48	0.30
6602-10-10-8	1.00	0.94	0.48	0.48	0.39
6602-10-10-10	1.00	0.94	0.48	0.48	0.48
6602-10-10-10-FG	1.00	0.88	0.48	0.48	0.48
6602-10-10-12	1.00	1.13	0.48	0.48	0.61

6602 SWIVEL RUN TEE (Con't)

SAE J514 070432
MS51523





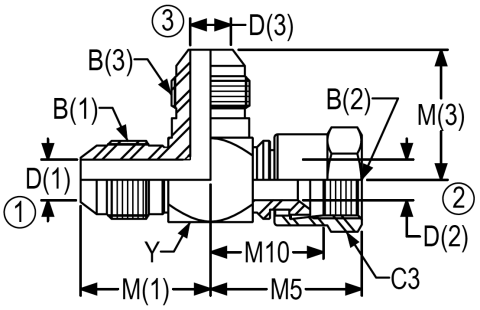
*Non forging parts are brazed construction

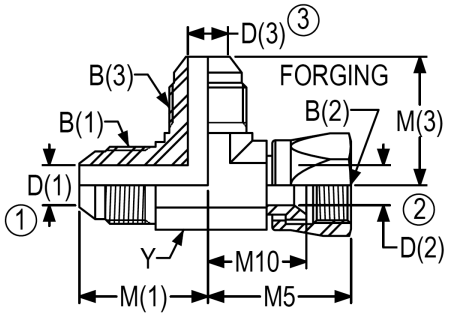
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	B (3) UN/UNF-2A	M (1)	M5	M10	M (3)
6602-10-12-10	5/8-3/4-5/8	7/8-14	1 1/16-12	7/8-14	1.55	1.75	1.19	1.55
6602-12-8-8	3/4-1/2-1/2	1 1/16-12	3/4-16	3/4-16	1.66	1.54	1.11	1.41
6602-12-12-4	3/4-3/4-1/4	1 1/16-12	1 1/16-12	7/16-20	1.66	1.75	1.19	1.20
6602-12-12-5	3/4-3/4-5/16	1 1/16-12	1 1/16-12	1/2-20	1.66	1.75	1.19	1.23
6602-12-12-8	3/4-3/4-1/2	1 1/16-12	1 1/16-12	3/4-16	1.66	1.75	1.19	1.41
6602-12-12-10	3/4-3/4-5/8	1 1/16-12	1 1/16-12	7/8-14	1.66	1.75	1.19	1.55
6602-12-12-12	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.66	1.75	1.19	1.66
6602-12-12-12-FG	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.66	1.75	1.19	1.66
6602-12-12-16	3/4-3/4-1	1 1/16-12	1 1/16-12	1 5/16-12	1.78	1.88	1.31	1.81
6602-12-16-12-FG	3/4-1-3/4	1 1/16-12	1 5/16-12	1 1/16-12	1.76	2.00	1.41	1.76
6602-12-16-12	3/4-1-3/4	1 1/16-12	1 5/16-12	1 1/16-12	1.78	2.00	1.41	1.78
6602-14-14-14	7/8-7/8-7/8	1 3/16-12	1 3/16-12	1 3/16-12	1.80	1.78	1.22	1.80
6602-16-10-6	1-5/8-3/8	1 5/16-18	7/8-14	9/16-18	1.81	1.83	1.33	1.44
6602-16-12-12	1-3/4-3/4	1 5/16-12	1 1/16-12	1 1/16-12	1.81	1.88	1.31	1.78
6602-16-16-4	1-1-1/4	1 5/16-12	1 5/16-12	7/16-20	1.81	2.00	1.41	1.33

PART NO	C3	Y	D (1)	D (2)	D (3)
6602-10-12-10	1.25	1.13	0.48	0.61	0.48
6602-12-8-8	0.88	1.13	0.61	0.39	0.39
6602-12-12-4	1.25	1.13	0.61	0.61	0.17
6602-12-12-5	1.25	1.13	0.61	0.61	0.23
6602-12-12-8	1.25	1.13	0.61	0.61	0.39
6602-12-12-10	1.25	1.13	0.61	0.61	0.48
6602-12-12-12	1.25	1.13	0.61	0.61	0.61
6602-12-12-12-FG	1.25	1.06	0.61	0.61	0.61
6602-12-12-16	1.25	1.38	0.61	0.61	0.84
6602-12-16-12	1.50	1.38	0.61	0.84	0.61
6602-12-16-12-FG	1.50	1.31	0.61	0.84	0.61
6602-14-14-14	1.38	1.25	0.72	0.72	0.72
6602-16-10-6	1.00	1.38	0.84	0.48	0.30
6602-16-12-12	1.25	1.38	0.84	0.61	0.61
6602-16-16-4	1.50	1.38	0.84	0.84	0.17

6602 SWIVEL RUN TEE (Con't)

SAE J514 070432
MS51523



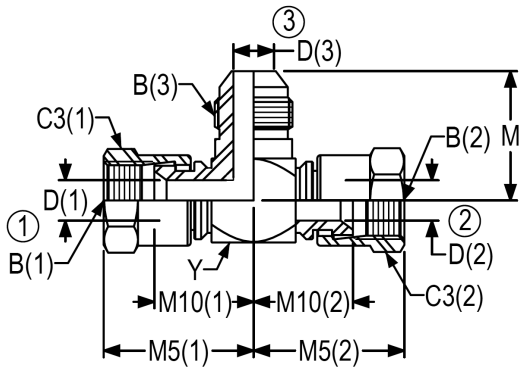


*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	B (3) UN/UNF-2A	M (1)	M5	M10	M (3)
6602-16-16-8	1-1-1/2	1 5/16-12	1 5/16-12	3/4-16	1.81	1.86	1.44	1.53
6602-16-16-10	1-1-5/8	1 5/16-12	1 5/16-12	7/8-14	1.81	2.00	1.41	1.67
6602-16-16-10-FG	1-1-5/8	1 5/16-12	1 5/16-12	7/8-14	1.82	2.04	1.44	1.64
6602-16-16-12	1-1-3/4	1 5/16-12	1 5/16-12	1 1/16-12	1.81	2.00	1.41	1.78
6602-16-16-16	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	2.00	1.41	1.81
6602-16-16-16-FG	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	2.00	1.41	1.81
6602-20-20-12	1 1/4-1 1/4-3/4	1 5/8-12	1 5/8-12	1 1/16-12	2.06	2.31	1.68	1.97
6602-20-20-20	1 1/4-1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.06	2.31	1.68	2.06
6602-24-24-24	1 1/2-1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 7/8-12	2.33	2.59	1.86	2.33
6602-24-24-24-FG	1 1/2-1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 7/8-12	2.30	2.59	1.86	2.33
6602-32-32-32	2-2-2	2 1/2-12	2 1/2-12	2 1/2-12	3.06	3.38	2.44	3.06
6602-32-32-32-FG	2-2-2	2 1/2-12	2 1/2-12	2 1/2-12	3.06	3.38	2.44	3.06

PART NO	C3	Y	D (1)	D (2)	D (3)
6602-16-16-8	0.88	1.38	0.84	0.84	0.39
6602-16-16-10	1.50	1.38	0.84	0.84	0.48
6602-16-16-10-FG	1.50	1.31	0.84	0.84	0.48
6602-16-16-12	1.50	1.38	0.84	0.84	0.61
6602-16-16-16	1.50	1.38	0.84	0.84	0.84
6602-16-16-16-FG	1.50	1.31	0.84	0.84	0.84
6602-20-20-12	2.00	1.75	1.08	1.08	0.61
6602-20-20-20	2.00	1.75	1.08	1.08	1.08
6602-24-24-24	2.25	2.00	1.31	1.31	1.31
6602-24-24-24-FG	2.25	1.85	1.31	1.31	1.31
6602-32-32-32	2.88	2.50	1.78	1.78	1.78
6602-32-32-32-FG	2.88	2.50	1.78	1.78	1.78

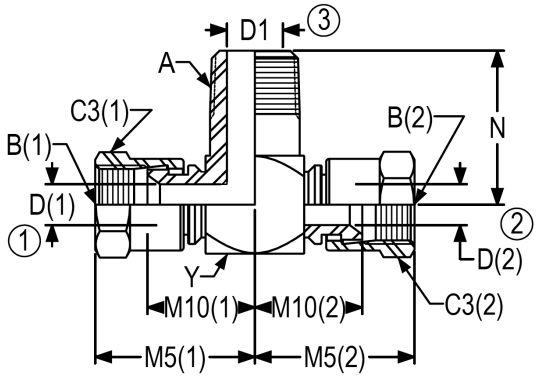
6603 SWIVEL RUN/RUN TEE



PART NO	TUBE OD	B (1) UN/UNF-2B	B (2) UN/UNF-2B	B (3) UN/UNF-2A	M5 (1)	M10 (1)	M5 (2)	M10 (2)
6603-4-4-4	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	1.00	0.66	1.00	0.66
6603-6-6-6	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.25	0.88	1.25	0.88
6603-8-8-8	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.38	0.96	1.38	0.96
6603-10-10-10	5/8-5/8-5/8	7/8-14	7/8-14	7/8-14	1.62	1.12	1.62	1.12
6603-12-12-12	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.75	1.19	1.75	1.19
6603-16-16-16	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	2.00	1.41	2.00	1.41
6603-20-20-20	1 1/4-1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.31	1.69	2.31	1.69

PART NO	M	C3 (1)	C3 (2)	Y	D (1)	D (2)	D (3)
6603-4-4-4	0.89	0.56	0.56	0.50	0.17	0.17	0.17
6603-6-6-6	1.06	0.69	0.69	0.63	0.30	0.30	0.30
6603-8-8-8	1.25	0.88	0.88	0.81	0.39	0.39	0.39
6603-10-10-10	1.45	1.00	1.00	0.94	0.48	0.48	0.48
6603-12-12-12	1.66	1.25	1.25	1.13	0.61	0.61	0.61
6603-16-16-16	1.81	1.50	1.50	1.38	0.84	0.84	0.84
6603-20-20-20	2.06	2.00	2.00	1.75	1.08	1.08	1.08

6604 MALE PIPE/SWIVEL RUN/RUN TEE

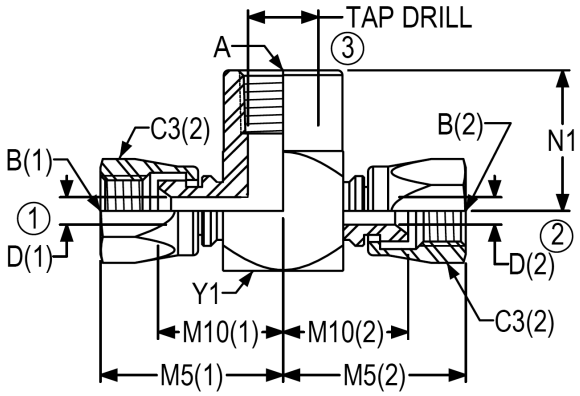


PART NO	TUBE OD	B (1) UN/UNF-2B	B (2) UN/UNF-2B	A NPTF	M5 (1)	M10 (1)	M5 (2)	M10 (2)
6604-4-4-4	1/4-1/4	7/16-20	7/16-20	1/4-18	1.06	0.72	1.06	0.72
6604-6-6-6	3/8-3/8	9/16-18	9/16-18	3/8-18	1.34	0.97	1.34	0.97
6604-8-8-8	1/2-1/2	3/4-16	3/4-16	1/2-14	1.44	1.02	1.44	1.02
6604-12-12-12	3/4-3/4	1 1/16-12	1 1/16-12	3/4-14	1.75	1.19	1.75	1.19
6604-16-16-16	1-1	1 5/16-12	1 5/16-12	1-11 1/2	2.04	1.44	2.04	1.44
6604-20-20-20	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 1/4-11 1/2	2.31	1.68	2.31	1.68

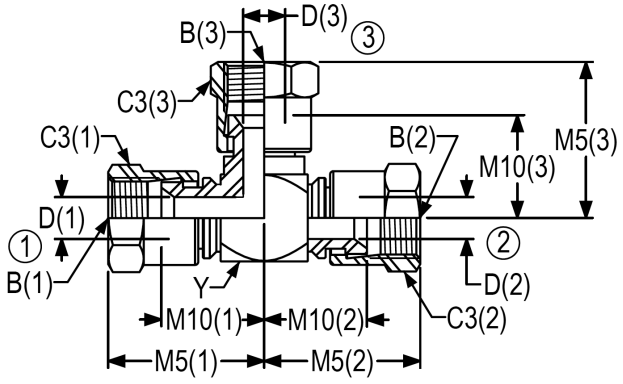
PART NO	N	C3 (1)	C3 (2)	Y	D (1)	D (2)	D1
6604-4-4-4	1.09	0.56	0.56	0.63	0.17	0.17	0.28
6604-6-6-6	1.22	0.69	0.69	0.81	0.30	0.30	0.41
6604-8-8-8	1.47	0.88	0.88	0.94	0.39	0.39	0.53
6604-12-12-12	1.59	1.25	1.25	1.13	0.61	0.61	0.72
6604-16-16-16	1.97	1.50	1.50	1.38	0.84	0.84	0.94
6604-20-20-20	2.38	2.00	2.00	1.75	1.08	1.08	1.25

6605 FEMALE PIPE/SWIVEL RUN/RUN TEE

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



6606 SWIVEL TEE



PART NO	TUBE OD	B (1) UN/UNF-2B	B (2) UN/UNF-2B	B (3) UN/UNF-2B	M5 (1)	M10 (1)	M5 (2)	M10 (2)	M5 (3)
6606-4-4-4	1/4-1/4-1/4	7/16-20	7/16-20	7/16-20	1.00	0.66	1.00	0.66	1.00
6606-6-6-6	3/8-3/8-3/8	9/16-18	9/16-18	9/16-18	1.25	0.88	1.25	0.88	1.25
6606-8-8-8	1/2-1/2-1/2	3/4-16	3/4-16	3/4-16	1.38	0.96	1.38	0.96	1.38
6606-12-12-12	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.75	1.19	1.75	1.19	1.75
6606-16-16-16	1-1-1	1 5/16-12	1 5/16-12	1 5/16-12	2.00	1.41	2.00	1.41	2.00

PART NO	M10 (3)	C3 (1)	C3 (2)	C3 (3)	Y	D (1)	D (2)	D (3)
6606-4-4-4	0.66	0.56	0.56	0.56	0.50	0.17	0.17	0.17
6606-6-6-6	0.88	0.69	0.69	0.69	0.63	0.30	0.30	0.30
6606-8-8-8	0.96	0.88	0.88	0.88	0.81	0.39	0.39	0.39
6606-12-12-12	1.19	1.25	1.25	1.25	1.13	0.61	0.61	0.61
6606-16-16-16	1.41	1.50	1.50	1.50	1.38	0.84	0.84	0.84

Features, Adjustable and O-Ring Fittings

O-Ring ports and stud ends per SAE J1926/ISO 11926 are the preferred port connection for use in hydraulic systems on industrial equipment and commercial products. The adjustable and O-Ring fittings described in this section provide a variety of options for connections between tube, hose or pipe ends to SAE J1926/1/ISO 11926-1 straight thread O-Ring ports or SAE J518 four-bolt flange ports. Fitting styles are available with male 37 degree tube ends, female 37 degree swivel ends, male or female NPTF pipe ends, female pipe swivels, adjustable and non-adjustable O-Ring studs, female O-Ring ports and low pressure beaded hose stem fittings.

The designs of the straight thread O-Ring stud per SAE J1926/3/ISO 11926-3 and the 37 degree flared fitting tube end per SAE J514/ISO 8434-2 are identical for either inch or metric tubing. With the exception of stock size, the flared tube fittings described in this section are interchangeable with the equivalent "inch" straight thread O-Ring stud fittings per ISO 8434-2. All 37 degree fitting styles are also available with the optional **FLARE-O®** tube end design.

Performance

Where applicable, fittings are designed and qualified to the requirements of SAE J514 and/or SAE J1926/3/ISO 11926-3. Beaded hose stem ends conform to SAE J1231 and are intended for suction or low pressure lines, typically less than 300 psi.

Construction

Unless otherwise specified, fittings are machined from cold drawn carbon steel barstock and forgings. Standard plating is electrodeposited zinc with a clear trivalent chromate conversion coating in accordance with ASTM B633 (Type V SC2). The minimum salt spray resistance is 240 hours to red corrosion when tested in accordance with ASTM B117

Threads

Straight Threads: Internal and external straight threads conform to the Unified National Class 2A and Class 2B Series respectively, with modified minor diameters where specified. Maximum diameters of plated external threads may conform to Class 3A maximum diameters after plating.

NPTF Threads: Male and female pipe threads conform to the Dryseal American Standard Taper Pipe Thread (SAE J476a, NPTF) Series which will provide pressure tight joints without the use of a lubricant or sealer. Use of these fittings with non-dryseal NPT pipe or hose ends is not recommended for high-pressure applications.

Note: Where not functionally objectionable, use of a compatible lubricant/sealant is recommended for either NPT or NPTF threads to minimize the possibility of galling in assembly.

Assembly Information

For assembly instructions, refer to the Technical Data Section for the appropriate fitting end. Also, refer to the Technical Data Section for recommendations regarding tubing pressure ratings, tube flares and hose/tube routing information. Please note the following:

Tubing for single flare tube ends should be either seamless or welded and drawn, fully annealed tubing per SAE J524 or J525. For double flaring, tubing per SAE J356, J524, J525 or J526 may be used.

For proper sealing with 37 degree flared fittings, flares for tubing should conform to the requirements of SAE J533. For heavy wall tubing, the optional tube preparation and single flare configuration specified in SAE J533 is also recommended. This optional configuration provides extended sealing surface contact area versus conventional flares.

In the design and fabrication of tubing or hose runs for any hydraulic system, precautions should be taken to allow for sufficient adjustment of the hose or tubing so that proper alignment can be attained at the fitting connections. Improper fit-up or misalignment should be corrected before final connections are made. Location of fitting connections should be planned to maximize accessibility. Whenever possible, use a torque wrench to tighten connections to the recommended torque.

Ordering Information

Size of fittings are indicated by dash number relating to sixteenths of an inch for the nominal O.D. of the tube size used. Example: 1/2 inch tube = 8/16 or (-8) size.

Order standard fittings from appropriate chart indicating required dash numbers. For example, 6405-8-6-O is 1/2" O-Ring stud end with 3/4-16 straight thread, and 3/8" female pipe thread. Jump size 6405-16-8-O is 1" O-Ring stud end with 1 5/16-12 straight thread and 1/2" female pipe thread. Pictorial views for each fitting style indicate the correct numbering sequence for fitting ends.

Adjustable and O-Ring fittings may be purchased in various stages of assembly. Catalog numbers include NWO as standard. For example, 6801-10-10-NWO would be assembled with "N"- Nut, "W"- Washer and "O"- O-Ring. 6801-10-10NW would be assembled with "N"- Nut and "W"- Washer only.

If information is needed for jump sizes not shown, please contact customer service for engineering assistance.

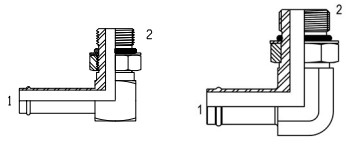
Table JA1. Pressure Ratings for 37 Deg. Flared Tube Ends, 37 Deg. Female Swivels, O-Ring Port Plugs and Straight Thread Stud Ends (Inch)										
Nominal Tube Size		Thread Size	Working Pressures							
Nom SAE Dash Size	Nom Inch Tube O.D.	SAE J514 Flared Tube End and SAE J1926/3/ ISO 11926-3 O-Ring Port Thread Size (Notes 1&2)	37 Deg. Flared Tube Ends, Unions and Bulkheads		37 Deg. Female Swivels		SAE J514 (Inch) Port Plugs and Stud Ends Per SAE J1926/3/ISO 11926-3			
							Port Plugs/Non-Adjustable Studs		Adjustable Studs	
			MPa	psi	Mpa	psi	MPa	psi	MPa	psi
-2	1/8	5/16-24 UNF	34.5	5,000	34.5	5,000	34.5	5,000	34.5	5,000
-3	3/16	3/8-24 UNF	34.5	5,000	34.5	5,000	34.5	5,000	34.5	5,000
-4	1/4	7/16-20 UNF	34.5	5,000	31	4,500	34.5	5,000	31.5	4,500
-5	5/16	1/2-20 UNF	34.5	5,000	27.5	4,000	34.5	5,000	27.5	4,000
-6	3/8	9/16-18 UNF	34.5	5,000	27.5	4,000	34.5	5,000	27.5	4,000
-8	1/2	3/4-16 UNF	31	4,500	27.5	4,000	31	4,500	27.5	4,000
-10	5/8	7/8-14 UNF	24	3,500	21	3,000	24	3,500	21	3,000
-12	3/4	1-1/16-12 UN	24	3,500	21	3,000	24	3,500	21	3,000
-14	7/8	1-3/16-12 UN	21	3,000	17	2,500	21	3,000	17	2,500
-16	1	1-5/16-12 UN	21	3,000	17	2,500	21	3,000	17	2,500
-20	1 1/4	1-5/8-12 UN	17	2,500	14	2,000	17	2,500	14	2,000
-24	1 1/2	1-7/8-12 UN	14	2,000	10.5	1,500	14	2,000	10.5	1,500
-32	2	2-1/2-12 UN	10.5	1,500	8	1,125	10.5	1,500	8	1,125

1) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)
2) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts

Table JA2. Pressure Ratings for Fittings With NPTF Pipe Threads and Adapter Unions							
Nominal Pipe Size		Thread Size		Working Pressures			
Nom SAE Dash Size	Nom Inch Pipe O.D.	Dryseal Pipe Thread (NPTF[1]) Male and Female	Straight Pipe Thread (NPSM[2]) Female Swivels	Fittings With NPTF Pipe Threads		Adapter Unions	
				MPa	psi	MPa	psi
-2	1/8	1/8-27	1/8-27	34.5	5,000	34.5	5,000
-4	1/4	1/4-18	1/4-18	27.5	4,000	34.5	5,000
-6	3/8	3/8-18	3/8-18	21	3,000	27.6	4,000
-8	1/2	1/2-14	1/2-14	21	3,000	24.1	3,500
-12	3/4	3/4-14	3/4-14	17	2,500	15.5	2,250
-16	1	1-11-1/2	1-11-1/2	14	2,000	13.8	2,000
-20	1 1/4	1-1/4-11-1/2	1-1/4-11-1/2	8	1,150	11.2	1,625
-24	1 1/2	1-1/2-11-1/2	1-1/2-11-1/2	7	1,000	8.6	1,250
-32	2	2-11-1/2	2-11-1/2	7	1,000	7.8	1,125

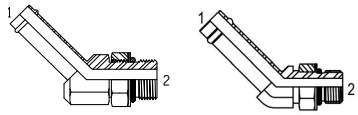
1) Dryseal American Standard Taper Pipe Thread
2) American Standard Straight Pipe Thread for Mechanical Joints

(430292)



4601-NWO-
(1)Beaded
(2)Adjustable O-Ring

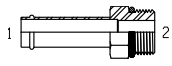
(430392)



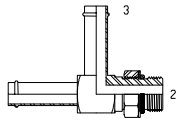
FG

4603-NWO-
(1)Beaded
(2)Adjustable O-Ring

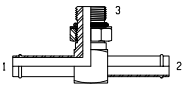
(430192)



4604-O-
(1)Beaded
(2)Male O-Ring

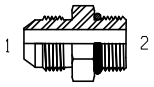


4605-NWO-
(1&3)Beaded
(2)Adjustable O-Ring



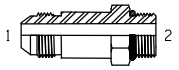
4606-NWO-
(1&2)Beaded
(3)Adjustable O-Ring

(070120)

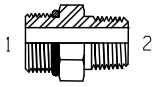


6400-O-
(1)Male Tube
(2)Male O-Ring

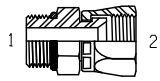
(070122)



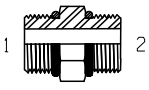
6400-L-O-
(1)Male Tube
(2)Male O-Ring-Long



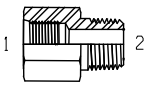
6401-O-
(1)Male O-Ring
(2)Male Pipe



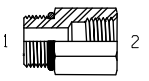
6402-O-
(1)Male O-Ring
(2)37° Female Swivel



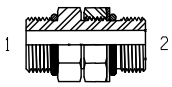
6403-O-
(1&2)Male O-Ring



6404-
(1)Female O-Ring
(2)Male Pipe



6405-O-
(1)Male O-Ring
(2)Female Pipe



6407-NWO-
(1)Male O-Ring
(2)Adjustable O-Ring

(090109A)

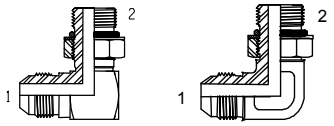
6408-O-
(1)Male O-Ring

(090109B)

6409-O-
(1)Male O-Ring

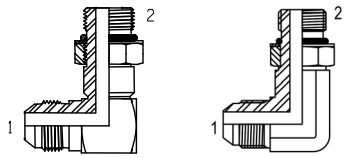
6410-O-
(1)Male O-Ring
(2)Female O-Ring

(070220)



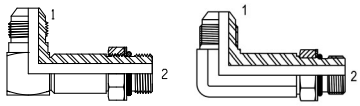
FG

6801-NWO-
(1)Male Tube
(2)Adjustable O-Ring



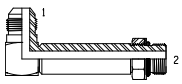
FG

6801-L-NWO-
(1)Male Tube
(2)Adj. O-Ring-Long



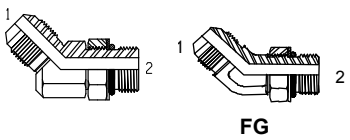
FG

6801-LL-NWO-
(1)Male Tube
(2)Adj. O-Ring-X-Long



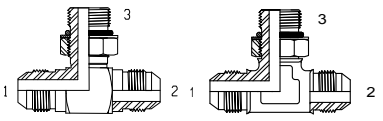
6801-LLL-NWO-
(1)Male Tube
(2)Adj.O-Ring-XX-Long

(070320)



FG

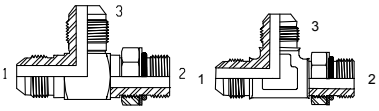
6802-NWO-
(1)Male Tube
(2)Adjustable O-Ring



FG

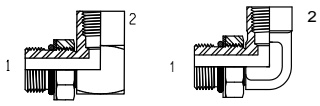
6803-NWO-
(1&2)Male Tube
(3)Adjustable O-Ring

(070428)



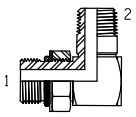
FG

6804-NWO-
(1&3)Male Tube
(2)Adjustable O-Ring

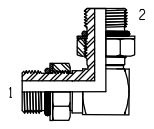


FG

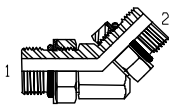
6805-NWO-
(1)Adjustable O-Ring
(2)Female Pipe



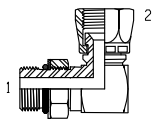
6806-NWO-
(1)Adjustable O-Ring
(2)Male Pipe



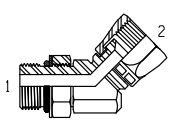
6807-NWO-
(1&2)Adjustable O-Ring



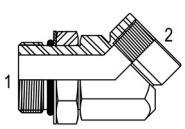
6808-NWO-
(1&2) Adjustable O-Ring



6809-NWO-
(1)Adjustable O-Ring
(2)37° Female Swivel

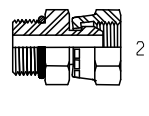


6810-NWO-
(1)Adjustable O-Ring
(2)37° Female Swivel

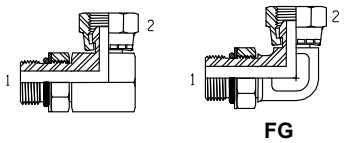
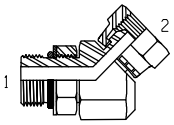
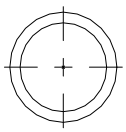


6811-NWO-
(1)Adjustable O-Ring
(2)Female Pipe Elbow

(140157)

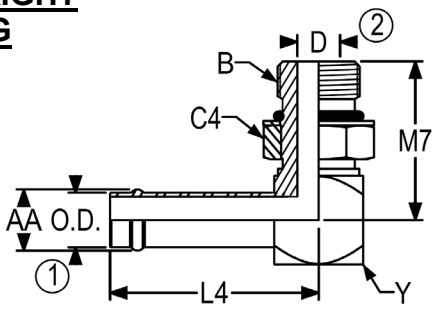


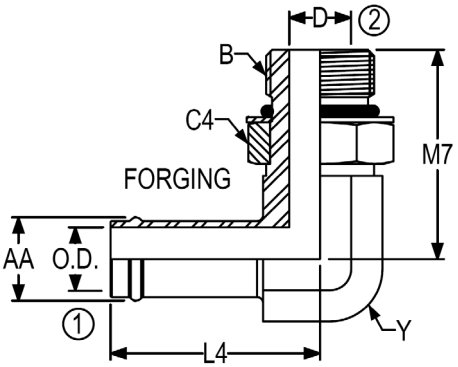
6900-O-
(1)Male O-Ring
(2)Female Pipe Swivel
See adapter section

(140257)  **FG** **6901-NWO-** (1)Adjustable O-Ring (2)Female Pipe Swivel See adapter section	(140357)  **6902-NWO-** (1)Adjustable O-Ring (2)Female Pipe Swivel See adapter section				(J515CH)  **4000-**O-Ring SAE J1926/2/3 Inch Stud Ends

4601 90 DEGREE STRAIGHT THREAD HOSE FITTING

SAE J1231 431492

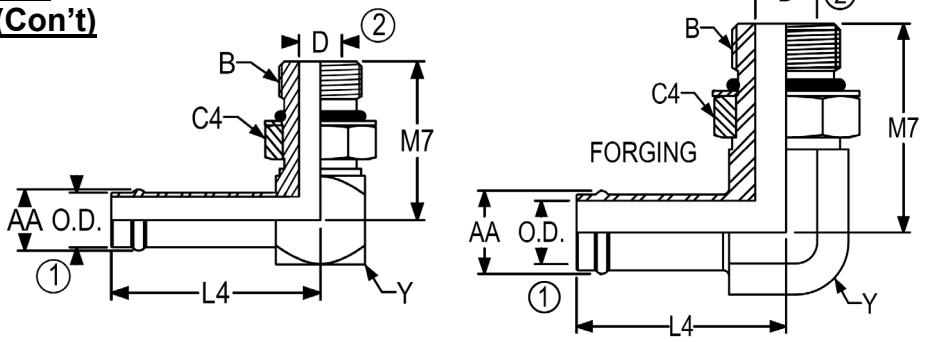




PART NO	TUBE OD	B UN/UNF-2A	L4	M7	C4	Y	AA	D
4601-4-2 NWO	1/4	5/16-24	1.75	0.94	0.44	0.50	0.29	0.06
4601-4-4 NWO	1/4	7/16-20	1.75	1.03	0.56	0.50	0.29	0.17
4601-4-5 NWO	1/4	1/2-20	1.78	1.13	0.63	0.56	0.29	0.23
4601-4-6 NWO	1/4	9/16-18	1.81	1.25	0.69	0.63	0.29	0.30
4601-5-4 NWO	5/16	7/16-20	1.75	1.03	0.56	0.50	0.36	0.17
4601-5-5 NWO	5/16	1/2-20	1.78	1.13	0.63	0.56	0.36	0.23
4601-5-6 NWO	5/16	9/16-18	1.81	1.25	0.69	0.63	0.36	0.30
4601-5-8 NWO	5/16	3/4-16	1.91	1.45	0.88	0.81	0.36	0.39
4601-6-4 NWO	3/8	7/16-20	1.75	1.03	0.56	0.50	0.43	0.17
4601-6-6 NWO	3/8	9/16-18	1.81	1.25	0.69	0.63	0.43	0.30
4601-6-8 NWO	3/8	3/4-16	1.91	1.45	0.88	0.81	0.43	0.39
4601-6-10 NWO	3/8	7/8-14	1.97	1.70	1.00	0.94	0.43	0.48
4601-6-12 NWO	3/8	1 1/16-12	2.06	1.94	1.25	1.13	0.43	0.61
4601-8-4 NWO	1/2	7/16-20	1.81	1.08	0.56	0.63	0.56	0.17
4601-8-6 NWO	1/2	9/16-18	1.81	1.25	0.69	0.63	0.56	0.30
4601-8-8 NWO	1/2	3/4-16	1.91	1.45	0.88	0.81	0.56	0.39
4601-8-10 NWO	1/2	7/8-14	1.97	1.70	1.00	0.94	0.56	0.48
4601-8-12 NWO	1/2	1 1/16-12	1.94	2.06	1.25	1.13	0.50	0.61
4601-8-16 NWO	1/2	1 5/16-12	2.19	2.05	1.50	1.38	0.56	0.84
4601-10-6 NWO	5/8	9/16-18	1.97	1.40	0.69	0.94	0.69	0.30
4601-10-8 NWO	5/8	3/4-16	1.91	1.45	0.88	0.81	0.69	0.39
4601-10-10 NWO	5/8	7/8-14	1.97	1.70	1.00	0.94	0.69	0.48
4601-10-12 NWO	5/8	1 1/16-12	2.06	1.94	1.25	1.13	0.69	0.61
4601-10-16 NWO	5/8	1 5/16-12	2.19	2.05	1.50	1.38	0.69	0.84
4601-12-8 NWO	3/4	3/4-16	1.91	1.45	0.88	0.81	0.82	0.39
4601-12-10 NWO	3/4	7/8-14	1.97	1.70	1.00	0.94	0.82	0.48
4601-12-12 NWO	3/4	1 1/16-12	2.06	1.94	1.25	1.13	0.82	0.61
4601-12-14 NWO	3/4	1 3/16-12	2.13	2.00	1.38	1.25	0.82	0.72
4601-12-20 NWO	3/4	1 5/8-12	2.38	2.25	1.88	1.75	0.82	1.08
4601-16-8 NWO	1	3/4-16	2.06	1.61	0.88	1.13	1.06	0.39
4601-16-10 NWO	1	7/8-14	2.06	1.80	1.00	1.13	1.06	0.48
4601-16-12 NWO	1	1 1/16-12	2.06	1.94	1.25	1.13	1.06	0.61
4601-16-14 NWO	1	1 3/16-12	2.12	2.00	1.38	1.25	1.06	0.72
4601-16-16 NWO	1	1 5/16-12	2.19	2.05	1.50	1.38	1.06	0.84
4601-16-20 NWO	1	1 5/8-12	2.38	2.25	1.88	1.75	1.06	1.08
4601-16-24 NWO	1	1 7/8-12	2.50	2.39	2.13	2.00	1.06	1.31

4601 90 DEGREE STRAIGHT THREAD HOSE FITTING (Con't)

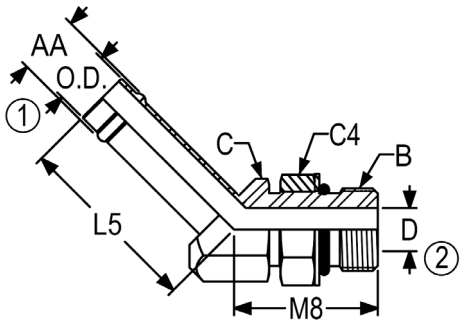
SAE J1231 431492

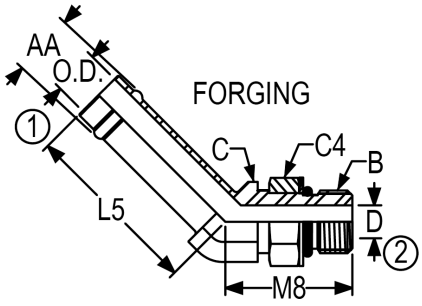


PART NO	TUBE OD	B UN/UNF-2A	L4	M7	C4	Y	AA	D
4601-18-12 NWO	1 1/8	1 1/16-12	2.19	2.06	1.25	1.38	1.23	0.61
4601-20-12 NWO	1 1/4	1 1/16-12	2.19	2.06	1.25	1.38	1.36	0.61
4601-20-16 NWO	1 1/4	1 5/16-12	2.19	2.05	1.50	1.38	1.36	0.84
4601-20-20 NWO	1 1/4	1 5/8-12	2.38	2.25	1.88	1.75	1.36	1.08
4601-20-20 NWO-FG	1 1/4	1 5/8-12	2.34	2.24	1.88	1.63	1.36	1.08
4601-20-24 NWO	1 1/4	1 7/8-12	2.50	2.39	2.13	2.00	1.36	1.31
4601-22-16 NWO	1 3/8	1 1/16-12	2.31	2.17	1.50	1.63	1.49	0.84
4601-24-12 NWO	1 1/2	1 1/16-12	2.31	2.19	1.25	1.63	1.62	0.61
4601-24-16 NWO	1 1/2	1 5/16-12	2.31	2.17	1.50	1.63	1.62	0.84
4601-24-20 NWO	1 1/2	1 5/8-12	2.38	2.25	1.88	1.75	1.62	1.08
4601-24-24 NWO	1 1/2	1 7/8-12	2.50	2.39	2.13	2.00	1.62	1.31
4601-32-32 NWO	2	2 1/2-12	2.81	2.89	2.75	2.63	2.15	1.78
4601-32-32 NWO-FG	2	2 1/2-12	2.81	2.89	2.75	2.50	2.15	1.78

4603 45 DEGREE STRAIGHT THREAD HOSE FITTING

SAE J1231 430392

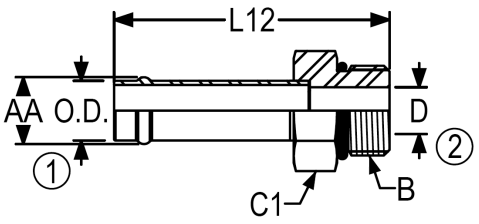




PART NO	TUBE OD	B UN/UNF-2A	L5	M8	C4	C	AA	D
4603-4-4 NWO	1/4	7/16-20	1.70	1.05	0.56	0.50	0.29	0.17
4603-4-4 NWO-FG	1/4	7/16-20	1.70	1.05	0.56	0.50	0.29	0.17
4603-4-6 NWO	1/4	9/16-18	1.70	1.14	0.69	0.63	0.29	0.30
4603-6-4 NWO	3/8	7/16-20	1.61	1.05	0.56	0.50	0.43	0.17
4603-6-6 NWO	3/8	9/16-18	1.69	1.14	0.69	0.63	0.43	0.30
4603-6-6 NWO-FG	3/8	9/16-18	1.69	1.14	0.69	0.63	0.43	0.30
4603-6-10 NWO	3/8	7/8-14	1.75	1.52	1.00	0.94	0.38	0.48
4603-8-6 NWO	1/2	9/16-18	1.61	1.14	0.69	0.63	0.56	0.30
4603-8-6 NWO-FG	1/2	9/16-18	1.61	1.14	0.69	0.63	0.56	0.30
4603-8-8 NWO	1/2	3/4-16	1.69	1.30	0.88	0.81	0.56	0.39
4603-8-10 NWO	1/2	7/8-14	1.76	1.52	1.00	0.94	0.56	0.48
4603-10-8 NWO	5/8	3/4-16	1.65	1.30	0.88	0.81	0.69	0.39
4603-10-10 NWO	5/8	7/8-14	1.70	1.52	1.00	0.94	0.69	0.48
4603-10-12 NWO	5/8	1 1/16-12	1.84	1.73	1.25	1.13	0.69	0.61
4603-10-16 NWO	5/8	1 5/16-12	1.96	1.86	1.50	1.38	0.69	0.84
4603-12-8 NWO	3/4	3/4-16	1.62	1.30	0.88	0.81	0.82	0.39
4603-12-10 NWO	3/4	7/8-14	1.66	1.52	1.00	0.94	0.82	0.48
4603-12-10 NWO-FG	3/4	7/8-14	1.66	1.52	1.00	0.94	0.82	0.48
4603-12-12 NWO	3/4	1 1/16-12	1.75	1.73	1.25	1.13	0.82	0.61
4603-12-16 NWO	3/4	1 5/16-12	1.90	1.86	1.50	1.38	0.82	0.84
4603-16-8 NWO	1	3/4-16	1.69	1.63	0.88	1.13	1.00	0.39
4603-16-10 NWO	1	7/8-14	1.64	1.59	1.00	1.13	1.06	0.48
4603-16-12 NWO	1	1 1/16-12	1.70	1.73	1.25	1.13	1.06	0.61
4603-16-14 NWO	1	1 3/16-12	1.78	1.80	1.38	1.25	1.06	0.72
4603-16-16 NWO	1	1 5/16-12	1.86	1.86	1.50	1.38	1.06	0.84
4603-16-20 NWO	1	1 5/8-12	1.92	1.91	1.88	1.75	1.06	1.08
4603-20-12 NWO	1 1/4	1 1/16-12	1.80	1.86	1.25	1.38	1.36	0.61
4603-20-14 NWO	1 1/4	1 3/16-12	1.85	1.86	1.38	1.38	1.36	0.72
4603-20-16 NWO	1 1/4	1 5/16-12	1.76	1.86	1.50	1.38	1.36	0.84
4603-20-20 NWO	1 1/4	1 5/8-12	1.92	1.91	1.88	1.75	1.36	1.08
4603-20-24 NWO	1 1/4	1 7/8-12	1.97	1.91	2.13	2.00	1.36	1.31
4603-24-16 NWO	1 1/2	1 5/16-12	1.80	1.91	1.50	1.75	1.62	0.84
4603-24-20 NWO	1 1/2	1 5/8-12	1.92	1.91	1.88	1.75	1.62	1.08
4603-24-24 NWO	1 1/2	1 7/8-12	1.97	1.91	2.13	2.00	1.62	1.31
4603-32-24 NWO	2	1 7/8-12	2.16	1.86	2.13	2.63	2.00	1.31
4603-32-32 NWO	2	2 1/2-12	2.14	1.86	2.75	2.63	2.15	1.78

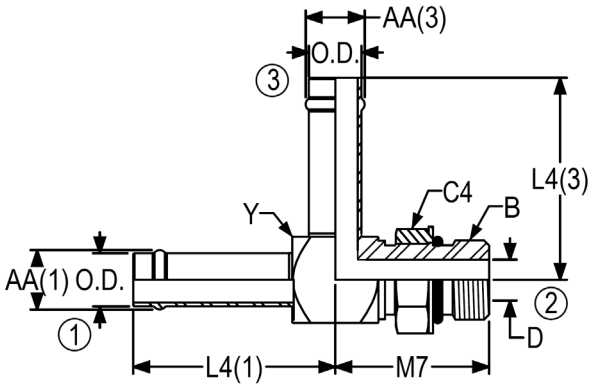
4604 MALE STRAIGHT THREAD HOSE CONNECTOR

SAE J1231 430192



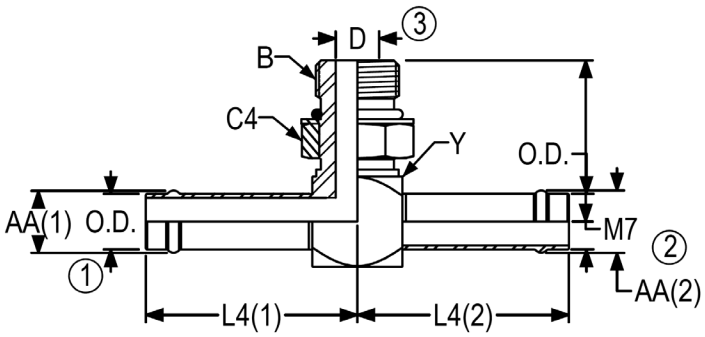
PART NO	TUBE OD	B UN/UNF-2A	L12	C1	AA	D
4604-4-3-O	1/4	3/8-24	2.07	0.50	0.29	0.13
4604-4-4-O	1/4	7/16-20	2.17	0.56	0.29	0.20
4604-4-6-O	1/4	9/16-18	2.23	0.69	0.29	0.21
4604-6-4-O	3/8	7/16-20	2.17	0.56	0.43	0.20
4604-6-6-O	3/8	9/16-18	2.23	0.69	0.43	0.30
4604-6-8-O	3/8	3/4-16	2.30	0.88	0.43	0.33
4604-8-6-O	1/2	9/16-18	2.23	0.69	0.56	0.30
4604-8-8-O	1/2	3/4-16	2.30	0.88	0.56	0.39
4604-8-10-O	1/2	7/8-14	2.43	1.00	0.56	0.43
4604-10-8-O	5/8	3/4-16	2.30	0.88	0.69	0.39
4604-10-10-O	5/8	7/8-14	2.43	1.00	0.69	0.50
4604-10-12-O	5/8	1 1/16-12	2.59	1.25	0.69	0.56
4604-10-16-O	5/8	1 5/16-12	2.63	1.50	0.69	0.56
4604-12-8-O	3/4	3/4-16	2.30	0.88	0.82	0.39
4604-12-10-O	3/4	7/8-14	2.43	1.00	0.82	0.50
4604-12-12-O	3/4	1 1/16-12	2.59	1.25	0.82	0.64
4604-12-16-O	3/4	1 5/16-12	2.62	1.50	0.82	0.64
4604-16-8-O	1	3/4-16	2.56	1.25	1.06	0.39
4604-16-10-O	1	7/8-14	2.62	1.25	1.06	0.50
4604-16-12-O	1	1 1/16-12	2.59	1.25	1.06	0.64
4604-16-16-O	1	1 5/16-12	2.62	1.50	1.06	0.89
4604-16-20-O	1	1 5/8-12	2.70	1.88	1.06	0.89
4604-16-24-O	1	1 7/8-12	2.77	2.13	1.06	0.89
4604-20-12-O	1 1/4	1 1/16-12	2.59	1.38	1.36	0.66
4604-20-14-0	1 1/4	1 3/16-12	2.59	1.38	1.36	0.72
4604-20-16-O	1 1/4	1 5/16-12	2.62	1.50	1.36	0.89
4604-20-20-O	1 1/4	1 5/8-12	2.70	1.88	1.36	1.09
4604-20-24-O	1 1/4	1 7/8-12	2.77	2.13	1.36	1.14
4604-22-12-O	1 3/8	1 1/16-12	2.62	1.63	1.49	0.61
4604-24-16-O	1 1/2	1 5/16-12	2.62	1.69	1.62	0.88
4604-24-20-O	1 1/2	1 5/8-12	2.70	1.88	1.62	1.09
4604-24-24-O	1 1/2	1 7/8-12	2.77	2.13	1.62	1.34
4604-32-20-O	2	1 5/8-12	2.86	2.25	2.15	1.09
4604-32-24-O	2	1 7/8-12	2.77	2.25	2.15	1.31
4604-32-32-O	2	2 1/2-12	2.93	2.75	2.15	1.78

4605 MALE STRAIGHT THREAD RUN HOSE CONNECTOR



PART NO	TUBE OD	B UN/UNF-2A	L4 (1)	M7	L4 (3)	C4	Y	AA (1)	D	AA (3)
4605-5-6-6 NWO	5/16-3/8	9/16-18	1.81	1.25	1.81	0.69	0.63	0.36	0.30	0.43
4605-8-8-8 NWO	1/2-1/2	3/4-16	1.91	1.45	1.91	0.88	0.81	0.50	0.39	0.50
4605-10-10-10 NWO	5/8-5/8	7/8-14	1.97	1.70	1.97	1.00	0.94	0.69	0.48	0.69
4605-12-10-12 NWO	3/4-3/4	7/8-14	1.97	1.70	1.97	1.00	0.94	0.82	0.48	0.82
4605-12-12-12 NWO	3/4-3/4	1 1/16-12	2.06	1.94	2.06	1.25	1.13	0.82	0.61	0.82
4605-12-16-10 NOW	3/4-5/8	1 5/16-12	2.19	2.05	2.19	1.5	1.38	0.82	0.84	0.69
4605-16-12-16 NWO	1-1	1 1/16-12	2.20	2.05	2.19	1.25	1.38	1.06	0.61	1.06
4605-16-16-10 NOW	1-5/8	1 5/16-12	2.19	2.05	2.19	1.50	1.38	1.06	0.84	0.69
4605-16-16-16 NWO	1-1	1 5/16-12	2.19	2.05	2.19	1.50	1.38	1.06	0.84	1.06
4605-16-20-16 NWO	1-1	1 5/8-12	2.38	2.25	2.38	1.88	1.75	1.06	1.08	1.06
4605-20-16-20 NWO	1 1/4-1	1 5/16-12	2.31	2.17	2.31	1.50	1.63	1.36	0.84	1.36
4605-20-20-12 NWO	1 1/4-1 1/4	1 5/8-12	2.38	2.25	2.38	1.88	1.75	1.36	1.08	0.82
4605-20-20-16 NWO	1 1/4-1 1/4	1 5/8-12	2.38	2.25	2.38	1.88	1.75	1.36	1.08	1.06
4605-20-20-20 NWO	1 1/4-1 1/4	1 5/8-12	2.38	2.25	2.38	1.88	1.75	1.36	1.08	1.36
4605-24-24-24 NWO	1 1/2-1 1/2	1 7/8-12	2.50	2.39	2.50	2.13	2.00	1.62	1.31	1.62

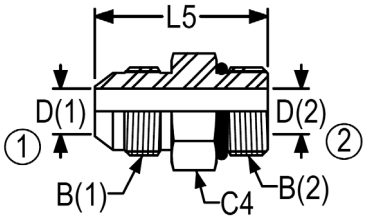
4606 MALE STRAIGHT THREAD BRANCH HOSE



PART NO	TUBE OD	B UN/UNF-2A	L4 (1)	L4 (2)	M7	C4	Y	AA (1)	AA (2)	D
4606-4-4-4 NWO	1/2-1/2	7/16-20	1.75	1.75	1.03	0.56	0.50	0.25	0.25	0.17
4606-6-6-6 NWO	3/8-3/8	9/16-18	1.81	1.81	1.25	0.69	0.63	0.43	0.43	0.30
4606-8-8-6 NWO	1/2-1/2	9/16-18	1.81	1.81	1.25	0.69	0.63	0.50	0.50	0.30
4606-8-8-8 NWO	1/2-1/2	3/4-16	1.91	1.91	1.45	0.88	0.81	0.56	0.56	0.39
4606-10-10-10 NWO	5/8-5/8	7/8-14	1.97	1.97	1.70	1.00	0.94	0.69	0.69	0.48
4606-12-10-12 NWO	3/4-5/8	1 1/16-12	2.06	2.06	1.94	1.25	1.13	0.82	0.69	0.61
4606-12-12-12 NWO	3/4-3/4	1 1/16-12	2.06	2.06	1.94	1.25	1.13	0.82	0.82	0.61
4606-12-12-16 NWO	3/4-3/4	1 5/16-12	2.19	2.19	2.05	1.50	1.38	0.82	0.82	0.84
4606-16-12-12 NWO	1-3/4	1 1/16-12	2.06	2.06	1.94	1.25	1.13	1.00	0.75	0.61

6400 STRAIGHT THREAD CONNECTOR

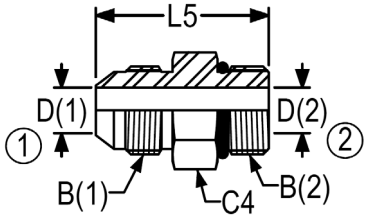
SAE J514 070120
MS51525
MS39324



PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	L5	C4	D (1)	D (2)
6400-2-2-O	1/8	5/16-24	5/16-24	1.06	0.44	0.06	0.06
6400-3-3-O	3/16	3/8-24	3/8-24	1.10	0.50	0.13	0.13
6400-3-4-O	3/16	3/8-24	7/16-20	1.16	0.56	0.13	0.17
6400-3-6-O	3/16	3/8-24	9/16-18	1.22	0.69	0.13	0.30
6400-4-2-O	1/4	7/16-20	5/16-24	1.17	0.50	0.17	0.06
6400-4-3-O	1/4	7/16-20	3/8-24	1.17	0.50	0.17	0.13
6400-4-4-O	1/4	7/16-20	7/16-20	1.23	0.56	0.17	0.17
6400-4-5-O	1/4	7/16-20	1/2-20	1.23	0.63	0.17	0.23
6400-4-6-O	1/4	7/16-20	9/16-18	1.29	0.69	0.17	0.30
6400-4-8-O	1/4	7/16-20	3/4-16	1.37	0.88	0.17	0.39
6400-4-10-O	1/4	7/16-20	7/8-14	1.49	1.00	0.17	0.48
6400-4-12-O	1/4	7/16-20	1 1/16-12	1.66	1.25	0.17	0.61
6400-5-4-O	5/16	1/2-20	7/16-20	1.23	0.56	0.23	0.17
6400-5-5-O	5/16	1/2-20	1/2-20	1.23	0.63	0.23	0.23
6400-5-6-O	5/16	1/2-20	9/16-18	1.29	0.69	0.23	0.30
6400-5-8-O	5/16	1/2-20	3/4-16	1.37	0.88	0.23	0.39
6400-5-10-O	5/16	1/2-20	7/8-14	1.49	1.00	0.23	0.48
6400-6-4-O	3/8	9/16-18	7/16-20	1.27	0.63	0.30	0.17
6400-6-5-O	3/8	9/16-18	1/2-20	1.27	0.63	0.30	0.23
6400-6-6-O	3/8	9/16-18	9/16-18	1.30	0.69	0.30	0.30
6400-6-8-O	3/8	9/16-18	3/4-16	1.38	0.88	0.30	0.39
6400-6-10-O	3/8	9/16-18	7/8-14	1.50	1.00	0.30	0.48
6400-6-12-O	3/8	9/16-18	1 1/16-12	1.66	1.25	0.30	0.61
6400-6-16-O	3/8	9/16-18	1 5/16-12	1.68	1.50	0.30	0.84
6400-8-4-O	1/2	3/4-16	7/16-20	1.49	0.81	0.39	0.17
6400-8-5-O	1/2	3/4-16	1/2-20	1.49	0.81	0.39	0.23
6400-8-6-O	1/2	3/4-16	9/16-18	1.44	0.81	0.39	0.30
6400-8-8-O	1/2	3/4-16	3/4-16	1.48	0.88	0.39	0.39
6400-8-10-O	1/2	3/4-16	7/8-14	1.60	1.00	0.39	0.48
6400-8-12-O	1/2	3/4-16	1 1/16-12	1.76	1.25	0.39	0.61
6400-8-14-O	1/2	3/4-16	1 3/16-12	1.76	1.38	0.39	0.72
6400-8-16-O	1/2	3/4-16	1 5/16-12	1.79	1.50	0.39	0.84
6400-10-6-O	5/8	7/8-14	9/16-18	1.71	0.94	0.48	0.30
6400-10-8-O	5/8	7/8-14	3/4-16	1.64	0.94	0.48	0.39
6400-10-10-O	5/8	7/8-14	7/8-14	1.70	1.00	0.48	0.48
6400-10-12-O	5/8	7/8-14	1 1/16-12	1.86	1.25	0.48	0.61

6400 STRAIGHT THREAD CONNECTOR (Con't)

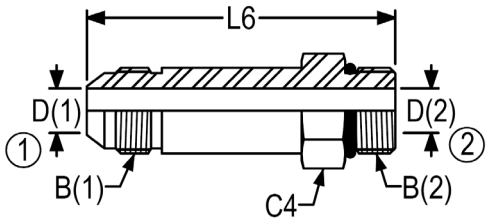
SAE J514 070120
MS51525
MS39324



PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	L5	C4	D (1)	D (2)
6400-10-14-O	5/8	7/8-14	1 3/16-12	1.86	1.38	0.48	0.72
6400-10-16-O	5/8	7/8-14	1 5/16-12	1.89	1.50	0.48	0.84
6400-10-20-O	5/8	7/8-14	1 5/8-12	1.97	1.88	0.48	1.08
6400-12-6-O	3/4	1 1/16-12	9/16-18	1.86	1.13	0.61	0.30
6400-12-8-O	3/4	1 1/16-12	3/4-16	1.94	1.13	0.61	0.39
6400-12-10-O	3/4	1 1/16-12	7/8-14	1.88	1.13	0.61	0.48
6400-12-12-O	3/4	1 1/16-12	1 1/16-12	1.97	1.25	0.61	0.61
6400-12-14-O	3/4	1 1/16-12	1 3/16-12	1.96	1.38	0.61	0.72
6400-12-16-O	3/4	1 1/16-12	1 5/16-12	1.99	1.50	0.61	0.84
6400-12-20-O	3/4	1 1/16-12	1 5/8-12	2.08	1.88	0.61	1.08
6400-12-24-O	3/4	1 1/16-12	1 7/8-12	2.15	2.13	0.61	1.31
6400-14-10-O	7/8	1 3/16-12	7/8-14	2.02	1.25	0.72	0.48
6400-14-12-O	7/8	1 3/16-12	1 1/16-12	1.99	1.25	0.72	0.61
6400-14-14-O	7/8	1 3/16-12	1 3/16-12	1.99	1.38	0.72	0.72
6400-14-16-O	7/8	1 3/16-12	1 5/16-12	2.02	1.50	0.72	0.84
6400-16-8-O	1	1 5/16-12	3/4-16	2.01	1.38	0.84	0.39
6400-16-10-O	1	1 5/16-12	7/8-14	2.07	1.38	0.84	0.48
6400-16-12-O	1	1 5/16-12	1 1/16-12	2.04	1.38	0.84	0.61
6400-16-14-O	1	1 5/16-12	1 3/16-12	2.04	1.38	0.84	0.72
6400-16-16-O	1	1 5/16-12	1 5/16-12	2.04	1.50	0.84	0.84
6400-16-20-O	1	1 5/16-12	1 5/8-12	2.12	1.88	0.84	1.08
6400-16-24-O	1	1 5/16-12	1 7/8-12	2.20	2.13	0.84	1.31
6400-20-12-O	1 1/4	1 5/8-12	1 1/16-12	2.30	1.69	1.08	0.61
6400-20-14-O	1 1/4	1 5/8-12	1 3/16-12	2.30	1.69	1.08	0.72
6400-20-16-O	1 1/4	1 5/8-12	1 5/16-12	2.33	1.69	1.08	0.84
6400-20-20-O	1 1/4	1 5/8-12	1 5/8-12	2.17	1.88	1.08	1.08
6400-20-24-O	1 1/4	1 5/8-12	1 7/8-12	2.24	2.13	1.08	1.31
6400-24-16-O	1 1/2	1 7/8-12	1 5/16-12	2.53	2.00	1.31	0.84
6400-24-20-O	1 1/2	1 7/8-12	1 5/8-12	2.53	2.00	1.31	1.08
6400-24-24-O	1 1/2	1 7/8-12	1 7/8-12	2.37	2.13	1.31	1.31
6400-24-32-O	1 1/2	1 7/8-12	2 1/2-12	2.53	2.75	1.31	1.78
6400-32-24-O	2	2 1/2-12	1 7/8-12	2.94	2.63	1.78	1.31
6400-32-32-O	2	2 1/2-12	2 1/2-12	2.78	2.75	1.78	1.78

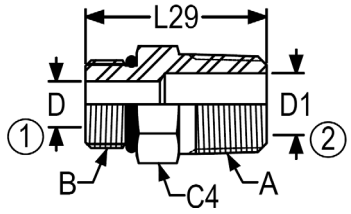
6400-L STRAIGHT THREAD CONNECTOR LONG

SAE J514 071720 formally 070122
MS51526



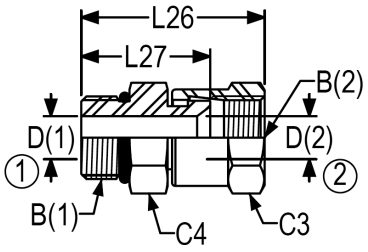
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	L6	C4	D (1)	D (2)
6400-L-4-4-O	1/4	7/16-20	7/16-20	2.08	0.56	0.17	0.17
6400-L-5-5-O	5/16	1/20-20	1/2-20	2.14	0.63	0.23	0.23
6400-L-6-6-O	3/8	9/16-18	9/16-18	2.31	0.69	0.30	0.30
6400-L-6-8-O	3/8	9/16-18	3/4-16	2.38	0.88	0.30	0.39
6400-L-6-10-O	3/8	9/16-18	7/8-14	2.51	1.00	0.30	0.48
6400-L-8-8-O	1/2	3/4-16	3/4-16	2.70	0.88	0.39	0.39
6400-L-8-10-O	1/2	3/4-16	7/8-14	2.83	1.00	0.39	0.48
6400-L-10-8-O	5/8	7/8-14	3/4-16	2.98	0.94	0.48	0.39
6400-L-10-10-O	5/8	7/8-14	7/8-14	3.04	1.00	0.48	0.48
6400-L-10-16-O	5/8	7/8-14	1 5/16-12	3.23	1.50	0.48	0.84
6400-L-12-10-O	3/4	1 1/16-12	7/8-14	3.52	1.13	0.61	0.48
6400-L-12-12-O	3/4	1 1/16-12	1 1/16-12	3.61	1.25	0.61	0.61
6400-L-12-16-O	3/4	1 1/16-12	1 5/16-12	3.64	1.50	0.61	0.84
6400-L-14-14-O	7/8	1 3/16-12	1 3/16-12	3.80	1.38	0.72	0.72
6400-L-16-16-O	1	1 5/16-12	1 5/16-12	3.98	1.50	0.84	0.84
6400-L-16-20-O	1	1 5/16-12	1 5/8-12	4.06	1.88	0.84	1.08
6400-L-20-16-O	1 1/4	1 5/8-12	1 5/16-12	4.85	1.69	1.08	0.84
6400-L-20-20-O	1 1/4	1 5/8-12	1 5/8-12	4.69	1.88	1.08	1.08
6400-L-24-24-O	1 1/2	1 7/8-12	1 7/8-12	5.17	2.13	1.31	1.31
6400-L-32-32-O	2	2 1/2-12	2 1/2-12	6.29	2.75	1.78	1.78

6401 STRAIGHT THREAD/MALE PIPE ADAPTER



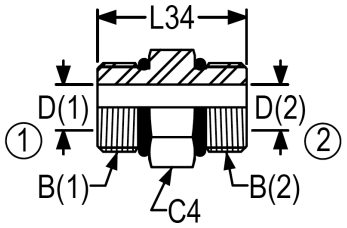
PART NO	B UN/UNF-2A	A NPTF	L29	C4	D	D1
6401-4-2-O	7/16-20	1/8-27	1.05	0.56	0.17	0.19
6401-4-4-O	7/16-20	1/4-18	1.23	0.56	0.17	0.28
6401-5-2-O	1/2-20	1/8-27	1.05	0.63	0.23	0.19
6401-5-4-O	1/2-20	1/4-18	1.16	0.63	0.23	0.28
6401-6-2-O	9/16-18	1/8-27	1.11	0.69	0.30	0.19
6401-6-4-O	9/16-18	1/4-18	1.30	0.69	0.30	0.28
6401-6-6-O	9/16-18	3/8-18	1.30	0.75	0.30	0.41
6401-6-8-O	9/16-18	1/2-14	1.48	0.88	0.30	0.53
6401-8-4-O	3/4-16	1/4-18	1.25	0.88	0.39	0.28
6401-8-6-O	3/4-16	3/8-18	1.36	0.88	0.39	0.41
6401-8-8-O	3/4-16	1/2-14	1.55	0.88	0.39	0.53
6401-8-12-O	3/4-16	3/4-14	1.58	1.13	0.39	0.72
6401-10-6-O	7/8-14	3/8-18	1.50	1.00	0.48	0.41
6401-10-8-O	7/8-14	1/2-14	1.69	1.00	0.48	0.53
6401-10-12-O	7/8-14	3/4-14	1.76	1.13	0.48	0.72
6401-12-6-O	1 1/16-12	3/8-18	1.66	1.25	0.61	0.41
6401-12-8-O	1 1/16-12	1/2-14	1.84	1.25	0.61	0.53
6401-12-12-O	1 1/16-12	3/4-14	1.73	1.25	0.61	0.72
6401-12-16-O	1 1/16-12	1-11 1/2	2.03	1.38	0.61	0.94
6401-16-12-O	1 5/16-12	3/4-14	1.87	1.50	0.84	0.72
6401-16-16-O	1 5/16-12	1-11 1/2	2.06	1.50	0.84	0.94
6401-20-20-O	1 5/8-12	1 1/4-11 1/2	2.17	1.88	1.08	1.25
6401-24-16-O	1 7/8-12	1-11 1/2	2.20	2.13	1.31	0.94
6401-24-20-O	1 7/8-12	1 1/4-11 1/2	2.23	2.13	1.31	1.25
6401-24-24-O	1 7/8-12	1 1/2-11 1/2	2.27	2.13	1.31	1.50
6401-32-32-O	2 1/2-12	2-11 1/2	2.47	2.75	1.78	1.94

6402 STRAIGHT THREAD/SWIVEL ADAPTER



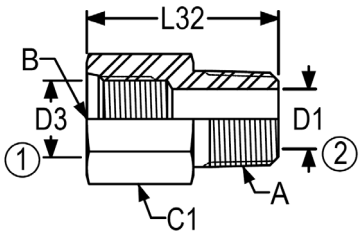
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	L26	L27	C4	C3	D (1)	D (2)
6402-4-4-O	1/4	7/16-20	7/16-20	1.29	0.95	0.56	0.56	0.17	0.17
6402-4-6-O	3/8	7/16-20	9/16-18	1.43	1.06	0.56	0.69	0.17	0.30
6402-6-4-O	1/4	9/16-18	7/16-20	1.34	1.00	0.69	0.56	0.30	0.17
6402-6-6-O	3/8	9/16-18	9/16-18	1.48	1.11	0.69	0.69	0.30	0.30
6402-6-8-O	1/2	9/16-18	3/4-16	1.48	1.06	0.75	0.88	0.30	0.39
6402-8-6-O	3/8	3/4-16	9/16-18	1.55	1.18	0.88	0.69	0.39	0.30
6402-8-8-O	1/2	3/4-16	3/4-16	1.59	1.17	0.88	0.88	0.39	0.39
6402-8-16-O	1	3/4-16	1 5/16-12	2.25	1.66	1.38	1.50	0.39	0.84
6402-10-8-O	1/2	7/8-14	3/4-16	1.72	1.30	1.00	0.88	0.48	0.39
6402-10-10-O	5/8	7/8-14	7/8-14	1.95	1.45	1.00	1.00	0.48	0.48
6402-12-8-O	1/2	1 1/16-12	3/4-16	1.71	1.29	1.25	0.88	0.61	0.39
6402-12-12-O	3/4	1 1/16-12	1 1/16-12	2.17	1.61	1.25	1.25	0.61	0.61
6402-12-16-O	1	1 1/16-12	1 5/16-12	2.28	1.69	1.38	1.50	0.61	0.84
6402-12-20-O	1 1/4	1 1/16-12	1 5/8-12	2.45	1.83	1.69	2.00	0.61	1.08
6402-16-12-O	3/4	1 5/16-12	1 1/16-12	2.19	1.63	1.50	1.25	0.84	0.61
6402-16-16-O	1	1 5/16-12	1 5/16-12	2.28	1.69	1.50	1.50	0.84	0.84
6402-16-20-O	1 1/4	1 5/16-12	1 5/8-12	2.51	1.88	2.00	2.00	0.84	1.08
6402-16-24-O	1 1/2	1 5/16-12	1 7/8-12	2.88	2.15	2.00	2.25	0.84	1.31
6402-20-20-O	1 1/4	1 5/8-12	1 5/8-12	2.45	1.83	1.88	2.00	1.08	1.08
6402-24-20-O	1 1/4	1 7/8-12	1 5/8-12	1.90	1.27	2.13	2.00	1.31	1.08
6402-24-24-O	1 1/2	1 7/8-12	1 7/8-12	2.72	1.99	2.13	2.25	1.31	1.31
6402-32-32-O	2	2 1/2-12	2 1/2-12	2.93	1.99	2.75	2.88	1.78	1.78

6403 STRAIGHT THREAD UNION



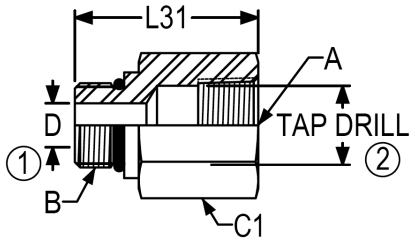
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	L34	C4	D (1)	D (2)
6403-6-4-O	3/8-1/4	9/16-18	7/16-20	1.11	0.69	0.30	0.17
6403-6-6-O	3/8-3/8	9/16-18	9/16-18	1.13	0.69	0.30	0.30
6403-8-8-O	1/2-1/2	3/4-16	3/4-16	1.26	0.88	0.39	0.39
6403-10-8-O	5/8-1/2	7/8-14	3/4-16	1.38	1.00	0.48	0.39
6403-10-10-O	5/8-5/8	7/8-14	7/8-14	1.44	1.00	0.48	0.48
6403-12-8-O	3/4-1/2	1 1/16-12	3/4-16	1.79	1.25	0.61	0.39
6403-12-12-O	3/4-3/4	1 1/16-12	1 1/16-12	1.68	1.25	0.61	0.61
6403-16-12-O	1-3/4	1 5/16-12	1 1/16-12	1.72	1.50	0.84	0.61

6404 O-RING PORT/MALE PIPE ADAPTER



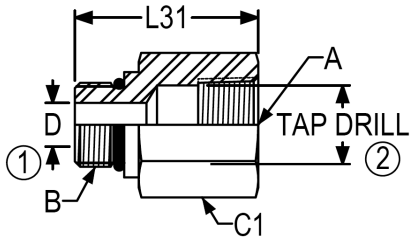
ART NO	B UN/UNF-2B	A NPTF	L32	C1	D3	D1
6404-4-2	7/16-20	1/8-27	1.13	0.69	0.38	0.19
6404-4-4	7/16-20	1/4-18	1.31	0.69	0.38	0.28
6404-4-6	7/16-20	3/8-18	1.14	0.69	0.38	0.38
6404-4-8	7/16-20	1/2-14	0.97	0.88	0.36	0.36
6404-5-2	1/2-20	1/8-27	1.19	0.75	0.45	0.19
6404-6-4	9/16-18	1/4-18	1.38	0.88	0.50	0.28
6404-6-6	9/16-18	3/8-18	1.38	0.88	0.50	0.41
6404-6-8	9/16-18	1/2-14	1.10	0.88	0.50	0.50
6404-8-4	3/4-16	1/4-18	1.73	1.00	0.68	0.28
6404-8-6	3/4-16	3/8-18	1.50	1.00	0.68	0.41
6404-8-8	3/4-16	1/2-14	1.69	1.00	0.68	0.53
6404-8-16	1 1/16-12	1-11 1/2	1.83	1.38	0.97	0.39
6404-8-24	3/4-16	1 1/2-11 1/2	1.93	2.00	0.68	0.68
6404-10-6	7/8-14	3/8-18	1.63	1.25	0.80	0.41
6404-10-8	7/8-14	1/2-14	1.81	1.25	0.80	0.53
6404-10-12	7/8-14	3/4-14	1.78	1.13	0.80	0.72
6404-12-6	1 1/16-12	3/8-18	1.78	1.38	0.97	0.41
6404-12-8	1 1/16-12	1/2-14	1.97	1.38	0.97	0.53
6404-12-12	1 1/16-12	3/4-14	1.97	1.38	0.97	0.72
6404-12-16	1 1/16-12	1-11 1/2	2.16	1.38	0.97	0.94
6404-16-12	1 5/16-12	3/4-14	1.97	1.63	1.22	0.72
6404-16-16	1 5/16-12	1-11 1/2	2.16	1.63	1.22	0.94
6404-16-20	1 5/16-12	1 1/4-11 1/2	1.91	1.75	1.22	1.22
6404-20-16	1 5/8-12	1-11 1/2	2.22	2.00	1.53	0.94
6404-20-20	1 5/8-12	1 1/4-11 1/2	2.25	2.00	1.53	1.25
6404-24-24	1 7/8-12	1 1/2-11 1/2	2.30	2.25	1.78	1.50

6405 STRAIGHT THREAD/FEMALE PIPE ADAPTER



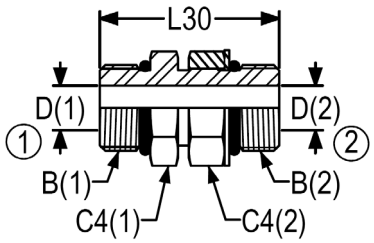
PART NO	B UN/UNF-2A	A NPTF	L31	C1	D	TAP DRILL
6405-3-4-O	3/8-24	1/4-18	1.10	0.75	0.13	0.43
6405-4-2-O	7/16-20	1/8-27	0.97	0.56	0.17	0.33
6405-4-4-O	7/16-20	1/4-18	1.16	0.75	0.17	0.43
6405-4-6-O	7/16-20	3/8-18	1.25	0.88	0.17	0.57
6405-5-2-O	1/2-20	1/8-27	0.94	0.63	0.23	0.33
6405-5-4-O	1/2-20	1/4-18	1.15	0.75	0.23	0.43
6405-6-2-O	9/16-18	1/8-27	0.73	0.69	0.33	0.33
6405-6-4-O	9/16-18	1/4-18	1.18	0.69	0.30	0.43
6405-6-6-O	9/16-18	3/8-18	1.31	0.88	0.30	0.57
6405-6-8-O	9/16-18	1/2-14	1.50	1.13	0.30	0.70
6405-8-2-O	3/4-16	1/8-27	0.80	0.88	0.33	0.33
6405-8-4-O	3/4-16	1/4-18	1.02	0.88	0.43	0.43
6405-8-6-O	3/4-16	3/8-18	1.26	0.88	0.39	0.57
6405-8-8-O	3/4-16	1/2-14	1.63	1.13	0.39	0.70
6405-8-12-O	3/4-16	3/4-14	1.63	1.38	0.39	0.91
6405-10-2-O	7/8-14	1/8-27	0.93	1.00	0.33	0.33
6405-10-4-O	7/8-14	1/4-18	0.93	1.00	0.43	0.43
6405-10-6-O	7/8-14	3/8-18	1.28	1.00	0.48	0.57
6405-10-8-O	7/8-14	1/2-14	1.55	1.13	0.48	0.70
6405-10-12-O	7/8-14	3/4-14	1.64	1.38	0.48	0.91
6405-12-4-O	1 1/16-12	1/4-18	1.09	1.25	0.43	0.43
6405-12-6-O	1 1/16-12	3/8-18	1.09	1.25	0.57	0.57
6405-12-8-O	1 1/16-12	1/2-14	1.50	1.25	0.61	0.70
6405-12-12-O	1 1/16-12	3/4-14	1.59	1.38	0.61	0.91
6405-12-16-O	1 1/16-12	1-11 1/2	1.95	1.63	0.61	1.14
6405-12-24-O	1 1/16-12	1 1/2-11 1/2	2.27	2.38	0.61	1.72
6405-14-8-O	1 3/16-12	1/2-14	1.47	1.38	0.70	0.70
6405-14-12-O	1 3/16-12	3/4-14	1.60	1.38	0.72	0.91
6405-16-2-O	1 5/16-12	1/8-2	1.12	1.50	0.33	0.33
6405-16-4-O	1 5/16-12	1/4-18	1.12	1.50	0.43	0.43
6405-16-6-O	1 5/16-12	3/8-18	1.00	1.50	0.57	0.57
6405-16-8-O	1 5/16-12	1/2-14	1.47	1.50	0.70	0.70
6405-16-12-O	1 5/16-12	3/4-14	1.62	1.50	0.84	0.91
6405-16-16-O	1 5/16-12	1-11 1/2	1.90	1.63	0.84	1.14
6405-16-20-O	1 5/16-12	1 1/4-11 1/2	2.09	2.00	0.84	1.48
6405-16-24-O	1 5/16-12	1 1/2-11 1/2	2.28	2.38	0.84	1.72
6405-20-4-O	1 5/8-12	1/4-18	1.20	1.88	0.43	0.43
6405-20-6-O	1 5/8-12	3/8-18	1.20	1.88	0.57	0.57
6405-20-8-O	1 5/8-12	1/2-14	1.20	1.88	0.70	0.70
6405-20-12-O	1 5/8-12	3/4-14	1.20	1.88	0.91	0.91

6405 STRAIGHT THREAD/FEMALE PIPE ADAPTER (CON'T)



PART NO	B UN/UNF-2A	A NPTF	L31	C1	D	TAP DRILL
6405-20-16-O	1 5/8-12	1-11 1/2	1.20	1.88	1.08	1.14
6405-20-20-O	1 5/8-12	1 1/4-11 1/2	1.95	2.00	1.08	1.48
6405-20-24-O	1 5/8-12	1 1/2-11 1/2	2.27	2.38	1.08	1.72
6405-24-12-O	1 7/8-12	3/4-14	1.00	2.13	0.91	0.91
6405-24-16-O	1 7/8-12	1-11 1/2	1.27	2.13	1.14	1.14
6405-24-20-O	1 7/8-12	1 1/4-11 1/2	1.85	2.13	1.31	1.48
6405-24-24-O	1 7/8-12	1 1/2-11 1/2	2.00	2.38	1.31	1.72
6405-32-20-O	2 1/2-12	1 1/4-11 1/2	1.43	2.75	1.48	1.48
6405-32-24-O	2 1/2-12	1 1/2-11 1/2	1.43	2.75	2.38	1.72
6405-32-32-O	2 1/2-12	2-11 1/2	2.23	2.88	1.78	2.19

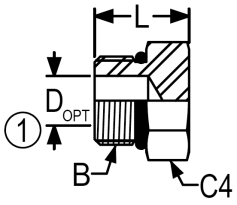
6407 STRAIGHT THREAD ADJUSTABLE UNION



PART NO	B (1) UN/UNF-2A	B (2) UN/UNF-2A	L30	C4 (1)	C4 (2)	D (1)	D (2)
6407-4-4 NWO	7/16-20	7/16-20	1.37	0.56	0.56	0.17	0.17
6407-6-6 NWO	9/16-18	9/16-18	1.50	0.69	0.69	0.30	0.30
6407-8-8 NWO	3/4-16	3/4-16	1.56	0.88	0.88	0.39	0.39
6407-10-6 NWO	7/8-14	9/16-18	1.55	1.00	0.69	0.48	0.30
6407-10-10 NWO	7/8-14	7/8-14	1.80	1.00	1.00	0.48	0.48
6407-12-10 NWO	1 1/16-12	7/8-14	1.97	1.25	1.00	0.61	0.48
6407-12-12 NWO	1 1/16-12	1 1/16-12	2.33	1.25	1.25	0.61	0.61
6407-16-12 NWO	1 5/16-12	1 1/16-12	2.28	1.50	1.25	0.84	0.61
6407-16-16 NWO	1 5/16-12	1 5/16-12	2.28	1.50	1.50	0.84	0.84
6407-20-8 NWO	1 5/8-12	3/4-16	2.08	1.88	0.88	1.08	0.39
6407-20-12 NWO	1 5/8-12	1 1/16-12	2.36	1.88	1.25	1.08	0.61
6407-20-20 NWO	1 5/8-12	1 5/8-12	2.13	1.88	1.88	1.08	1.08
6407-20-24 NWO	1 5/8-12	1 7/8-12	2.50	2.13	2.13	1.08	1.31
6407-24-16 NWO	1 7/8-12	1 5/16-12	2.42	2.13	1.50	1.31	0.84
6407-24-24 NWO	1 7/8-12	1 7/8-12	2.42	2.13	2.13	1.31	1.31
6407-32-32 NWO	2 1/2-12	2 1/2-12	2.59	2.75	2.75	1.78	1.78

6408 HEXAGON HEAD O-RING BOSS PLUG

SAE J514 090109A

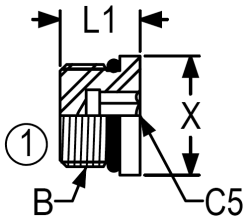


AVAILABLE WITH OR WITHOUT HOLE. CALL CUSTOMER SERVICE FOR AVAILABILITY.

PART NO	B UN/UNF-2A	L	C4	D (OPT)
6408-2-O	5/16-24	0.60	0.44	0.09
6408-3-O	3/8-24	0.60	0.50	0.13
6408-4-O	7/16-20	0.67	0.56	0.20
6408-5-O	1/2-20	0.67	0.63	0.23
6408-6-O	9/16-18	0.73	0.69	0.30
6408-8-O	3/4-16	0.80	0.88	0.42
6408-10-O	7/8-14	0.93	1.00	0.50
6408-12-O	1 1/16-12	1.09	1.25	0.66
6408-14-O	1 3/16-12	1.09	1.38	0.72
6408-16-O	1 5/16-12	1.12	1.50	0.88
6408-20-O	1 5/8-12	1.20	1.88	1.09
6408-24-O	1 7/8-12	1.27	2.13	1.34
6408-32-O	2 1/2-12	1.43	2.75	1.81

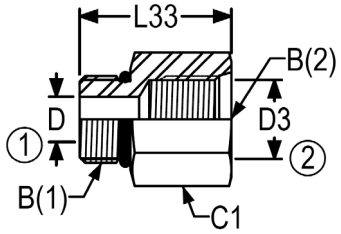
6409 HEXAGON SOCKET O-RING BOSS PLUG

SAE J514 090109B



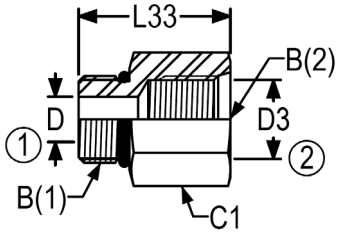
PART NO	B UN/UNF-2A	L1	C5	X
6409-2-O	5/16-24	0.40	0.13	0.44
6409-3-O	3/8-24	0.40	0.13	0.50
6409-4-O	7/16-20	0.47	0.19	0.56
6409-5-O	1/2-20	0.47	0.19	0.63
6409-6-O	9/16-18	0.50	0.25	0.69
6409-8-O	3/4-16	0.58	0.31	0.88
6409-10-O	7/8-14	0.65	0.38	1.00
6409-12-O	1 1/16-12	0.77	0.56	1.25
6409-14-O	1 3/16-12	0.77	0.56	1.38
6408-16-O	1 5/16-12	0.77	0.63	1.50
6409-20-O	1 5/8-12	0.77	0.75	1.88
6409-24-O	1 7/8-12	0.77	0.75	2.13
6409-32-O	2 1/2-12	0.77	0.75	2.75

6410 STRAIGHT THREAD REDUCER/EXPANDER



PART NO	B (1) UN/UNF-2A	B (2) UN/UNF-2B	L33	C1	D	D3
6410-4-4-O	7/16-20	7/16-20	1.25	0.69	0.17	0.38
6410-4-6-O	7/16-20	9/16-18	1.20	0.88	0.17	0.50
6410-5-4-O	1/2-20	7/16-20	1.05	0.69	0.23	0.38
6410-6-3-O	9/16-18	3/8-24	0.98	0.75	0.19	0.33
6410-6-4-O	9/16-18	7/16-20	1.03	0.69	0.30	0.38
6410-6-5-O	9/16-18	1/2-20	1.09	0.81	0.30	0.50
6410-6-6-O	9/16-18	9/16-18	1.16	0.88	0.30	0.50
6410-6-8-O	9/16-18	3/4-16	1.32	1.00	0.30	0.68
6410-6-10-O	9/16-18	7/8-14	1.40	1.13	0.30	0.80
6410-6-12-O	9/16-18	1 1/16-12	1.70	1.38	0.30	0.97
6410-8-3-O	3/4-16	3/8-24	0.63	0.88	0.31	0.31
6410-8-4-O	3/4-16	7/16-20	0.80	0.88	0.38	0.38
6410-8-5-O	3/4-16	1/2-20	0.75	0.88	0.45	0.45
6410-8-6-O	3/4-16	9/16-18	1.16	0.88	0.39	0.50
6410-8-8-O	3/4-16	3/4-16	1.31	1.00	0.39	0.68
6410-8-10-O	3/4-16	7/8-14	1.47	1.13	0.39	0.80
6410-8-12-O	3/4-16	1 1/16-12	1.66	1.38	0.39	0.97
6410-10-4-O	7/8-14	7/16-20	0.93	1.00	0.38	0.38
6410-10-6-O	7/8-14	9/16-18	0.93	1.00	0.50	0.50
6410-10-8-O	7/8-14	3/4-16	1.34	1.00	0.48	0.68
6410-10-10-O	7/8-14	7/8-14	1.47	1.13	0.48	0.80
6410-10-12-O	7/8-14	1 1/16-12	1.69	1.38	0.48	0.97
6410-10-16-O	7/8-14	1 5/16-12	1.78	1.63	0.48	1.22
6410-12-4-O	1 1/16-12	7/16-20	1.00	1.25	0.38	0.38
6410-12-6-O	1 1/16-12	9/16-18	1.09	1.25	0.50	0.50
6410-12-8-O	1 1/16-12	3/4-16	1.09	1.25	0.68	0.68
6410-12-10-O	1 1/16-12	7/8-14	1.56	1.25	0.61	0.80
6410-12-12-O	1 1/16-12	1 1/16-12	1.75	1.38	0.61	0.97
6410-12-16-O	1 1/16-12	1 5/16-12	1.81	1.63	0.61	1.22
6410-14-4-O	1 3/16-12	7/16-20	1.20	1.38	0.38	0.38
6410-14-10-O	1 3/16-12	7/8-14	1.09	1.38	0.80	0.80
6410-14-12-O	1 3/16-12	1 1/16-12	1.72	1.38	0.72	0.97
6410-14-16-O	1 3/16-12	1 5/16-12	1.81	1.63	0.72	1.22
6410-16-6-O	1 5/16-12	9/16-18	1.00	1.50	0.50	0.50
6410-16-8-O	1 5/16-12	3/4-16	1.12	1.50	0.68	0.68
6410-16-10-O	1 5/16-12	7/8-14	1.12	1.50	0.80	0.80
6410-16-12-O	1 5/16-12	1 1/16-12	1.70	1.50	0.84	0.97

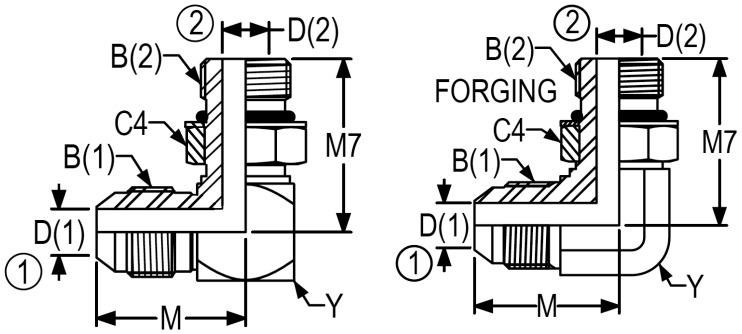
6410 STRAIGHT THREAD REDUCER/EXPANDER (Con't)



PART NO	B (1) UN/UNF-2A	B (2) UN/UNF-2B	L33	C1	D	D3
6410-16-14-O	1 5/16-12	1 3/16-12	1.72	1.50	0.84	1.10
6410-16-20-O	1 5/16-12	1 5/8-12	2.00	2.00	0.84	1.53
6410-20-6-O	1 5/8-12	9/16-18	1.00	1.88	0.62	0.62
6410-20-10-O	1 5/8-12	7/8-14	1.20	1.88	0.80	0.80
6410-20-12-O	1 5/8-12	1 1/16-12	1.20	1.88	0.97	0.97
6410-20-16-O	1 5/8-12	1 5/16-12	1.20	1.88	1.22	1.22
6410-20-24-O	1 5/8-12	1 7/8-12	1.88	2.25	1.08	1.78
6410-24-6-O	1 7/8-12	9/16-18	1.27	2.13	0.50	0.50
6410-24-8-O	1 7/8-12	3/4-16	1.28	2.13	0.68	0.68
6410-24-12-O	1 7/8-12	1 1/16-12	1.26	2.13	0.97	0.97
6410-24-16-O	1 7/8-12	1 5/16-12	1.27	2.13	1.22	1.22
6410-24-20-O	1 7/8-12	1 5/8-12	1.75	2.13	1.31	1.53
6410-32-6-O	2 1/2-12	9/16-18	1.43	2.75	0.50	0.50
6410-32-8-O	2 1/2-12	3/4-16	1.43	2.75	0.68	0.68
6410-32-12-O	2 1/2-12	1 1/16-12	1.43	2.75	0.96	0.98
6410-32-20-O	2 1/2-12	1 5/8-12	1.43	2.75	1.53	1.72
6410-32-24-O	2 1/2-12	1 7/8-12	1.43	2.75	1.78	1.78

6801 90 DEGREE STRAIGHT THREAD ELBOW

SAE J514 070220
MS51527

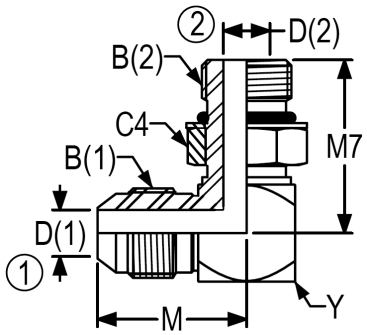


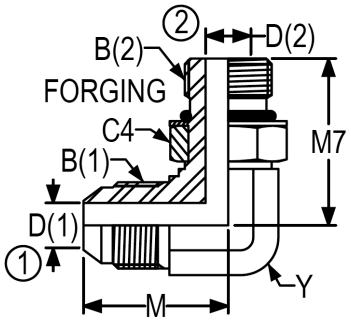
*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M	M7	C4	Y	D (1)	D (2)
6801-2-2 NWO	1/8	5/16-24	5/16-24	0.77	0.94	0.44	0.44	0.06	0.06
6801-2-2 NWO-FG	1/8	5/16-24	5/16-24	0.77	0.94	0.44	0.44	0.06	0.06
6801-2-4 NWO	1/8	5/16-24	7/16-20	0.81	1.03	0.56	0.50	0.06	0.17
6801-3-3 NWO-FG	3/16	3/8-24	3/8-24	0.83	0.94	0.50	0.44	0.13	0.13
6801-3-5 NWO	3/16	3/8-24	1/2-20	0.89	1.13	0.56	0.56	0.13	0.23
6801-3-6 NWO	3/16	3/8-24	9/16-18	0.92	1.25	0.69	0.63	0.13	0.30
6801-4-2 NWO	1/4	7/16-20	5/16-24	0.89	0.97	0.44	0.50	0.17	0.06
6801-4-2 NWO-FG	1/4	7/16-20	5/16-24	0.89	1.03	0.44	0.44	0.17	0.06
6801-4-3 NWO	1/4	7/16-20	3/8-24	0.89	0.97	0.50	0.50	0.17	0.13
6801-4-3 NWO-FG	1/4	7/16-20	3/8-24	0.89	0.92	0.50	0.44	0.17	0.13
6801-4-4 NWO	1/4	7/16-20	7/16-20	0.89	1.03	0.56	0.50	0.17	0.17
6801-4-4 NWO-FG	1/4	7/16-20	7/16-20	0.89	1.03	0.56	0.44	0.17	0.17
6801-4-5 NWO	1/4	7/16-20	1/2-20	0.92	1.13	0.63	0.56	0.17	0.23
6801-4-5 NWO-FG	1/4	7/16-20	1/2-20	0.95	1.13	0.63	0.56	0.17	0.23
6801-4-6 NWO	1/4	7/16-20	9/16-18	0.95	1.25	0.69	0.63	0.17	0.30
6801-4-6 NWO-FG	1/4	7/16-20	9/16-18	1.05	1.25	0.69	0.56	0.17	0.30
6801-4-8 NWO	1/4	7/16-20	3/4-16	1.05	1.45	0.88	0.81	0.17	0.39
6801-4-8 NWO-FG	1/4	7/16-20	3/4-16	1.12	1.45	0.88	0.75	0.17	0.39
6801-4-10 NWO	1/4	7/16-20	7/8-14	1.11	1.70	1.00	0.94	0.17	0.48
6801-4-12 NWO	1/4	7/16-20	1 1/16-12	1.20	1.94	1.25	1.13	0.17	0.61
6801-5-4 NWO	5/16	1/2-20	7/16-20	0.95	1.06	0.56	0.56	0.23	0.17
6801-5-4 NWO-FG	5/16	1/2-20	7/16-20	0.95	1.13	0.56	0.56	0.23	0.17
6801-5-5 NWO	5/16	1/2-20	1/2-20	0.95	1.13	0.63	0.56	0.23	0.23
6801-5-5 NWO-FG	5/16	1/2-20	1/2-20	0.95	1.13	0.63	0.56	0.23	0.23
6801-5-6 NWO	5/16	1/2-20	9/16-18	0.98	1.25	0.69	0.63	0.23	0.30
6801-5-6 NWO-FG	5/16	1/2-20	9/16-18	1.05	1.25	0.69	0.56	0.23	0.30
6801-5-8 NWO	5/16	1/2-20	3/4-16	1.08	1.45	0.88	0.81	0.23	0.39
6801-5-10 NWO	5/16	1/2-20	7/8-14	1.14	1.70	1.00	0.94	0.23	0.48
6801-6-4 NWO	3/8	9/16-18	7/16-20	1.06	1.09	0.56	0.63	0.30	0.17
6801-6-4 NWO-FG	3/8	9/16-18	7/16-20	1.06	1.19	0.56	0.56	0.30	0.17
6801-6-5 NWO	3/8	9/16-18	1/2-20	1.06	1.16	0.63	0.63	0.30	0.23
6801-6-5 NWO-FG	3/8	9/16-18	1/2-20	1.06	1.19	0.63	0.56	0.30	0.23
6801-6-6 NWO	3/8	9/16-18	9/16-18	1.06	1.25	0.69	0.63	0.30	0.30
6801-6-6 NWO-FG	3/8	9/16-18	9/16-18	1.06	1.25	0.69	0.56	0.30	0.30
6801-6-8 NWO	3/8	9/16-18	3/4-16	1.15	1.45	0.88	0.81	0.30	0.39
6801-6-8 NWO-FG	3/8	9/16-18	3/4-16	1.14	1.45	0.88	0.75	0.30	0.39

6801 90 DEGREE STRAIGHT THREAD ELBOW (Con't)

SAE J514 070220
MS51527





*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M	M7	C4	Y	D (1)	D (2)
6801-6-10 NWO	3/8	9/16-18	7/8-14	1.22	1.70	1.00	0.94	0.30	0.48
6801-6-10 NWO-FG	3/8	9/16-18	7/8-14	1.22	1.70	1.00	0.88	0.30	0.48
6801-6-12 NWO	3/8	9/16-18	1 1/16-12	1.31	1.94	1.25	1.13	0.30	0.61
6801-6-12 NWO-FG	3/8	9/16-18	1 1/16-12	1.31	1.94	1.25	1.06	0.30	0.61
6801-8-4 NWO	1/2	3/4-16	7/16-20	1.25	1.18	0.56	0.81	0.39	0.17
6801-8-5 NWO	1/2	3/4-16	1/2-20	1.25	1.25	0.63	0.81	0.39	0.23
6801-8-6 NWO	1/2	3/4-16	9/16-18	1.25	1.34	0.69	0.81	0.39	0.30
6801-8-6 NWO-FG	1/2	3/4-16	9/16-18	1.25	1.32	0.69	0.75	0.39	0.30
6801-8-8 NWO	1/2	3/4-16	3/4-16	1.25	1.45	0.88	0.81	0.39	0.39
6801-8-8 NWO-FG	1/2	3/4-16	3/4-16	1.25	1.45	0.88	0.75	0.39	0.39
6801-8-10 NWO	1/2	3/4-16	7/8-14	1.31	1.70	1.00	0.94	0.39	0.48
6801-8-10 NWO-FG	1/2	3/4-16	7/8-14	1.33	1.70	1.00	0.88	0.39	0.48
6801-8-12 NWO	1/2	3/4-16	1 1/16-12	1.40	1.94	1.25	1.13	0.39	0.61
6801-8-12 NWO-FG	1/2	3/4-16	1 1/16-12	1.42	1.94	1.25	1.06	0.39	0.61
6801-8-14 NWO	1/2	3/4-16	1 3/16-12	1.47	2.00	1.38	1.25	0.39	0.72
6801-8-16 NWO	1/2	3/4-16	1 5/16-12	1.53	2.05	1.50	1.38	0.39	0.84
6801-10-6 NWO	5/8	7/8-14	9/16-18	1.45	1.40	0.69	0.94	0.48	0.30
6801-10-6 NWO-FG	5/8	7/8-14	9/16-18	1.45	1.41	0.69	0.88	0.48	0.29
6801-10-8 NWO	5/8	7/8-14	3/4-16	1.45	1.51	0.88	0.94	0.48	0.39
6801-10-8 NWO-FG	5/8	7/8-14	3/4-16	1.45	1.54	0.88	0.88	0.48	0.39
6801-10-10 NWO	5/8	7/8-14	7/8-14	1.45	1.70	1.00	0.94	0.48	0.48
6801-10-10 NWO-FG	5/8	7/8-14	7/8-14	1.45	1.70	1.00	0.88	0.48	0.48
6801-10-12 NWO	5/8	7/8-14	1 1/16-12	1.55	1.94	1.25	1.13	0.48	0.61
6801-10-12 NWO-FG	5/8	7/8-14	1 1/16-12	1.54	1.94	1.25	1.06	0.48	0.61
6801-10-14 NWO	5/8	7/8-14	1 3/16-12	1.61	2.00	1.38	1.25	0.48	0.72
6801-10-16 NWO	5/8	7/8-14	1 5/16-12	1.67	2.05	1.50	1.38	0.48	0.84
6801-10-20 NWO	5/8	7/8-14	1 5/8-12	1.86	2.25	1.88	1.75	0.48	1.08
6801-12-6 NWO	3/4	1 1/16-12	9/16-18	1.66	1.50	0.69	1.13	0.61	0.30
6801-12-8 NWO	3/4	1 1/16-12	3/4-16	1.66	1.61	0.88	1.13	0.61	0.39
6801-12-8 NWO-FG	3/4	1 1/16-12	3/4-16	1.66	1.62	0.88	1.06	0.61	0.39
6801-12-10 NWO	3/4	1 1/16-12	7/8-14	1.66	1.80	1.00	1.13	0.61	0.48
6801-12-10 NWO-FG	3/4	1 1/16-12	7/8-14	1.66	1.78	1.00	1.06	0.61	0.48
6801-12-12 NWO	3/4	1 1/16-12	1 1/16-12	1.66	1.94	1.25	1.13	0.61	0.61
6801-12-12 NWO-FG	3/4	1 1/16-12	1 1/16-12	1.66	1.94	1.25	1.06	0.61	0.61
6801-12-14 NWO	3/4	1 1/16-12	1 3/16-12	1.72	2.00	1.38	1.25	0.61	0.72

6801 90 DEGREE STRAIGHT THREAD ELBOW (Con't)

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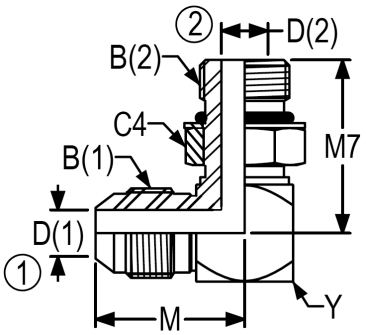
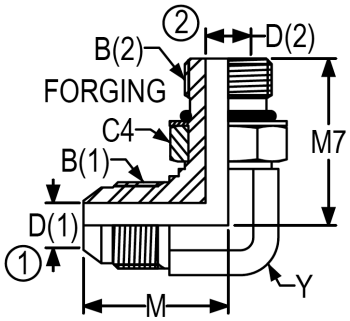


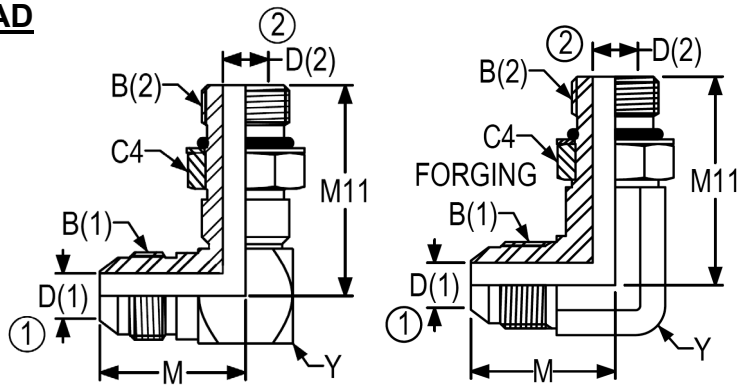


*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M	M7	C4	Y	D (1)	D (2)
6801-12-16 NWO	3/4	1 1/16-12	1 5/16-12	1.78	2.05	1.50	1.38	0.61	0.84
6801-12-16 NWO-FG	3/4	1 1/16-12	1 5/16-12	1.76	2.05	1.50	1.31	0.61	0.84
6801-12-20 NWO	3/4	1 1/16-12	1 5/8-12	1.97	2.25	1.88	1.75	0.61	1.08
6801-14-12 NWO	7/8	1 3/16-12	1 1/16-12	1.80	2.00	1.25	1.25	0.72	0.61
6801-14-14 NWO	7/8	1 3/16-12	1 3/16-12	1.80	2.00	1.38	1.25	0.72	0.72
6801-14-14 NWO-FG	7/8	1 3/16-12	1 3/16-12	1.80	2.00	1.38	1.31	0.72	0.72
6801-14-16 NWO	7/8	1 3/16-12	1 5/16-12	1.86	2.05	1.50	1.38	0.72	0.84
6801-16-8 NWO	1	1 5/16-12	3/4-16	1.81	1.73	0.88	1.38	0.84	0.39
6801-16-10 NWO	1	1 5/16-12	7/8-14	1.81	1.92	1.00	1.38	0.84	0.48
6801-16-12 NWO	1	1 5/16-12	1 1/16-12	1.81	2.06	1.25	1.38	0.84	0.61
6801-16-12 NWO-FG	1	1 5/16-12	1 1/16-12	1.81	2.05	1.25	1.31	0.84	0.61
6801-16-14 NWO	1	1 5/16-12	1 3/16-12	1.81	2.06	1.38	1.38	0.84	0.72
6801-16-14 NWO-FG	1	1 5/16-12	1 3/16-12	1.81	2.05	1.38	1.31	0.84	0.72
6801-16-16 NWO	1	1 5/16-12	1 5/16-12	1.81	2.05	1.50	1.38	0.84	0.84
6801-16-16 NWO-FG	1	1 5/16-12	1 5/16-12	1.81	2.05	1.50	1.31	0.84	0.84
6801-16-20 NWO	1	1 5/16-12	1 5/8-12	2.00	2.25	1.88	1.75	0.84	1.08
6801-16-20 NWO-FG	1	1 5/16-12	1 5/8-12	2.01	2.25	1.88	1.63	0.84	1.08
6801-16-24 NWO	1	1 5/16-12	1 7/8-12	2.39	2.13	2.13	2.00	0.84	1.31
6801-20-12 NWO	1 1/4	1 5/8-12	1 1/16-12	2.06	2.25	1.25	1.75	1.08	0.61
6801-20-14 NWO	1 1/4	1 5/8-12	1 3/16-12	2.06	2.25	1.38	1.75	1.08	0.72
6801-20-16 NWO	1 1/4	1 5/8-12	1 5/16-12	2.06	2.23	1.50	1.75	1.08	0.84
6801-20-16 NWO-FG	1 1/4	1 5/8-12	1 5/16-12	2.06	2.25	1.50	1.63	1.08	0.84
6801-20-20 NWO	1 1/4	1 5/8-12	1 5/8-12	2.06	2.25	1.88	1.75	1.08	1.08
6801-20-20 NWO-FG	1 1/4	1 5/8-12	1 5/8-12	2.06	2.25	1.88	1.63	1.08	1.08
6801-20-24 NWO	1 1/4	1 5/8-12	1 7/8-12	2.19	2.39	2.13	2.00	1.08	1.31
6801-20-24 NWO-FG	1 1/4	1 5/8-12	1 7/8-12	2.20	2.39	2.13	1.88	1.08	1.31
6801-24-16 NWO	1 1/2	1 7/8-12	1 5/16-12	2.33	2.36	1.50	2.00	1.31	0.84
6801-24-20 NWO	1 1/2	1 7/8-12	1 5/8-12	2.33	2.38	1.88	2.00	1.31	1.08
6801-24-24 NWO	1 1/2	1 7/8-12	1 7/8-12	2.33	2.39	2.13	2.00	1.31	1.31
6801-24-24 NWO-FG	1 1/2	1 7/8-12	1 7/8-12	2.33	2.39	2.13	1.88	1.31	1.31
6801-32-24 NWO	2	2 1/2-12	1 7/8-12	3.06	2.70	2.13	2.63	1.78	1.31
6801-32-24 NWO-FG	2	2 1/2-12	1 7/8-12	3.06	2.89	2.13	2.50	1.31	1.78
6801-32-32 NWO	2	2 1/2-12	2 1/2-12	3.06	2.89	2.75	2.63	1.78	1.78

6801-L 90 DEGREE STRAIGHT THREAD ELBOW LONG

SAE J514 071520



PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M	M11	C4	Y	D (1)	D (2)
6801-L-4-4 NWO	1/4	7/16-20	7/16-20	0.89	1.19	0.56	0.50	0.17	0.17
6801-L-4-4 NWO-FG	1/4	7/16-20	7/16-20	0.89	1.19	0.56	0.44	0.17	0.17
6801-L-4-6 NWO	1/4	7/16-20	9/16-18	0.95	1.66	0.69	0.63	0.17	0.30
6801-L-4-12 NWO	1/4	7/16-20	1 1/16-12	1.20	2.47	1.25	1.13	0.17	0.61
6801-L-5-5 NWO	5/16	1/2-20	1/2-20	0.95	1.22	0.63	0.56	0.23	0.23
6801-L-6-6 NWO	3/8	9/16-18	9/16-18	1.06	1.66	0.69	0.63	0.30	0.30
6801-L-6-6 NWO-FG	3/8	9/16-18	9/16-18	1.06	1.66	0.69	0.56	0.30	0.30
6801-L-6-8 NWO	3/8	9/16-18	3/4-16	1.16	1.81	0.88	0.81	0.30	0.39
6801-L-6-10 NWO	3/8	9/16-18	7/8-14	1.22	2.16	1.00	0.94	0.30	0.48
6801-L-8-6 NWO	1/2	3/4-16	9/16-18	1.25	1.75	0.69	0.81	0.39	0.30
6801-L-8-8 NWO	1/2	3/4-16	3/4-16	1.25	1.81	0.88	0.81	0.39	0.39
6801-L-8-8 NWO-FG	1/2	3/4-16	3/4-16	1.25	1.81	0.88	0.75	0.39	0.39
6801-L-8-10 NWO	1/2	3/4-16	7/8-14	1.31	2.16	1.00	0.94	0.39	0.48
6801-L-8-12 NWO	1/2	3/4-16	1 1/16-12	1.41	2.47	1.25	1.13	0.39	0.61
6801-L-10-8 NWO	5/8	7/8-14	3/4-16	1.45	1.88	0.88	0.94	0.48	0.39
6801-L-10-10 NWO	5/8	7/8-14	7/8-14	1.45	2.16	1.00	0.94	0.48	0.48
6801-L-10-10 NWO-FG	5/8	7/8-14	7/8-14	1.45	2.26	1.00	0.88	0.48	0.48
6801-L-10-12 NWO	5/8	7/8-14	1 1/16-12	1.55	2.47	1.25	1.13	0.48	0.61
6801-L-12-10 NWO	3/4	1 1/16-12	7/8-14	1.66	2.25	1.00	1.13	0.61	0.48
6801-L-12-12 NWO	3/4	1 1/16-12	1 1/16-12	1.66	2.47	1.25	1.13	0.61	0.61
6801-L-12-12 NWO-FG	3/4	1 1/16-12	1 1 /16-12	1.66	2.47	1.25	1.06	0.61	0.61
6801-L-16-12 NWO	1	1 5/16-12	1 1/16-12	1.81	2.59	1.25	1.38	0.84	0.61
6801-L-16-16 NWO	1	1 5/16-12	1 5/16-12	1.81	3.06	1.50	1.38	0.84	0.84
6801-L-20-20 NWO	1 1/4	1 5/8-12	1 5/8-12	2.06	3.48	1.88	1.75	1.08	1.08

6801-LL 90 DEGREE STRAIGHT THREAD ELBOW EXTRA LONG

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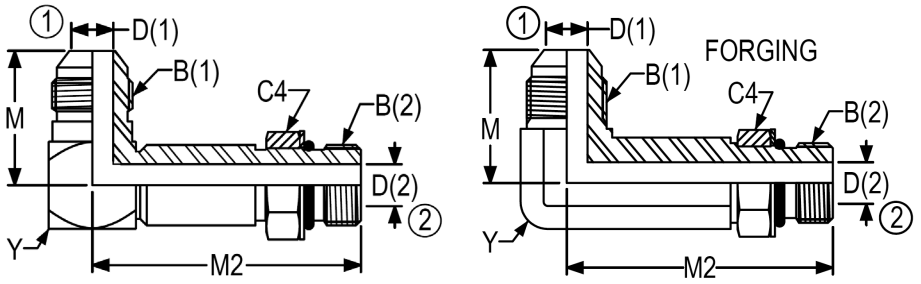
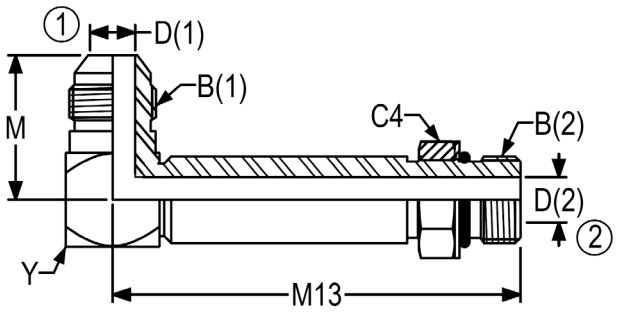


PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M	M12	C4	Y	D (1)	D (2)
6801-LL-4-4 NWO	1/4	7/16-20	7/16-20	0.89	1.73	0.56	0.50	0.17	0.17
6801-LL-4-4 NWO-FG	1/4	7/16-20	7/16-20	0.89	1.73	0.56	0.44	0.17	0.17
6801-LL-4-6 NWO	1/4	7/16-20	9/16-18	0.95	2.08	0.69	0.63	0.17	0.30
6801-LL-6-4 NWO	3/8	9/16-18	7/16-20	1.06	1.78	0.56	0.63	0.30	0.17
6801-LL-6-6 NWO	3/8	9/16-18	9/16-18	1.06	2.08	0.69	0.63	0.30	0.30
6801-LL-6-6 NWO-FG	3/8	9/16-18	9/16-18	1.06	2.08	0.69	0.56	0.30	0.30
6801-LL-6-8 NWO	3/8	9/16-18	3/4-16	1.16	2.50	0.88	0.81	0.30	0.39
6801-LL-8-6 NWO	1/2	3/4-16	9/16-18	1.25	2.17	0.69	0.81	0.39	0.30
6801-LL-8-8 NWO	1/2	3/4-16	3/4-16	1.25	2.50	0.88	0.81	0.39	0.39
6801-LL-8-8 NWO-FG	1/2	3/4-16	3/16-16	1.25	2.50	0.88	0.75	0.39	0.39
6801-LL-8-10 NWO	1/2	3/4-16	7/8-14	1.31	3.25	1.00	0.94	0.39	0.48
6801-LL-8-12 NWO	1/2	3/4-16	1 1/16-12	1.41	3.34	1.25	1.13	0.39	0.61
6801-LL-10-8 NWO	5/8	7/8-14	3/4-16	1.45	2.56	0.88	0.94	0.48	0.39
6801-LL-10-10 NWO	5/8	7/8-14	7/8-14	1.45	3.25	1.00	0.94	0.48	0.48
6801-LL-10-12 NWO-FG	5/8	7/8-14	1 1/16-12	1.54	3.34	1.25	1.06	0.48	0.61
6801-LL-12-8 NWO	3/4	1 1/16-12	3/4-16	1.66	2.66	0.88	1.13	0.61	0.39
6801-LL-12-12 NWO	3/4	1 1/16-12	1 1/16-12	1.66	3.34	1.25	1.13	0.61	0.61
6801-LL-12-16 NWO	3/4	1 1/16-12	1 5/16-12	1.78	3.72	1.50	1.38	0.61	0.84
6801-LL-16-10 NWO	1	1 5/16-12	7/8-14	1.81	3.47	1.00	1.38	0.84	0.48
6801-LL-16-12 NWO	1	1 5/16-12	1 1/16-12	1.81	3.47	1.25	1.38	0.84	0.61
6801-LL-16-16 NWO	1	1 5/16-12	1 5/16-12	1.81	3.72	1.50	1.38	0.84	0.84
6801-LL-20-16 NWO	1 1/4	1 5/8-12	1 5/16-12	2.06	3.91	1.50	1.75	1.08	0.84
6801-LL-20-20 NWO	1 1/4	1 5/8-12	1 5/8-12	2.06	4.41	1.88	1.75	1.08	1.08

6801-LLL 90 DEGREE STRAIGHT THREAD ELBOW EXTRA EXTRA LONG

SAE J514 072120 formerly 071720



PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M	M13	C4	Y	D (1)	D (2)
6801-LLL-4-4 NWO	1/4	7/16-20	7/16-20	0.89	2.44	0.56	0.50	0.17	0.17
6801-LLL-6-6 NWO	3/8	9/16-18	9/16-18	1.06	3.06	0.69	0.63	0.30	0.30
6801-LLL-6-8 NWO	3/8	9/16-18	3/4-16	1.16	3.53	0.88	0.81	0.30	0.39
6801-LLL-8-8 NWO	1/2	3/4-16	3/4-16	1.25	3.53	0.88	0.81	0.39	0.39
6801-LLL-10-10 NWO	5/8	7/8-14	7/8-14	1.45	3.69	1.00	0.94	0.48	0.48
6801-LLL-12-8-NWO	3/4	1 1/16-12	3/4-16	1.66	3.69	0.88	1.13	0.61	0.39
6801-LLL-16-16 NWO	1	1 5/16-12	1 5/16-12	1.81	5.39	1.50	1.38	0.84	0.84

6802 45 DEGREE STRAIGHT THREAD ELBOW

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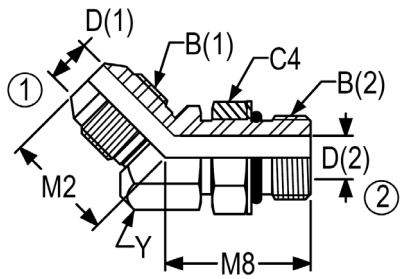
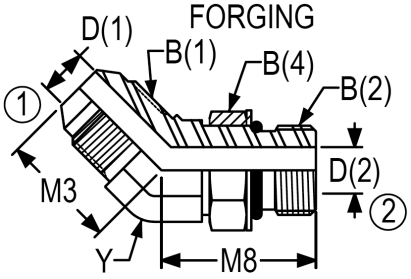
MS51528



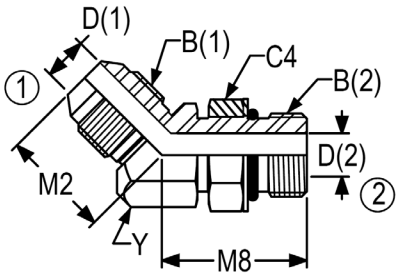


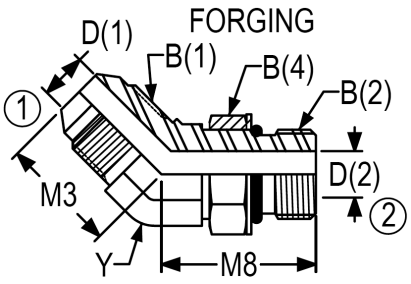
*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M2	M8	C4	Y	D (1)	D (2)
6802-4-4 NWO	1/4	7/16-20	7/16-20	0.72	1.05	0.56	0.50	0.17	0.17
6802-4-4 NWO-FG	1/4	7/16-20	7/16-20	0.72	1.05	0.56	0.44	0.17	0.17
6802-4-5 NWO	1/4	7/16-20	1/2-20	0.75	1.05	0.63	0.56	0.17	0.23
6802-4-5 NWO-FG	1/4	7/16-20	1/2-20	0.72	1.05	0.63	0.56	0.17	0.23
6802-4-6 NWO	1/4	7/16-20	9/16-18	0.72	1.14	0.69	0.63	0.17	0.30
6802-4-6 NWO-FG	1/4	7/16-20	9/16-18	0.82	1.14	0.56	0.56	0.17	0.30
6802-4-8 NWO	1/4	7/16-20	3/4-16	0.85	1.30	0.88	0.81	0.17	0.39
6802-5-3 NWO	5/16	1/2-20	3/8-24	0.77	0.92	0.56	0.56	0.23	0.13
6802-5-4 NWO	5/16	1/2-20	7/16-20	0.77	0.99	0.56	0.56	0.23	0.17
6802-5-5 NWO	5/16	1/2-20	1/2-20	0.77	1.05	0.63	0.56	0.23	0.23
6802-5-5 NWO-FG	5/16	1/2-20	1/2-20	0.77	1.05	0.63	0.56	0.23	0.23
6802-6-4 NWO	3/8	9/16-18	7/16-20	0.83	1.01	0.56	0.63	0.30	0.17
6802-6-4 NWO-FG	3/8	9/16-18	7/16-20	0.83	1.08	0.56	0.56	0.30	0.17
6802-6-5 NWO	3/8	9/16-18	1/2-20	0.83	1.06	0.63	0.63	0.30	0.23
6802-6-6 NWO	3/8	9/16-18	9/16-18	0.83	1.14	0.69	0.63	0.30	0.30
6802-6-6 NWO-FG	3/8	9/16-18	9/16-18	0.83	1.14	0.69	0.56	0.30	0.30
6802-6-8 NWO	3/8	9/16-18	3/4-16	0.88	1.30	0.88	0.81	0.30	0.39
6802-6-8 NWO-FG	3/8	9/16-18	3/4-16	0.87	1.30	0.88	0.75	0.30	0.39
6802-6-10 NWO	3/8	9/16-18	7/8-14	0.91	1.52	1.00	0.94	0.30	0.48
6802-6-12 NWO	3/8	9/16-18	1 1/16-12	0.93	1.73	1.25	1.13	0.30	0.61
6802-8-4 NWO	1/2	3/4-16	7/16-20	0.98	1.08	0.56	0.81	0.39	0.17
6802-8-5 NWO	1/2	3/4-16	1/2-20	0.98	1.06	0.63	0.81	0.39	0.23
6802-8-6 NWO	1/2	3/4-16	9/16-18	0.98	1.17	0.69	0.81	0.39	0.30
6802-8-6 NWO-FG	1/2	3/4-16	9/16-18	0.98	1.20	0.69	0.75	0.39	0.30
6802-8-8 NWO	1/2	3/4-16	3/4-16	0.98	1.30	0.88	0.81	0.39	0.39
6802-8-8 NWO-FG	1/2	3/4-16	3/4-16	0.98	1.30	0.88	0.75	0.39	0.39
6802-8-10 NWO	1/2	3/4-16	7/8-14	0.99	1.52	1.00	0.94	0.39	0.48
6802-8-10 NWO-FG	1/2	3/4-16	7/8-14	0.99	1.52	1.00	0.88	0.39	0.48
6802-8-12 NWO	1/2	3/4-16	1 1/16-12	1.05	1.73	1.25	1.13	0.39	0.61
6802-10-8 NWO	5/8	7/8-14	3/4-16	1.11	1.36	0.88	0.94	0.48	0.39
6802-10-8 NWO-FG	5/8	7/8-14	3/4-16	1.11	1.36	0.88	0.88	0.48	0.39
6802-10-10 NWO	5/8	7/8-14	7/8-14	1.11	1.52	1.00	0.94	0.48	0.48
6802-10-10 NWO-FG	5/8	7/8-14	7/8-14	1.11	1.52	1.00	0.88	0.48	0.48
6802-10-12 NWO	5/8	7/8-14	1 1/16-12	1.22	1.73	1.25	1.13	0.48	0.61
6802-10-12 NWO-FG	5/8	7/8-14	1 1/16-12	1.16	1.73	1.25	1.06	0.48	0.61
6802-12-8 NWO	3/4	1 1/16-12	3/4-16	1.28	1.41	0.88	1.13	0.61	0.39
6802-12-10 NWO	3/4	1 1/16-12	7/8-14	1.28	1.57	1.00	1.13	0.61	0.48
6802-12-10 NWO-FG	3/4	1 1/16-12	7/8-14	1.28	1.57	1.00	1.06	0.61	0.48

6802 45 DEGREE STRAIGHT THREAD ELBOW (Con't)

SAE J514 070320
MS51528





*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M2	M8	C4	Y	D (1)	D (2)
6802-12-12 NWO	3/4	1 1/16-12	1 1/16-12	1.28	1.73	1.25	1.13	0.61	0.61
6802-12-12 NWO-FG	3/4	1 1/16-12	1 1/16-12	1.28	1.73	1.25	1.06	0.61	0.61
6802-12-14 NWO	3/4	1 1/16-12	1 3/16-12	1.38	1.86	1.38	1.25	0.61	0.72
6802-12-16 NWO	3/4	1 1/16-12	1 5/16-12	1.45	1.86	1.50	1.38	0.61	0.84
6802-12-16 NWO-FG	3/4	1 1/16-12	1 5/16-12	1.42	1.86	1.50	1.31	0.61	0.84
6802-14-12 NWO	7/8	1 3/16-12	1 1/16-12	1.39	1.80	1.25	1.25	0.72	0.61
6802-14-14 NWO	7/8	1 3/16-12	1 3/16-12	1.45	1.86	1.38	1.25	0.72	0.72
6802-16-12 NWO	1	1 5/16-12	1 1/16-12	1.47	1.86	1.25	1.38	0.84	0.61
6802-16-12 NWO-FG	1	1 5/16-12	1 1/16-12	1.47	1.86	1.25	1.31	0.84	0.61
6802-16-14 NWO	1	1 5/16-12	1 3/16-12	1.47	1.86	1.38	1.38	0.84	0.72
6802-16-16 NWO	1	1 5/16-12	1 5/16-12	1.47	1.86	1.50	1.38	0.84	0.84
6802-16-16 NWO-FG	1	1 5/16-12	1 5/16-12	1.47	1.86	1.50	1.31	0.84	0.84
6802-16-20 NWO	1	1 5/16-12	1 5/8-12	1.55	1.91	1.88	1.75	0.84	1.08
6802-16-20 NWO-FG	1	1 5/16-12	1 5/8-12	1.54	1.91	1.88	1.63	0.84	1.08
6802-20-16 NWO	1 1/4	1 5/8-12	1 5/16-12	1.59	1.91	1.50	1.75	1.08	0.84
6802-20-16 NWO-FG	1 1/4	1 5/8-12	1 5/16-12	1.59	1.91	1.50	1.63	1.08	0.84
6802-20-20 NWO	1 1/4	1 5/8-12	1 5/8-12	1.59	1.91	1.88	1.75	1.08	1.08
6802-20-20 NWO-FG	1 1/4	1 5/8-12	1 5/8-12	1.59	1.91	1.88	1.63	1.08	1.08
6802-20-24 NWO	1 1/4	1 5/8-12	1 7/8-12	1.68	1.91	2.13	2.00	1.08	1.31
6802-24-20 NWO	1 1/2	1 7/8-12	1 5/8-12	1.78	1.91	1.88	2.00	1.31	1.08
6802-24-24 NWO	1 1/2	1 7/8-12	1 7/8-12	1.78	1.91	2.13	2.00	1.31	1.31
6802-24-24 NWO-FG	1 1/2	1 7/8-12	1 7/8-12	1.78	1.91	2.13	1.87	1.31	1.31
6802-32-32 NWO	2	2 1/2-12	2 1/2-12	2.22	1.86	2.75	2.63	1.78	1.78

6803 STRAIGHT THREAD BRANCH TEE

SAE J514 070429
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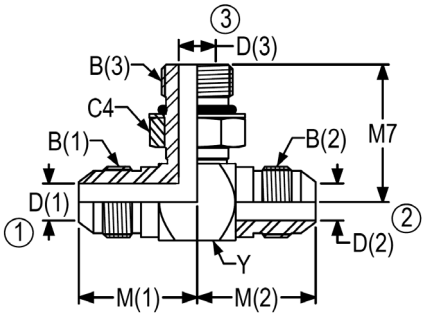

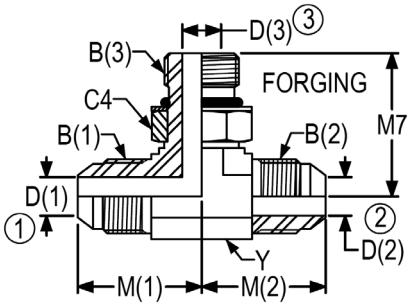

*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M (2)	M7	C4
6803-3-3-6 NWO	3/16-3/16	3/8-24	3/8-24	9/16-18	0.92	0.92	1.25	0.69
6803-4-3-6 NWO	1/4-3/16	7/16-20	3/8-20	9/16-18	0.95	0.92	1.25	0.69
6803-4-4-4 NWO	1/4-1/4	7/16-20	7/16-20	7/16-20	0.89	0.89	1.03	0.56
6803-4-4-4 NWO-FG	1/4-1/4	7/16-20	7/16-20	7/16-20	0.89	0.89	1.03	0.56
6803-4-4-6 NWO	1/4-1/4	7/16-20	7/16-20	9/16-18	0.95	0.95	1.25	0.69
6803-5-5-5 NWO	5/16-5/16	1/2-20	1/2-20	1/2-20	0.95	0.95	1.13	0.63
6803-5-5-5 NWO-FG	5/16-5/16	1/2-20	1/2-20	1/2-20	0.95	0.95	1.13	0.63
6803-6-6-4 NWO	3/8-3/8	9/16-18	9/16-18	7/16-20	1.06	1.06	1.09	0.56
6803-6-6-5 NWO	3/8-3/8	9/16-18	9/16-18	1/2-20	1.06	1.06	1.16	0.63
6803-6-6-6 NWO	3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.06	1.25	0.69
6803-6-6-6 NWO-FG	3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.06	1.25	0.69
6803-6-6-8 NWO	3/8-3/8	9/16-18	9/16-18	3/4-16	1.15	1.15	1.45	0.88
6803-6-6-8 NWO-FG	3/8-3/8	9/16-18	9/16-18	3/4-16	1.14	1.14	1.45	0.88
6803-6-6-12 NWO	3/8-3/8	9/16-18	9/16-18	1 1/16-12	1.31	1.31	1.94	1.25
6803-8-6-6 NWO	1/2-3/8	3/4-16	9/16-18	9/16-18	1.25	1.15	1.34	0.69
6803-8-6-8 NWO	1/2-3/8	3/4-16	9/16-18	3/4-16	1.25	1.15	1.45	0.88
6803-8-8-6 NWO	1/2-1/2	3/4-16	3/4-16	9/16-18	1.25	1.25	1.34	0.69

PART NO	Y	D (1)	D (2)	D (3)
6803-3-3-6 NWO	0.63	0.13	0.13	0.30
6803-4-3-6 NWO	0.63	0.13	0.17	0.30
6803-4-4-4 NWO	0.50	0.17	0.17	0.17
6803-4-4-4 NWO-FG	0.44	0.17	0.17	0.17
6803-4-4-6 NWO	0.63	0.17	0.17	0.30
6803-5-5-5 NWO	0.56	0.23	0.23	0.23
6803-5-5-5 NWO-FG	0.56	0.23	0.23	0.23
6803-6-6-4 NWO	0.63	0.30	0.30	0.17
6803-6-6-5 NWO	0.63	0.30	0.30	0.23
6803-6-6-6 NWO	0.63	0.30	0.30	0.30
6803-6-6-6 NWO-FG	0.56	0.30	0.30	0.30
6803-6-6-8 NWO	0.81	0.30	0.30	0.39
6803-6-6-8 NWO-FG	0.75	0.30	0.30	0.39
6803-6-6-12 NWO	1.13	0.30	0.30	0.61
6803-8-6-6 NWO	0.81	0.39	0.30	0.30
6803-8-6-8 NWO	0.81	0.39	0.30	0.39
6803-8-8-6 NWO	0.81	0.39	0.39	0.30

6803 STRAIGHT THREAD BRANCH TEE (Con't)

SAE J514 070429
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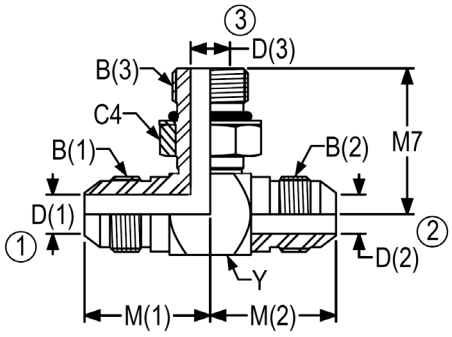

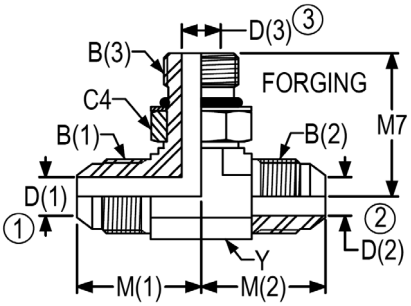

*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M (2)	M7	C4
6803-8-8-8 NWO	1/2-1/2	3/4-16	3/4-16	3/4-16	1.25	1.25	1.45	0.88
6803-8-8-8 NWO-FG	1/2-1/2	3/4-16	3/4-16	3/4-16	1.25	1.25	1.45	0.88
6803-8-8-10 NWO	1/2-1/2	3/4-16	3/4-16	7/8-14	1.31	1.31	1.70	1.00
6803-8-8-12 NWO	1/2-1/2	3/4-16	3/4-16	1 1/16-12	1.40	1.40	1.94	0.88
6803-10-8-8 NWO	5/8-1/2	7/8-14	3/4-16	3/4-16	1.45	1.31	1.51	0.88
6803-10-8-10 NWO	5/8-1/2	7/8-14	3/4-16	7/8-14	1.45	1.31	1.70	1.00
6803-10-10-6 NWO	5/8-5/8	7/8-14	7/8-14	9/16-18	1.45	1.45	1.40	0.69
6803-10-10-8 NWO	5/8-5/8	7/8-14	7/8-14	3/4-16	1.45	1.45	1.51	0.88
6803-10-10-10 NWO	5/8-5/8	7/8-14	7/8-14	7/8-14	1.45	1.45	1.70	1.00
6803-10-10-10 NWO-FG	5/8-5/8	7/8-14	7/8-14	7/8-14	1.45	1.45	1.70	1.00
6803-10-10-12 NWO	5/8-5/8	7/8-14	7/8-14	1 1/16-12	1.55	1.55	1.94	1.25
6803-10-10-12 NWO-FG	5/8-5/8	7/8-14	7/8-14	1 1/16-12	1.54	1.54	1.94	1.25
6803-10-10-16 NWO	5/8-5/8	7/8-14	7/8-14	1 5/16-12	1.67	1.67	2.05	1.50
6803-12-4-12 NWO	3/4-1/4	1 1/16-12	7/16-20	1 1/16-12	1.66	1.20	1.94	1.25
6803-12-6-10 NWO	3/4-3/8	1 1/16-12	9/16-18	7/8-14	1.66	1.31	1.80	1.00
6803-12-8-12 NWO	3/4-1/2	1 1/16-12	3/4-16	1 1/16-12	1.66	1.41	1.94	1.25
6803-12-8-12 NWO-FG	3/4-1/2	1 1/16-12	3/4-16	1 1/16-12	1.66	1.42	1.94	1.25

PART NO	Y	D (1)	D (2)	D (3)
6803-8-8-8 NWO	0.81	0.39	0.39	0.39
6803-8-8-8 NWO-FG	0.75	0.39	0.39	0.39
6803-8-8-10 NWO	0.94	0.39	0.39	0.48
6803-8-8-12 NWO	1.13	0.39	0.39	0.61
6803-10-8-8 NWO	0.94	0.48	0.39	0.39
6803-10-8-10 NWO	0.94	0.48	0.39	0.48
6803-10-10-6 NWO	0.94	0.48	0.48	0.30
6803-10-10-8 NWO	0.94	0.48	0.48	0.39
6803-10-10-10 NWO	0.94	0.48	0.48	0.48
6803-10-10-10 NWO-FG	0.88	0.48	0.48	0.48
6803-10-10-12 NWO	1.13	0.48	0.48	0.61
6803-10-10-12 NWO-FG	1.06	0.48	0.48	0.61
6803-10-10-16 NWO	1.38	0.48	0.48	0.84
6803-12-4-12 NWO	1.13	0.61	0.17	0.61
6803-12-6-10 NWO	1.13	0.61	0.30	0.48
6803-12-8-12 NWO	1.13	0.61	0.39	0.61
6803-12-8-12 NWO-FG	1.06	0.61	0.39	0.61

6803 STRAIGHT THREAD BRANCH TEE (Con't)

SAE J514 070429
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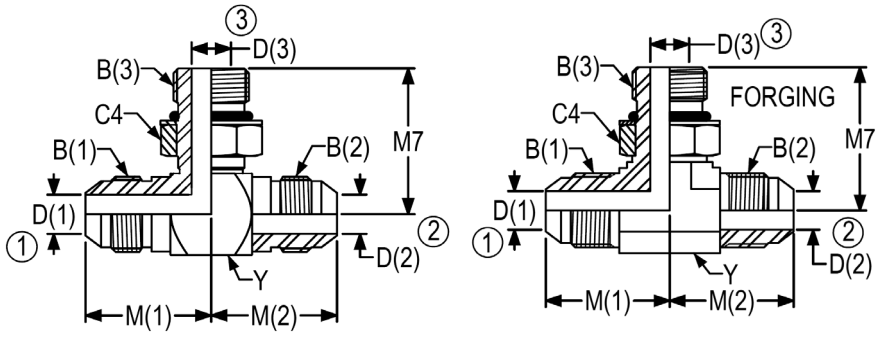

*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M (2)	M7	C4
6803-12-8-16 NWO	3/4-1/2	1 1/16-12	3/4-16	1 5/16-12	1.78	1.53	2.05	1.50
6803-12-10-12 NWO	3/4-5/8	1 1/16-12	7/8-14	1 1/16-12	1.66	1.55	1.94	1.25
6803-12-10-12 NWO-FG	3/4-5/8	1 1/16-12	7/8-14	1 1/16-12	1.66	1.54	1.94	1.25
6803-12-12-6 NWO	3/4-3/4	1 1/16-12	1 1/16-12	9/16-18	1.66	1.66	1.50	0.69
6803-12-12-8 NWO	3/4-3/4	1 1/16-12	1 1/16-12	3/4-16	1.66	1.66	1.61	0.88
6803-12-12-10 NWO	3/4-3/4	1 1/16-12	1 1/16-12	7/8-14	1.66	1.66	1.80	1.00
6803-12-12-10 NWO-FG	3/4-3/4	1 1/16-12	1 1/16-12	7/8-14	1.66	1.66	1.89	1.00
6803-12-12-12 NWO	3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.66	1.66	1.94	1.25
6803-12-12-12 NWO-FG	3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.65	1.65	1.94	1.25
6803-12-12-16 NWO	3/4-3/4	1 1/16-12	1 1/16-12	1 5/16-12	1.78	1.78	2.05	1.50
6803-14-14-14 NWO	7/8-7/8	1 3/16-12	1 3/16-12	1 3/16-12	1.80	1.80	2.00	1.38
6803-16-6-10 NWO	1-3/8	1 5/16-12	9/16-18	7/8-14	1.81	1.44	1.92	1.00
6803-16-6-16 NWO	1-3/8	1 5/16-12	9/16-18	1 5/16-12	1.81	1.44	2.05	1.50
6803-16-10-10 NWO	1-5/8	1 5/16-12	7/8-14	7/8-14	1.81	1.67	1.92	1.00
6803-16-12-12 NWO	1-3/4	1 5/16-12	1 1/16-12	1 1/16-12	1.81	1.79	2.06	1.25
6803-16-12-16 NWO	1-3/4	1 5/16-12	1 1/16-12	1 5/16-12	1.81	1.78	2.05	1.50

PART NO	Y	D (1)	D (2)	D (3)
6803-12-8-16 NWO	1.38	0.61	0.39	0.84
6803-12-10-12 NWO	1.13	0.61	0.48	0.61
6803-12-10-12 NWO-FG	1.06	0.61	0.48	0.61
6803-12-12-10 NWO-FG	1.06	0.61	0.61	0.48
6803-12-12-16 NWO	1.38	0.61	0.61	0.84
6803-12-12-12 NWO	1.13	0.61	0.61	0.61
6803-12-12-12 NWO-FG	1.06	0.61	0.61	0.61
6803-12-12-6 NWO	1.13	0.61	0.61	0.30
6803-12-12-8 NWO	1.13	0.61	0.61	0.39
6803-12-12-10 NWO	1.13	0.61	0.61	0.48
6803-14-14-14 NWO	1.25	0.72	0.72	0.72
6803-16-6-10 NWO	1.38	0.84	0.30	0.48
6803-16-6-16 NWO	1.38	0.84	0.30	0.84
6803-16-10-10 NWO	1.38	0.84	0.48	0.48
6803-16-12-12 NWO	1.38	0.84	0.61	0.61
6803-16-12-16 NWO	1.38	0.84	0.61	0.84

6803 STRAIGHT THREAD BRANCH TEE (Con't)

SAE J514 070429
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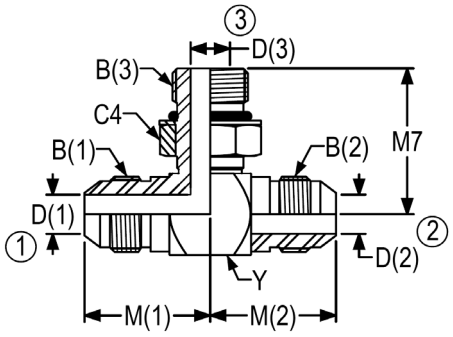

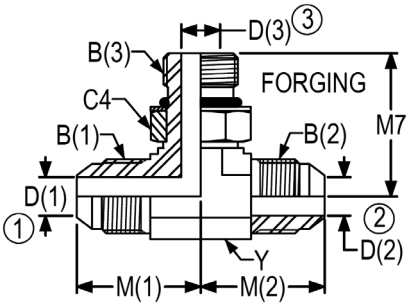

*Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M (2)	M7	C4
6803-16-16-16 NWO	1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	1.81	2.05	1.50
6803-16-16-16 NWO-FG	1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	1.81	2.05	1.50
6803-20-16-16 NWO	1 1/4-1	1 5/8-12	1 5/16-12	1 5/16-12	2.06	2.00	2.23	1.50
6803-20-16-20 NWO	1 1/4-1	1 5/8-12	1 5/16-12	1 5/8-12	2.06	2.00	2.25	1.88
6803-20-20-12 NWO	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 1/16-12	2.06	2.06	2.25	1.25
6803-20-20-16 NWO	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/16-12	2.06	2.06	2.23	1.50
6803-20-20-20 NWO	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.06	2.06	2.25	1.88
6803-20-20-20 NWO-FG	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.06	2.06	2.25	1.88
6803-24-24-24 NWO	1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 7/8-12	2.33	2.33	2.39	2.13
6803-32-32-32 NWO	2-2	2 1/2-12	2 1/2-12	2 1/2-12	3.06	3.06	2.89	2.75
6803-32-32-32 NWO-FG	2-2	2 1/2-12	2 1/2-12	2 1/2-12	3.06	3.06	2.89	2.75

PART NO	Y	D (1)	D (2)	D (3)
6803-16-16-16 NWO	1.38	0.84	0.84	0.84
6803-16-16-16 NWO-FG	1.31	0.84	0.84	0.84
6803-20-16-16 NWO	1.75	1.08	0.84	0.84
6803-20-16-20 NWO	1.75	1.08	0.84	1.08
6803-20-20-12 NWO	1.75	1.08	1.08	0.61
6803-20-20-16 NWO	1.75	1.08	1.08	0.84
6803-20-20-20 NWO	1.75	1.08	1.08	1.08
6803-20-20-20 NWO-FG	1.63	1.08	1.08	1.08
6803-24-24-24 NWO	2.00	1.31	1.31	1.31
6803-32-32-32 NWO	2.50	1.78	1.78	1.78
6803-32-32-32 NWO-FG	2.50	1.78	1.78	1.78

6804 STRAIGHT THREAD RUN TEE

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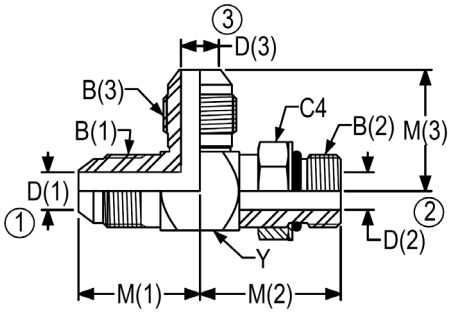

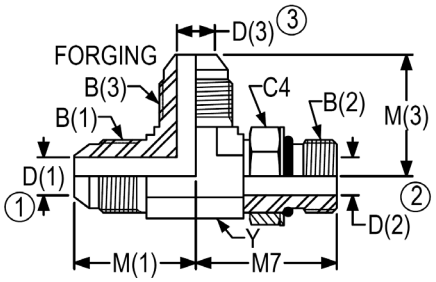

Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M7	M (3)
6804-4-4-4 NWO	1/4-1/4	7/16-20	7/16-20	7/16-20	0.89	1.03	0.89
6804-4-4-4 NWO-FG	1/4-1/4	7/16-20	7/16-20	7/16-20	0.89	1.03	0.89
6804-4-6-4 NWO	1/4-1/4	7/16-20	9/16-18	7/16-20	0.95	1.25	0.95
6804-4-6-6 NWO	1/4-3/8	7/16-20	9/16-18	9/16-18	0.95	1.25	1.06
6804-4-6-6 NWO-FG	1/4-3/8	7/16-20	9/16-18	9/16-18	1.05	1.25	1.06
6804-4-8-6 NWO	1/4-3/8	7/16-20	3/4-16	9/16-18	1.05	1.45	1.15
6804-4-10-8 NWO	1/4-1/2	7/16-20	7/8-14	3/4-16	1.11	1.70	1.31
6804-4-10-10 NWO	1/4-5/8	7/16-20	7/8-14	7/8-14	1.11	1.70	1.45
6804-5-4-5 NWO	5/16-5/16	1/2-20	7/16-20	1/2-20	0.95	1.06	0.95
6804-5-5-3 NWO	5/16-	1/2-20	1/2-20	3/8-24	0.95	1.13	0.89
6804-5-5-5 NWO	5/16-5/16	1/2-20	1/2-20	1/2-20	0.95	1.13	0.95
6804-5-5-5 NWO-FG	5/16-	1/2-20	1/2-20	1/2-20	0.95	1.13	0.95
6804-6-4-6 NWO	3/8-3/8	9/16-18	7/16-20	9/16-18	1.06	1.09	1.06
6804-6-6-4 NWO	3/8-1/4	9/16-18	9/16-18	7/16-20	1.06	1.25	0.95
6804-6-6-5 NWO	3/8-3/8	9/16-18	9/16-18	1/2-20	1.06	1.25	0.98
6804-6-6-6 NWO	3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.25	1.06
6804-6-6-6 NWO-FG	3/8-3/8	9/16-18	9/16-18	9/16-18	1.06	1.25	1.06
6804-6-6-8 NWO	3/8-1/2	9/16-18	9/16-18	3/4-16	1.15	1.34	1.25

PART NO	C4	Y	D (1)	D (2)	D (3)
6804-4-4-4 NWO	0.56	0.50	0.17	0.17	0.17
6804-4-4-4 NWO-FG	0.56	0.44	0.17	0.17	0.17
6804-4-6-4 NWO	0.69	0.63	0.17	0.30	0.17
6804-4-6-6 NWO	0.69	0.63	0.17	0.30	0.30
6804-4-6-6 NWO-FG	0.69	0.56	0.17	0.30	0.30
6804-4-8-6 NWO	0.88	0.81	0.17	0.39	0.30
6804-4-10-8 NWO	1.00	0.94	0.17	0.48	0.39
6804-4-10-10 NWO	1.00	0.94	0.17	0.48	0.48
6804-5-4-5 NWO	0.56	0.56	0.23	0.17	0.23
6804-5-5-3 NWO	0.63	0.56	0.23	0.23	0.13
6804-5-5-5 NWO	0.63	0.56	0.23	0.23	0.23
6804-5-5-5 NWO-FG	0.63	0.56	0.23	0.23	0.23
6804-6-4-6 NWO	0.56	0.63	0.30	0.17	0.30
6804-6-6-4 NWO	0.69	0.63	0.30	0.30	0.17
6804-6-6-5 NWO	0.69	0.63	0.30	0.30	0.23
6804-6-6-6 NWO	0.69	0.63	0.30	0.30	0.30
6804-6-6-6 NWO-FG	0.69	0.56	0.30	0.30	0.30
6804-6-6-8 NWO	0.69	0.81	0.30	0.30	0.39

6804 STRAIGHT THREAD RUN TEE (Con't)

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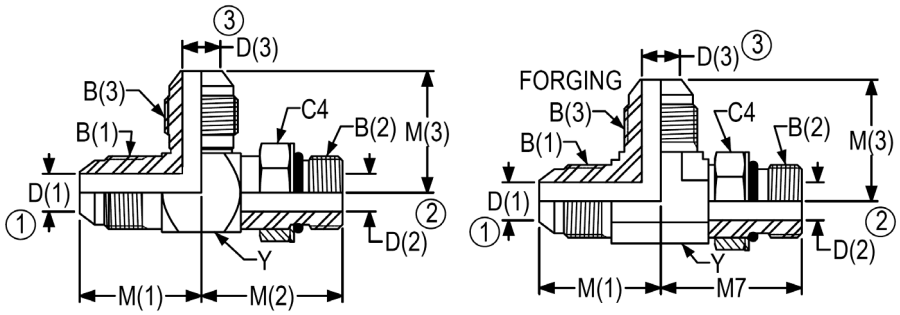

Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M7	M (3)
6804-6-8-6 NWO	3/8-3/8	9/16-18	3/4-16	9/16-18	1.15	1.45	1.15
6804-6-8-8 NWO	3/8-1/2	9/16-18	3/4-16	3/4-16	1.15	1.45	1.25
6804-6-12-8 NWO	3/8-1/2	9/16-18	1 1/16-12	3/4-16	1.31	1.94	1.40
6804-6-12-12 NWO	3/8-3/4	9/16-18	1 1/16-12	1 1/16-12	1.31	1.94	1.66
6804-6-16-16 NWO	3/8-1	9/16-18	1 5/16-12	1 5/16-12	1.44	2.05	1.81
6804-8-6-8 NWO	1/2-1/2	3/4-16	9/16-18	3/4-16	1.25	1.34	1.25
6804-8-8-4 NWO	1/2-1/4	3/4-16	3/4-16	7/16-20	1.25	1.45	1.05
6804-8-8-4 NWO-FG	1/2-1/2	3/4-16	3/4-16	7/16-20	1.25	1.45	1.00
6804-8-8-8 NWO	1/2-1/2	3/4-16	3/4-16	3/4-16	1.25	1.45	1.25
6804-8-8-8 NWO-FG	1/2-1/2	3/4-16	3/4-16	3/4-16	1.25	1.45	1.25
6804-8-10-4 NWO	1/2-1/4	3/4-16	7/8-14	7/16-20	1.31	1.70	1.11
6804-8-10-8 NWO	1/2-1/2	3/4-16	7/8-14	3/4-16	1.31	1.70	1.31
6804-8-12-4 NWO	1/2-1/4	3/4-16	1 1/16-12	7/16-20	1.40	1.94	1.20
6804-8-12-8 NWO	1/2-1/2	3/4-16	1 1/16-12	3/4-16	1.40	1.94	1.40
6804-10-8-8 NWO	5/8-1/2	7/8-14	3/4-16	3/4-16	1.45	1.51	1.31
6804-10-8-10 NWO	5/8-5/8	7/8-14	3/4-16	7/8-14	1.45	1.51	1.45
6804-10-10-4 NWO	5/8-1/4	7/8-14	7/8-14	7/16-20	1.45	1.70	1.11

PART NO	C4	Y	D (1)	D (2)	D (3)
6804-6-8-6 NWO	0.88	0.81	0.30	0.39	0.30
6804-6-8-8 NWO	0.88	0.81	0.30	0.39	0.39
6804-6-12-8 NWO	1.25	1.13	0.30	0.61	0.39
6804-6-12-12 NWO	1.25	1.13	0.30	0.61	0.61
6804-6-16-16 NWO	1.50	1.38	0.30	0.84	0.84
6804-8-6-8 NWO	0.69	0.81	0.39	0.30	0.39
6804-8-8-4 NWO	0.88	0.81	0.39	0.39	0.17
6804-8-8-4 NWO-FG	0.88	0.75	0.39	0.39	0.17
6804-8-8-8 NWO	0.88	0.81	0.39	0.39	0.39
6804-8-8-8 NWO-FG	0.88	0.75	0.39	0.39	0.39
6804-8-10-4 NWO	1.00	0.94	0.39	0.48	0.17
6804-8-10-8 NWO	1.00	0.94	0.39	0.48	0.39
6804-8-12-4 NWO	1.25	1.13	0.39	0.61	0.17
6804-8-12-8 NWO	1.25	1.13	0.39	0.61	0.39
6804-10-8-8 NWO	0.88	0.94	0.48	0.39	0.39
6804-10-8-10 NWO	0.88	0.94	0.48	0.39	0.48
6804-10-10-4 NWO	1.00	0.94	0.48	0.48	0.17

6804 STRAIGHT THREAD RUN TEE (Con't)

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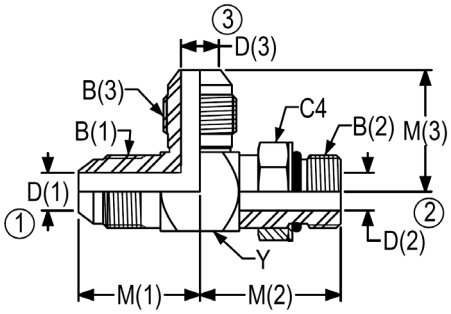

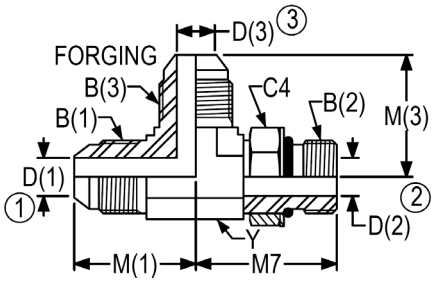

Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M7	M (3)
6804-10-10-10 NWO	5/8-5/8	7/8-14	7/8-14	7/8-14	1.45	1.70	1.45
6804-10-10-10 NWO-FG	5/8-5/8	7/8-14	7/8-14	7/8-14	1.45	1.70	1.45
6804-10-10-12 NWO	5/8-3/4	7/8-14	7/8-14	1 1/16-12	1.55	1.80	1.66
6804-10-12-10 NWO	5/8-5/8	7/8-14	1 1/16-12	7/8-14	1.55	1.94	1.55
6804-10-12-10 NWO-FG	5/8-3/4	7/8-14	1 1/16-12	7/8-14	1.54	1.94	1.54
6804-10-12-12 NWO	5/8-3/4	7/8-14	1 1/16-12	1 1/16-12	1.55	1.94	1.66
6804-10-12-16 NWO	5/8-1	7/8-14	1 1/16-12	1 5/16-12	1.67	2.06	1.81
6804-10-16-10 NWO	5/8-5/8	7/8-14	1 5/16-12	7/8-14	1.67	2.05	1.67
6804-12-8-12 NWO	3/4-3/4	1 1/16-12	3/4-16	1 1/16-12	1.66	1.61	1.66
6804-12-10-8 NWO	3/4-1/2	1 1/16-12	7/8-14	3/4-16	1.66	1.80	1.40
6804-12-10-12 NWO	3/4-3/4	1 1/16-12	7/8-14	1 1/16-12	1.66	1.80	1.66
6804-12-10-12 NWO-FG	3/4-5/8	1 1/16-12	7/8-14	1 1/16-12	1.66	1.78	1.66
6804-12-12-4 NWO	3/4-1/4	1 1/16-12	1 1/16-12	7/16-20	1.66	1.94	1.20
6804-12-12-6 NWO	3/4-3/8	1 1/16-12	1 1/16-12	9/16-18	1.66	1.94	1.31
6804-12-12-6 NWO-FG	3/4-3/4	1 1/16-12	1 1/16-12	9/16-18	1.66	1.94	1.31
6804-12-12-8 NWO-FG	3/4-3/4	1 1/16-12	1 1/16-12	3/4-16	1.66	1.94	1.42
6804-12-12-10 NWO	3/4-5/8	1 1/16-12	1 1/16-12	7/8-14	1.66	1.94	1.55

PART NO	C4	Y	D (1)	D (2)	D (3)
6804-10-10-10 NWO	1.00	0.94	0.48	0.48	0.48
6804-10-10-10 NWO-FG	1.00	0.88	0.48	0.48	0.48
6804-10-10-12 NWO	1.00	1.13	0.48	0.48	0.61
6804-10-12-10 NWO	1.25	1.13	0.48	0.61	0.48
6804-10-12-10 NWO-FG	1.25	1.06	0.48	0.61	0.48
6804-10-12-12 NWO	1.25	1.13	0.48	0.61	0.61
6804-10-12-16 NWO	1.25	1.38	0.48	0.61	0.84
6804-10-16-10 NWO	1.50	1.38	0.48	0.84	0.48
6804-12-8-12 NWO	0.88	1.13	0.61	0.39	0.61
6804-12-10-8 NWO	1.00	1.13	0.61	0.48	0.39
6804-12-10-12 NWO	1.00	1.13	0.61	0.48	0.61
6804-12-10-12 NWO-FG	1.00	1.06	0.61	0.48	0.61
6804-12-12-4 NWO	1.25	1.13	0.61	0.61	0.17
6804-12-12-6 NWO	1.25	1.13	0.61	0.61	0.30
6804-12-12-6 NWO-FG	1.25	1.06	0.61	0.61	0.30
6804-12-12-8 NWO-FG	1.25	1.06	0.61	0.61	0.39
6804-12-12-10 NWO	1.25	1.13	0.61	0.61	0.48

6804 STRAIGHT THREAD RUN TEE (Con't)

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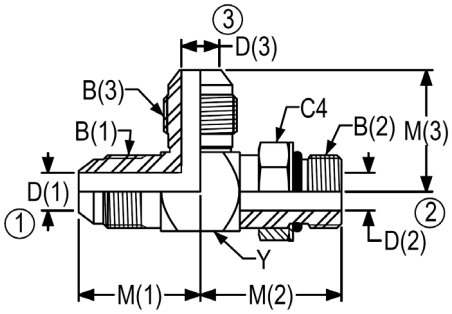
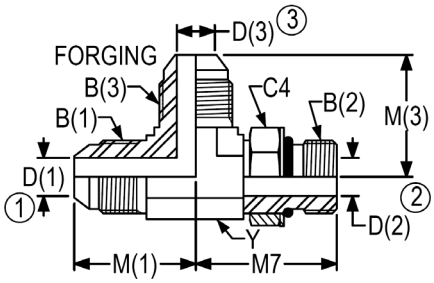




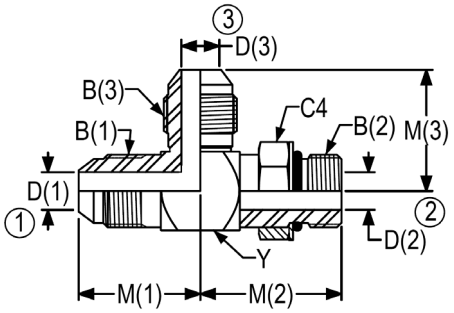
Non forging parts are brazed construction

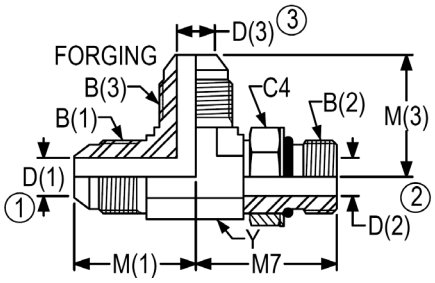
PART NO	TUBE OD	B(1) UN/UNF-2A	B(2) UN/UNF-2A	B(3) UN/UNF-2A	M (1)	M7	M (3)
6804-12-12-12 NWO	3/4-3/4	1 1/16-12	1 1/16-12	1 1/16-12	1.66	1.94	1.66
6804-12-12-16 NWO	3/4-1	1 1/16-12	1 1/16-12	1 5/16-12	1.78	2.06	1.81
6804-12-14-6 NWO	3/4-3/8	1 1/16-12	1 3/16-12	9/16-18	1.72	2.00	1.38
6804-12-16-5 NWO	3/4-5/16	1 1/16-12	1 5/16-12	1/2-20	1.78	2.05	1.36
6804-12-16-12 NWO	3/4-3/4	1 1/16-12	1 5/16-12	1 1/16-12	1.78	2.05	1.78
6804-12-16-12 NWO-FG	3/4-1	1 1/16-12	1 5/16-12	1 1/16-12	1.76	2.05	1.76
6804-12-16-16 NWO	3/4-1	1 1/16-12	1 5/16-12	1 5/16-12	1.78	2.05	1.81
6804-12-16-20 NWO	3/4-1	1 1/16-12	1 5/16-12	1 5/8-12	1.97	2.24	2.06
6804-12-20-16 NWO	3/4-1	1 1/16-12	1 5/8-12	1 5/16-12	1.97	2.25	2.00
6804-14-14-14 NWO	7/8-7/8	1 3/16-12	1 3/16-12	1 3/16-12	1.80	2.00	1.80
6804-16-10-16 NWO	1-1	1 5/16-12	7/8-14	1 5/16-12	1.81	1.92	1.81
6804-16-12-12 NWO	1-3/4	1 5/16-12	1 1/16-12	1 1/16-12	1.81	2.06	1.78
6804-16-12-16 NWO	1-1	1 5/16-12	1 1/16-12	1 5/16-12	1.81	2.06	1.81
6804-16-14-16 NWO	1-1	1 5/16-12	1 3/16-12	1 5/16-12	1.81	2.06	1.81
6804-16-16-4 NWO	1-1/4	1 5/16-12	1 5/16-12	7/16-20	1.81	2.05	1.33
6804-16-16-8 NWO	1-1/2	1 5/16-12	1 5/16-12	3/4-16	1.81	2.05	1.53
6804-16-16-10 NWO	1-5/8	1 5/16-12	1 5/16-12	7/8-14	1.81	2.05	1.67

PART NO	C4	Y	D (1)	D (2)	D (3)
6804-12-12-12 NWO	1.25	1.13	0.61	0.61	0.61
6804-12-12-16 NWO	1.25	1.38	0.61	0.61	0.84
6804-12-14-6 NWO	1.38	1.25	0.61	0.72	0.30
6804-12-16-5 NWO	1.50	1.38	0.61	0.84	0.23
6804-12-16-12 NWO	1.50	1.38	0.61	0.84	0.61
6804-12-16-12 NWO-FG	1.50	1.31	0.61	0.84	0.61
6804-12-16-16 NWO	1.50	1.38	0.61	0.84	0.84
6804-12-16-20 NWO	1.50	1.75	0.61	0.84	1.08
6804-12-20-16 NWO	1.88	1.75	0.61	1.08	0.84
6804-14-14-14 NWO	1.38	1.25	0.72	0.72	0.72
6804-16-10-16 NWO	1.00	1.38	0.84	0.48	0.84
6804-16-12-12 NWO	1.25	1.38	0.84	0.61	0.61
6804-16-12-16 NWO	1.25	1.38	0.84	0.61	0.84
6804-16-14-16 NWO	1.38	1.38	0.84	0.72	0.84
6804-16-16-4 NWO	1.50	1.38	0.84	0.84	0.17
6804-16-16-8 NWO	1.50	1.38	0.84	0.84	0.39
6804-16-16-10 NWO	1.88	1.38	0.84	0.84	0.48

6804 STRAIGHT THREAD RUN TEE (Con't)

SAE J514 070428
MS51530



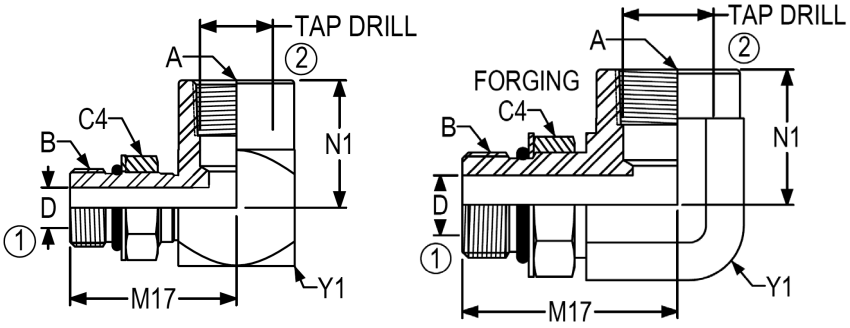


Non forging parts are brazed construction

PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (1)	M7	M (3)
6804-16-16-12 NWO	1-3/4	1 5/16-12	1 5/16-12	1 1/16-12	1.81	2.05	1.78
6804-16-16-16 NWO	1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	2.05	1.81
6804-16-16-16 NWO-FG	1-1	1 5/16-12	1 5/16-12	1 5/16-12	1.81	2.05	1.81
6804-16-16-20 NWO	1-1 1/4	1 5/16-12	1 5/16-12	1 5/8-12	2.00	2.23	2.06
6804-16-20-10 NWO	1-5/8	1 5/16-12	1 5/8-12	7/8-14	2.00	2.25	1.86
6804-16-20-16 NWO	1-1	1 5/16-12	1 5/8-12	1 5/16-12	2.00	2.25	2.00
6804-16-20-16 NWO-FG	1-1 1/4	1 5/16-12	1 5/8-12	1 5/16-12	2.01	2.25	2.01
6804-16-24-24 NWO	1-1 1/2	1 5/16-12	1 7/8-12	1 7/8-12	2.13	2.39	2.33
6804-20-16-16 NWO	1 1/4-1	1 5/8-12	1 5/16-12	1 5/16-12	2.06	2.23	2.00
6804-20-16-20 NWO	1 1/4-1 1/4	1 5/8-12	1 5/16-12	1 5/8-12	2.06	2.23	2.06
6804-20-20-10 NWO	1 1/4-5/8	1 5/8-12	1 5/8-12	7/8-14	2.06	2.25	1.86
6804-20-20-20 NWO	1 1/4-1 1/4	1 5/8-12	1 5/8-12	1 5/8-12	2.06	2.25	2.06
6804-20-20-20 NWO-FG	1 1/4-1	1 5/8-12	1 5/8-12	1 5/8-12	2.06	2.25	2.06
6804-24-20-24 NWO	1 1/2-1 1/2	1 7/8-12	1 5/8-12	1 7/8-12	2.33	2.38	2.33
6804-24-24-16 NWO	1 1/2-1	1 7/8-12	1 7/8-12	1 5/16-12	2.33	2.39	2.13
6804-24-24-24 NWO	1 1/2-1 1/2	1 7/8-12	1 7/8-12	1 7/8-12	2.33	2.39	2.33
6803-32-32-32 NWO-FG	2-2	2 1/2-12	2 1/2-12	2 1/2-12	3.06	3.06	2.89
6804-32-32-32 NWO	2-2	2 1/2-12	2 1/2-12	2 1/2-12	3.06	2.89	3.06

PART NO	C4	Y	D (1)	D (2)	D (3)
6804-16-16-12 NWO	1.50	1.38	0.84	0.84	0.61
6804-16-16-16 NWO	1.50	1.38	0.84	0.84	0.84
6804-16-16-16 NWO-FG	1.50	1.31	0.84	0.84	0.84
6804-16-16-20 NWO	1.50	1.75	0.84	0.84	1.08
6804-16-20-10 NWO	1.88	1.38	1.08	0.84	0.48
6804-16-20-16 NWO	1.88	1.75	0.84	1.08	0.84
6804-16-20-16 NWO-FG	1.88	1.63	0.84	1.08	0.84
6804-16-24-24 NWO	2.13	2.00	0.84	1.31	1.31
6804-20-16-16 NWO	1.50	1.75	1.08	0.84	0.84
6804-20-16-20 NWO	1.50	1.75	1.08	0.84	1.08
6804-20-20-10 NWO	1.88	1.75	1.08	1.08	0.48
6804-20-20-20 NWO	1.88	1.75	1.08	1.08	1.08
6804-20-20-20 NWO-FG	1.88	1.63	1.08	1.08	1.08
6804-24-20-24 NWO	1.88	2.00	1.31	1.08	1.31
6804-24-24-16 NWO	2.13	2.00	1.31	1.31	0.84
6804-24-24-24 NWO	2.13	2.00	1.31	1.31	1.31
6803-32-32-32 NWO-FG	2.75	2.50	1.78	1.78	1.78
6804-32-32-32 NWO	2.75	2.63	1.78	1.78	1.78

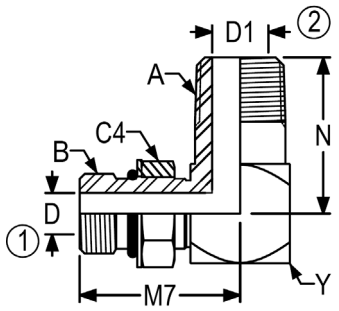
6805 90 DEGREE STRAIGHT THREAD/FEMALE PIPE ELBOW



Non forging parts are brazed construction

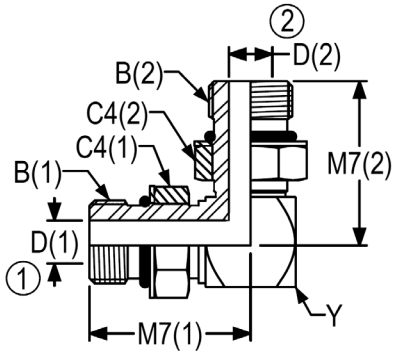
PART NO	B UN/UNF-2A	A NPTF	M17	N1	C4	Y1	D	TAP DRILL
6805-4-2-NWO	7/16-20	1/8-27	1.09	0.66	0.56	0.63	0.17	0.33
6805-4-4-NWO	7/16-20	1/4-18	1.15	0.88	0.56	0.75	0.17	0.43
6805-4-6 NWO	7/16-20	3/8-18	1.22	1.02	0.56	0.88	0.17	0.57
6805-5-2 NWO	1/2-20	1/8-27	1.16	0.66	0.63	0.63	0.23	0.33
6805-6-2 NWO	9/16-18	1/8-27	1.25	0.66	0.69	0.63	0.30	0.33
6805-6-4 NWO	9/16-18	1/4-18	1.31	0.88	0.69	0.75	0.30	0.43
6805-6-4 NWO-FG	9/16-18	1/4-18	1.31	0.88	0.69	0.75	0.30	0.43
6805-6-6 NWO	9/16-18	3/8-18	1.37	1.02	0.69	0.88	0.30	0.57
6805-8-6 NWO	3/4-16	3/8-18	1.48	1.02	0.88	0.88	0.39	0.57
6805-8-6 NWO-FG	3/4-16	3/8-18	1.47	0.63	0.88	0.88	0.39	0.57
6805-8-8 NWO	3/4-16	1/2-14	1.61	1.23	0.88	1.13	0.39	0.70
6805-10-6 NWO	7/8-14	3/8-18	1.67	1.02	1.00	0.88	0.48	0.57
6805-10-8 NWO	7/8-14	1/2-14	1.79	1.23	1.00	1.13	0.48	0.70
6805-10-12 NWO	7/8-14	3/4-14	1.92	1.36	1.00	1.38	0.48	0.91
6805-12-8 NWO	1 1/16-12	1/2-14	1.94	1.23	1.25	1.13	0.61	0.70
6805-12-12 NWO	1 1/16-12	3/4-14	2.07	1.36	1.25	1.38	0.61	0.91
6805-12-12 NWO-FG	1 1/16-12	3/4-14	2.04	1.36	1.25	1.31	0.61	0.91
6805-14-12 NWO	1 3/16-12	3/4-14	2.07	1.42	1.38	1.38	0.72	0.91
6805-16-4 NWO	1 5/16-12	1/4-18	2.05	1.19	1.50	1.38	0.84	0.43
6805-16-6 NWO	1 5/16-12	3/8-18	2.05	1.26	1.50	1.38	0.84	0.57
6805-16-8 NWO	1 5/16-12	1/2-14	2.05	1.36	1.50	1.38	0.84	0.70
6805-16-12 NWO	1 5/16-12	3/4-14	2.05	1.36	1.50	1.38	0.84	0.91
6805-16-16 NWO	1 5/16-12	1-11 1/2	2.17	1.62	1.50	1.63	0.84	1.14
6805-20-12 NWO	1 5/8-12	3/4-14	2.25	1.55	1.88	1.75	1.08	0.91
6805-20-16 NWO	1 5/8-12	1-11 ½	2.25	1.68	1.88	1.75	1.08	1.14
6805-20-20 NWO	1 5/8-12	1 1/4-11 1/2	2.38	1.70	1.88	2.00	1.08	1.48
6805-24-24 NWO	1 7/8-12	1 1/2-11 1/2	2.58	2.08	2.13	2.38	1.31	1.72
6805-32-32 NWO	2 1/2-12	2-11 1/2	3.02	2.39	2.75	2.88	1.78	2.19

6806 90 DEGREE STRAIGHT THREAD/MALE PIPE ELBOW



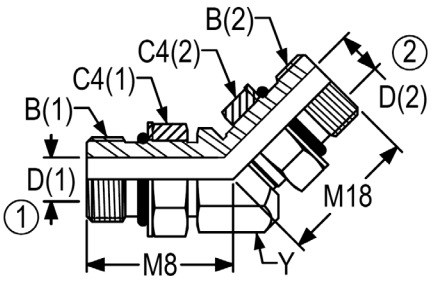
PART NO	B UN/UNF-2A	A NPTF	M7	N	C4	Y	D	D1
6806-2-4 NWO	5/16-24	1/4-18	1.03	1.09	0.56	0.63	0.06	0.28
6806-4-2 NWO	7/16-20	1/8-27	1.03	0.78	0.56	0.50	0.17	0.19
6806-4-4 NWO	7/16-20	1/4-18	1.09	1.09	0.56	0.63	0.17	0.28
6806-4-6 NWO	7/16-20	3/8-18	1.19	1.22	0.56	0.81	0.17	0.41
6806-5-2 NWO	1/2-20	1/8-27	1.13	0.81	0.63	0.56	0.23	0.19
6806-5-6 NWO	1/2-20	3/8-18	1.25	1.22	1.63	0.81	0.23	0.41
6806-6-4 NWO	9/16-18	1/4-18	1.25	1.09	0.69	0.63	0.30	0.28
6806-6-6 NWO	9/16-18	3/8-18	1.34	1.22	0.69	0.81	0.30	0.41
6806-6-8 NWO	9/16-18	1/2-14	1.40	1.47	0.69	0.94	0.30	0.53
6806-8-6 NWO	3/4-16	3/8-18	1.45	1.22	0.88	0.81	0.39	0.41
6806-8-8 NWO	3/4-16	1/2-14	1.51	1.47	0.88	0.94	0.39	0.53
6806-10-8 NWO	7/8-14	1/2-14	1.70	1.47	1.00	0.94	0.48	0.53
6806-12-6 NWO	1 1/16-12	3/8-18	1.94	1.38	1.25	1.13	0.61	0.41
6806-12-8 NWO	1 1/16-12	1/2-14	1.94	1.56	1.25	1.13	0.61	0.53
6806-12-12 NWO	1 1/16-12	3/4-14	1.94	1.59	1.25	1.13	0.61	0.72
6806-12-16 NWO	1 1/16-12	1-11 1/2	2.07	1.97	1.25	1.38	0.61	0.94
6806-14-12 NWO	1 3/16-12	3/4-14	2.00	1.66	1.38	1.25	0.72	0.72
6806-16-12 NWO	1 5/16-12	3/4-14	2.05	1.72	1.50	1.38	0.84	0.72
6806-16-16 NWO	1 5/16-12	1-11 1/2	2.05	1.97	1.50	1.38	0.84	0.94
6806-20-16 NWO	1 5/8-12	1-11 1/2	2.25	2.16	1.88	1.75	1.08	0.94
6806-20-20 NWO	1 5/8-12	1 1/4-11 1/2	2.25	2.38	1.88	1.75	1.08	1.25
6806-20-24 NWO	1 5/8-12	1 1/2-11 1/2	2.38	2.64	1.88	2.00	1.08	1.50
6806-24-24 NWO	1 7/8-12	1 1/2-11 1/2	2.39	2.64	2.13	2.00	1.31	1.50

6807 90 DEGREE STRAIGHT THREAD UNION ELBOW



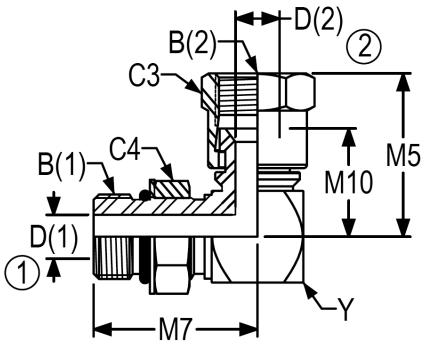
PART NO	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M7 (1)	M7 (2)	C4 (1)	C4 (2)	Y	D (1)	D (2)
6807-4-4 NWO	7/16-20	7/16-20	1.03	1.03	0.56	0.56	0.50	0.17	0.17
6807-6-4 NWO	9/16-18	7/16-20	1.25	1.09	0.69	0.56	0.63	0.30	0.17
6807-6-6 NWO	9/16-18	9/16-18	1.25	1.25	0.69	0.69	0.63	0.30	0.30
6807-8-6 NWO	3/4-16	9/16-18	1.45	1.34	0.88	0.69	0.81	0.39	0.30
6807-8-8 NWO	3/4-16	3/4-16	1.45	1.45	0.88	0.88	0.81	0.39	0.39
6807-10-8 NWO	7/8-14	3/4-16	1.70	1.51	1.00	0.88	0.94	0.48	0.39
6807-10-10 NWO	7/8-14	7/8-14	1.70	1.70	1.00	1.00	0.94	0.48	0.48
6807-12-12 NWO	1 1/16-12	1 1/16-12	1.94	1.94	1.25	1.25	1.13	0.61	0.61
6807-16-16 NWO	1 5/16-12	1 5/16-12	2.05	2.05	1.50	1.50	1.38	0.84	0.84
6807-20-20 NWO	1 5/8-12	1 5/8-12	2.25	2.25	1.88	1.88	1.75	1.08	1.08
6807-24-24 NWO	1 7/8-12	1 7/8-12	2.39	2.39	2.13	2.13	2.00	1.31	1.31

6808 45 DEGREE STRAIGHT THREAD UNION ELBOW



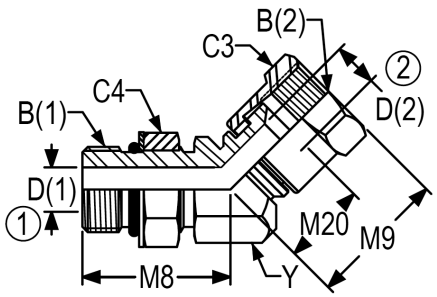
PART NO	B (1) UN/UNF-2A	B (2) UN/UNF-2A	M8	M18	C4 (1)	C4 (2)	Y	D (1)	D (2)
6808-4-4 NWO	7/16-20	7/16-20	1.05	0.91	0.56	0.56	0.50	0.17	0.17
6808-6-6 NWO	9/16-18	9/16-18	1.14	1.07	0.69	0.69	0.63	0.30	0.30
6808-8-6 NWO	3/4-16	9/16-18	1.30	1.11	0.88	0.69	0.81	0.39	0.30
6808-8-8 NWO	3/4-16	3/4-16	1.30	1.23	0.88	0.88	0.81	0.39	0.39
6808-16-12 NWO	1 5/16-12	1 1/16-12	1.86	1.74	1.50	1.25	1.38	0.84	0.61
6808-16-16 NWO	1 5/16-12	1 5/16-12	1.86	1.70	1.50	1.50	1.38	0.84	0.84
6802-20-16 NWO	1 5/8-12	1 5/16-12	1.91	1.78	1.88	1.50	1.75	0.84	0.84
6808-20-20 NWO	1 5/8-12	1 5/8-12	1.91	1.78	1.88	1.88	1.75	1.08	1.08
6808-24-16 NWO	1 7/8-12	1 5/16-12	1.91	1.88	2.13	1.50	2.00	0.84	0.84
6808-24-24 NWO	1 7/8-12	1 7/8-12	1.91	1.84	2.13	2.13	2.00	1.31	1.31

6809 90 DEGREE STRAIGHT THREAD/SWIVEL ELBOW



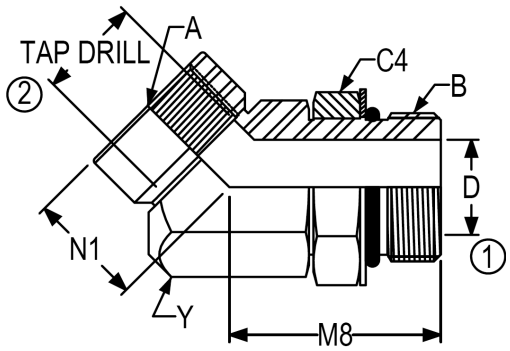
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	M7	M5	M10	C3	C4	Y	D (1)	D (2)
6809-4-4 NWO	1/4	7/16-20	7/16-20	1.03	1.00	0.66	0.56	0.56	0.50	0.17	0.17
6809-6-4 NWO	1/4	9/16-18	7/16-20	1.25	1.06	0.72	0.56	0.69	0.63	0.30	0.17
6809-6-6 NWO	3/8	9/16-18	9/16-18	1.25	1.25	0.88	0.69	0.69	0.63	0.30	0.30
6809-8-6 NWO	3/8	3/4-16	9/16-18	1.45	1.34	0.97	0.69	0.88	0.81	0.39	0.30
6809-8-8 NWO	1/2	3/4-16	3/4-16	1.45	1.38	0.96	0.88	0.88	0.81	0.39	0.39
6809-8-12 NWO	3/4	3/4-16	1 1/16-12	1.61	1.75	1.19	1.25	0.88	1.13	0.39	0.61
6809-10-8 NWO	1/2	7/8-14	3/4-16	1.70	1.44	1.02	0.88	1.00	0.94	0.48	0.39
6809-10-10 NWO	5/8	7/8-14	7/8-14	1.70	1.62	1.12	1.00	1.00	0.94	0.48	0.48
6808-12-10 NWO	5/8	1 1/16-12	7/8-14	1.94	1.71	1.21	1.00	1.25	1.13	0.61	0.48
6809-12-12 NWO	3/4	1 1/16-12	1 1/16-12	1.94	1.75	1.19	1.25	1.25	1.13	0.61	0.61
6809-16-16 NWO	1	1 5/16-12	1 5/16-12	2.05	2.00	1.41	1.50	1.50	1.38	0.84	0.84
6809-20-20 NWO	1 1/4	1 5/8-12	1 5/8-12	2.25	2.31	1.68	2.00	1.88	1.75	1.08	1.08
6809-24-24 NWO	1 1/2	1 7/8-12	1 7/8-12	2.39	2.59	1.86	2.25	2.25	2.00	1.31	1.31

6810 45 DEGREE STRAIGHT THREAD/SWIVEL ELBOW



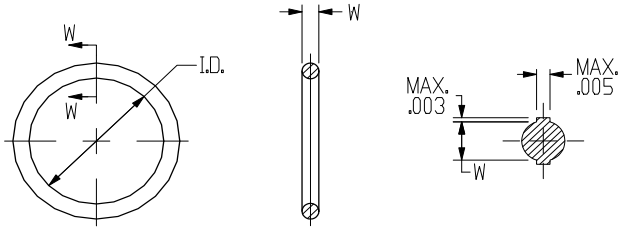
PART NO	TUBE OD	B (1) UN/UNF-2A	B (2) UN/UNF-2B	M8	M19	M20	C3	C4	Y	D (1)	D (2)
6810-4-4 NWO	1/4	7/16-20	7/16-20	1.05	0.88	0.53	0.56	0.56	0.50	0.17	0.17
6810-6-6 NWO	3/8	9/16-18	9/16-18	1.14	1.07	0.69	0.69	0.69	0.63	0.30	0.30
6810-8-8 NWO	1/2	3/4-16	3/4-16	1.30	1.16	0.74	0.88	0.88	0.81	0.39	0.39
6810-10-10 NWO	5/8	7/8-14	7/8-14	1.52	1.32	0.82	1.00	1.00	0.94	0.48	0.48
6810-12-12 NWO	3/4	1 1/16-12	1 1/16-12	1.73	1.38	0.81	1.25	1.25	1.13	0.61	0.61
6810-16-16 NWO	1	1 5/16-12	1 5/16-12	1.86	1.68	1.09	1.50	1.50	1.38	0.84	0.84

6811 45 DEGREE STRAIGHT THREAD/ FEMALE PIPE ELBOW



PART NO	B UN/UNF-2A	A NPTF	N1	M8	C4	Y	D	TAP DRILL
6811-16-4 NWO	1 5/16-12	1/4-18	0.95	1.86	1.50	1.38	0.61	0.43
6811-16-6 NWO	1 5/16-12	3/8-18	1.03	1.86	1.50	1.38	0.61	0.57
6811-16-8 NWO	1 5/16-12	1/2-14	1.03	1.86	1.50	1.38	0.61	0.70
6811-16-12 NWO	1 5/16-12	3/4-14	1.02	1.86	1.50	1.38	0.84	0.91
6811-16-16 NWO	1 5/16-12	1-11 1/2	1.12	1.92	1.50	1.63	0.84	1.14
6811-20-8 NWO	1 5/8-12	1/2-14	1.07	1.91	1.88	1.75	0.84	0.70
6811-20-12 NWO	1 5/8-12	3/4-14	1.07	1.91	1.88	1.75	0.84	0.91
6811-20-16 NWO	1 5/8-12	1-11 1/2	1.07	1.91	1.88	1.75	0.84	1.14
6811-20-20 NWO	1 5/8-12	1 1/4-11 1/2	1.63	1.92	1.88	1.63	1.08	1.48

O-Rings For SAE J-1926/2/3 Stud Ends



TUBE SIZE	STANDARD A-W PART #	ITEM #	OPTIONAL COMPOUND ITEM #			SAE AS568A REF. #	I.D.	W
	CH (BUNA-N) 4000	4000-	HK (VITON) 4001-	CH (HI-TEMP)(1) 4002-	CA (EPDM) 4006-			
-2	4000-2	0001	*	*	*	902	.239 ±.005	.064 ±.003
-3	4000-3	0002	0002	*	*	903	.301 ±.005	.064 ±.003
-4	4000-4	0003	0003	0200	*	904	.351 ±.005	.072 ±.003
-5	4000-5	0004	0004	0300	*	905	.414 ±.005	.072 ±.003
-6	4000-6	0005	0005	0400	*	906	.468 ±.005	.078 ±.003
-8	4000-8	0006	0006	0500	*	908	.644 ±.009	.087 ±.003
-10	4000-10	0007	0007	0600	*	910	.755 ±.009	.097 ±.003
-12	4000-12	0008	0008	0700	*	912	.924 ±.009	.116 ±.004
-14	4000-14	0009	0009	0800	*	914	1.048 ±.010	.116 ±.004
-16	4000-16	0010	0010	0900	*	916	1.171 ±.010	.116 ±.004
-20	4000-20	0011	0011	1000	*	920	1.475 ±.014	.118 ±.004
-24	4000-24	0012	0012	1100	*	924	1.720 ±.014	.118 ±.004
-32	4000-32	0013	0013	*	*	932	2.337 ±.018	.118 ±.004

SAE Type CH was SAE Type 1 Type CA was SAE Type 2 and Type HK was SAE Type 3.

Specification	SAE/ASTM Type CH	SAE/ASTM Type CA	SAE/ASTM Type HK
Usage	Nitrile Elastomer, 90 Durometer Hardness, for petroleum based fluids	EPDM Elastomer, 80 Durometer Hardness, for water based hydraulic or nonpetroleum based fluids	Fluorocarbon Elastomer, 90 Durometer Hardness, for petroleum or nonpetroleum based fluids
General Service	High pressure applications of pneumatics, water based hydraulic fluids, lubricating oils, hydraulic oils, and gasoline	High pressure applications of nonflammable hydraulic fluids of phosphate ester base type	High pressure, high temperature applications of pneumatic, water based hydraulic fluids, lubricating oils, hydraulic oils, and fuels
Temperature	-35°C to 125°C (-30°F to 250°F)	-40°C to 125°C (-40°F to 250°F)	-15°C to 275°C (5°F to 525°F)
Shore Hardness	90 pts ±5 pts	80 pts ±5 pts	90 pts ±5 pts
Elongation	100% min	150% min	100% min
Tensile	10 MPa min	10 MPa min	10 MPa min
Compound	Nitrile (Buna-N) to ASTM D 2000 or SAE J200 M4CH910B14E015E35Z1 Z1 = TR 10 temperature –21° C or lower. Alternate Low Temperature Product Test, 5 hours at –30° C, rings compressed 25% of ID, no cracks.	EPDM to ASTM D 2000 or SAE J200 M7CA810A25B35F17	M7HK910A1-11B38EF31E088Z1 Z1 = TR 10 temperature –15°C or lower (similar to MIL-R 83248 Type 1, Class 2)
Lubrication	When assembling Type CH O-Rings with O-Ring style fittings, the O-Ring shall be coated with the fluid used or petrolatum before assembly to ease installation.	When assembling Type CA O-Rings with O-Ring style fittings, lubricate the O-Ring with the fluid used in the system. Do not use a petroleum-based lubricant.	When assembling Type HK O-Rings with O-Ring style fittings, the O-Ring shall be coated with the fluid used or petrolatum before assembly to ease installation.

1. Type CH(HI-TEMP) Air-Way part #4002, 90 Durometer Nitrile Compound, temperature range –32°C to 135°C(-25°F to 275°F). Approved compounds National O-Ring Compound C67-90, Parker Seal Groove Compound N1059-90.

Features, Braze Fittings For Tubing

The fittings described in this section provide a variety of braze on end connections for tube assembly/fabrication requirements. Fitting styles are available with male 37 degree tube and bulkhead ends, female 37 degree swivel ends, male or female NPTF pipe ends, female pipe swivels, SAE J518 four-bolt flanges and tube to tube junction blocks.

Standard braze joint designs provide a slip fit to nominal O.D. inch size tubing and are intended for silver brazing. Press fit counterbores and other special designs are available on request.

All 37 degree fitting styles are also available with the optional **FLARE-O®** tube end design.

Performance

Where applicable, fittings are designed and qualified to the requirements of SAE J514. Four bolt flange ends conform to SAE J518.

The rated working pressures for braze fittings are based on the standard pressure rating of the separable fitting end. For proper performance, the design of any hydraulic system should take into consideration the rated working pressures for each of the components of the system, including standard ratings for hose and tubing components. For brazed tube assemblies, these factors include the tubing material specifications, fabrication techniques and braze processes.

Construction

Unless otherwise specified, fittings are machined from cold drawn carbon steel barstock and forgings. Standard plating is electrodeposited zinc with a clear trivalent chromate conversion coating in accordance with ASTM B633 (Type V SC2). The minimum salt spray resistance is 240 hours to red corrosion when tested in accordance with ASTM B117.

Threads

Straight Threads: Internal and external straight threads conform to the Unified National Class 2A and Class 2B Series respectively, with modified minor diameters where specified. Maximum diameters of plated external threads may conform to Class 3A maximum diameters after plating.

NPTF Threads: Male and female pipe threads conform to the Dryseal American Standard Taper Pipe Thread (SAE J476a, NPTF) Series which will provide pressure tight joints without the use of a lubricant or sealer. Use of these fittings with non-dryseal NPT pipe or hose ends is not recommended for high-pressure applications.

Note: Where not functionally objectionable, use of a compatible lubricant/sealant is recommended for either NPT or NPTF threads to minimize the possibility of galling in assembly.

NPSM Swivels: Female threads for adapter union swivel nuts conform to the American Standard Straight Pipe Thread (NPSM) Series. These threads mate with either NPT or NPTF Series male threads to provide a mechanical connection between the adapter and mating male end. Sealing is provided by metal to metal contact between the machined 30 degree female seat on the NPT/NPTF male end and the nose of the swivel end. The NPSM swivel threads are not a sealing member.

Caution: For proper sealing, ensure that the mating male end has been machined with the proper 30 degree female seat.

Assembly Information

For silver brazing and fitting assembly instructions, refer to the Technical Data Section for the appropriate fitting end. Also, refer to the Technical Data Section for recommendations regarding tubing pressure ratings, tube flares and hose/tube routing information. Please note: Tubing for single flare tube ends should be either seamless or welded and drawn, fully annealed tubing per SAE J524 or J525. For double flaring, tubing per SAE J356, J524, J525 or J526 may be used.

For proper sealing with 37 degree flared fittings, flares for tubing should conform to the requirements of SAE J533. For heavy wall tubing, the optional tube preparation and single flare configuration specified in SAE J533 is also recommended. This optional configuration provides extended sealing surface contact area versus conventional flares.

In the design and fabrication of tubing or hose runs for any hydraulic system, precautions should be taken to allow for sufficient adjustment of the hose or tubing so that proper alignment can be attained at the fitting connections. Improper fit-up or misalignment should be corrected before final connections are made. Location of fitting connections should be planned to maximize accessibility. Whenever possible, use a torque wrench to tighten connections to the recommended torque.

Ordering Information

Size of fittings is indicated by dash number relating to sixteenths of an inch for the nominal O.D. of the tube size used. Example: 1/2 inch tube = 8/16 or (-8) size.

Order standard fittings from appropriate chart indicating required dash numbers. For example, 500-8-8 is a 90 degree braze elbow with 1/2" nominal braze counterbore and 1/2" male tube end (3/4-16 thread). Jump size 500-10-8 is a 90 degree braze elbow with 5/8" nominal braze counterbore and 1/2" male tube end (3/4-16 thread).

Pictorial views for each fitting style indicate the correct numbering sequence for fitting ends.

If information is needed for jump sizes not shown, please contact customer service for engineering assistance.

Table JB1. Pressure Ratings for 37 Deg. Flared Tube Ends, Bulkheads and 37 Deg. Female Swivels

Nominal Tube Size		Thread Size	Working Pressures			
Nom SAE Dash Size	Nom Inch Tube O.D.	SAE J514 Flared Tube Ends, Unions, Bulkheads and Swivels (Notes 1&2)	37 Deg. Flared Tube Ends, Unions and Bulkheads		37 Deg. Female Swivels	
			MPa	psi	MPa	psi
-2	1/8	5/16-24 UNF	34.5	5,000	34.5	5,000
-3	3/16	3/8-24 UNF	34.5	5,000	34.5	5,000
-4	1/4	7/16-20 UNF	34.5	5,000	31	4,500
-5	5/16	1/2-20 UNF	34.5	5,000	27.5	4,000
-6	3/8	9/16-18 UNF	34.5	5,000	27.5	4,000
-8	1/2	3/4-16 UNF	31	4,500	27.5	4,000
-10	5/8	7/8-14 UNF	24	3,500	21	3,000
-12	3/4	1-1/16-12 UN	24	3,500	21	3,000
-14	7/8	1-3/16-12 UN	21	3,000	17	2,500
-16	1	1-5/16-12 UN	21	3,000	17	2,500
-20	1 1/4	1-5/8-12 UN	17	2,500	14	2,000
-24	1 1/2	1-7/8-12 UN	14	2,000	10.5	1,500
-32	2	2-1/2-12 UN	10.5	1,500	8	1,125

1) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)
2) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts

Table JB2. Pressure Ratings for Fittings With NPTF Pipe Threads and NPSM Female Swivels

Nominal Pipe Size		Thread Size		Working Pressures			
Nom SAE Dash Size	Nom Inch Pipe O.D.	Dryseal Pipe Thread (NPTF[1]) Male and Female	Straight Pipe Thread (NPSM[2]) Female Swivels	Fittings With NPTF Pipe Threads		NPSM Female Swivels	
				MPa	psi	MPa	psi
-2	1/8	1/8-27	1/8-27	34.5	5,000	34.5	5,000
-4	1/4	1/4-18	1/4-18	27.5	4,000	34.5	5,000
-6	3/8	3/8-18	3/8-18	21	3,000	27.6	4,000
-8	1/2	1/2-14	1/2-14	21	3,000	24.1	3,500
-12	3/4	3/4-14	3/4-14	17	2,500	15.5	2,250
-16	1	1-11-1/2	1-11-1/2	14	2,000	13.8	2,000
-20	1 1/4	1-1/4-11-1/2	1-1/4-11-1/2	8	1,150	11.2	1,625
-24	1 1/2	1-1/2-11-1/2	1-1/2-11-1/2	7	1,000	8.6	1,250
-32	2	2-11-1/2	2-11-1/2	7	1,000	7.8	1,125

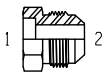
1) Dryseal American Standard Taper Pipe Thread
2) American Standard Straight Pipe Thread for Mechanical Joints

Table JB3. Pressure Ratings for Code 61 Four-Bolt Split Flange Ends

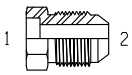
Nominal Flange Size		Bolt Dimensions			Working Pressures @ Recommended Torque (Note: See Below)			
Nom SAE Dash Size	Nom Inch Pipe O.D.	Thread	Length		Maximum Recommended Working Pressure		Recommended Torque Range	
			mm	inch	MPa	psi	Nm	lb-in
-8	1/2	5/16-18	32	1-1/4	34.5	5,000	20-25	175-225
-12	3/4	3/8-16	32	1-1/4	34.5	5,000	28-40	250-350
-16	1	3/8-16	32	1-1/4	34.5	5,000	37-48	325-425
-20	1 1/4	7/16-14	38	1-1/2	27.6	4,000	48-62	425-550
-24	1 1/2	1/2-13	38	1-1/2	20.7	3,000	62-79	550-700
-32	2	1/2-13	38	1-1/2	20.7	3,000	73-90	650-800

Table JB4. Pressure Ratings for Code 62 Four-Bolt Split Flange Ends								
Nominal Flange Size		Bolt Dimensions			Working Pressures @ Recommended Torque (Note: See Below)			
Nom SAE Dash Size	Nom Inch Pipe O.D.	Thread	Length		Maximum Recommended Working Pressure		Recommended Torque Range	
			mm	inch	MPa	psi	Nm	lb-in
-8	1/2	5/16-18	32	1-1/4	41.4	6,000	20-25	175-225
-12	3/4	3/8-16	38	1-1/2	41.4	6,000	34-45	300-400
-16	1	7/16-14	44	1-3/4	41.4	6,000	56-68	500-600
-20	1 1/4	1/2-13	44	1-3/4	41.4	6,000	85-102	750-900
-24	1 1/2	5/8-11	57	2-1/4	41.4	6,000	158-181	1400-1600
-32	2	3/4-10	70	2-3/4	41.4	6,000	271-294	2400-2600

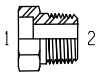
Note: SAE J518, Code 61 and Code 62 Four-Bolt Split Flange connections are non-threaded port ends which utilize O-Rings for sealing. They are assembled to ports with split flange clamp halves and clamping pressure is provided by bolts or socket head cap screws of SAE Grade 5 material or better as specified in SAE J429. Rated design factor for these connections is dependent on the selected grade for the clamp bolts. Flanged head ends are incorporated into fittings having suitable means for attachment to tubes, pipes or hoses to provide connection ends.



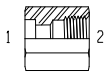
403-
(1)Bore
(2)Male Tube



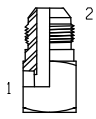
403-L-
(1)Bore
(2)Bulkhead



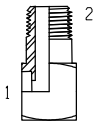
404-
(1)Bore
(2)Male Pipe



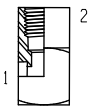
405-
(1)Bore
(2)Female Pipe



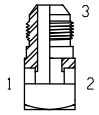
500-
(1)Bore
(2)Male Tube



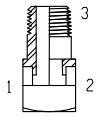
501-
(1)Bore
(2)Male Pipe



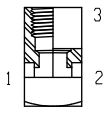
502-
(1)Bore
(2)Female Pipe



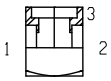
600-
(1&2)Bore
(3)Male Tube



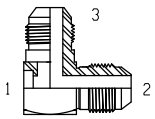
601-
(1&2)Bore
(3)Male Pipe



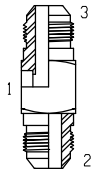
602-
(1&2)Bore
(3)Female Tube



603-
(1,2,&3)Bore

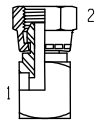


701-
(1)Bore
(2&3)Male Tube

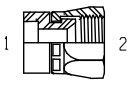


702-
(1)Bore
(2&3)Male Tube

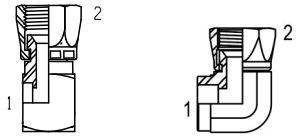
800-
(1)Bore
(2)Female Pipe Swivel



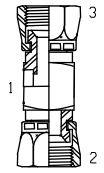
801-
(1)Bore
(2)Female Pipe Swivel



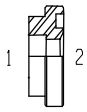
900-
(1)Bore
(2)37° Female Swivel



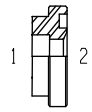
901-
(1)Bore
(2)37° Female Swivel



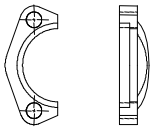
902-
(1)Bore
(2&3)37° Female Swivel



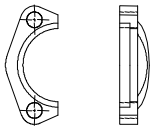
3300-61-
(1)Bore
(2)Code 61 Flange



3300-62-
(1)Bore
(2)Code 62 Flange

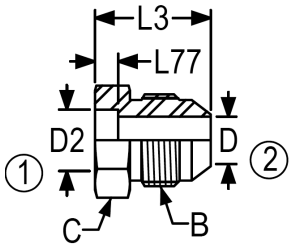


31205-61-
Code 61 Split Flange Clamp
See flange adapters



31205-62-
Code 62 Split Flange Clamp
See flange adapters

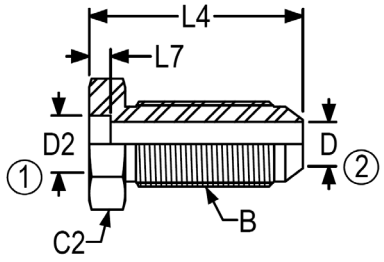
403 BRAZE TUBE UNION



PART NO	TUBE OD	B UN/UNF-2A	L3	L7	C	D	D2
403-4-4 PF UNPL	1/4-1/4	7/16-20	0.80	0.125	0.50	0.17	0.247
403-4-4 UNPL	1/4-1/4	7/16-20	0.80	0.125	0.50	0.17	0.254
403-5-5 UNPL	5/16-5/16	1/2-20	0.80	0.133	0.56	0.23	0.316
403-6-6 PF UNPL	3/8-3/8	9/16-18	0.84	0.140	0.63	0.30	0.372
403-6-6 UNPL	3/8-3/8	9/16-18	0.84	0.140	0.63	0.30	0.379
403-6-8 UNPL	3/8-1/2	3/4-16	0.94	0.140	0.81	0.30	0.379
403-8-8 PF UNPL	1/2-1/2	3/4-16	0.94	0.188	0.81	0.39	0.497
403-8-8 UNPL	1/2-1/2	3/4-16	0.94	0.188	0.81	0.39	0.504
403-8-12 UNPL	1/2-3/4	1 1/16-12	1.24	0.188	1.13	0.39	0.504
403-10-8 UNPL	5/8-1/2	3/4-16	0.94	0.188	0.81	0.39	0.631
403-10-10 PF UNPL	5/8-5/8	7/8-14	1.10	0.218	0.94	0.48	0.622
403-10-10 UNPL	5/8-5/8	7/8-14	1.10	0.218	0.94	0.48	0.631
403-10-12 UNPL	5/8-3/4	1 1/16-12	1.28	0.218	1.13	0.48	0.631
403-12-8 UNPL	3/4-1/2	3/4-16	0.98	0.232	0.94	0.39	0.756
403-12-10 UNPL	3/4-5/8	7/8-14	1.10	0.232	0.94	0.48	0.756
403-12-12 PF UNPL	3/4-3/4	1 1/16-12	1.28	0.232	1.13	0.61	0.747
403-12-12 UNPL	3/4-3/4	1 1/16-12	1.28	0.232	1.13	0.61	0.756
403-14-12 UNPL	7/8-3/4	1 1/16-12	1.28	0.241	1.13	0.61	0.881
403-14-14 UNPL	7/8-7/8	1 3/16-12	1.31	0.241	1.25	0.72	0.881
403-16-10 UNPL	1-5/8	7/8-14	1.28	0.312	1.38	0.48	1.007
403-16-12 PF UNPL	1-3/4	1 1/16-12	1.28	0.250	1.25	0.61	0.997
403-16-12 UNPL	1-3/4	1 1/16-12	1.28	0.250	1.25	0.61	1.006
403-16-16 PF UNPL	1-1	1 5/16-12	1.33	0.250	1.38	0.84	0.997
403-16-16 UNPL	1-1	1 5/16-12	1.33	0.250	1.38	0.84	1.006
403-16-20 UNPL	1-1 1/4	1 5/8-12	1.45	0.250	1.69	0.84	1.006
403-20-16 UNPL	1 1/4-1	1 5/16-12	1.33	0.250	1.38	0.84	1.256
403-20-20 PF UNPL	1 1/4-1 1/4	1 5/8-12	1.45	0.312	1.69	1.08	1.247
403-20-20 UNPL	1 1/4-1 1/4	1 5/8-12	1.45	0.312	1.69	1.08	1.256
403-20-24 UNPL	1 1/4-1 1/2	1 7/8-12	1.65	0.312	2.00	1.08	1.256
403-24-20 UNPL	1 1/2-1 1/4	1 5/8-12	1.45	0.343	1.69	1.08	1.506
403-24-24 PF UNPL	1 1/2-1 1/2	1 7/8-12	1.65	0.343	2.00	1.31	1.497
403-24-24 UNPL	1 1/2-1 1/2	1 7/8-12	1.65	0.343	2.00	1.31	1.506
403-32-32 UNPL	2-2	2 1/2-12	2.05	0.343	2.63	1.78	2.006

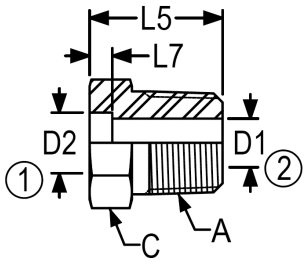
*PF=PRESS FIT

403-L BRAZE BULKHEAD UNION



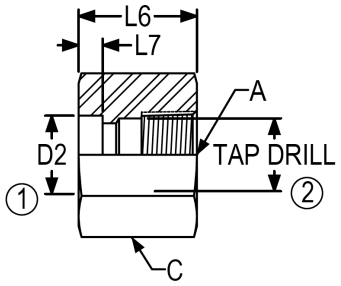
PART NO	TUBE OD	B UN/UNF-2A	L4	L7	C2	D	D2
403-L-8-8 UNPL	1/2-1/2	3/4-16	1.88	0.188	1.00	0.39	0.504
403-L-10-10 UNPL	5/8-5/8	7/8-14	2.06	0.218	1.13	0.48	0.631
403-L-12-12 UNPL	3/4-3/4	1 1/16-12	2.17	0.232	1.38	0.61	0.756
403-L-16-16 UNPL	1-1	1 5/16-12	2.33	0.250	1.63	0.84	1.006

404 MALE PIPE UNION



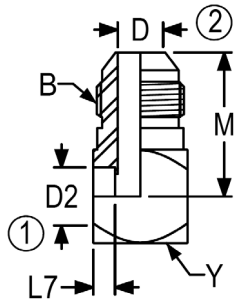
PART NO	TUBE OD	A NPTF	L5	L7	C	D1	D2
404-6-4 UNPL	3/8	1/4-18	0.81	0.140	0.63	0.28	0.379
404-6-6 UNPL	3/8	3/8-18	0.85	0.140	0.81	0.28	0.379
404-8-6 UNPL	1/2	3/8-18	0.85	0.188	0.81	0.41	0.504
404-8-8 UNPL	1/2	1/2-14	1.10	0.188	0.94	0.41	0.504
404-10-8 UNPL	5/8	1/2-14	1.10	0.218	0.94	0.53	0.631
404-12-8 UNPL	3/4	1/2-14	1.10	0.232	0.94	0.53	0.756
404-12-12 UNPL	3/4	3/4-14	1.10	0.232	1.13	0.61	0.756
404-16-8 UNPL	1	1/2-14	1.12	0.250	1.25	0.53	1.006
404-16-12 UNPL	1	3/4-14	1.25	0.250	1.25	0.72	1.006
404-16-16 UNPL	1	1-11 1/2	1.31	0.250	1.38	0.84	1.006
404-20-16 UNPL	1 1/4	1-11 1/2	1.31	0.250	1.50	0.94	1.256
404-20-20 UNPL	1 1/4	1 1/4-11 1/2	1.41	0.312	1.69	1.08	1.256
404-24-24 UNPL	1 1/2	1 1/2-11 1/2	1.50	0.343	2.00	1.31	1.506
404-32-32 UNPL	2	2-11 1/2	1.78	0.343	2.63	1.78	2.006

405 BRAZE FEMALE PIPE UNION



PART NO	TUBE OD	A NPTF	L6	L7	C	TAP DRILL	D2
405-6-4	3/8	1/4-18	0.75	0.140	0.75	0.43	0.379
405-12-8	3/4	1/2-14	1.06	0.232	1.13	0.70	0.756
405-12-12	3/4	3/4-14	1.14	0.232	1.38	0.91	0.756
405-20-20	1 1/4	1 1/4-11 1/2	1.52	0.312	2.00	1.48	1.256
405-24-24	1 1/2	1 1/2-11 1/2	1.38	0.343	2.13	1.72	1.506

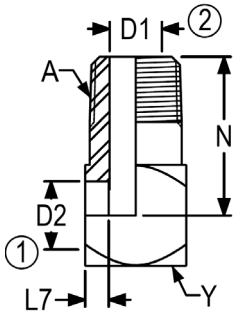
500 BRAZE 90 DEGREE TUBE ELBOW



PART NO	TUBE OD	B UN/UNF-2A	M	L7	Y	D2	D
500-2-2 UNPL	1/8-1/8	5/16-24	0.77	0.093	0.44	0.129	0.06
500-4-4 UNPL	1/4-1/4	7/16-20	0.89	0.125	0.50	0.254	0.17
500-5-5 UNPL	5/16-5/16	1/2-20	0.95	0.133	0.56	0.316	0.23
500-6-5 PF UNPL	3/8-5/16	1/2-20	0.95	0.140	0.56	0.372	0.23
500-6-5 UNPL	3/8-5/16	1/2-20	0.95	0.140	0.56	0.379	0.23
500-6-6 PF UNPL	3/8-3/8	9/16-18	1.06	0.140	0.63	0.372	0.30
500-6-6 UNPL	3/8-3/8	9/16-18	1.06	0.140	0.63	0.379	0.30
500-8-8 PF UNPL	1/2-1/2	3/4-16	1.25	0.188	0.81	0.497	0.39
500-8-8 UNPL	1/2-1/2	3/4-16	1.25	0.188	0.81	0.504	0.39
500-8-10 UNPL	1/2-5/8	7/8-14	1.45	0.200	0.94	0.504	0.48
500-10-8 UNPL	5/8-1/2	3/4-16	1.31	0.218	0.94	0.631	0.39
500-10-10 UNPL	5/8-5/8	7/8-14	1.45	0.203	0.94	0.631	0.48
500-12-8 UNPL	3/4-1/2	3/4-16	1.31	0.232	0.94	0.756	0.39
500-12-12 PF UNPL	3/4-3/4	1 1/16-12	1.66	0.232	1.13	0.747	0.61
500-12-12 UNPL	3/4-3/4	1 1/16-12	1.66	0.232	1.13	0.756	0.61
500-12-16 UNPL	3/4-1	1 5/16-12	1.81	0.232	1.38	0.756	0.84
500-14-14 UNPL	7/8-7/8	1 3/16-12	1.80	0.232	1.25	0.881	0.72
500-16-12 UNPL	1-3/4	1 1/16-12	1.66	0.232	1.13	1.006	0.61
500-16-16 UNPL	1-1	1 5/16-12	1.81	0.250	1.38	1.006	0.84
500-20-16 UNPL	1 1/4-1	1 5/16-12	1.88	0.312	1.50	1.256	0.84
500-20-20 UNPL	1 1/4-1 1/4	1 5/8-12	2.06	0.312	1.75	1.256	1.08
500-24-24 UNPL	1 1/2-1 1/2	1 7/8-12	2.33	0.328	2.00	1.506	1.31

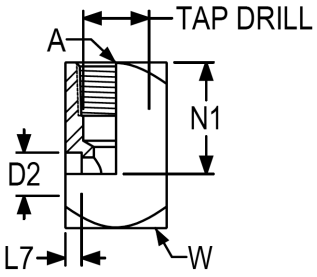
*PF=PRESS FIT

501 BRAZE 90 DEGREE MALE PIPE ELBOW



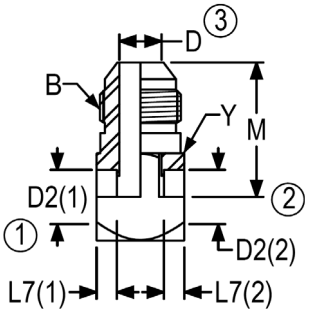
PART NO	TUBE OD	A NPTF	N	L7	Y	D2	D1
501-10-8 UNPL	5/8	1/2-14	1.47	0.218	0.94	0.631	0.48
501-20-16 UNPL	1 1/4	1-11 1/2	2.03	0.312	1.50	1.256	0.84

502 BRAZE 90 DEGREE FEMALE PIPE ELBOW



PART NO	TUBE OD	A NPTF	N1	L7	W	D2	TAP DRILL
502-6-6 UNPL	3/8	3/8-18	0.97	0.14	0.88	0.379	0.57

600 BRAZE TUBE RUN/RUN TEE

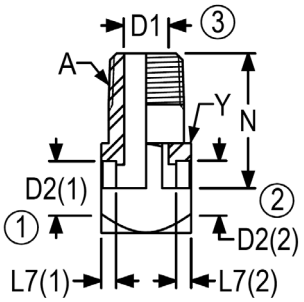


PART NO	TUBE OD	B UN/UNF-2A	M	L7 (1)	L7 (2)	Y	D2 (1)	D2 (2)	D
600-4-4-4 UNPL	1/4-1/4-1/4	7/16-20	0.89	0.125	0.125	0.50	0.254	0.254	0.17
600-5-5-5 PF UNPL	5/16-5/16-5/16	1/2-20	0.95	0.133	0.133	0.56	0.309	0.309	0.23
600-5-5-5 UNPL	5/16-5/16-5/16	1/2-20	0.95	0.133	0.133	0.56	0.316	0.316	0.23
600-6-6-4 UNPL	3/8-3/8-1/4	7/16-20	0.95	0.140	0.140	0.63	0.379	0.379	0.17
600-6-6-6 PF UNPL	3/8-3/8-3/8	9/16-18	1.06	0.140	0.140	0.63	0.372	0.372	0.30
600-6-6-6 UNPL	3/8-3/8-3/8	9/16-18	1.06	0.140	0.140	0.63	0.379	0.379	0.30
600-8-8-8 UNPL	1/2-1/2-1/2	3/4-16	1.25	0.188	0.188	0.81	0.504	0.504	0.39
600-10-10-6 UNPL	5/8-5/8-3/8	9/16-18	1.22	0.150	0.150	0.94	0.484	0.484	0.30
600-10-10-10 UNPL	5/8-5/8-5/8	7/8-14	1.45	0.203	0.203	0.94	0.631	0.631	0.48
600-12-12-8 UNPL	3/4-3/4-1/2	3/4-16	1.31	0.232	0.232	0.94	0.609	0.609	0.39
600-12-12-10 UNPL	3/4-3/4-5/8	7/8-14	1.41	2.00	2.00	0.94	0.766	0.756	0.48
600-12-12-12 UNPL	3/4-3/4-3/4	1 1/16-12	1.66	0.232	0.232	1.13	0.756	0.756	0.61
600-12-12-16 UNPL	3/4-3/4-1	1 5/16-12	1.81	0.232	0.232	1.38	0.756	0.756	0.84
600-16-12-12 UNPL	1-3/4-3/4	1 1/16-12	1.66	0.232	0.232	1.13	1.006	0.756	0.61
600-16-16-16 PF UNPL	1-1-1	1 5/16-12	1.81	2.500	2.500	1.38	1.006	1.006	0.84
600-16-16-16 UNPL	1-1-1	1 5/16-12	1.81	0.250	0.250	1.38	1.006	1.006	0.84
600-20-20-20 UNPL	1 1/4-1 1/4-1 1/4	1 5/8-12	2.06	0.312	0.312	1.75	1.256	1.256	1.08

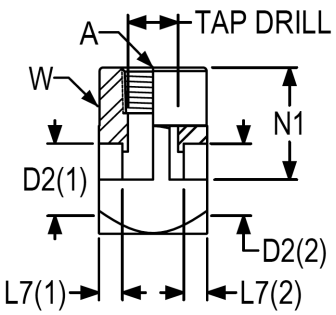
*PF=PRESS FIT

601 BRAZE MALE PIPE RUN/RUN TEE

INFORMATION AVAILABLE UPON REQUEST.

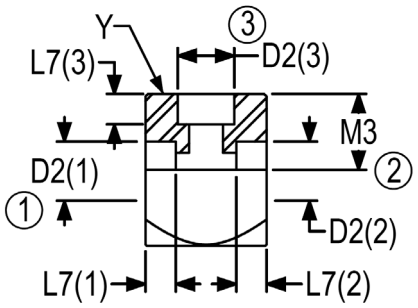


602 BRAZE FEMALE PIPE RUN/RUN TEE



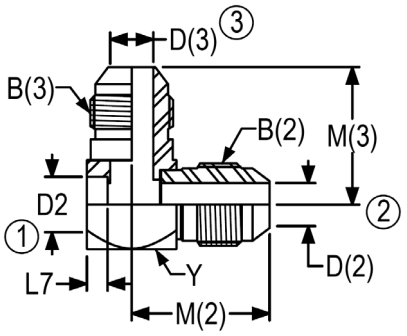
PART NO	TUBE OD	A NPTF	N1	L7 (1)	L7 (2)	W	D2 (1)	D2 (2)	TAP DRILL
602-6-6-2 UNPL	3/8-3/8	1/8-27	0.66	0.140	0.140	0.56	0.379	0.379	0.33
602-10-10-4 UNPL	5/8-5/8	1/4-18	0.94	0.203	0.203	0.94	0.625	0.625	0.43

603 BRAZE JUNCTION TEE



PART NO	TUBE OD	M3	L7 (1)	L7 (2)	L7 (3)	Y	D2 (1)	D2 (2)	D2 (3)
603-4-4-4 UNPL	1/4-1/4-1/4	0.31	0.125	0.125	0.125	0.50	0.254	0.254	0.254
603-6-6-6 UNPL	3/8-3/8-3/8	0.39	0.140	0.140	0.140	0.63	0.379	0.379	0.379

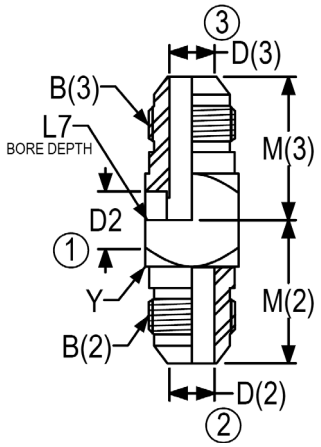
701 BRAZE TUBE RUN TEE



PART NO	TUBE OD	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (2)	M (3)	Y	L7	D2	D (2)	D (3)
701-4-4-4 UNPL	1/4-1/4-1/4	7/16-20	7/16-20	0.89	0.89	0.50	0.12	0.254	0.17	0.17
701-5-5-5 UNPL	5/16-5/16-5/16	1/2-20	1/2-20	0.95	0.95	0.56	0.13	0.316	0.23	0.23
701-6-6-6 UNPL	3/8-3/8-3/8	9/16-18	9/16-18	1.06	1.06	0.63	0.14	0.379	0.30	0.30
701-10-10-6 UNPL	5/8-5/8-3/8	7/8-14	9/16-18	1.45	1.22	0.94	0.21	0.631	0.48	0.30
701-8-8-8 UNPL	1/2-1/2-1/2	3/4-16	3/4-16	1.25	1.25	0.81	0.18	0.504	0.39	0.39
701-10-10-10 UNPL	5/8-5/8-5/8	7/8-14	7/8-14	1.45	1.45	0.94	0.21	0.631	0.48	0.48
701-12-12-12 UNPL	3/4-3/4-3/4	1 1/6-12	1 1/16-12	1.66	1.66	1.13	0.23	0.756	0.61	0.61
701-14-14-14 PF UNPL	7/8-7/8-7/8	1 3/16-12	1 3/16-12	1.80	1.80	1.25	0.24	0.872	0.72	0.72

*PF=PRESS FIT

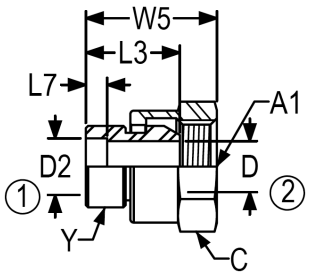
702 BRAZE TUBE BRANCH TEE



PART NO	TUBE OD	B (2) UN/UNF-2A	B (3) UN/UNF-2A	M (2)	M (3)	Y	L7	D2	D (2)	D (3)
702-4-4-4 UNPL	1/4-1/4-1/4	7/16-20	7/16-20	0.89	0.89	0.50	0.125	0.254	0.17	0.17
702-5-5-5 UNPL	5/16-5/16-5/16	1/2-20	1/2-20	0.95	0.95	0.56	0.133	0.316	0.23	0.23
702-6-4-4 UNPL	5/16-1/4-1/4	7/16-20	7/16-20	0.95	0.95	0.63	0.140	0.379	0.17	0.17
702-6-6-6 UNPL	3/8-3/8-3/8	9/16-18	9/16-18	1.06	1.06	0.63	0.140	0.379	0.30	0.30
702-6-10-10 UNPL	3/8-5/8-5/8	7/8-14	7/8-14	1.45	1.45	0.94	0.140	0.379	0.48	0.48
702-8-6-6 UNPL	1/2-3/8-3/8	9/16-18	9/16-18	1.06	1.06	0.63	0.140	0.504	0.30	0.30
702-8-8-8 PF UNPL	1/2-1/2-1/2	3/4-16	3/4-16	1.25	1.25	0.81	0.188	0.497	0.39	0.39
702-8-8-8 UNPL	1/2-1/2-1/2	3/4-16	3/4-16	1.25	1.25	0.81	0.188	0.504	0.39	0.39
702-10-8-8 UNPL	5/8-1/2-1/2	3/4-16	3/4-16	1.25	1.25	0.81	0.188	0.631	0.39	0.39
702-10-10-10 UNPL	5/8-5/8-5/8	7/8-14	7/8-14	1.45	1.45	0.94	0.203	0.631	0.48	0.48
702-10-12-12 UNPL	5/8-3/4-3/4	1 1/16-12	1 1/16-12	1.66	1.66	1.13	0.218	0.631	0.61	0.61
702-12-10-10 UNPL	3/4-5/8-5/8	7/8-14	7/8-14	1.55	1.55	1.13	0.232	0.750	0.48	0.48
702-12-12-12 UNPL	3/4-3/4-3/4	1 1/16-12	1 1/16-12	1.66	1.66	1.13	0.232	0.756	0.61	0.61
702-16-12-12 UNPL	1-3/4-3/4	1 1/16-12	1 1/16-12	1.79	1.79	1.38	0.250	1.006	0.61	0.61
702-16-16-16 UNPL	1-1-1	1 5/16-12	1 5/16-12	1.81	1.81	1.38	0.250	1.006	0.84	0.84
702-20-20-20 UNPL	1 1/4-1 1/4-1 1/4	1 5/8-12	1 5/8-12	2.06	2.06	1.75	0.312	1.256	1.08	1.08

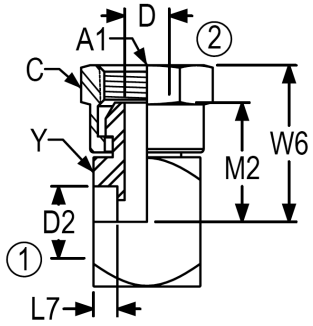
*PF=PRESS FIT

800 BRAZE FEMALE PIPE SWIVEL UNION



PART NO	TUBE OD	A1 NPSM	W5	L3	L7	Y (DIA)	C	D2	D
800-6-4 UNPL	3/8	1/4-18	0.93	0.74	0.14	0.63	0.69	0.381	0.22
800-6-6 UNPL	3/8	3/8-18	1.02	0.77	0.140	0.63	0.88	0.379	0.30
800-8-8 UNPL	1/2	1/2-14	1.16	0.83	0.19	0.81	1.00	0.504	0.45
800-10-8 UNPL	5/8	1/2-14	1.19	0.86	0.218	0.88	1.00	0.631	0.48
800-16-12 UNPL	1	3/4-14	1.33	1.00	0.250	1.25	1.25	1.006	0.66
800-16-16 UNPL	1	1-11 1/2	1.38	1.00	0.250	1.25	1.50	1.006	0.84

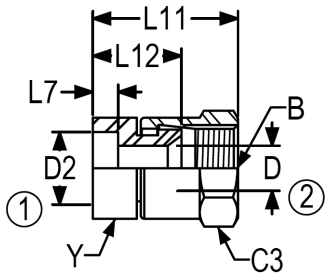
801 BRAZE 90 DEGREE FEMALE PIPE SWIVEL ELBOW



PART NO	TUBE OD	A1 NPSM	W6	M2	C	L7	Y	D2	D
801-8-6 UNPL	1/2	3/8-18	1.06	0.81	0.88	0.16	0.75	0.504	0.33
801-10-8 UNPL	5/8	1/2-14	1.38	1.05	1.00	0.21	0.94	0.631	0.39
801-12-8 UNPL	3/4	1/2-14	1.28	0.95	1.00	0.22	1.00	0.756	0.45
801-16-12 PF UNPL	1	3/4-14	1.57	1.23	1.25	0.25	1.25	0.997	0.63
801-24-16 PF UNPL	1 1/2	1-11 1/2	1.88	1.50	1.50	0.25	1.75	1.497	0.84
801-24-16 UNPL	1 1/2	1-11 1/2	1.88	1.50	1.50	0.25	1.75	1.506	0.84

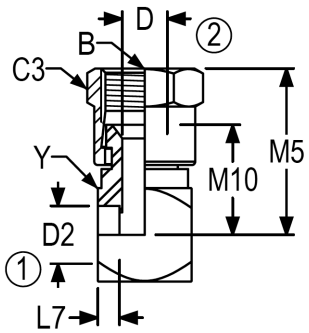
*PF=PRESS FIT

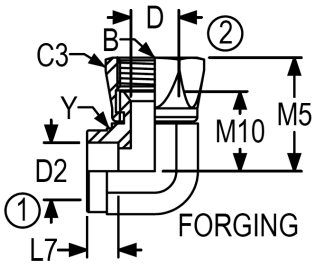
900 BRAZE 37 DEGREE FEMALE SWIVEL UNION



PART NO	TUBE OD	B UN/UNF-2B	L11	L12	C3	L7	Y (DIA)	D2	D
900-5-4 UNPL	5/16-1/4	7/16-20	1.02	0.68	0.56	0.17	0.50	0.317	0.17
900-5-5 UNPL	5/16-5/16	1/2-20	0.94	0.56	0.63	0.156	0.50	0.317	0.23
900-6-6 UNPL	3/8-3/8	9/16-18	1.10	0.73	0.69	0.188	0.63	0.375	0.30
900-10-8 UNPL	5/8-1/2	3/4-16	1.19	0.77	0.88	0.218	0.88	0.628	0.39
900-10-10 UNPL	5/8-5/8	7/8-14	1.40	0.90	1.00	0.218	1.00	0.628	0.48
900-12-10 UNPL	3/4-5/8	7/8-14	1.40	0.90	1.00	0.232	1.00	0.756	0.48
900-12-12 UNPL	3/4-3/4	1 1/16-12	1.61	1.06	1.25	0.232	1.00	0.756	0.61
900-16-16 UNPL	1-1	1 5/16-12	1.78	1.19	1.50	0.250	1.31	1.006	0.84
900-20-16 UNPL	1 1/4-1	1 5/16-12	1.97	1.38	1.50	0.312	1.50	1.256	0.84

901 BRAZE 90 DEGREE-37 DEGREE FEMALE SWIVEL



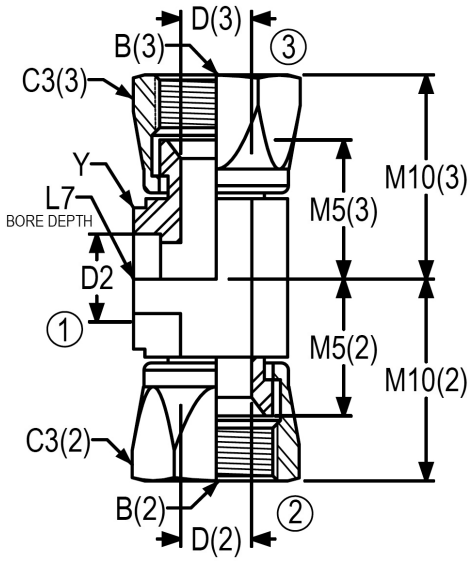


PART NO	TUBE OD	B UN/UNF-2B	M5	M10	C3	L7	Y	D2	D
901-5-5 UNPL	5/16-5/16	1/2-20	1.06	0.69	0.63	0.133	0.56	0.316	0.23
901-6-6 UNPL	3/8-3/8	9/16-18	1.07	0.69	0.69	0.140	0.63	0.379	0.30
901-8-8 UNPL	1/2-1/2	3/4-16	1.38	0.96	0.88	0.188	0.81	0.504	0.39
901-8-8 PF UNPL	1/2-1/2	3/4-16	1.38	0.96	0.88	0.188	0.81	0.497	0.39
901-10-10 PF UNPL	5/8-5/8	7/8-14	1.49	0.99	1.00	0.203	0.94	0.622	0.48
901-12-12 UNPL	3/4-3/4	1 1/16-12	1.78	1.22	1.25	0.23	1.13	0.756	0.61
901-16-16 UNPL-FG	1-1	1 5/16-12	2.00	1.41	1.50	0.55	1.31	1.007	0.84

*PF=PRESS FIT

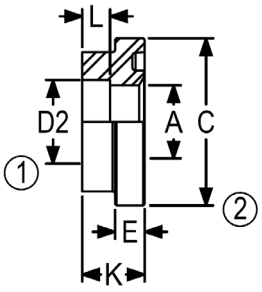
902 BRAZE 37 DEGREE FEMALE SWIVEL BRANCH TEE

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



3300-61 BRAZE CODE 61 FLANGED HEAD

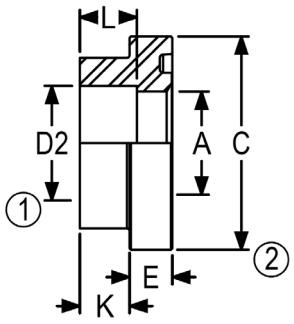
ALSO AVAILABLE IN SOLID, CALL CUSTOMER SERVICE FOR DETAILS.



PART NO	TUBE OD	FLANGE SIZE	A	C	E	K	D2	L
3300-61-12 UNPL	3/4	3/4	0.66	1.50	0.26	0.56	0.752	0.250
3300-61-16 UNPL	1	1	0.91	1.75	0.31	0.56	1.006	0.250
3300-61-20 UNPL	1 1/4	1 1/4	1.13	2.00	0.31	0.56	1.256	0.250
3300-61-24 UNPL	1 1/2	1 1/2	1.38	2.38	0.31	0.63	1.504	0.438
3300-61-32 UNPL	2	2	1.88	2.81	0.38	0.63	2.006	0.500
3300-61-48 UNPL	3	3	2.88	4.00	0.38	0.75	3.004	0.562

3300-62 BRAZE CODE 62 FLANGED HEAD

INFORMATION AVAILABLE UPON REQUEST. CALL CUSTOMER SERVICE FOR DETAILS.



Features, Adapter Unions

Adapter unions provide female pipe swivel connections for use with male pipe or NPT/NPTF hose ends with a 30 degree female seat. ***Caution: For proper sealing, ensure that the mating male end has been machined with the proper 30 degree female seat***. The adapter unions described in this section include female pipe swivel fittings with NPTF (Dryseal) male or female pipe ends and SAE straight thread O-Ring stud ends. Pipe thread connections are used in a wide variety of applications and provide reliable metal to metal sealing. Because of the tapered NPTF thread design, pipe thread connections are not recommended for applications that require repeated re-assembly or precise orientation of the fitting after tightening. For these applications, use of the SAE adjustable O-Ring stud end is recommended.

Performance

Where applicable, fittings are designed and qualified to the requirements of SAE J514. Straight thread O-Ring stud ends conform to SAE J514 and/or SAE J1926/3/ISO 11926-3.

Construction

Unless otherwise specified, fittings are machined from cold drawn carbon steel barstock and forgings. Standard plating is electrodeposited zinc with a clear trivalent chromate conversion coating in accordance with ASTM B633 (Type V SC2). The minimum salt spray resistance is 240 hours to red corrosion when tested in accordance with ASTM B117.

Threads

Straight Threads: External straight threads conform to the Unified National Class 2A. Maximum diameters of plated external threads may conform to Class 3A maximum diameters after plating.

NPTF Threads: Male and female pipe threads conform to the Dryseal American Standard Taper Pipe Thread (SAE J476a, NPTF) Series which will provide pressure tight joints without the use of a lubricant or sealer. Use of these fittings with non-dryseal NPT pipe or hose ends is not recommended for high-pressure applications.

Note: Where not functionally objectionable, use of a compatible lubricant/sealant is recommended for either NPT or NPTF threads to minimize the possibility of galling in assembly.

NPSM Swivels: Female threads for adapter union swivel nuts conform to the American Standard Straight Pipe Thread (NPSM) Series. These threads mate with either NPT or NPTF Series male threads to provide a mechanical connection between the adapter and mating male end. Sealing is provided by metal to metal contact between the machined 30 degree female seat on the NPT/NPTF male end and the nose of the swivel end. The NPSM swivel threads are not a sealing member. ***Caution: For proper sealing, ensure that the mating male end has been machined with the proper 30 degree female seat***.

Assembly Information

For assembly instructions, refer to the Technical Data Section for the appropriate fitting end. Also, refer to the Technical Data Section for recommendations regarding tubing pressure ratings, tube flares and hose/tube routing information. Please note the following:

In the design and fabrication of tubing or hose runs for any hydraulic system, precautions should be taken to allow for sufficient adjustment of the hose or tubing so that proper alignment can be attained at the fitting connections. Improper fit-up or misalignment should be corrected before final connections are made. Location of fitting connections should be planned to maximize accessibility. Whenever possible, use a torque wrench to tighten connections to the recommended torque.

Ordering information

Size of fittings are indicated by dash number relating to sixteenths of an inch for the nominal O.D. of the pipe size used. Example: 1/2 inch pipe = 8/16 or (-8) size.

Order standard fittings from appropriate chart indicating required dash numbers. For example, 1404-8-8 is 1/2" male pipe thread to 1/2" female pipe swivel. Jump size 1404-8-6 is 1/2" male pipe thread to 3/8" female pipe swivel. Pictorial views for each fitting style indicate the correct numbering sequence for fitting ends.

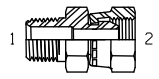
If information is needed for jump sizes not shown, please contact customer service for engineering assistance.

Table JU1. Pressure Ratings for Fittings With NPTF Pipe Threads and Adapter Unions						
Nom. Pipe Size		Thread Size			Working Pressures	
Nom SAE Dash Size	Nom Inch Pipe O.D.	Dryseal Pipe Thread (NPTF[1]) Male and Female	Straight Pipe Thread (NPSM[2]) Female Swivels	SAE J1926/3/ ISO 11926-3 O-Ring Port Thread Size (Notes 3&4)	Adapter Unions	
					MPa	psi
-2	1/8	1/8-27	1/8-27	5/16-24 UNF	34.5	5,000
-4	1/4	1/4-18	1/4-18	7/16-20 UNF	34.5	5,000
-6	3/8	3/8-18	3/8-18	9/16-18 UNF	27.6	4,000
-8	1/2	1/2-14	1/2-14	3/4-16 UNF	24.1	3,500
-12	3/4	3/4-14	3/4-14	1-1/16-12 UN	15.5	2,250
-16	1	1-11-1/2	1-11-1/2	1-5/16-12 UN	13.8	2,000
-20	1 1/4	1-1/4-11-1/2	1-1/4-11-1/2	1-5/8-12 UN	11.2	1,625
-24	1 1/2	1-1/2-11-1/2	1-1/2-11-1/2	1-7/8-12 UN	8.6	1,250
-32	2	2-11-1/2	2-11-1/2	2-1/2-12 UN	7.8	1,125

1) Dryseal American Standard Taper Pipe Thread
2) American Standard Straight Pipe Thread for Mechanical Joints
3) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)
4) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts

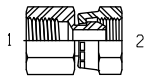
Adapter Union Fittings Index

(140130)

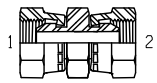


1404-
(1)Male Pipe
(2)Female Pipe Swivel

(140131)

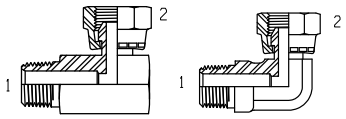


1405-
(1)Female Pipe
(2)Female Pipe Swivel



1406-
(1&2)Female Pipe Swivel

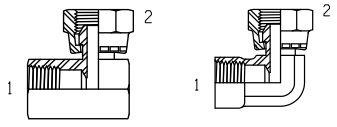
(140230)



FG

1501-
(1)Male Pipe
(2)Female Pipe Swivel

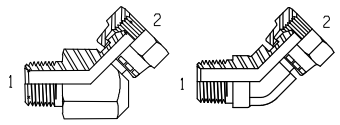
(140231)



FG

1502-
(1)Female Pipe
(2)Female Pipe Swivel

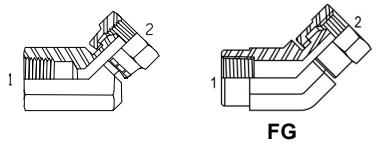
(140330)



FG

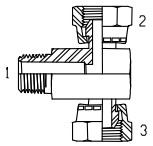
1503-
(1)Male Pipe
(2)Female Pipe Swivel

(140331)

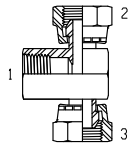


FG

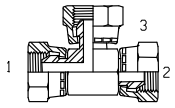
1504-
(1)Female Pipe
(2)Female Pipe Swivel



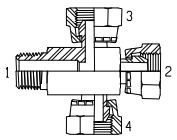
1601-
(1)Male Pipe
(2&3)Female Pipe Swivel



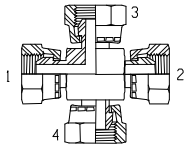
1602-
(1)Female Pipe
(2&3)Female Pipe Swivel



1603-
(1,2&3)Female Pipe Swivel

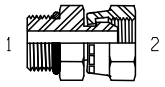


1604-
(1)Male Pipe
(2,3&4)Female Pipe Swivel



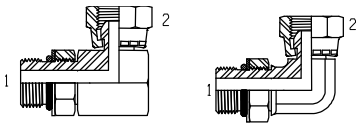
1605-
(1,2,3&4)Female Pipe Swivel

(140157)



6900-O-
(1)Male O-Ring
(2)Female Pipe Swivel

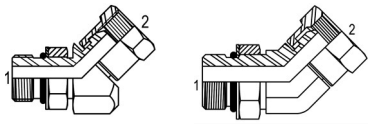
(140257)



FG

6901-NWO-
(1)Adjustable O-Ring
(2)Female Pipe Swivel

(140357)

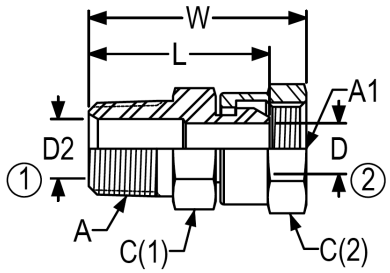


FG

6902-NWO-
(1)Adjustable O-Ring
(2)Female Pipe Swivel

1404 FEMALE ADAPTER UNION TO MALE PIPE

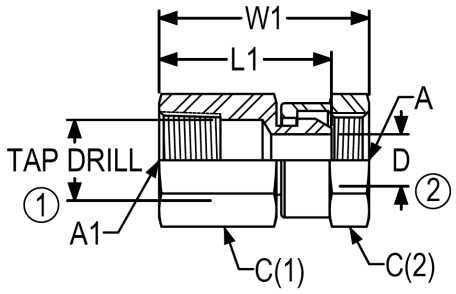
SAE J514 140130



PART NO	A NPTF	A1 NPSM	W	L	C (1)	C (2)	D2	D
1404-2-2	1/8-27	1/8-27	1.15	1.00	0.50	0.56	0.19	0.13
1404-2-4	1/8-27	1/4-18	1.25	1.06	0.63	0.69	0.19	0.19
1404-4-2	1/4-18	1/8-27	1.34	1.19	0.63	0.56	0.28	0.13
1404-4-4	1/4-18	1/4-18	1.44	1.25	0.63	0.69	0.28	0.22
1404-4-6	1/4-18	3/8-18	1.56	1.31	0.81	0.88	0.28	0.28
1404-4-8	1/4-18	1/2-14	1.75	1.42	0.94	1.00	0.28	0.28
1404-6-4	3/8-18	1/4-18	1.50	1.31	0.75	0.69	0.41	0.22
1404-6-6	3/8-18	3/8-18	1.56	1.31	0.81	0.88	0.41	0.33
1404-6-8	3/8-18	1/2-14	1.75	1.42	0.94	1.00	0.41	0.41
1404-8-4	1/2-14	1/4-18	1.75	1.56	0.88	0.69	0.53	0.22
1404-8-6	1/2-14	3/8-18	1.81	1.56	0.88	0.88	0.53	0.33
1404-8-8	1/2-14	1/2-14	1.94	1.61	0.94	1.00	0.53	0.45
1404-8-12	1/2-14	3/4-14	2.06	1.73	1.13	1.25	0.53	0.53
1404-12-6	3/4-14	3/8-18	1.82	1.57	1.13	0.88	0.72	0.33
1404-12-8	3/4-14	1/2-14	1.95	1.62	1.13	1.00	0.72	0.45
1404-12-12	3/4-14	3/4-14	2.06	1.73	1.13	1.25	0.72	0.63
1404-12-16	3/4-14	1-11 1/2	2.18	1.81	1.50	1.50	0.72	0.72
1404-12-20	3/4-14	1 1/4-11 1/2	2.24	1.82	1.75	1.88	0.72	0.94
1404-16-8	1-11 1/2	1/2-14	2.18	1.85	1.38	1.00	0.94	0.45
1404-16-12	1-11 1/2	3/4-14	2.31	1.98	1.38	1.25	0.94	0.63
1404-16-16	1-11 1/2	1-11 1/2	2.38	2.00	1.50	1.50	0.94	0.84
1404-16-20	1-11 1/2	1 1/4-11 1/2	2.46	2.03	1.75	1.88	0.94	0.94
1404-16-24	1-11 1/2	1 1/2-11 1/2	2.06	1.64	2.13	2.13	0.94	1.26
1404-20-16	1 1/4-11 1/2	1-11 1/2	2.38	2.00	1.75	1.50	1.25	0.84
1404-20-20	1 1/4-11 1/2	1 1/4-11 1/2	2.49	2.06	1.75	1.88	1.25	1.01
1404-20-24	1 1/4-11 1/2	1 1/2-11 1/2	2.51	2.09	2.13	2.13	1.25	1.25
1404-24-20	1 1/2-11 1/2	1 1/4-11 1/2	2.61	2.19	2.00	1.88	1.50	1.01
1404-24-24	1 1/2-11 1/2	1 1/2-11 1/2	2.55	2.13	2.13	2.13	1.50	1.26
1404-32-32	2-11 1/2	2-11 1/2	2.79	2.38	2.50	2.63	1.94	1.72

1405 FEMALE ADAPTER UNION TO FEMALE PIPE

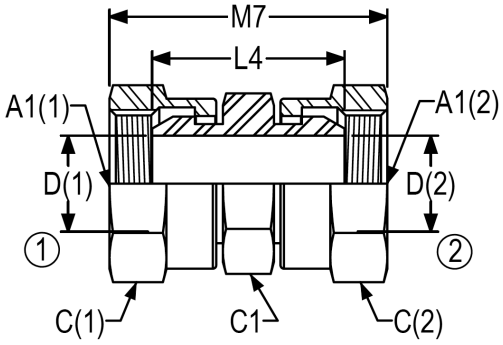
SAE J514 140131



PART NO	A1 NPTF	A NPSM	W1	L1	C (1)	C (2)	TAP DRILL	D
1405-2-2	1/8-27	1/8-27	1.03	0.88	0.56	0.56	0.33	0.13
1405-2-4	1/8-27	1/4-18	1.44	1.25	0.56	0.69	0.33	0.22
1405-4-2	1/4-18	1/8-27	1.34	1.19	0.69	0.56	0.43	0.13
1405-4-4	1/4-18	1/4-18	1.44	1.25	0.69	0.69	0.43	0.22
1405-4-6	1/4-18	3/8-18	1.50	1.25	0.69	0.88	0.43	0.33
1405-6-4	3/8-18	1/4-18	1.50	1.31	0.88	0.69	0.57	0.22
1405-6-6	3/8-18	3/8-18	1.56	1.31	0.88	0.88	0.57	0.33
1405-6-8	3/8-18	1/2-14	1.83	1.30	0.88	1.00	0.57	0.45
1405-8-4	1/2-14	1/4-18	1.75	1.56	1.00	0.69	0.70	0.22
1405-8-6	1/2-14	3/8-18	1.70	1.45	1.00	0.88	0.70	0.33
1405-8-8	1/2-14	1/2-14	1.83	1.50	1.00	1.00	0.70	0.45
1405-12-8	3/4-14	1/2-14	1.83	1.54	1.25	1.00	0.91	0.45
1405-12-12	3/4-14	3/4-14	1.96	1.63	1.25	1.25	0.91	0.63
1405-12-16	3/4-14	1-11 1/2	2.30	1.92	1.25	1.50	0.91	0.84
1405-16-12	1-11 1/2	3/4-14	2.23	1.90	1.50	1.25	1.14	0.63
1405-16-16	1-11 1/2	1-11 1/2	2.30	1.92	1.50	1.50	1.14	0.84
1405-20-20	1 1/4-11 1/2	1 1/4-11 1/2	2.43	2.00	1.88	1.88	1.48	1.01
1405-24-24	1 1/2-11 1/2	1 1/2-11 1/2	2.42	2.00	2.13	2.13	1.72	1.26
1405-32-32	2-11 1/2	2-11 1/2	2.54	2.13	2.63	2.63	2.19	1.72

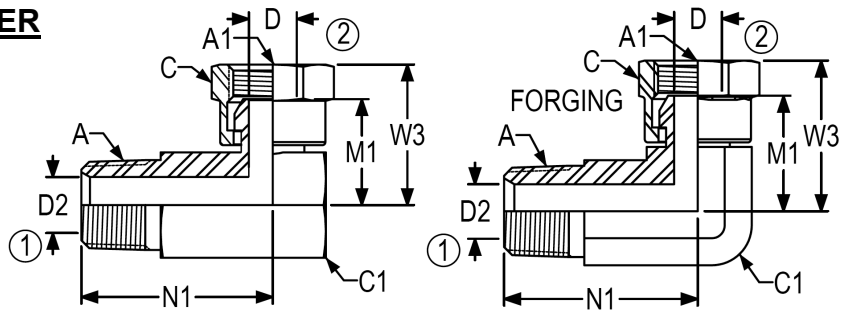
1406 FEMALE ADAPTER UNION (DOUBLE SWIVEL)

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



1501 90 DEGREE FEMALE ADAPTER UNION TO MALE PIPE

SAE J514 140230

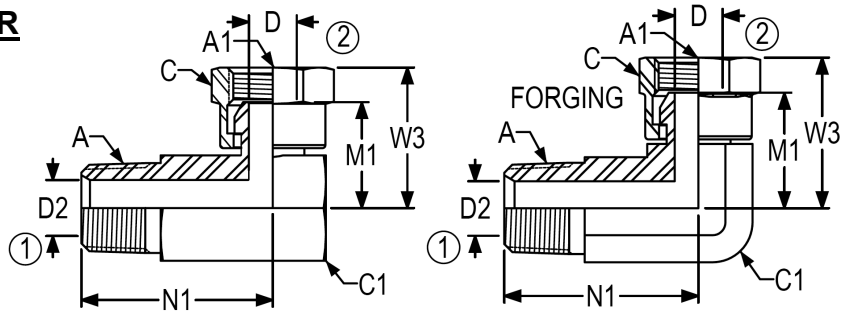


*Non forging parts are brazed construction

PART NO	A NPTF	A1 NPSM	N1	W3	M1	C	C1	D2	D
1501-2-2	1/8-27	1/8-27	0.94	0.85	0.70	0.56	0.56	0.19	0.13
1501-2-2-FG	1/8-27	1/8-27	0.72	0.85	0.70	0.56	0.44	0.19	0.13
1501-2-4-FG	1/8-24	1/4-18	1.06	0.98	0.79	0.69	0.50	0.19	0.22
1501-4-2	1/4-18	1/8-27	1.19	0.91	0.76	0.56	0.69	0.28	0.13
1501-4-2-FG	1/4-18	1/8-27	1.09	0.91	0.76	0.56	0.50	0.28	0.23
1501-4-4	1/4-18	1/4-18	1.19	0.98	0.79	0.69	0.69	0.28	0.22
1501-4-4-FG	1/4-18	1/4-18	1.09	0.98	0.79	0.69	0.50	0.28	0.22
1501-4-6	1/4-18	3/8-18	1.50	1.20	0.95	0.88	0.88	0.28	0.33
1501-4-6-FG	1/4-18	3/8-18	1.09	1.20	0.95	0.88	0.75	0.28	0.33
1501-4-8	1/4-18	1/2-14	1.56	1.33	1.00	1.00	1.00	0.28	0.45
1501-6-4	3/8-18	1/4-18	1.50	1.07	0.88	0.69	0.88	0.41	0.22
1501-6-4-FG	3/8-18	1/4-18	1.22	1.07	0.88	0.69	0.75	0.41	0.22
1501-6-6	3/8-18	3/8-18	1.50	1.20	0.95	0.88	0.88	0.41	0.33
1501-6-6-FG	3/8-18	3/8-18	1.22	1.20	0.95	0.88	0.75	0.41	0.33
1501-6-8	3/8-18	1/2-14	1.56	1.33	1.00	1.00	1.00	0.41	0.45
1501-6-8-FG	3/8-18	1/2-14	1.22	1.33	1.00	1.00	0.87	0.41	0.45
1501-6-12	3/8-18	3/4-14	1.81	1.61	1.27	1.25	1.25	0.41	0.63
1501-8-4	1/2-14	1/4-18	1.81	1.13	0.94	0.69	1.00	0.53	0.22
1501-8-4-FG	1/2-14	1/4-18	1.47	1.13	0.94	0.69	0.87	0.53	0.22
1501-8-6	1/2-14	3/8-18	1.81	1.26	1.01	0.88	1.00	0.53	0.33
1501-8-6-FG	1/2-14	3/8-18	1.47	1.26	1.01	0.88	0.88	0.53	0.33
1501-8-8	1/2-14	1/2-14	1.81	1.33	1.00	1.00	1.00	0.53	0.45
1501-8-8-FG	1/2-14	1/2-14	1.47	1.34	1.01	1.00	0.88	0.53	0.45
1501-8-12	1/2-14	3/4-14	2.00	1.60	1.26	1.25	1.25	0.53	0.63
1501-8-12-FG	1/2-14	3/4-14	1.47	1.60	1.27	1.25	1.06	0.53	0.63
1501-12-6	3/4-14	3/8-18	2.00	1.38	1.13	0.88	1.25	0.72	0.33
1501-12-6-FG	3/4-14	3/8-18	1.59	1.38	1.13	0.88	1.06	0.72	0.33
1501-12-8	3/4-14	1/2-14	2.00	1.45	1.13	1.00	1.25	0.72	0.45
1501-12-8-FG	3/4-14	1/2-14	1.59	1.46	1.13	1.00	1.06	0.72	0.42
1501-12-12	3/4-14	3/4-14	2.00	1.60	1.26	1.25	1.25	0.72	0.63
1501-12-12-FG	3/4-14	3/4-14	1.59	1.60	1.27	1.25	1.31	0.72	0.63
1501-12-16	3/4-14	1-11 1/2	2.19	1.77	1.40	1.50	1.50	0.72	0.84
1501-12-16-FG	3/4-14	1-11 1/2	1.97	1.78	1.40	1.50	1.31	0.72	0.84
1501-12-20	3/4-14	1 1/4-11 1/2	2.34	2.09	1.67	1.88	1.88	0.72	1.01
1501-16-8	1-11 1/2	1/2-14	2.38	1.58	1.25	1.00	1.50	0.94	0.45
1501-16-8-FG	1-11 1/2	1/2-14	1.97	1.58	1.25	1.00	1.31	0.94	0.45

1501 90 DEGREE FEMALE ADAPTER UNION TO MALE PIPE (Con't)

SAE J514 140230

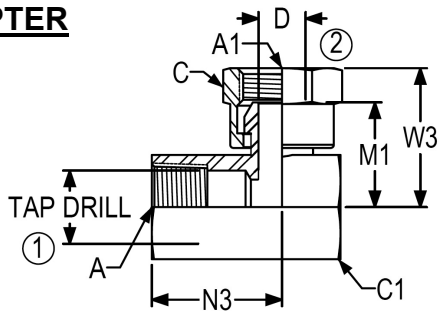


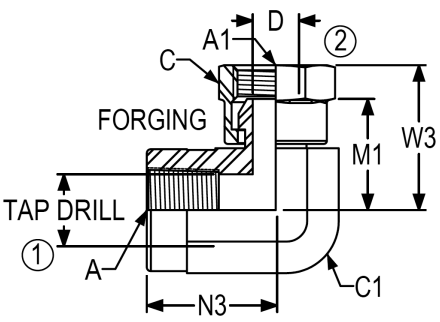
*Non forging parts are brazed construction

PART NO	A NPTF	A1 NPSM	N1	W3	M1	C	C1	D2	D
1501-16-12	1-11 1/2	3/4-14	2.38	1.72	1.39	1.25	1.50	0.94	0.63
1501-16-12-FG	1-11 1/2	3/4-14	1.97	1.73	1.39	1.25	1.31	0.94	0.63
1501-16-16	1-11 1/2	1-11 1/2	2.38	1.77	1.40	1.50	1.50	0.94	0.84
1501-16-16-FG	1-11 1/2	1-11 1/2	1.97	1.78	1.40	1.50	1.31	0.94	0.84
1501-16-20	1-11 1/2	1 1/4-11 1/2	2.53	2.09	1.67	1.88	1.88	0.94	1.01
1501-16-20-FG	1-11 1/2	1 1/4-11 1/2	2.35	2.10	1.67	1.88	1.63	0.94	1.01
1501-16-24	1-11 1/2	1 1/2-11 1/2	2.75	1.76	1.34	2.13	2.13	0.94	1.26
1501-20-12	1 1/4-11 1/2	3/4-14	2.56	1.91	1.58	1.25	1.88	1.25	0.63
1501-20-16	1 1/4-11 1/2	1-11 1/2	2.63	1.96	1.59	1.50	1.88	1.25	0.84
1501-20-16-FG	1 1/4-11 1/2	1-11 1/2	2.38	1.97	1.59	1.50	1.26	1.25	0.84
1501-20-20	1 1/4-11 1/2	1 1/4-11 1/2	2.63	2.09	1.67	1.88	1.88	1.25	1.01
1501-20-20-FG	1 1/4-11 1/2	1 1/4-11 1/2	2.38	2.10	1.67	1.88	1.63	1.25	1.01
1501-20-24	1 1/4-11 1/2	1 1/2-11 1/2	2.78	2.18	1.76	2.13	2.13	1.25	1.26
1501-24-20	1 1/2-11 1/2	1 1/4-11 1/2	2.81	2.22	1.79	1.88	2.13	1.50	1.01
1501-24-24	1 1/2-11 1/2	1 1/2-11 1/2	2.81	2.19	1.76	2.13	2.13	1.50	1.26
1501-24-24-FG	1 1/2-11 1/2	1 1/2-11 1/2	2.64	2.19	1.76	1.88	1.87	1.50	1.26
1501-32-32	2-11 1/2	2-11 1/2	3.13	2.50	2.08	2.63	2.63	1.94	1.72
1501-32-32-FG	2-11 1/2	2-11 1/2	3.13	2.62	2.21	2.63	2.50	1.94	1.72
1501-L-8-8-FG	1/2-14	1/2-14	1.78	1.33	1.00	1.00	0.88	0.53	0.45
1501-L-12-12-FG	3/4-14	3/4-14	2.00	1.52	1.19	1.25	1.06	0.72	0.63
1501-LL-2-2-FG	1/8-27	1/8-27	1.64	0.85	0.70	0.56	0.44	0.19	0.13

1502 90 DEGREE FEMALE ADAPTER UNION TO FEMALE PIPE

SAE J514 140231



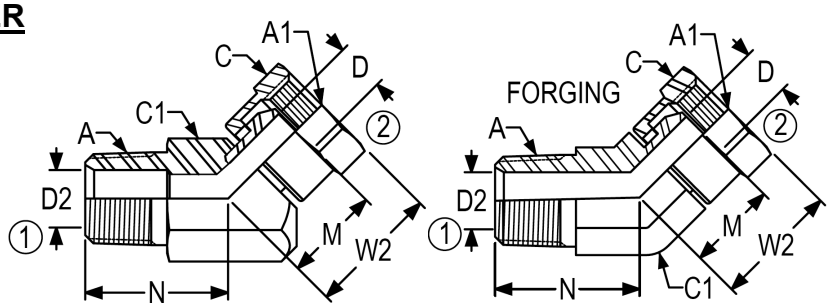


*Non forging parts are brazed construction

PART NO	A NPTF	A1 NPSM	N3	W3	M1	C	C1	TAP DRILL	D
1502-2-2	1/8-27	1/8-27	0.69	0.85	0.70	0.56	0.56	0.33	0.13
1502-2-2-FG	1/8-27	1/8-27	0.75	0.89	0.74	0.56	0.56	0.33	0.13
1502-4-2	1/8-18	1/8-27	0.94	0.91	0.76	0.56	0.69	0.43	0.13
1502-4-4	1/4-18	1/4-18	0.94	0.98	0.79	0.69	0.69	0.43	0.22
1502-4-4-FG	1/4-18	1/4-18	0.94	0.97	0.78	0.69	0.69	0.43	0.22
1502-4-6	1/4-18	3/8-18	1.06	1.20	0.94	0.88	0.88	0.43	0.33
1502-6-4	3/8-18	1/4-18	1.06	1.07	0.88	0.69	0.88	0.57	0.22
1502-6-6	3/8-18	3/8-18	1.06	1.20	0.94	0.88	0.88	0.57	0.33
1502-6-8	3/8-18	1/2-14	1.25	1.33	1.00	1.00	1.00	0.57	0.45
1502-8-4	1/2-14	1/4-18	1.25	1.13	0.94	0.69	1.00	0.70	0.22
1502-8-6	1/2-14	3/8-18	1.25	1.26	1.01	0.88	1.00	0.70	0.33
1502-8-8	1/2-14	1/2-14	1.25	1.33	1.00	1.00	1.00	0.70	0.45
1502-8-12	1/2-14	3/4-14	1.44	1.60	1.26	1.25	1.25	0.70	0.63
1502-12-8	3/4-14	1/2-14	1.44	1.45	1.13	1.00	1.25	0.91	0.45
1502-12-12	3/4-14	3/4-14	1.44	1.60	1.26	1.25	1.25	0.91	0.63
1502-12-16	3/4-14	1-11 1/2	1.75	1.77	1.40	1.50	1.50	0.91	0.84
1502-16-12	1-11 1/2	3/4-14	1.75	1.72	1.39	1.25	1.50	1.14	0.63
1502-16-16	1-11 1/2	1-11 1/2	1.75	1.77	1.40	1.50	1.50	1.14	0.84
1502-20-16	1 1/4-11 1/2	1-11 1/2	2.00	1.97	1.59	1.50	1.88	1.48	0.84
1502-20-20	1 1/4-11 1/2	1 1/4-11 1/2	2.00	2.09	1.67	1.88	1.88	1.48	1.01
1502-24-24	1 1/2-11 1/2	1 1/2-11 1/2	2.25	2.19	1.76	2.13	2.13	1.72	1.26
1502-32-32	2-11 1/2	2-11 1/2	2.50	2.50	2.08	2.63	2.63	2.19	1.72

1503 45 DEGREE FEMALE ADAPTER UNION TO MALE PIPE

SAE J514 140330

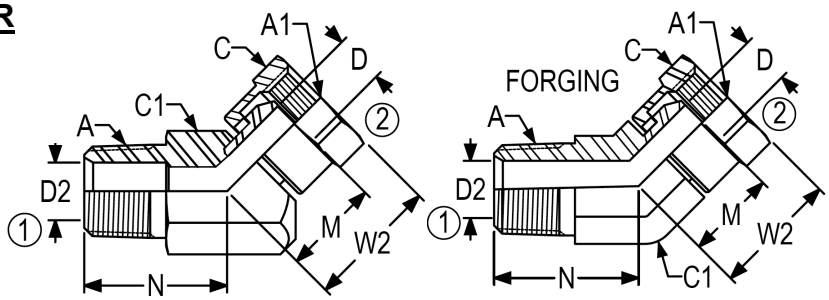


*Non forging parts are brazed construction

PART NO	A NPTF	A1 NPSM	N	W2	M	C	C1	D2	D
1503-2-2	1/8-27	1/8-27	0.63	0.75	0.60	0.56	0.56	0.19	0.13
1503-2-2-FG	1/8-27	1/8-27	0.63	0.75	0.60	0.56	0.44	0.19	0.13
1503-2-4	1/8-27	1/4-18	0.56	0.84	0.65	0.69	0.69	0.19	0.22
1503-2-4-FG	1/8-27	1/4-18	0.56	0.84	0.56	0.69	0.56	0.19	0.22
1503-4-2	1/4-18	1/8-27	0.94	0.79	0.64	0.69	0.69	0.28	0.13
1503-4-4	1/4-18	1/4-18	0.94	0.88	0.69	0.69	0.69	0.28	0.22
1503-4-4-FG	1/4-18	1/4-18	0.91	0.91	0.72	0.69	0.56	0.28	0.22
1503-4-6	1/4-18	3/8-18	1.06	1.00	0.75	0.88	0.88	0.28	0.33
1503-6-4	3/8-18	1/4-18	1.06	0.97	0.78	0.69	0.88	0.41	0.22
1503-6-6	3/8-18	3/8-18	1.06	1.00	0.75	0.88	0.88	0.41	0.33
1503-6-6-FG	3/8-18	3/8-18	1.12	1.20	0.95	0.88	0.75	0.41	0.33
1503-6-8	3/8-18	1/2-14	1.19	1.11	0.78	1.00	1.00	0.41	0.45
1503-6-8-FG	3/8-18	1/2-14	1.19	1.11	0.78	1.00	0.88	0.41	0.45
1503-8-4	1/2-14	1/4-18	1.31	1.00	0.81	0.69	1.00	0.53	0.22
1503-8-6	1/2-14	3/8-18	1.31	1.13	0.88	0.88	1.00	0.53	0.33
1503-8-6-FG	1/2-14	3/8-18	1.31	1.13	0.88	0.88	0.88	0.53	0.33
1503-8-8	1/2-14	1/2-14	1.31	1.21	0.88	1.00	1.00	0.53	0.45
1503-8-8-FG	1/2-14	1/2-14	1.44	1.27	0.94	1.00	0.88	0.53	0.45
1503-8-12	1/2-14	3/4-14	1.50	1.41	1.08	1.25	1.25	0.53	0.63
1503-8-12-FG	1/2-14	3/4-14	1.50	1.41	1.08	1.25	1.06	0.53	0.63
1503-12-6	3/4-14	3/8-18	1.50	1.10	0.85	0.88	1.25	0.72	0.33
1503-12-8	3/4-14	1/2-14	1.50	1.21	0.88	1.00	1.25	0.72	0.45
1503-12-8-FG	3/4-14	1/2-14	1.50	1.21	0.88	1.00	1.06	0.72	0.45
1503-12-12	3/4-14	3/4-14	1.50	1.33	1.00	1.25	1.25	0.72	0.63
1503-12-12-FG	3/4-14	3/4-14	1.50	1.33	1.00	1.25	1.06	0.72	0.63
1503-12-16	3/4-14	1-11 1/2	1.31	1.42	1.05	1.50	1.50	0.72	0.84
1503-12-16-FG	3/4-14	1-11 1/2	1.31	1.42	1.05	1.50	1.31	0.72	0.84
1503-16-12	1-11 1/2	3/4-14	1.50	1.37	1.03	1.25	1.50	0.94	0.63
1503-16-12-FG	1-11 1/2	3/4-14	1.50	1.37	1.03	1.25	1.31	0.94	0.63
1503-16-16	1-11 1/2	1-11 1/2	1.44	1.51	1.13	1.50	1.50	0.94	0.84
1503-16-16-FG	1-11 1/2	1-11 1/2	1.44	1.51	1.13	1.50	1.31	0.94	0.84

1503 45 DEGREE FEMALE ADAPTER UNION TO MALE PIPE (Con't)

SAE J514 140330

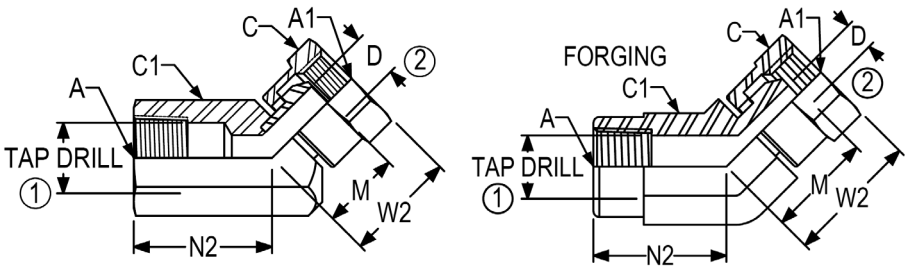


*Non forging parts are brazed construction

PART NO	A NPTF	A1 NPSM	N	W2	M	C	C1	D2	D
1503-16-20	1-11 1/2	1 1/4-11 1/2	1.75	1.58	1.16	1.88	1.88	0.94	1.01
1503-20-16	1 1/4-11 1/2	1-11 1/2	1.80	1.67	1.30	1.50	1.88	1.25	0.84
1503-20-16-FG	1 1/4-11 1/2	1-11 1/2	1.80	1.67	1.30	1.50	1.63	1.25	0.84
1503-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1.75	1.71	1.28	1.88	1.88	1.25	1.01
1503-20-20-FG	1 1/4-11 1/2	1 1/4-11 1/2	1.80	1.71	1.28	1.88	1.63	1.25	1.01
1503-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1.94	1.80	1.38	2.13	2.13	1.50	1.26
1503-24-24-FG	1 1/2-11 1/2	1 1/2-11 1/2	1.94	1.80	1.38	2.13	1.88	1.50	1.26
1503-32-32	2-11 1/2	2-11 1/2	2.00	1.94	1.53	2.63	2.63	1.94	1.72
1503-32-32-FG	2-11 1/2	2-11 1/2	2.00	1.97	1.55	2.63	2.50	1.94	1.72

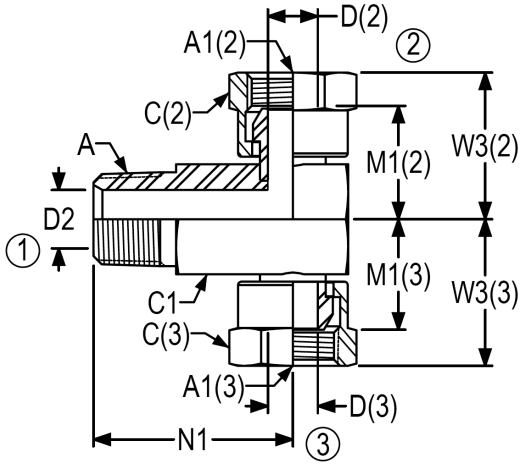
1504 45 DEGREE FEMALE ADAPTER UNION TO FEMALE PIPE

SAE J514 140331



PART NO	A NPTF	A1 NPSM	N2	W2	M	C	C1	TAP DRILL	D
1504-2-2	1/8-27	1/8-27	0.67	0.79	0.65	0.56	0.56	0.33	0.13
1504-2-4	1/8-27	1/4-18	0.91	0.85	0.66	0.69	0.69	0.33	0.22
1504-4-4	1/4-18	1/4-18	0.91	0.85	0.66	0.69	0.69	0.43	0.22
1504-4-4-FG	1/4-18	1/4-18	0.91	0.91	0.72	0.69	0.69	0.43	0.22
1504-6-4	3/8-18	1/4-18	1.06	0.93	0.74	0.69	0.88	0.57	0.22
1504-6-6	3/8-18	3/8-18	1.06	1.01	0.76	0.88	0.88	0.57	0.33
1504-6-8	3/8-18	1/2-14	1.38	1.13	0.80	1.00	1.00	0.57	0.45
1504-8-6	1/2-14	3/8-18	1.38	1.04	0.79	0.88	1.00	0.70	0.33
1504-8-8	1/2-14	1/2-14	1.38	1.11	0.79	1.00	1.00	0.70	0.45
1504-12-8	3/4-14	1/2-14	1.25	1.31	0.98	1.00	1.25	0.91	0.45
1504-12-12	3/4-14	3/4-14	1.25	1.34	1.01	1.25	1.25	0.91	0.63
1504-16-12	1-11 1/2	3/4-14	1.50	1.49	1.15	1.25	1.50	1.14	0.63
1504-16-16	1-11 1/2	1-11 1/2	1.50	1.46	1.09	1.50	1.50	1.14	0.84
1504-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1.78	1.76	1.34	1.88	1.88	1.48	1.01
1504-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1.97	1.77	1.35	2.13	2.13	1.72	1.26

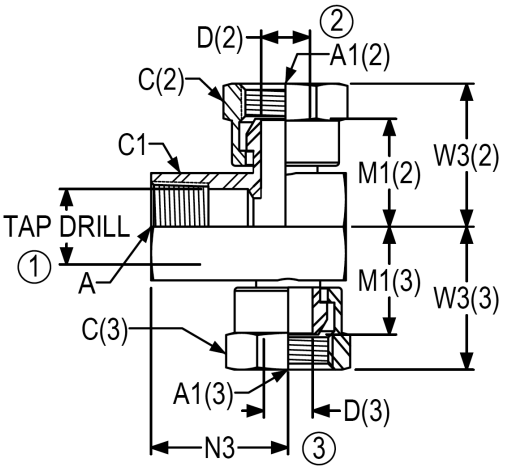
1601 FEMALE ADAPTER UNION TO MALE PIPE BRANCH



PART NO	A NPTF	A1 (2) NPSM	A1 (3) NPSM	N1	W3 (2)	M1 (2)	W3 (3)	M1 (3)	C (2)	C (3)
1601-2-2-2	1/8-27	1/8-27	1/8-27	0.94	0.85	0.70	0.85	0.70	0.56	0.56
1601-4-4-4	1/4-18	1/4-18	1/4-18	1.19	0.98	0.79	0.98	0.79	0.69	0.69
1601-4-6-6	1/4-18	3/8-18	3/8-18	1.50	1.20	0.95	1.20	0.95	0.88	0.88
1601-6-4-4	3/8-18	1/4-18	1/4-18	1.50	1.07	0.88	1.07	0.88	0.69	0.69
1601-6-6-6	3/8-18	3/8-18	3/8-18	1.50	1.20	0.95	1.20	0.95	0.88	0.88
1601-8-4-4	1/2-14	1/4-18	1/4-18	1.81	1.13	0.94	1.13	0.94	0.69	0.69
1601-8-6-6	1/2-14	3/8-18	3/8-18	1.81	1.26	1.01	1.26	1.01	0.88	0.88
1601-8-8-8	1/2-14	1/2-14	1/2-14	1.81	1.33	1.00	1.33	1.00	1.00	1.00
1601-8-12-12	1/2-14	3/4-14	3/4-14	2.00	1.60	1.26	1.60	1.26	1.25	1.25
1601-12-8-8	3/4-14	1/2-14	1/2-14	2.00	1.45	1.13	1.45	1.13	1.00	1.00
1601-12-12-12	3/4-14	3/4-14	3/4-14	2.00	1.60	1.26	1.60	1.26	1.25	1.25
1601-12-16-16	3/4-14	1-11 1/2	1-11 1/2	2.19	1.77	1.40	1.77	1.40	1.50	1.50
1601-16-12-12	1-11 1/2	3/4-14	3/4-14	2.38	1.72	1.39	1.72	1.39	1.25	1.25
1601-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	2.38	1.77	1.40	1.77	1.40	1.50	1.50
1601-20-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	2.63	2.09	1.67	2.09	1.67	1.88	1.88
1601-24-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1 1/2-11 1/2	2.81	2.19	1.76	2.19	1.76	2.13	2.13

PART NO	C1	D2	D (2)	D (3)
1601-2-2-2	0.56	0.19	0.13	0.13
1601-4-4-4	0.69	0.28	0.22	0.22
1601-4-6-6	0.88	0.28	0.33	0.33
1601-6-4-4	0.88	0.41	0.22	0.22
1601-6-6-6	0.88	0.41	0.33	0.33
1601-8-4-4	1.00	0.53	0.22	0.22
1601-8-6-6	1.00	0.53	0.33	0.33
1601-8-8-8	1.00	0.53	0.45	0.45
1601-8-12-12	1.25	0.53	0.63	0.63
1601-12-8-8	1.25	0.72	0.45	0.45
1601-12-12-12	1.25	0.72	0.63	0.63
1601-12-16-16	1.50	0.72	0.84	0.84
1601-16-12-12	1.50	0.94	0.63	0.63
1601-16-16-16	1.50	0.94	0.84	0.84
1601-20-20-20	1.88	1.25	1.01	1.01
1601-24-24-24	2.13	1.50	1.26	1.26

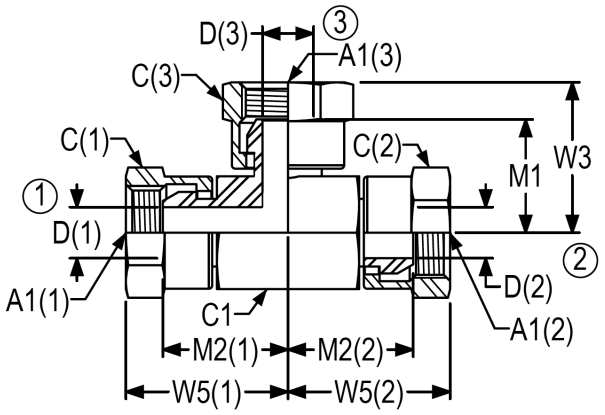
1602 FEMALE ADAPTER UNION TO FEMALE PIPE BRANCH



PART NO	A NPTF	A1 (2) NPSM	A1 (3) NPSM	N3	W3 (2)	M1 (2)	W3 (3)	M1 (3)	C (2)	C (3)
1602-2-2-2	1/8-27	1/8-27	1/8-27	0.69	0.85	0.70	0.85	0.70	0.56	0.56
1602-4-4-4	1/4-18	1/4-18	1/4-18	0.94	0.98	0.79	0.98	0.79	0.69	0.69
1602-6-4-4	3/8-18	1/4-18	1/4-18	1.06	1.07	0.88	1.07	0.88	0.69	0.69
1602-6-6-6	3/8-18	3/8-18	3/8-18	1.06	1.20	0.94	1.20	0.94	0.88	0.88
1602-8-6-6	1/2-14	3/8-18	3/8-18	1.25	1.26	1.01	1.26	1.01	0.88	0.88
1602-8-8-8	1/2-14	1/2-14	1/2-14	1.25	1.33	1.00	1.33	1.00	1.00	1.00
1602-12-8-8	3/4-14	1/2-14	1/2-14	1.44	1.45	1.13	1.45	1.13	1.00	1.00
1602-12-12-12	3/4-14	3/4-14	3/4-14	1.44	1.60	1.26	1.60	1.26	1.25	1.25
1602-16-12-12	1-11 1/2	3/4-14	3/4-14	1.75	1.72	1.39	1.72	1.39	1.25	1.25
1602-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	1.75	1.77	1.40	1.77	1.40	1.50	1.50
1602-20-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	2.00	2.09	1.67	2.09	1.67	1.88	1.88

PART NO	C1	TAP DRILL	D (2)	D (3)
1602-2-2-2	0.56	0.33	0.13	0.13
1602-4-4-4	0.69	0.43	0.22	0.22
1602-6-4-4	0.88	0.57	0.22	0.22
1602-6-6-6	0.88	0.57	0.33	0.33
1602-8-6-6	1.00	0.70	0.33	0.33
1602-8-8-8	1.00	0.70	0.45	0.45
1602-12-8-8	1.25	0.91	0.45	0.45
1602-12-12-12	1.25	0.91	0.63	0.63
1602-16-12-12	1.50	1.14	0.63	0.63
1602-16-16-16	1.50	1.14	0.84	0.84
1602-20-20-20	1.88	1.48	1.01	1.01

1603 FEMALE ADAPTER UNION (TRIPLE SWIVEL)

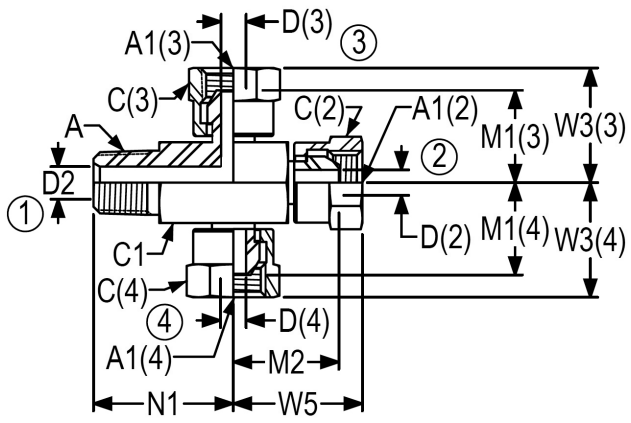


PART NO	A1 (1) NPSM	A1 (2) NPSM	A1 (3) NPSM	W3	M1	W5 (1)	M2 (1)	W5 (2)	M2 (2)
1603-2-2-2	1/8-27	1/8-27	1/8-27	0.85	0.70	0.85	0.70	0.85	0.70
1603-4-4-4	1/4-18	1/4-18	1/4-18	0.98	0.79	1.05	0.86	1.05	0.86
1603-6-6-6	3/8-18	3/8-18	3/8-18	1.20	0.95	1.11	0.86	1.11	0.86
1603-8-8-8	1/2-14	1/2-14	1/2-14	1.33	1.00	1.44	1.11	1.44	1.11
1603-12-12-12	3/4-14	3/4-14	3/4-14	1.60	1.26	1.73	1.39	1.73	1.39
1603-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	1.77	1.40	1.90	1.53	1.90	1.53
1603-20-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	2.09	1.67	2.08	1.66	2.08	1.66

PART NO	C (1)	C (2)	C (3)	C1	D (1)	D (2)	D (3)
1603-2-2-2	0.56	0.56	0.56	0.56	0.13	0.13	0.13
1603-4-4-4	0.69	0.69	0.69	0.69	0.22	0.22	0.22
1603-6-6-6	0.88	0.88	0.88	0.88	0.33	0.33	0.33
1603-8-8-8	1.00	1.00	1.00	1.00	0.45	0.45	0.45
1603-12-12-12	1.25	1.25	1.25	1.25	0.63	0.63	0.63
1603-16-16-16	1.50	1.50	1.50	1.50	0.84	0.84	0.84
1603-20-20-20	1.88	1.88	1.88	1.88	1.01	1.01	1.01

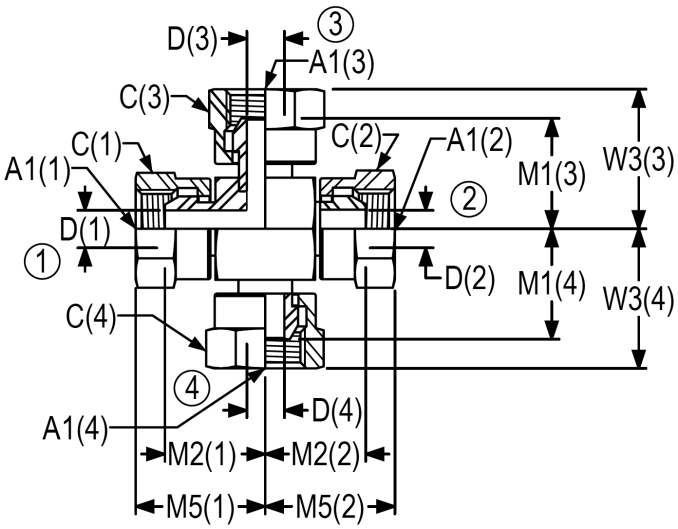
1604 FEMALE ADAPTER UNION MALE PIPE RUN CROSS

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



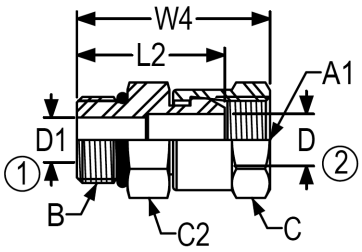
1605 FEMALE ADAPTER UNION CROSS (QUAD SWIVEL)

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



6900 FEMALE ADAPTER UNION TO MALE STRAIGHT

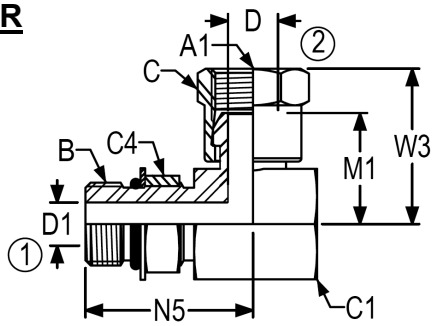
SAE J514 140157

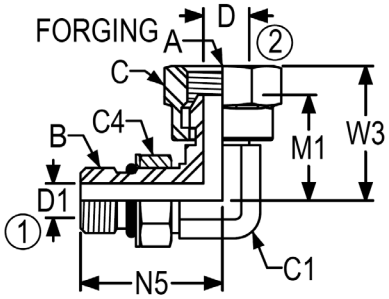


PART NO	B UN/UNF-2A	A1 NPSM	W4	L2	C2	C	D1	D
6900-4-2-O	7/16-20	1/8-27	1.09	0.94	0.56	0.56	0.17	0.13
6900-4-4-O	7/16-20	1/4-18	1.30	1.11	0.56	0.69	0.17	0.22
6900-4-6-O	7/16-20	3/8-18	1.39	1.14	0.69	0.88	0.17	0.33
6900-5-4-O	1/2-20	1/4-18	1.30	1.19	0.63	0.69	0.22	0.22
6900-5-8-O	1/2-20	1/2-14	1.53	1.20	0.88	1.00	0.23	0.45
6900-6-4-O	9/16-18	1/4-18	1.36	1.17	0.69	0.69	0.30	0.22
6900-6-6-O	9/16-18	3/8-18	1.42	1.17	0.69	0.88	0.30	0.33
6900-6-8-O	9/16-18	1/2-14	1.56	1.23	0.88	1.00	0.30	0.45
6900-8-4-O	3/4-16	1/4-18	1.42	1.23	0.88	0.69	0.39	0.22
6900-8-6-O	3/4-16	3/8-18	1.48	1.23	0.88	0.88	0.39	0.33
6900-8-8-O	3/4-16	1/2-14	1.61	1.28	0.88	1.00	0.39	0.45
6900-8-12-O	3/4-16	3/4-14	1.74	1.41	1.00	1.25	0.39	0.63
6900-10-6-O	7/8-14	3/8-18	1.62	1.37	1.00	0.88	0.48	0.33
6900-10-8-O	7/8-14	1/2-14	1.73	1.40	1.00	1.00	0.48	0.45
6900-10-12-O	7/8-14	3/4-14	1.88	1.55	1.00	1.25	0.48	0.48
6900-12-6-O	1 1/16-12	3/8-18	1.78	1.53	1.25	0.88	0.61	0.33
6900-12-8-O	1 1/16-12	1/2-14	1.78	1.45	1.25	1.00	0.61	0.45
6900-12-12-O	1 1/16-12	3/4-14	1.91	1.58	1.25	1.25	0.61	0.63
6900-12-16-O	1 1/16-12	1-11 1/2	2.04	1.66	1.50	1.50	0.61	0.84
6900-14-12-O	1 3/16-12	3/4-14	2.03	1.70	1.38	1.25	0.72	0.63
6900-16-12-O	1 5/16-12	3/4-14	2.06	1.73	1.50	1.25	0.84	0.63
6900-16-16-O	1 5/16-12	1-11 1/2	2.13	1.75	1.50	1.50	0.84	0.84
6900-16-20-O	1 5/16-12	1 1/4-11 1/2	2.32	1.89	1.75	1.88	0.84	1.16
6900-20-12-O	1 5/8-12	3/4-14	2.14	1.81	1.88	1.25	1.08	0.63
6900-20-16-O	1 5/8-12	1-11 1/2	2.20	1.83	1.88	1.50	1.08	0.84
6900-20-20-O	1 5/8-12	1 1/4-11 1/2	2.32	1.89	1.88	1.88	1.08	1.01
6900-24-20-O	1 7/8-12	1 1/4-11 1/2	2.38	1.95	2.13	1.88	1.31	1.16
6900-24-24-O	1 7/8-12	1 1/2-11 1/2	2.37	1.95	2.13	2.13	1.31	1.26
6900-32-32-O	2 1/2-12	2-11 1/2	2.57	2.16	2.75	2.75	1.78	1.72

6901 90 DEGREE FEMALE ADAPTER UNION TO ADJ. MALE

SAE J514 140257



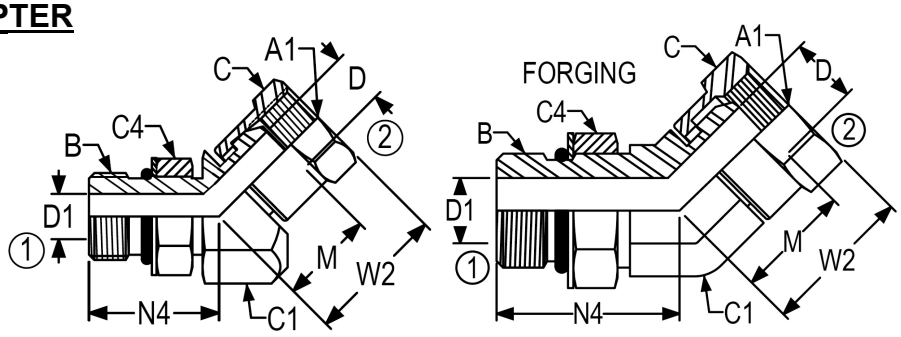


Non forging parts are brazed construction

PART NO	B UN/UNF-2A	A1 NPSM	N5	W3	M1	C	C4	C1	D1	D
6901-2-2 NWO	5/16-24	1/8-27	0.93	0.78	0.64	0.56	0.56	0.44	0.06	0.13
6901-4-2 NWO	7/16-20	1/8-27	1.11	0.91	0.76	0.56	0.56	0.69	0.17	0.13
6901-4-4 NWO	7/16-20	1/4-18	1.11	0.98	0.79	0.69	0.56	0.69	0.17	0.22
6901-4-4 NWO-FG	7/16-20	1/4-18	1.25	1.18	0.94	0.69	0.56	0.50	0.17	0.22
6901-4-6 NWO	7/16-20	3/8-18	1.30	1.20	0.94	0.88	0.56	0.88	0.17	0.33
6901-4-8 NWO	7/16-20	1/2-14	1.28	1.33	1.00	1.00	0.56	1.00	0.17	0.45
6901-6-4 NWO	9/16-18	1/4-18	1.19	0.98	0.79	0.69	0.69	0.69	0.30	0.22
6901-6-4 NWO-FG	9/16-18	1/4-18	1.25	1.18	0.94	0.69	0.69	0.75	0.30	0.22
6901-6-6 NWO	9/16-18	3/8-18	1.22	1.20	0.94	0.88	0.69	0.88	0.30	0.33
6901-6-6 NWO-FG	9/16-18	3/8-18	1.51	1.40	1.12	0.88	0.69	0.75	0.29	0.33
6901-6-8 NWO	9/16-18	1/2-14	1.48	1.33	1.00	1.00	0.69	1.00	0.30	0.45
6901-8-4 NWO	3/4-16	1/4-18	1.52	1.13	0.94	0.69	0.88	1.00	0.39	0.22
6901-8-6 NWO	3/4-16	3/8-18	1.52	1.26	1.01	0.88	0.88	1.00	0.39	0.33
6901-8-6 NWO-FG	3/4-16	3/8-18	1.70	1.50	1.11	0.88	0.88	0.88	0.39	0.33
6901-8-8 NWO	3/4-16	1/2-14	1.52	1.33	1.00	1.00	0.88	1.00	0.39	0.45
6901-8-8 NWO-FG	3/4-16	1/2-14	1.70	1.50	1.11	1.00	0.88	0.88	0.39	0.45
6901-8-12 NWO	3/4-16	3/4-14	1.66	1.60	1.26	1.25	0.88	1.25	0.39	0.63
6901-10-4 NWO	7/8-14	1/4-18	1.64	1.13	0.94	0.69	1.00	1.00	0.48	0.22
6901-10-6 NWO	7/8-14	3/8-18	1.64	1.26	1.01	0.88	1.00	1.00	0.48	0.33
6901-10-8 NWO	7/8-14	1/2-14	1.64	1.33	1.00	1.00	1.00	1.00	0.48	0.45
6901-10-8 NWO-FG	7/8-14	1/2-14	1.70	1.50	1.11	1.00	1.00	1.11	0.48	0.45
6901-10-12 NWO	7/8-14	3/4-14	1.78	1.60	1.26	1.25	1.00	1.25	0.48	0.63
6901-12-6 NWO	1 1/16-12	3/8-18	1.92	1.38	1.13	0.88	1.25	1.25	0.61	0.33
6901-12-8 NWO	1 1/16-12	1/2-14	1.92	1.45	1.13	1.00	1.25	1.25	0.61	0.45
6901-12-12 NWO	1 1/16-12	3/4-14	1.92	1.60	1.26	1.25	1.25	1.25	0.61	0.63
6901-12-16 NWO	1 1/16-12	1-11 1/2	1.97	1.77	1.40	1.50	1.25	1.50	0.61	0.84
6901-14-12 NWO	1 3/16-12	3/4-14	1.92	1.60	1.26	1.25	1.38	1.25	0.72	0.63
6901-14-16 NWO	1 3/16-12	1-11 1/2	2.09	1.77	1.40	1.50	1.38	1.50	0.72	0.84
6901-16-12 NWO	1 5/16-12	3/4-14	2.09	1.72	1.39	1.25	1.50	1.50	0.84	0.63
6901-16-16 NWO	1 5/16-12	1-11 1/2	2.09	1.77	1.40	1.50	1.50	1.50	0.84	0.84
6901-16-20 NWO	1 5/16-12	1 1/4-11 1/2	2.47	2.09	1.67	1.88	1.50	1.88	0.84	1.01
6901-20-12 NWO	1 5/8-12	3/4-14	2.48	1.91	1.58	1.25	1.88	1.88	1.08	0.63
6901-20-16 NWO	1 5/8-12	1-11 1/2	2.48	1.96	1.59	1.50	1.88	1.88	1.08	0.84
6901-20-20 NWO	1 5/8-12	1 1/4-11 1/2	2.48	2.09	1.67	1.88	1.88	1.88	1.08	1.01
6901-24-24 NWO	1 7/8-12	1 1/2-11 1/2	2.61	2.18	1.76	2.13	2.13	2.13	1.31	1.26
6901-32-32 NWO	2 1/2-12	2-11 1/2	3.25	2.50	2.08	2.63	2.75	2.63	1.78	1.72

6902 45 DEGREE FEMALE ADAPTER UNION TO ADJ. MALE

SAE J514 140357



PART NO	B UN/UNF-2A	A1 NPSM	N4	W2	M	C	C4	C1	D1	D
6902-4-4 NWO	7/16-20	1/4-18	1.06	0.85	0.66	0.69	0.56	0.69	0.17	0.22
6902-4-6 NWO	7/16-20	3/8-18	1.06	0.96	0.71	0.88	0.69	0.88	0.17	0.33
6902-6-4 NWO	9/16-18	1/4-18	1.06	0.85	0.66	0.69	0.69	0.88	0.30	0.22
6902-6-6 NWO	9/16-18	3/8-18	1.06	0.96	0.71	0.88	0.69	0.88	0.30	0.33
6902-6-8 NWO	9/16-18	1/2-14	1.06	1.12	0.79	1.00	0.69	1.00	0.30	0.45
6902-8-4 NWO	3/4-16	1/4-18	1.13	1.03	0.84	0.69	0.88	1.00	0.39	0.22
6902-8-6 NWO	3/4-16	3/8-18	1.13	1.13	0.88	0.88	0.88	1.00	0.39	0.33
6902-8-8 NWO	3/4-16	1/2-14	1.13	1.14	0.81	1.00	0.88	1.00	0.39	0.45
6902-8-12 NWO	3/4-16	3/4-14	1.22	1.38	1.05	1.25	0.88	1.25	0.39	0.63
6902-10-6 NWO	7/8-14	3/8-18	1.50	1.07	0.82	0.88	1.00	1.00	0.48	0.33
6902-10-8 NWO	7/8-14	1/2-14	1.50	1.11	0.78	1.00	1.00	1.00	0.48	0.45
6902-10-12 NWO	7/8-14	3/4-14	1.36	1.38	1.05	1.25	1.00	1.25	0.48	0.63
6902-12-8 NWO	1 1/16-12	1/2-14	1.50	1.33	1.00	1.00	1.25	1.25	0.61	0.45
6902-12-12 NWO	1 1/16-12	3/4-14	1.50	1.39	1.06	1.25	1.25	1.25	0.61	0.63
6902-12-12 NWO-FG	1 1/16-12	3/4-14	1.73	1.39	1.06	1.25	1.25	1.06	0.61	0.63
6902-12-16 NWO	1 1/16-12	1-11 1/2	1.53	1.52	1.14	1.50	1.25	1.50	0.61	0.84
6902-16-12 NWO	1 5/16-12	3/4-14	1.63	1.53	1.20	1.25	1.50	1.50	0.84	0.63
6902-16-16 NWO	1 5/16-12	1-11 1/2	1.63	1.52	1.14	1.50	1.50	1.50	0.84	0.84
6902-16-20 NWO	1 5/16-12	1 1/4-11 1/2	1.81	1.61	1.18	1.88	1.50	1.88	0.84	1.01
6902-20-16 NWO	1 5/8-12	1-11 1/2	1.81	1.79	1.42	1.50	1.88	1.88	1.08	0.84
6902-20-20 NWO	1 5/8-12	1 1/4-11 1/2	1.81	1.74	1.31	1.88	1.88	1.88	1.08	1.01
6902-24-24 NWO	1 7/8-12	1 1/2-11 1/2	2.28	1.77	1.34	2.13	2.13	2.13	1.31	1.26
6902-32-32 NWO	2 1/2-12	2-11 /2	2.00	1.91	1.50	2.63	2.63	2.63	1.78	1.72

Features, NPTF Pipe Fittings

NPTF pipe fittings described in this section include fittings with NPTF male or female pipe ends. Pipe thread connections are used in a wide variety of applications and provide reliable metal to metal sealing. Because of the tapered NPTF thread design, pipe thread connections are not recommended for applications that require repeated re-assembly or precise orientation of the fitting after tightening.

For connections between male or female NPTF pipe ends and 37 degree tube ends, refer to the Tube Fittings Section. For connections between male/female NPTF pipe ends and SAE O-Ring Ports, refer to the Adjustable and O-Ring Fittings Section. For connections between NPTF male pipe ends and Female NPSM Swivels, refer to the Adapter Union Section.

Performance

Where applicable, fittings are designed and qualified to the requirements of SAE J514. Beaded hose stem ends conform to SAE J1231 and are intended for suction or low pressure lines, typically less than 300 psi.

Construction

Unless otherwise specified, fittings are machined from cold drawn carbon steel barstock and forgings. Standard plating is electrodeposited zinc with a clear trivalent chromate conversion coating in accordance with ASTM B633 (Type V SC2). The minimum salt spray resistance is 240 hours to red corrosion when tested in accordance with ASTM B117

Threads

NPTF Threads: Male and female pipe threads conform to the Dryseal American Standard Taper Pipe Thread (SAE J476a, NPTF) Series which will provide pressure tight joints without the use of a lubricant or sealer. Use of these fittings with non-dryseal NPT pipe or hose ends is not recommended for high-pressure applications.

Note: Where not functionally objectionable, use of a compatible lubricant/sealant is recommended for either NPT or NPTF threads to minimize the possibility of galling in assembly.

Assembly Information

For assembly instructions, refer to the Technical Data Section for the appropriate fitting end. Also, refer to the Technical Data Section for recommendations regarding tubing pressure ratings, tube flares and hose/tube routing information. Please note the following:

Tubing for single flare tube ends should be either seamless or welded and drawn, fully annealed tubing per SAE J524 or J525. For double flaring, tubing per SAE J356, J524, J525 or J526 may be used.

In the design and fabrication of tubing or hose runs for any hydraulic system, precautions should be taken to allow for sufficient adjustment of the hose or tubing so that proper alignment can be attained at the fitting connections. Improper fit-up or misalignment should be corrected before final connections are made. Location of fitting connections should be planned to maximize accessibility. Whenever possible, use a torque wrench to tighten connections to the recommended torque.

Ordering Information

Size of fittings are indicated by dash number relating to sixteenths of an inch for the nominal O.D. of the pipe size used. Example: 1/2 inch pipe = 8/16 or (-8) size.

Order standard fittings from appropriate chart indicating required dash numbers. For example, 5502-8-8 is 1/2" male pipe thread to 1/2" female pipe thread. Jump size 5502-8-6 is 1/2" male pipe thread to 3/8" female pipe thread. Pictorial views for each fitting style indicate the correct numbering sequence for fitting ends.

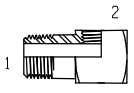
If information is needed for jump sizes not shown, please contact customer service for engineering assistance.

Table JP1. Pressure Ratings for Fittings With NPTF Pipe Threads

Nominal Pipe Size		Thread Size	Working Pressures	
Nom SAE Dash Size	Nom Inch Pipe O.D.	Dryseal Pipe Thread (NPTF[1]) Male and Female	Fittings With NPTF Pipe Threads	
			MPa	psi
-2	1/8	1/8-27	34.5	5,000
-4	1/4	1/4-18	27.5	4,000
-6	3/8	3/8-18	21	3,000
-8	1/2	1/2-14	21	3,000
-12	3/4	3/4-14	17	2,500
-16	1	1-11-1/2	14	2,000
-20	1 1/4	1-1/4-11-1/2	8	1,150
-24	1 1/2	1-1/2-11-1/2	7	1,000
-32	2	2-11-1/2	7	1,000

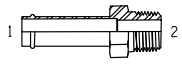
1) Dryseal American Standard Taper Pipe Thread

Pipe Fittings Index



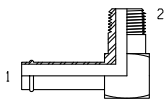
3051-
(1)Male Pipe
(2)Female Pipe

(430160)



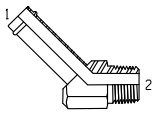
4404-
(1)Beaded
(2)Male Pipe

(430260)

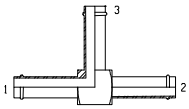


4501-
(1)Beaded
(2)Male Pipe

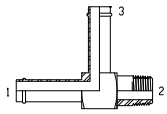
(430360)



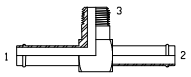
4503-
(1)Beaded
(2)Male Pipe



4504-
(1,2&3)Beaded

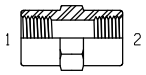


4505-
(1&3)Beaded
(2)Male Pipe



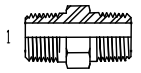
4506-
(1&2)Beaded
(3)Male Pipe

(140138)

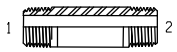


5000-
(1&2)Female Pipe

(140137)

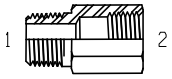


5404-
(1&2)Male Pipe



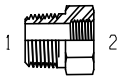
5404-N-
(1&2)Male Pipe

(140139)



5405-
(1)Male Pipe
(2)Female Pipe

(140140)

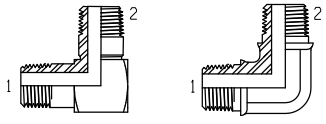


5406-
(1)Male Pipe
(2)Female Pipe

5406-C-
(1)Female Pipe

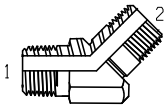
(130109E)

5406-P-
(1)Male Pipe



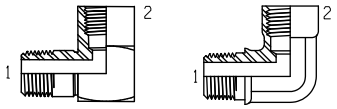
5500-
(1&2)Male Pipe

FG



5501-
(1&2)Male Pipe

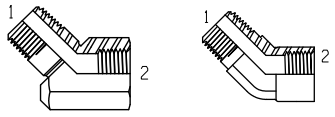
(140239)



5502-
(1)Male Pipe
(2)Female Pipe

FG

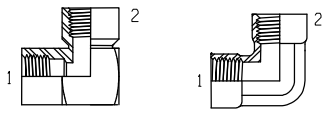
(140339)



5503-
(1)Male Pipe
(2)Female Pipe

FG

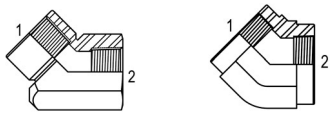
(140238)



5504-
(1&2)Female Pipe

FG

(140338)



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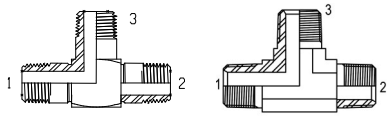
(1&2)Female Pipe

FG



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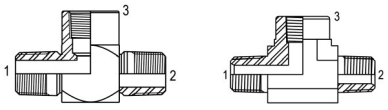
(1,2&3)Male Pipe

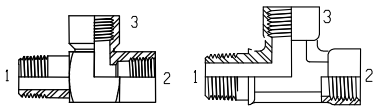
FG



5601-
(1&2)Male Pipe
(3)Female Pipe

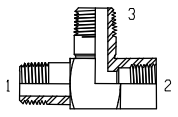
FG

(140424)



5602-
(1)Male Pipe
(2&3)Female Pipe

FG



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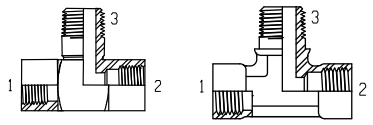
(2)Female Pipe

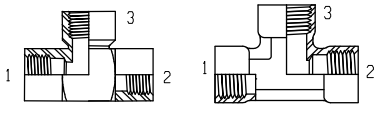
(140425)



5604-
(1&2)Female Pipe
(3)Male Pipe

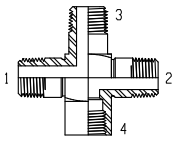
FG

(140438)

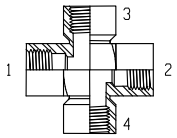


5605-
(1,2&3)Female Pipe

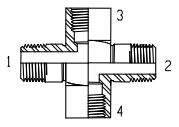
FG



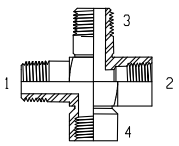
5651-
(1,2,3)Male Pipe
(4)Female Pipe



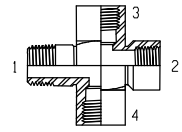
5652-
(1,2,3&4)Female Pipe



5653-
(1&2)Male Pipe
(3&4)Female Pipe



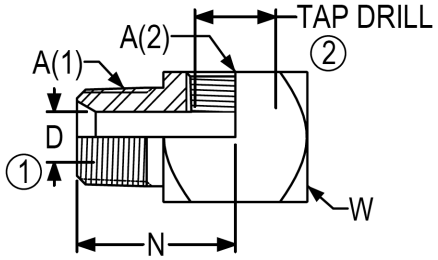
5654-
(1&3)Male Pipe
(2&4)Female Pipe



5655-
(1)Male Pipe
(2,3&4)Female Pipe

Long Allen Plug-
(1)Male Pipe

3051 90 DEGREE SHORT STREET ELBOW

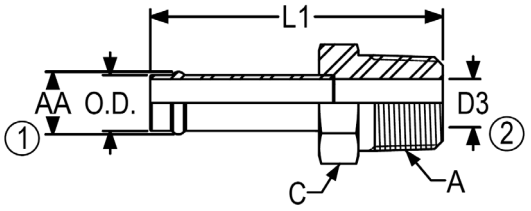


PRESSURE RATINGS ON TABLE JP1 DO NOT APPLY.

PART NO	A (1) NPTF	A (2) NPTF	N	W	D	TAP DRILL
3051-2-2	1/8-27	1/8-27	0.66	0.56	0.19	0.33
3051-2-2-SHORT	1/8-27	1/8-27	0.55	0.50	0.19	0.33
3051-4-4	1/4-18	1/4-18	1.06	0.88	0.25	0.43
3051-6-6	3/8-18	3/8-18	1.06	0.88	0.31	0.57
3051-8-8	1/2-14	1/2-14	1.38	1.13	0.44	0.70
3051-12-12	3/4-14	3/4-14	1.50	1.38	0.56	0.91
3051-16-16	1-11 1/2	1-11 1/2	1.75	1.63	0.61	1.14

4404 MALE PIPE THREAD HOSE CONNECTOR

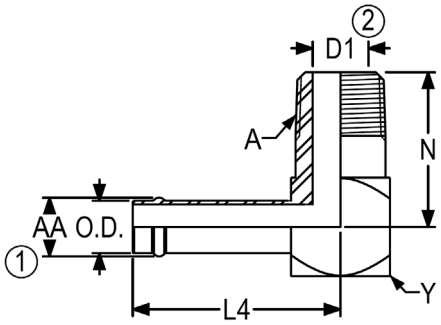
SAE J1231 430160



PART NO	TUBE OD	A NPTF	L1	C	AA	D3
4404-4-2	1/4	1/8-27	2.08	0.44	0.29	0.19
4404-4-4	1/4	1/4-18	2.35	0.56	0.29	0.21
4404-4-6	1/4	3/8-18	2.35	0.75	0.29	0.21
4404-5-2	5/16	1/8-27	2.08	0.44	0.36	0.19
4404-5-4	5/16	1/4-18	2.35	0.56	0.36	0.26
4404-5-6	5/16	3/8-18	2.35	0.75	0.36	0.26
4404-6-2	3/8	1/8-27	2.13	0.63	0.43	0.19
4404-6-4	3/8	1/4-18	2.35	0.63	0.43	0.33
4404-6-6	3/8	3/8-18	2.35	0.75	0.43	0.33
4404-6-8	3/4	1/2-14	2.60	0.94	0.43	0.53
4404-8-6	1/2	3/8-18	2.35	0.75	0.56	0.41
4404-8-8	1/2	1/2-14	2.60	0.94	0.56	0.43
4404-8-12	1/2	3/4-14	2.67	1.13	0.56	0.43
4404-10-4	5/8	1/4-18	2.35	0.75	0.69	0.28
4404-10-6	5/8	3/8-18	2.35	0.75	0.69	0.41
4404-10-8	5/8	1/2-14	2.60	0.94	0.69	0.53
4404-10-12	5/8	3/4-14	2.67	1.13	0.69	0.56
4404-10-16	5/8	1-11 1/2	2.86	1.38	0.69	0.56
4404-12-6	3/4	3/8-18	2.35	0.94	0.82	0.41
4404-12-8	3/4	1/2-14	2.60	0.94	0.82	0.53
4404-12-12	3/4	3/4-14	2.67	1.13	0.82	0.69
4404-12-16	3/4	1-11 1/2	2.86	1.38	0.82	0.69
4404-16-8	1	1/2-14	2.63	1.25	1.06	0.53
4404-16-12	1	3/4-14	2.67	1.25	1.06	0.72
4404-16-16	1	1-11 1/2	2.86	1.38	1.06	0.89
4404-16-24	1	1 1/2-11 1/2	3.07	2.00	1.06	0.88
4404-20-12	1 1/4	3/4-14	2.67	1.38	1.36	0.72
4404-20-16	1 1/4	1-11 1/2	2.86	1.38	1.36	0.94
4404-20-20	1 1/4	1 1/4-11 1/2	2.97	1.75	1.36	1.14
4404-20-24	1 1/4	1 1/2-11 1/2	3.07	2.00	1.14	1.25
4404-22-12	1 3/8	3/4-14	2.67	1.75	1.49	0.72
4404-24-20	1 1/2	1 1/4-11 1/2	2.97	1.75	1.62	1.25
4404-24-24	1 1/2	1 1/2-11 1/2	3.07	2.00	1.62	1.40
4404-28-32	1 3/4	2-11 1/2	2.91	2.50	1.89	1.65
4404-32-32	2	2-11 1/2	3.25	2.50	2.15	1.81

4501 90 DEGREE MALE PIPE HOSE FITTING

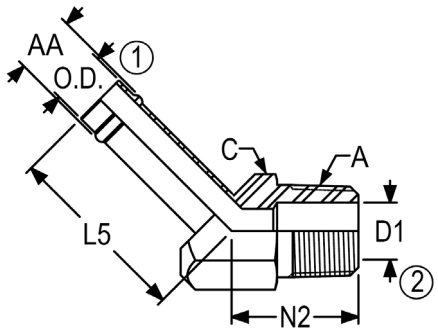
SAE J1231 431460



PART NO	TUBE OD	A NPTF	L4	N	Y	AA	D1
4501-4-2	1/4	1/8-27	1.75	0.78	0.50	0.29	0.19
4501-4-4	1/4	1/4-18	1.81	1.09	0.63	0.29	0.28
4501-4-6	1/4	3/8-18	1.91	1.22	0.81	0.29	0.41
4501-5-2	5/16	1/8-27	1.75	0.78	0.50	0.36	0.19
4501-5-4	5/16	1/4-18	1.81	1.09	0.63	0.36	0.28
4501-5-6	5/16	3/8-18	1.91	1.22	0.81	0.36	0.41
4501-6-2	3/8	1/8-27	1.75	0.78	0.50	0.43	0.19
4501-6-4	3/8	1/4-18	1.81	1.09	0.63	0.43	0.28
4501-6-6	3/8	3/8-18	1.91	1.22	0.81	0.43	0.41
4501-6-8	3/8	1/2-14	1.97	1.47	0.94	0.43	0.53
4501-8-4	1/2	1/4-18	1.81	1.09	0.63	0.56	0.28
4501-8-6	1/2	3/8-18	1.91	1.22	0.81	0.56	0.41
4501-8-8	1/2	1/2-14	1.97	1.47	0.94	0.56	0.53
4501-8-12	1/2	3/4-14	2.06	1.59	1.13	0.56	0.72
4501-10-4	5/8	1/4-18	1.97	1.25	0.94	0.69	0.28
4501-10-6	5/8	3/8-18	1.91	1.22	0.81	0.69	0.41
4501-10-8	5/8	1/2-14	1.97	1.47	0.94	0.69	0.53
4501-10-12	5/8	3/4-14	2.06	1.59	1.13	0.69	0.72
4501-10-16	5/8	1-11 1/2	2.19	1.97	1.38	0.69	0.94
4501-12-6	3/4	3/8-18	1.91	1.22	0.81	0.82	0.41
4501-12-8	3/4	1/2-14	1.97	1.47	0.94	0.82	0.53
4501-12-12	3/4	3/4-14	2.06	1.59	1.13	0.82	0.72
4501-12-16	3/4	1-11 1/2	2.19	1.97	1.38	0.82	0.94
4501-16-8	1	1/2-14	2.19	1.69	1.38	1.06	0.53
4501-16-12	1	3/4-14	2.06	1.59	1.13	1.06	0.72
4501-16-16	1	1-11 1/2	2.19	1.97	1.38	1.06	0.94
4501-16-20	1	1 1/4-11 1/2	2.38	2.38	1.75	1.06	1.25
4501-20-12	1 1/4	3/4-14	2.19	1.72	1.38	1.36	0.72
4501-20-16	1 1/4	1-11 1/2	2.19	1.97	1.38	1.36	0.94
4501-20-20	1 1/4	1 1/4-11 1/2	2.38	2.38	1.75	1.36	1.25
4501-20-24	1 1/4	1 1/2-11 1/2	2.50	2.64	2.00	1.36	1.50
4501-24-16	1 1/2	1-11 1/2	2.38	2.16	1.75	1.62	0.94
4501-24-20	1 1/2	1 1/4-11 1/2	2.38	2.38	1.75	1.62	1.25
4501-24-24	1 1/2	1 1/2-11 1/2	2.50	2.64	2.00	1.62	1.50
4501-32-32	2	2-11 1/2	2.81	3.00	2.63	2.15	1.94

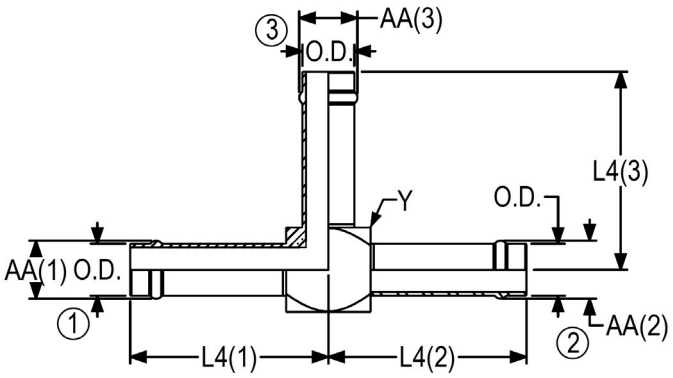
4503 45 DEGREE MALE PIPE HOSE FITTING

SAE J1231 430360



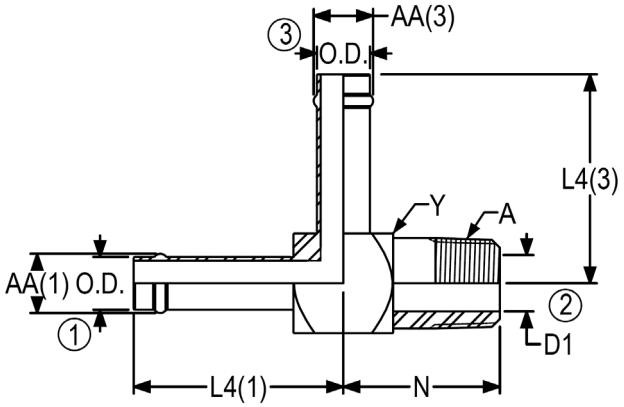
PART NO	TUBE OD	A NPTF	L5	N2	C	AA	D1
4503-4-2	1/4	1/8-27	1.68	0.64	0.50	0.29	0.19
4503-4-4	1/4	1/4-18	1.70	0.86	0.63	0.29	0.28
4503-5-2	5/16	1/8-27	1.63	0.64	0.50	0.36	0.19
4503-5-4	5/16	1/4-18	1.70	0.86	0.63	0.36	0.30
4503-6-4	3/8	1/4-18	1.67	0.86	0.63	0.43	0.30
4503-6-6	3/8	3/8-18	1.69	0.95	0.81	0.43	0.41
4503-8-4	1/2	1/4-18	1.62	0.86	0.63	0.56	0.30
4503-8-6	1/2	3/8-18	1.74	0.95	0.81	0.56	0.41
4503-8-8	1/2	1/2-14	1.72	1.17	0.94	0.56	0.53
4503-10-6	5/8	3/8-18	1.67	0.95	0.81	0.69	0.41
4503-10-8	5/8	1/2-14	1.75	1.17	0.94	0.69	0.53
4503-10-12	5/8	3/4-14	1.81	1.20	1.13	0.69	0.64
4503-12-6	3/4	3/8-18	1.69	0.95	0.81	0.82	0.41
4503-12-8	3/4	1/2-14	1.72	1.17	0.94	0.82	0.53
4503-12-12	3/4	3/4-14	1.78	1.20	1.13	0.82	0.64
4503-12-16	3/4	1-11 1/2	2.03	1.48	1.38	0.82	0.94
4503-16-12	1	3/4-14	1.75	1.75	1.13	1.06	0.64
4503-16-16	1	1-11 1/2	1.85	1.48	1.38	1.06	0.94
4503-16-20	1	1 1/4-11 1/2	2.06	1.67	1.75	1.06	1.25
4503-20-16	1 1/4	1-11 1/2	1.78	1.48	1.38	1.36	0.94
4503-20-20	1 1/4	1 1/4-11 1/2	1.91	1.67	1.75	1.36	1.25
4503-24-20	1 1/2	1 1/4-11 1/2	1.84	1.67	1.75	1.62	1.25
4503-24-24	1 1/2	1 1/2-11 1/2	1.95	1.77	2.00	1.62	1.34
4503-32-32	2	2-11 1/2	2.20	2.11	2.50	2.15	1.94

4504 BEADED HOSE FITTING TEE



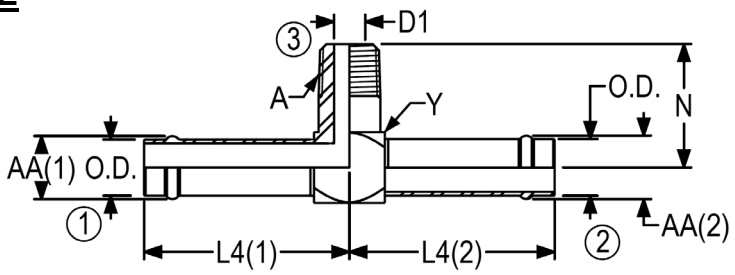
PART NO	TUBE OD	L4 (1)	L4 (2)	L4 (3)	Y	AA (1)	AA (2)	AA (3)
4504-4-4-4	1/4-1/4-1/4	1.75	1.75	1.75	0.50	0.29	0.29	0.29
4504-6-6-4	3/8-3/8-1/4	1.81	1.81	1.81	0.63	0.43	0.43	0.29
4504-6-6-6	3/8-3/8-3/8	1.80	1.80	1.75	0.50	0.43	0.43	0.43
4504-6-6-8	3/8-3/8-1/2	2.00	2.00	2.00	1.00	0.43	0.43	0.56
4504-6-6-10	3/8-3/8-5/8	1.97	1.97	1.97	0.94	0.43	0.43	0.69
4504-8-5-5	1/2-5/16-5/16	1.91	1.91	1.91	0.81	0.56	0.36	0.36
4504-8-6-6	1/2-3/8-3/8	1.91	1.91	1.91	0.81	0.56	0.43	0.43
4504-8-6-8	1/2-3/8-1/2	1.91	1.91	1.91	0.81	0.56	0.43	0.56
4504-8-8-4	1/2-1/2-1/4	1.81	1.81	1.91	0.63	0.56	0.56	0.29
4504-8-8-8	1/2-1/2-1/2	1.91	1.91	1.91	0.81	0.56	0.56	0.56
4504-10-10-4	5/8-5/8-1/4	1.91	1.91	1.97	0.81	0.69	0.69	0.29
4504-10-10-6	5/8-5/8-3/8	1.91	1.91	1.97	0.81	0.69	0.69	0.43
4504-10-10-10	5/8-5/8-5/8	1.97	1.97	1.97	0.94	0.69	0.69	0.69
4504-10-10-12	5/8-5/8-3/4	2.00	2.00	2.00	1.00	0.69	0.69	0.82
4504-12-8-12	3/4-1/2-3/4	2.00	2.00	2.00	1.00	0.82	0.56	0.82
4504-12-12-8	3/4-3/4-1/2	2.06	2.06	2.06	1.13	0.82	0.82	0.56
4504-12-12-10	3/4-3/4-5/8	2.06	2.06	2.06	1.13	0.82	0.82	0.69
4504-12-12-12	3/4-3/4-3/4	2.00	2.00	2.00	1.00	0.82	0.82	0.82
4504-16-12-16	1-3/4-1	2.19	2.19	2.19	1.38	1.06	0.82	1.06
4504-16-16-4	1-1-1/4	2.19	2.19	2.19	1.38	1.06	1.06	0.29
4504-16-16-12	1-1-3/4	2.19	2.19	2.19	1.38	1.06	1.06	0.82
4504-16-16-16	1-1-1	2.19	2.19	2.19	1.38	1.06	1.06	1.06
4504-20-16-16	1 1/4-1-1	2.31	2.31	2.31	1.63	1.25	1.00	1.00
4504-20-16-20	1 1/4-1-1 1/4	2.31	2.31	2.31	1.63	1.25	1.00	1.25
4504-20-20-12	1 1/4-1 1/4-3/4	2.31	2.31	2.31	1.63	1.25	1.25	0.75

4505 MALE PIPE RUN HOSE FITTING TEE



PART NO	TUBE OD	A NPTF	L4 (1)	N	L4 (3)	Y	AA (1)	D1	AA (3)
4505-8-8-8	1/2-1/2	1/2-14	1.97	1.47	1.97	0.94	0.56	0.53	0.56
4505-12-12-12	3/4-3/4	3/4-14	2.06	1.59	2.06	1.13	0.82	0.72	0.82
4505-16-16-12	1-3/4	1-11 1/2	2.19	1.97	2.19	1.38	1.06	0.94	0.82
4505-16-16-16	1-1	1-11 1/2	2.19	1.97	2.19	1.38	1.06	0.94	1.06

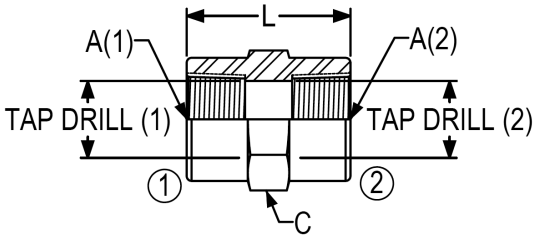
4506 MALE PIPE BRANCH HOSE FITTING TEE



PART NO	TUBE OD	A NPTF	L4 (1)	L4 (2)	N	Y	AA (1)	AA (2)	D1
4506-8-8-4	1/2-1/2	1/4-18	1.81	1.81	1.09	0.63	0.50	0.50	0.28
4506-8-8-6	1/2-1/2	3/8-18	1.91	1.91	1.22	0.81	0.56	0.56	0.41
4506-10-10-8	5/8-5/8	1/2-14	1.97	1.97	1.47	0.94	0.63	0.63	0.53

5000 HEXAGON PIPE COUPLING

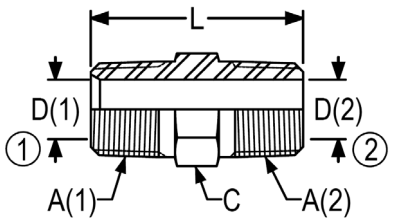
SAE J514 140138



PART NO	A (1) NPTF	A (2) NPTF	L	C	TAP DRILL (1)	TAP DRILL (2)
5000-2-2	1/8-27	1/8-27	0.75	0.63	0.33	0.33
5000-4-2	1/4-18	1/8-27	1.13	0.75	0.43	0.33
5000-4-4	1/4-18	1/4-18	1.13	0.75	0.43	0.43
5000-6-4	3/8-18	1/4-18	1.13	0.88	0.57	0.43
5000-6-6	3/8-18	3/8-18	1.13	0.88	0.57	0.57
5000-8-2	1/2-14	1/8-27	1.50	1.13	0.70	0.33
5000-8-4	1/2-14	1/4-18	1.50	1.13	0.70	0.43
5000-8-6	1/2-14	3/8-18	1.50	1.13	0.70	0.57
5000-8-8	1/2-14	1/2-14	1.50	1.13	0.70	0.70
5000-12-6	3/4-14	3/8-18	1.53	1.38	0.91	0.57
5000-12-8	3/4-14	1/2-14	1.53	1.38	0.91	0.70
5000-12-12	3/4-14	3/4-14	1.53	1.38	0.91	0.91
5000-16-12	1-11 1/2	3/4-14	1.89	1.63	1.14	0.91
5000-16-16	1-11 1/2	1-11 1/2	1.89	1.63	1.14	1.14
5000-20-12	1 1/4-11 1/2	3/4-14	2.08	2.00	1.48	0.91
5000-20-16	1 1/4-11 1/2	1-11 1/2	1.93	2.00	1.48	1.14
5000-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1.93	2.00	1.48	1.48
5000-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1.93	2.38	1.72	1.72
5000-32-32	2-11 1/2	2-11 1/2	1.96	2.88	2.19	2.19
5000-40-40	2 1/2-8	2 1/2-8	2.67	3.50	2.64	2.64

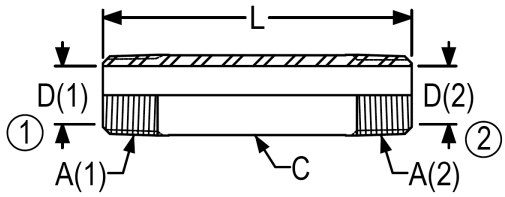
5404 HEXAGON PIPE NIPPLE

SAE J514 140137



PART NO	A (1) NPTF	A (2) NPTF	L	C	D (1)	D (2)
5404-2-2	1/8-27	1/8-27	1.06	0.44	0.19	0.19
5404-4-2	1/4-18	1/8-27	1.26	0.63	0.28	0.19
5404-4-4	1/4-18	1/4-18	1.45	0.63	0.28	0.28
5404-6-2	3/8-18	1/8-27	1.26	0.75	0.41	0.19
5404-6-4	3/8-18	1/4-18	1.45	0.75	0.41	0.28
5404-6-6	3/8-18	3/8-18	1.45	0.75	0.41	0.41
5404-8-4	1/2-14	1/4-18	1.70	0.88	0.53	0.28
5404-8-6	1/2-14	3/8-18	1.70	0.88	0.53	0.41
5404-8-8	1/2-14	1/2-14	1.89	0.88	0.53	0.53
5404-12-4	3/4-14	1/4-18	1.77	1.13	0.72	0.28
5404-12-6	3/4-14	3/8-18	1.77	1.13	0.72	0.41
5404-12-8	3/4-14	1/2-14	1.96	1.13	0.72	0.53
5404-12-12	3/4-14	3/4-14	1.96	1.13	0.72	0.72
5404-16-6	1-11 1/2	3/8-18	1.96	1.38	0.94	0.41
5404-16-8	1-11 1/2	1/2-14	2.15	1.38	0.94	0.53
5404-16-12	1-11 1/2	3/4-14	2.15	1.38	0.94	0.72
5404-16-16	1-11 1/2	1-11 1/2	2.34	1.38	0.94	0.94
5404-20-8	1 1/4-11 1/2	1/2-14	2.26	1.75	1.25	0.53
5404-20-12	1 1/4-11 1/2	3/4-14	2.26	1.75	1.25	0.72
5404-20-16	1 1/4-11 1/2	1-11 1/2	2.45	1.75	1.25	0.94
5404-20-20	1 1/4-11 1/2	1 1/4-11 1/2	2.48	1.75	1.25	1.25
5404-24-12	1 1/2-11 1/2	3/4-14	2.36	2.00	1.50	0.72
5404-24-16	1 1/2-11 1/2	1-11 1/2	2.55	2.00	1.50	0.94
5404-24-20	1 1/2-11 1/2	1 1/4-11 1/2	2.58	2.00	1.50	1.25
5404-24-24	1 1/2-11 1/2	1 1/2-11 1/2	2.61	2.00	1.50	1.50
5404-32-12	2-11 1/2	1/2-14	2.54	2.50	1.94	0.72
5404-32-16	2-11 1/2	1-11 1/2	2.63	2.50	1.78	0.94
5404-32-20	1 1/4-11 1/2	2-11 1/2	2.76	2.50	1.13	1.78
5404-32-24	2-11 1/2	1 1/2-11 1/2	2.79	2.50	1.94	1.50
5404-32-32	2-11 1/2	2-11 1/2	2.82	2.50	1.94	1.94

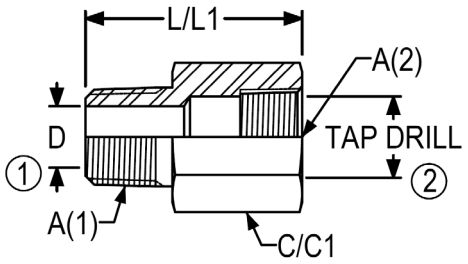
5404-N STRAIGHT PIPE NIPPLE



PART NO	A (1) NPTF	A (2) NPTF	L	C	D (1)	D (2)
5404-N-2-2 X 3/4	1/8-27	1/8-27	0.75	0.44	0.17	0.17
5404-N-2-2 X 2	1/8-27	1/8-27	2.00	0.44	0.17	0.17
5404-N-2-2 X 2 1/2	1/8-27	1/8-27	2.50	0.44	0.17	0.17
5404-N-2-2 X 4	1/8-27	1/8-27	4.00	0.44	0.17	0.17
5404-N-4-4 X 7/8	1/4-18	1/4-18	0.88	0.56	0.30	0.30
5404-N-4-4 X 1 1/2	1/4-18	1/4-18	1.50	0.56	0.30	0.30
5404-N-4-4 X 2	1/4-18	1/4-18	2.00	0.56	0.30	0.30
5404-N-4-4 X 2 1/2	1/4-18	1/4-18	2.50	0.56	0.30	0.30
5404-N-4-4 X 3	1/4-18	1/4-18	3.00	0.56	0.30	0.30
5404-N-4-4 X 6	1/4-18	1/4-18	6.00	0.56	0.30	0.30
5404-N-6-6 X 1	3/8-18	3/8-18	1.00	0.69	0.39	0.39
5404-N-6-6 X 1 1/2	3/8-18	3/8-18	1.50	0.69	0.39	0.39
5404-N-6-6 X 2	3/8-18	3/8-18	2.00	0.69	0.39	0.39
5404-N-6-6 X 3	3/8-18	3/8-18	3.00	0.69	0.39	0.39
5404-N-6-6 X 4	3/8-18	3/8-18	4.00	0.69	0.39	0.39
5404-N-6-6 X 6	3/8-18	3/8-18	6.00	0.69	0.39	0.39
5404-N-8-8 X 1 1/8	1/2-14	1/2-14	1.13	0.88	0.48	0.48
5404-N-8-8 X 1 1/2	1/2-14	1/2-14	1.50	0.88	0.48	0.48
5404-N-8-8 X 2	1/2-14	1/2-14	2.00	0.88	0.48	0.48
5404-N-8-8 X 2 1/2	1/2-14	1/2-14	2.50	0.88	0.48	0.48
5404-N-8-8 X 3	1/2-14	1/2-14	3.00	0.88	0.48	0.48
5404-N-8-8 X 3 1/2	1/2-14	1/2-14	3.50	0.88	0.48	0.48
5404-N-8-8 X 4	1/2-14	1/2-14	4.00	0.88	0.48	0.48
5404-N-8-8 X 4 1/2	1/2-14	1/2-14	4.50	0.88	0.48	0.48
5404-N-8-8 X 8 1/2	1/2-14	1/2-14	8.50	0.88	0.48	0.48
5404-N-12-12 X 1 3/8	3/4-14	3/4-14	1.38	1.06	0.61	0.61
5404-N-12-12 X 2	3/4-14	3/4-14	2.00	1.06	0.61	0.61
5404-N-12-12 X 2 1/2	3/4-14	3/4-14	2.50	1.06	0.61	0.61
5404-N-12-12 X 3	3/4-14	3/4-14	3.00	1.06	0.61	0.61
5404-N-12-12 X 4	3/4-14	3/4-14	4.00	1.06	0.61	0.61
5404-N-12-12 X 6	3/4-14	3/4-14	6.00	1.06	0.61	0.61
5404-N-16-16 X 2	1-11 1/2	1-11 1/2	2.00	1.31	0.84	0.84
5404-N-16-16 X 3	1-11 1/2	1-11 1/2	3.00	1.31	0.84	0.84
5404-N-16-16 X 4	1-11 1/2	1-11 1/2	4.00	1.31	0.84	0.84
5404-N-16-16 X 5	1-11 1/2	1-11 1/2	5.00	1.31	0.84	0.84
5404-N-24-24 X 2 1/2	1 1/2-11 1/2	1 1/2-11 1/2	2.50	2.00	1.38	1.38

5405 PIPE ADAPTER

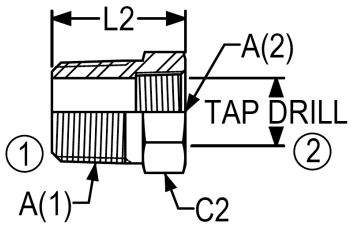
SAE J514 140139



PART NO	A (1) NPTF	A (2) NPTF	L/L1	C/C1	D	TAP DRILL
5405-2-2	1/8-27	1/8-27	1.04	0.63	0.19	0.33
5405-2-4	1/8-27	1/4-18	1.21	0.75	0.19	0.43
5405-2-6	1/8-27	3/8-18	1.26	0.88	0.19	0.57
5405-2-8	1/8-27	1/2-14	1.50	1.13	0.19	0.70
5405-4-2	1/4-18	1/8-27	1.39	0.56	0.28	0.33
5405-4-4	1/4-18	1/4-18	1.39	0.75	0.28	0.43
5405-4-6	1/4-18	3/8-18	1.44	0.88	0.28	0.57
5405-4-8	1/4-18	1/2-14	1.68	1.13	0.28	0.70
5405-6-4	3/8-18	1/4-18	1.44	0.75	0.41	0.57
5405-6-6	3/8-18	3/8-18	1.44	0.88	0.41	0.57
5405-6-8	3/8-18	1/2-14	1.68	1.13	0.41	0.70
5405-6-12	3/8-18	3/4-14	1.74	1.38	0.41	0.91
5405-8-6	1/2-14	3/8-18	1.87	0.88	0.53	0.57
5405-8-8	1/2-14	1/2-14	1.87	1.13	0.53	0.70
5405-8-12	1/2-14	3/4-14	1.93	1.38	0.53	0.91
5405-8-16	1/2-14	1-11 1/2	2.19	1.63	0.53	1.14
5405-12-8	3/4-14	1/2-14	1.93	1.13	0.72	0.70
5405-12-12	3/4-14	3/4-14	1.93	1.38	0.72	0.91
5405-12-16	3/4-14	1-11 1/2	2.18	1.63	0.72	1.14
5405-12-20	3/4-14	1 1/4-11 1/2	2.28	2.00	0.72	1.48
5405-16-8	1-11 1/2	1/2-14	2.37	1.38	0.94	0.70
5405-16-12	1-11 1/2	3/4-14	2.37	1.38	0.94	0.91
5405-16-16	1-11 1/2	1-11 1/2	2.37	1.63	0.94	1.14
5405-16-20	1-11 1/2	1 1/4-11 1/2	2.46	2.00	0.94	1.48
5404-16-24	1-11 1/2	1 1/2-11 1/2	2.47	2.38	0.94	1.72
5405-20-16	1 1/4-11 1/2	1-11 1/2	2.49	1.75	1.25	1.14
5405-20-24	1 1/4-11 1/2	1 1/2-11 1/2	2.50	2.38	1.25	1.72
5405-20-32	1 1/4-11 1/2	2-11 1/2	2.60	2.88	1.25	2.19
5405-24-24	1 1/2-11 1/2	1 1/2-11 1/2	2.53	2.38	1.50	1.72
5405-24-32	1 1/2-11 1/2	2-11 1/2	2.63	2.88	1.50	2.19
5405-32-32	2-11 1/2	2-11 1/2	2.66	2.88	1.94	2.20

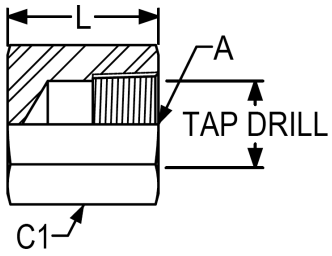
5406 PIPE REDUCER BUSHING

SAE J514 140140



PART NO	A (1) NPTF	A (2) NPTF	L2	C2	TAP DRILL
5406-4-2	1/4-18	1/8-27	0.85	0.63	0.33
5406-6-2	3/8-18	1/8-27	0.85	0.75	0.33
5406-6-4	3/8-18	1/4-18	0.85	0.75	0.43
5406-8-2	1/2-14	1/8-27	1.10	0.88	0.33
5406-8-4	1/2-14	1/4-18	1.10	0.88	0.43
5406-8-6	1/2-14	3/8-18	1.10	0.88	0.57
5406-12-2	3/4-14	1/8-27	1.17	1.13	0.33
5406-12-4	3/4-14	1/4-18	1.17	1.13	0.43
5406-12-6	3/4-14	3/8-18	1.17	1.13	0.57
5406-12-8	3/4-14	1/2-14	1.17	1.13	0.70
5406-16-2	1-11 1/2	1/8-27	1.36	1.38	0.33
5406-16-4	1-11 1/2	1/4-18	1.36	1.38	0.43
5406-16-6	1-11 1/2	3/8-18	1.36	1.38	0.57
5406-16-8	1-11 1/2	1/2-14	1.36	1.38	0.70
5406-16-12	1-11 1/2	3/4-14	1.36	1.38	0.91
5406-20-4	1 1/4-11 1/2	1/4-18	1.47	1.75	0.43
5406-20-6	1 1/4-11 1/2	3/8-18	1.47	1.75	0.57
5406-20-8	1 1/4-11 1/2	1/2-14	1.47	1.75	0.70
5406-20-12	1 1/4-11 1/2	3/4-14	1.47	1.75	0.91
5406-20-16	1 1/4-11 1/2	1-11 1/2	1.47	1.75	1.14
5406-24-4	1 1/2-11 1/2	1/4-18	1.55	2.00	0.43
5406-24-6	1 1/2-11 1/2	3/8-18	1.57	2.00	0.57
5406-24-8	1 1/2-11 1/2	1/2-14	1.57	2.00	0.70
5406-24-12	1 1/2-11 1/2	3/4-14	1.57	2.00	0.91
5406-24-16	1 1/2-11 1/2	1-11 1/2	1.57	2.00	1.14
5406-24-20	1 1/2-11 1/2	1 1/4-11 1/2	1.57	2.00	1.48
5406-32-8	2-11 1/2	1/2-14	1.75	2.50	0.70
5406-32-12	2-11 1/2	3/4-14	1.75	2.50	0.91
5406-32-16	2-11 1/2	1-11 1/2	1.75	2.50	1.14
5406-32-20	2-11 1/2	1 1/4-11 1/2	1.75	2.50	1.48
5406-32-24	2-11 1/2	1 1/2-11 1/2	1.75	2.50	1.72

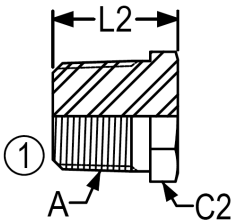
5406-C HEAVY DUTY FEMALE PIPE CAP NUT



PART NO	A NPTF	L	C1	TAP DRILL
5406-C-2	1/8-27	0.69	0.56	0.33
5406-C-4	1/4-18	0.92	0.75	0.43
5406-C-6	3/8-18	0.97	0.88	0.57
5406-C-8	1/2-14	1.23	1.13	0.70
5406-C-12	3/4-14	1.31	1.38	0.91
5406-C-16	1-11 1/2	1.61	1.63	1.14
5406-C-40	2 1/2-8	1.70	3.50	2.64

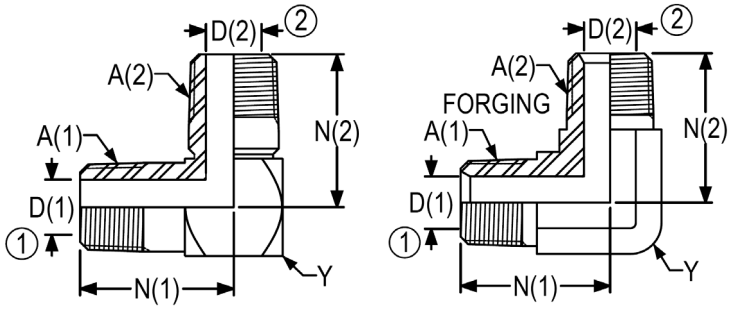
5406-P MALE PIPE PLUG

SAE J531 130109E



PART NO	A NPTF	L2	C2
5406-2P	1/8-27	0.56	0.44
5406-4P	1/4-18	0.75	0.56
5406-6P	3/8-18	0.78	0.69
5406-8P	1/2-14	0.96	0.88
5406-12P	3/4-14	1.05	1.13
5406-16P	1-11 1/2	1.24	1.38
5406-20P	1 1/4-11 1/2	1.47	1.75
5406-24P	1 1/2-11 1/2	1.57	2.00
5406-32P	2-11 1/2	1.75	2.50

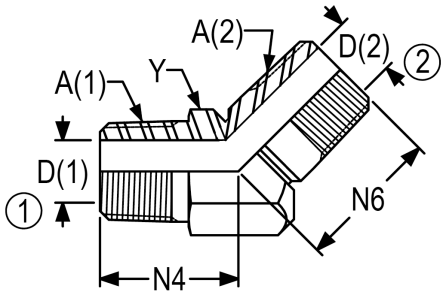
5500 90 DEGREE MALE PIPE ELBOW



*Non forging parts are brazed construction

PART NO	A (1) NPTF	A (2) NPTF	N (1)	N (2)	Y	D (1)	D (2)
5500-2-2	1/8-27	1/8-27	0.78	0.78	0.50	0.19	0.19
5500-2-2-FG	1/8-27	1/8-27	0.72	0.72	0.44	0.19	0.19
5500-4-2	1/4-18	1/8-27	1.09	0.84	0.63	0.28	0.19
5500-4-2-FG	1/4-18	1/8-27	1.09	0.90	0.56	0.28	0.19
5500-4-4	1/4-18	1/4-18	1.09	1.09	0.63	0.28	0.28
5500-4-4-FG	1/4-18	1/4-18	1.09	1.09	0.56	0.28	0.28
5500-6-4	3/8-18	1/4-18	1.22	1.19	0.81	0.41	0.28
5500-6-4-FG	3/8-18	1/4-18	1.22	1.22	0.75	0.41	0.28
5500-6-6	3/8-18	3/8-18	1.22	1.22	0.81	0.41	0.41
5500-6-6-FG	3/8-18	3/8-18	1.22	1.22	0.75	0.41	0.41
5500-8-4	1/2-14	1/4-18	1.47	1.25	0.94	0.53	0.28
5500-8-6	1/2-14	3/8-18	1.47	1.28	0.94	0.53	0.41
5500-8-6-FG	1/2-14	3/8-18	1.47	1.28	0.88	0.53	0.41
5500-8-8	1/2-14	1/2-14	1.47	1.47	0.94	0.53	0.53
5500-8-8-FG	1/2-14	1/2-14	1.47	1.47	0.88	0.53	0.53
5500-12-4	3/4-14	1/4-18	1.59	1.34	1.13	0.72	0.28
5500-12-8	3/4-14	1/2-14	1.59	1.56	1.13	0.72	0.53
5500-12-8-FG	3/4-14	1/2-14	1.59	1.59	1.06	0.72	0.53
5500-12-12	3/4-14	3/4-14	1.59	1.59	1.13	0.72	0.72
5500-12-12-FG	3/4-14	3/4-14	1.59	1.59	1.06	0.72	0.72
5500-16-12	1-11 1/2	3/4-14	1.97	1.72	1.38	0.94	0.72
5500-16-12-FG	1-11 1/2	3/4-14	1.78	1.97	1.31	0.94	0.72
5500-16-16	1-11 1/2	1-11 1/2	1.97	1.97	1.38	0.94	0.94
5500-16-16-FG	1-11 1/2	1-11 1/2	1.97	1.97	1.31	0.94	0.94
5500-20-16	1 1/4-11 1/2	1-11 1/2	2.38	2.16	1.75	1.25	0.94
5500-20-20	1 1/4-11 1/2	1 1/4-11 1/2	2.38	2.38	1.75	1.25	1.25
5500-20-20-FG	1 1/4-11 1/2	1 1/2-11 1/2	2.38	2.38	1.63	1.25	1.25
5500-24-24	1 1/2-11 1/2	1 1/2-11 1/2	2.64	2.64	2.00	1.50	1.50
5500-32-32	2-11 1/2	2-11 1/2	3.00	3.00	2.63	1.94	1.94

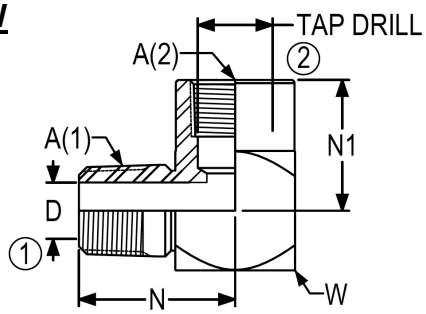
5501 45 DEGREE MALE PIPE ELBOW

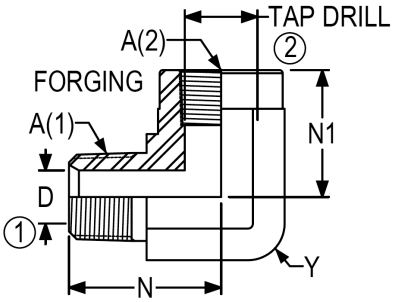


PART NO	A (1) NPTF	A (2) NPTF	N4	N6	Y	D (1)	D (2)
5501-2-2	1/8-27	1/8-27	0.63	0.66	0.50	0.19	0.19
5501-4-4	1/4-18	1/4-18	0.86	0.91	0.63	0.28	0.28
5501-6-6	3/8-18	3/8-18	0.95	1.00	0.81	0.41	0.41
5501-8-8	1/2-14	1/2-14	1.17	1.22	0.94	0.53	0.53
5501-12-4	3/4-14	1/4-18	1.20	1.16	1.13	0.72	0.28
5501-12-12	3/4-14	3/4-14	1.20	1.20	1.13	0.72	0.72
5501-16-16	1-11 1/2	1-11 1/2	1.48	1.63	1.38	0.94	0.94
5501-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1.67	1.70	1.75	1.25	1.25
5501-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1.77	2.02	2.00	1.34	1.34
5501-32-32	2-11 1/2	2-11 1/2	2.11	2.11	2.50	1.94	1.94

5502 90 DEGREE STREET ELBOW

SAE J514 140239



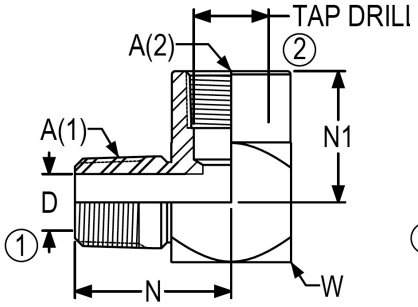


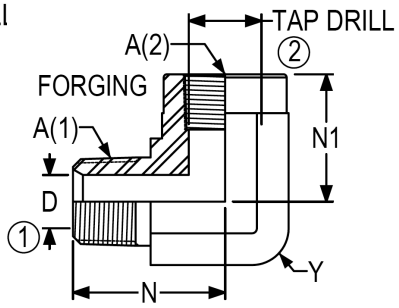
*Non forging parts are brazed construction

PART NO	A (1) NPTF	A (2) NPTF	N	N1	W	Y	D	TAP DRILL
5502-2-2	1/8-27	1/8-27	0.84	0.66	0.63	--	0.19	0.33
5502-2-2-FG	1/8-27	1/8-27	0.89	0.66	--	0.56	0.19	0.33
5502-2-4	1/8-27	1/4-18	0.91	0.88	0.75	--	0.19	0.43
5502-2-6	1/8-27	3/8-18	0.97	1.02	0.88	--	0.19	0.57
5502-4-2	1/4-18	1/8-27	1.09	0.66	0.63	--	0.28	0.33
5502-4-2-FG	1/4-18	1/8-27	1.09	0.67	--	0.75	0.28	0.33
5502-4-4	1/4-18	1/4-18	1.09	0.88	0.75	--	0.28	0.43
5502-4-4-FG	1/4-18	1/4-18	1.09	0.88	--	0.75	0.28	0.43
5502-4-6	1/4-18	3/8-18	1.16	1.02	0.88	--	0.28	0.57
5502-4-6-FG	1/4-18	3/8-18	1.22	1.02	--	0.88	0.28	0.57
5502-4-8	1/4-18	1/2-14	1.23	1.28	1.13	--	0.28	0.70
5502-6-2	3/8-18	1/8-27	1.22	0.75	0.81	--	0.41	0.33
5502-6-2-FG	3/8-18	1/8-27	1.22	0.80	--	0.88	0.41.	0.33
5502-6-4	3/8-18	1/4-18	1.22	0.91	0.81	--	0.41	0.43
5502-6-4-FG	3/8-18	1/4-18	1.22	1.01	--	0.88	0.41	0.43
5502-6-6	3/8-18	3/8-18	1.22	1.02	0.88	--	0.41	0.57
5502-6-6-FG	3/8-18	3/8-18	1.38	1.02	--	0.88	0.41	0.57
5502-6-8	3/8-18	1/2-14	1.38	1.23	1.13	--	0.41	0.70
5502-6-12	3/8-18	3/4-14	1.50	1.36	1.38	--	0.41	0.91
5502-8-4	1/2-14	1/4-18	1.47	0.97	0.94	--	0.53	0.43
5502-8-4-FG	1/2-14	1/4-18	1.47	1.00	--	1.06	0.53	0.43
5502-8-6	1/2-14	3/8-18	1.47	1.05	0.94	--	0.53	0.57
5502-8-6-FG	1/2-14	3/8-18	1.47	1.01	--	1.06	0.53	0.57
5502-8-8	1/2-14	1/2-14	1.47	1.23	1.13	--	0.53	0.70
5502-8-8-FG	1/2-14	1/2-14	1.47	1.23	--	1.06	0.53	0.70
5502-8-12	1/2-14	3/4-14	1.59	1.36	1.38	--	0.53	0.91
5502-8-12-FG	1/2-14	3/4-14	1.59	1.36	--	1.31	0.53	0.91
5502-12-6	3/4-14	3/8-18	1.59	1.13	1.13	--	0.72	0.57
5502-12-8	3/4-14	1/2-14	1.59	1.23	1.13	--	0.72	0.70

5502 90 DEGREE STREET ELBOW (Con't)

SAE J514 140239



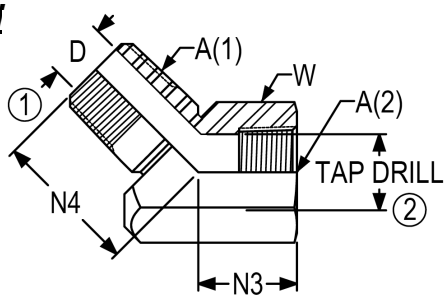


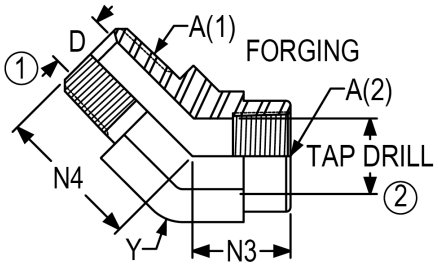
*Non forging parts are brazed construction

PART NO	A (1) NPTF	A (2) NPTF	N	N1	W	Y	D	TAP DRILL
5502-12-12	3/4-14	3/4-14	1.59	1.36	1.38	--	0.72	0.91
5502-12-12-FG	3/4-14	3/4-14	1.83	1.36	--	1.31	0.72	0.91
5502-12-16	3/4-14	1-11 1/2	1.72	1.62	1.63	--	0.72	1.14
5502-16-8	1-11 1/2	1/2-14	1.97	1.36	1.38	--	0.94	0.70
5502-16-12	1-11 1/2	3/4-14	1.84	1.36	1.38	--	0.94	0.91
5502-16-12-FG	1-11 1/2	3/4-14	1.97	1.39	--	1.63	0.94	0.91
5502-16-16	1-11 1/2	1-11 1/2	1.97	1.62	1.63	--	0.94	1.14
5502-16-16-FG	1-11 1/2	1-11 1/2	1.97	1.62	--	1.63	0.94	1.14
5502-16-20	1-11 1/2	1 1/4-11 1/2	2.16	1.70	2.00	--	0.94	1.48
5502-20-16	1 1/4-11 1/2	1-11 1/2	2.38	1.69	1.75	--	1.25	1.14
5502-20-20	1 1/4-11 1/2	1 1/4-11 1/2	2.38	1.70	2.00	--	1.25	1.48
5502-20-20-FG	1 1/4-11 1/2	1 1/4-11 1/2	2.75	1.70	--	1.88	1.25	1.48
5502-20-24	1 1/4-11 1/2	1 1/2-11 1/2	2.56	2.08	2.38	--	1.25	1.72
5502-24-24-FG	1 1/2-11 1/2	1 1/2-11 1/2	3.05	2.08	2.56		1.50	1.72
5502-24-24	1 1/2-11 1/2	1 1/2-11 1/2	2.64	2.08	2.38	--	1.50	1.72
5502-24-32	1 1/2-11 1/2	2-11 1/2	2.97	2.39	2.81	--	1.50	2.19
5502-24-32-FG	1 1/2-11 1/2	2-11 1/2	2.97	2.39	--	2.81	1.50	2.19
5502-32-32	2-11 1/2	2-11 1/2	3.00	2.39	2.88	--	1.94	2.19
5502-32-32-FG	2-11 1/2	2-11 1/2	3.00	2.39	--	2.81	1.94	2.20

5503 45 DEGREE STREET ELBOW

SAE J514 140339



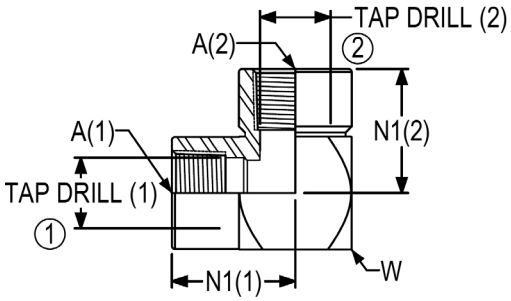


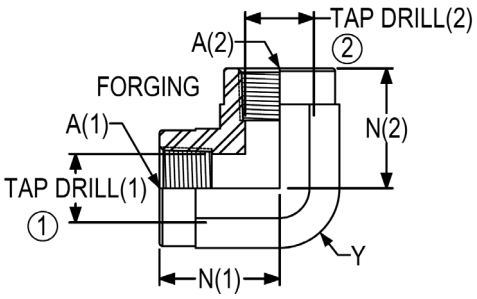
*Non forging parts are brazed construction

PART NO	A (1) NPTF	A (2) NPTF	N4	N3	W	Y	D	TAP DRILL
5503-2-2	1/8-27	1/8-27	0.72	0.47	0.63	--	0.19	0.33
5503-2-2-FG	1/8-27	1/8-27	0.72	0.47	--	0.56	0.83	0.33
5503-2-4	1/8-27	1/4-18	0.86	0.62	0.75	--	0.19	0.43
5503-4-4	1/4-18	1/4-18	1.05	0.62	0.75	--	0.28	0.43
5503-4-4-FG	1/4-18	1/4-18	1.05	0.62	--	0.75	1.19	0.43
5503-6-6	3/8-18	3/8-18	1.10	0.72	0.88	--	0.41	0.57
5503-6-6-FG	3/8-18	3/8-18	1.06	0.72	--	0.88	0.41	0.57
5503-8-6	1/2-14	3/8-18	1.34	0.91	1.13	--	0.53	0.57
5503-8-8	1/2-14	1/2-14	1.34	0.91	1.13	--	0.53	0.70
5503-8-8-FG	1/2-14	1/2-14	1.34	0.91	--	1.06	1.54	0.70
5503-12-12	3/4-14	3/4-14	1.38	0.97	1.38	--	0.72	0.91
5503-12-12-FG	3/4-14	3/4-14	1.38	0.97	--	1.31	1.64	0.91
5503-16-16	1-11 1/2	1-11 1/2	1.72	1.12	1.63	--	0.94	1.14
5503-16-20	1-11 1/2	1 1/4-11 1/2	1.77	1.63	2.00	--	0.94	1.48
5503-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1.80	1.63	2.00	--	1.25	1.48
5503-24-24	1 1/2-11 1/2	1 1/2-11 1/2	2.06	1.69	2.38	--	1.50	1.72
5503-32-32	2-11 1/2	2-11 1/2	2.15	2.19	2.88	--	1.94	2.19

5504 90 DEGREE FEMALE PIPE ELBOW

SAE J514 140238



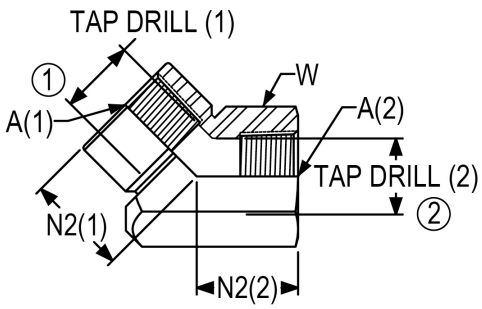


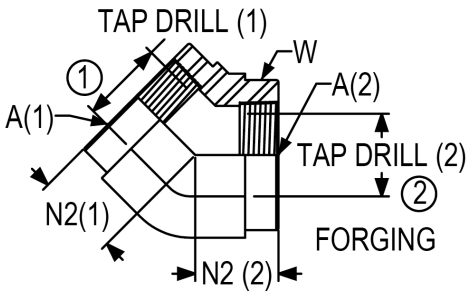
*Non forging parts are brazed construction

PART NO	A (1) NPTF	A (2) NPTF	N1 (1)	N1 (2)	W	Y	TAP DRILL (1)	TAP DRILL (2)
5504-2-2	1/8-27	1/8-27	0.66	0.66	0.63	--	0.33	0.33
5504-2-2-FG	1/8-27	1/8-27	0.66	0.66	--	0.56	0.33	0.33
5504-4-2	1/4-18	1/8-27	0.88	0.72	0.75	--	0.43	0.33
5504-4-4	1/4-18	1/4-18	0.88	0.88	0.75	--	0.43	0.43
5504-4-4-FG	1/4-18	1/4-18	0.88	0.88	--	0.75	0.43	0.43
5504-6-2	3/8-18	1/8-27	1.02	0.78	0.88	--	0.57	0.33
5504-6-4	3/8-18	1/4-18	1.02	0.94	0.88	--	0.57	0.43
5504-6-6	3/8-18	3/8-18	1.02	1.02	0.88	--	0.57	0.57
5504-6-6-FG	3/8-18	3/8-18	1.02	1.02	--	0.88	0.57	0.57
5504-8-4	1/2-14	1/4-18	1.23	1.06	1.13	--	0.70	0.43
5504-8-6	1/2-14	3/8-18	1.23	1.14	1.13	--	0.70	0.57
5504-8-8	1/2-14	1/2-14	1.23	1.23	1.13	--	0.70	0.70
5504-8-8-FG	1/2-14	1/2-14	1.23	1.23	--	1.06	0.70	0.70
5504-12-8	3/4-14	1/2-14	1.36	1.36	1.38	--	0.91	0.70
5504-12-12	3/4-14	3/4-14	1.36	1.36	1.38	--	0.91	0.91
5504-16-12	1-11 1/2	3/4-14	1.62	1.48	1.63	--	1.14	0.91
5504-16-16	1-11 1/2	1-11 1/2	1.62	1.62	1.63	--	1.14	1.14
5504-16-16-FG	1-11 1/2	1-11 1/2	1.62	1.62	--	1.63	1.14	1.14
5504-20-16	1 1/4-11 1/2	1-11 1/2	1.70	1.80	2.00	--	1.14	1.48
5504-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1.70	1.70	2.00	--	1.48	1.48
5504-24-24	1 1/2-11 1/2	1 1/2-11 1/2	2.08	2.08	2.38	--	1.72	1.72
5504-32-32	2-11 1/2	2-11 1/2	2.39	2.39	2.88	--	2.19	2.19

5505 45 DEGREE FEMALE PIPE ELBOW

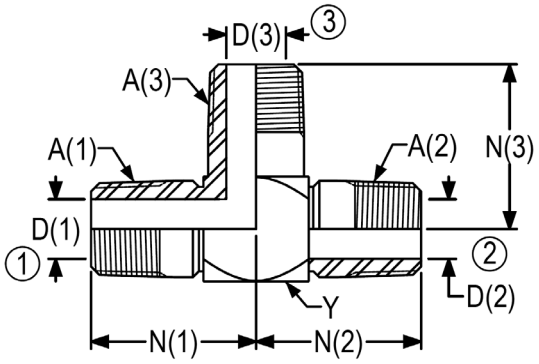
SAE J514 140338

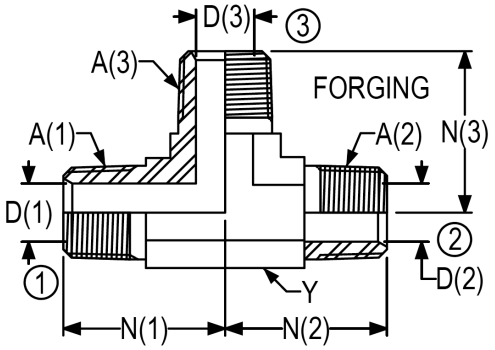




PART NO	A (1) NPTF	A (2) NPTF	N2 (1)	N2 (2)	W	TAP DRILL (1)	TAP DRILL (2)
5505-2-2	1/8-27	1/8-27	0.50	0.50	0.63	0.33	0.33
5505-4-4	1/4-18	1/4-18	0.69	0.69	0.75	0.43	0.43
5505-6-6	3/8-18	3/8-18	0.75	0.75	0.88	0.57	0.57
5505-8-8	1/2-14	1/2-14	0.94	0.94	1.13	0.70	0.70
5505-12-12	3/4-14	3/4-14	1.06	1.00	1.38	0.91	0.91
5505-16-16	1-11 1/2	1-11 1/2	1.19	1.19	1.63	1.14	1.14
5505-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1.13	1.13	2.00	1.48	1.48
5505-24-24-FG	1 1/2-11 1/2	1 1/2-11 1/2	1.46	1.46	2.50	1.70	1.70

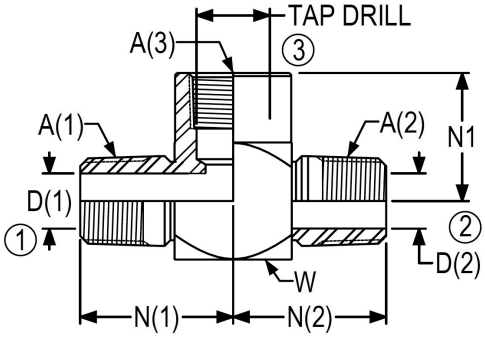
5600 MALE PIPE TEE

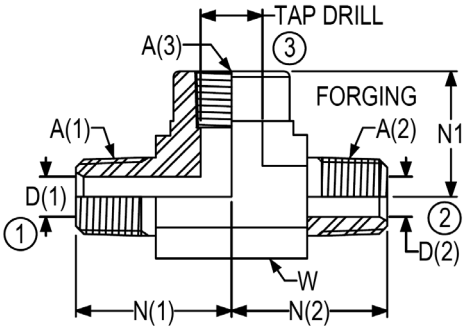




PART NO	A (1) NPTF	A (2) NPTF	A (3) NPTF	N (1)	N (2)	N (3)	Y	D (1)	D (2)	D (3)
5600-2-2-2	1/8-27	1/8-27	1/8-27	0.78	0.78	0.78	0.50	0.19	0.19	0.19
5600-2-2-2-FG	1/8-27	1/8-27	1/8-27	0.78	0.78	0.78	0.44	0.19	0.19	0.19
5600-4-4-4	1/4-18	1/4-18	1/4-18	1.09	1.09	1.09	0.63	0.28	0.28	0.28
5600-4-4-4-FG	1/4-18	1/4-18	1/4-18	1.09	1.09	1.09	0.56	0.28	0.28	0.28
5600-6-6-6	3/8-18	3/8-18	3/8-18	1.22	1.22	1.22	0.81	0.41	0.41	0.41
5600-6-6-6-FG	3/8-18	3/8-18	3/8-18	1.22	1.22	1.22	0.75	0.41	0.41	0.41
5600-8-8-8	1/2-14	1/2-14	1/2-14	1.47	1.47	1.47	0.94	0.53	0.53	0.53
5600-8-8-8-FG	1/2-14	1/2-14	1/2-14	1.47	1.47	1.47	0.88	0.53	0.53	0.53
5600-12-12-12	3/4-14	3/4-14	3/4-14	1.59	1.59	1.59	1.13	0.72	0.72	0.72
5600-12-12-12-FG	3/4-14	3/4-14	3/4-14	1.59	1.59	1.59	1.06	0.72	0.72	0.72
5600-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	1.97	1.97	1.97	1.38	0.94	0.94	0.94
5600-16-16-16-FG	1-11 1/2	1-11 1/2	1-11 1/2	1.97	1.97	1.97	1.31	0.94	0.94	0.94
5600-20-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	2.38	2.38	2.38	1.75	1.25	1.25	1.25
5600-24-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1 1/2-11 1/2	2.64	2.64	2.64	2.00	1.50	1.50	1.50

5601 FEMALE BRANCH PIPE TEE

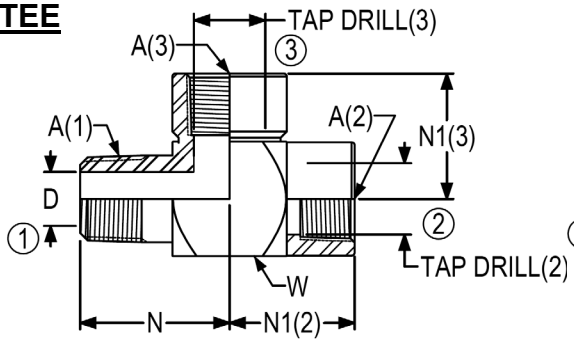


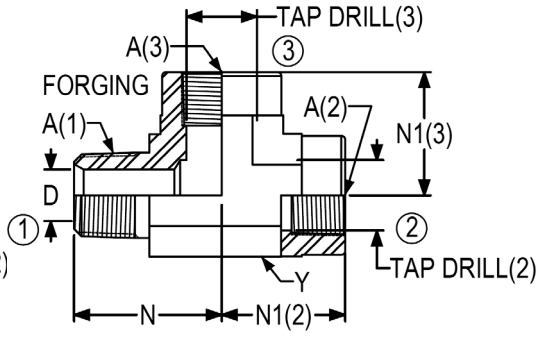


PART NO	A (1) NPTF	A (2) NPTF	A (3) NPTF	N (1)	N (2)	N1	W	D (1)	D (2)	TAP DRILL
5601-2-2-2	1/8-27	1/8-27	1/8-27	0.84	0.84	0.66	0.63	0.19	0.19	0.33
5601-4-4-4	1/4-18	1/4-18	1/4-18	1.09	1.09	0.88	0.75	0.28	0.28	0.43
5604-4-4-4-FG	1/4-18	1/4-18	1/4-18	1.09	1.09	0.88	0.75	0.28	0.28	0.43
5601-6-6-6	3/8-18	3/8-18	3/8-18	1.22	1.22	1.02	0.88	0.41	0.41	0.57
5601-8-8-8	1/2-14	1/2-14	1/2-14	1.47	1.47	1.23	1.13	0.53	0.53	0.70
5601-12-12-12	3/4-14	3/4-14	3/4-14	1.59	1.59	1.36	1.38	0.72	0.72	0.91
5601-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	1.97	1.97	1.62	1.63	0.94	0.94	1.14
5601-20-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	2.38	2.38	1.70	2.00	1.25	1.25	1.48

5602 MALE RUN PIPE TEE

SAE J514 140424



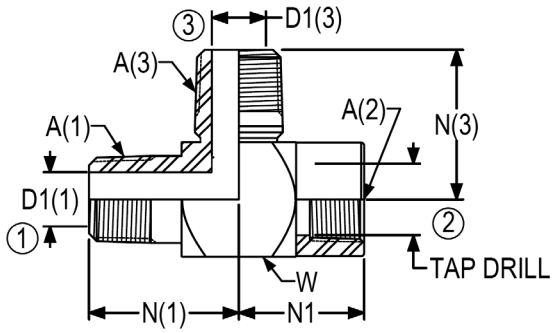


*Non forging parts are brazed construction

PART NO	A (1) NPTF	A (2) NPTF	A (3) NPTF	N	N1 (2)	N1 (3)	W	Y
5602-2-2-2	1/8-27	1/8-27	1/8-27	0.78	0.66	0.66	0.63	--
5602-2-2-4	1/8-27	1/8-27	1/4-18	0.90	0.72	0.88	0.75	--
5602-2-4-4	1/8-27	1/4-18	1/4-18	0.91	0.88	0.88	0.75	--
5602-4-4-2	1/4-18	1/4-18	1/8-27	1.09	0.88	0.72	0.75	--
5602-4-4-4	1/4-18	1/4-18	1/4-18	1.09	0.88	0.88	0.75	--
5602-4-4-4-FG	1/4-18	1/4-18	1/4-18	1.09	0.88	0.88	--	0.75
5602-6-4-6	3/8-18	1/4-18	3/8-18	1.22	0.94	1.02	0.88	--
5602-6-6-6	3/8-18	3/8-18	3/8-18	1.22	1.02	1.02	0.88	--
5602-8-8-8	1/2-14	1/2-14	1/2-14	1.47	1.23	1.23	1.13	--
5602-8-8-8-FG	1/2-14	1/2-14	1/2-14	1.47	1.23	1.23	--	1.06
5602-12-12-12	3/4-14	3/4-14	3/4-14	1.59	1.36	1.36	1.38	--
5602-12-12-12-FG	3/4-14	3/4-14	3/4-14	1.59	1.36	1.36	--	1.31
5602-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	1.97	1.62	1.62	1.63	--
5602-20-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	2.38	1.70	1.70	2.00	--
5602-24-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1 1/2-11 1/2	2.64	2.08	2.08	2.38	--
5602-32-32-32	2-11 1/2	2-11 1/2	2-11 1/2	3.00	2.39	2.39	2.88	--

PART NO	D	TAP DRILL (2)	TAP DRILL (3)
5602-2-2-2	0.19	0.33	0.33
5602-2-2-4	0.19	0.33	0.43
5602-2-4-4	0.19	0.43	0.43
5602-4-4-2	0.28	0.43	0.33
5602-4-4-4	0.28	0.43	0.43
5602-4-4-4-FG	0.28	0.43	0.43
5602-6-4-6	0.41	0.43	0.57
5602-6-6-6	0.41	0.57	0.57
5602-8-8-8	0.53	0.70	0.70
5602-8-8-8-FG	0.53	0.70	0.70
5602-12-12-12	0.72	0.91	0.91
5602-12-12-12-FG	0.72	0.91	0.91
5602-16-16-16	0.94	1.14	1.14
5602-20-20-20	1.25	1.48	1.48
5602-24-24-24	1.50	1.72	1.72
5602-32-32-32	1.94	2.19	2.19

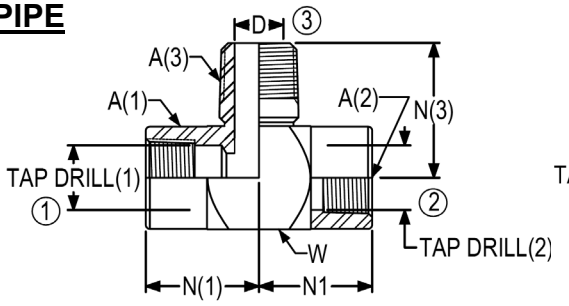
5603 FEMALE RUN PIPE TEE

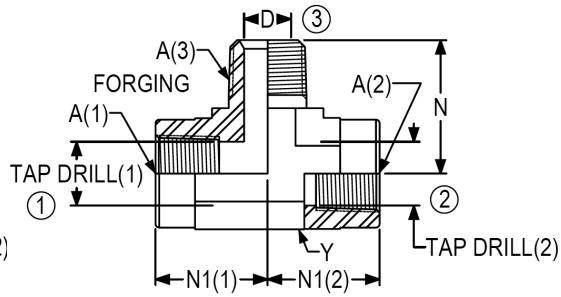


PART NO	A (1) NPTF	A (2) NPTF	A (3) NPTF	N (1)	N1	N (3)	W	D1 (1)	TAP DRILL	D1 (3)
5603-2-2-2	1/8-27	1/8-27	1/8-27	0.78	0.66	0.84	0.63	0.19	0.33	0.19
5603-4-4-4	1/4-18	1/4-18	1/4-18	1.09	0.88	1.09	0.75	0.28	0.43	0.28
5603-6-6-6	3/8-18	3/8-18	3/8-18	1.22	1.02	1.22	0.88	0.41	0.57	0.41
5603-8-8-8	1/2-14	1/2-14	1/2-14	1.47	1.23	1.47	1.13	0.53	0.70	0.53
5603-12-12-12	3/4-14	3/4-14	3/4-14	1.59	1.36	1.59	1.38	0.72	0.91	0.72
5603-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	1.97	1.62	1.97	1.63	0.94	1.14	0.94
5603-20-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	2.38	1.70	2.38	2.00	1.25	1.48	1.25
5603-24-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1 1/2-11 1/2	2.64	2.08	2.64	2.38	1.50	1.72	1.50

5604 MALE BRANCH PIPE TEE

SAE J514 140425





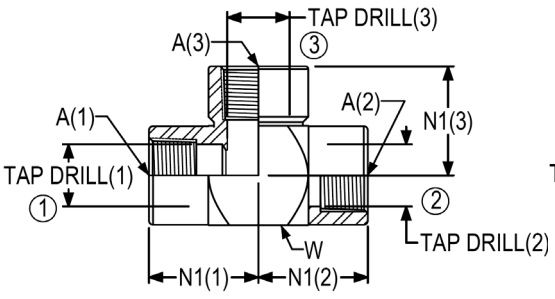
*Non forging parts are brazed construction

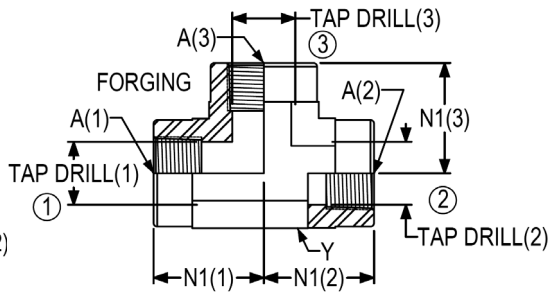
PART NO	A (1) NPTF	A (2) NPTF	A (3) NPTF	N1 (1)	N1 (2)	N	W	Y
5604-2-2-2	1/8-27	1/8-27	1/8-27	0.66	0.66	0.84	0.63	--
5604-4-4-4	1/4-18	1/4-18	1/4-18	0.88	0.88	1.09	0.75	--
5604-4-4-4-FG	1/4-18	1/4-18	1/4-18	0.88	0.88	1.09	--	0.75
5604-6-6-6	3/8-18	3/8-18	3/8-18	1.02	1.02	1.22	0.88	--
5604-6-6-6-FG	3/8-18	3/8-18	3/8-18	1.02	1.02	1.22	0.81	
5604-8-8-8	1/2-14	1/2-14	1/2-14	1.23	1.23	1.47	1.13	--
5604-8-8-8-FG	1/2-14	1/2-14	1/2-14	1.23	1.23	1.47	--	1.06
5604-12-12-8	3/4-14	3/4-14	1/2-14	1.36	1.36	1.59	1.38	--
5604-12-12-12	3/4-14	3/4-14	3/4-14	1.36	1.36	1.59	1.38	--
5604-12-12-12-FG	3/4-14	3/4-14	3/4-14	1.36	1.36	1.59	--	1.31
5604-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	1.62	1.62	1.97	1.63	--
5604-20-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	1.70	1.70	2.38	2.00	--
5604-24-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1 1/2-11 1/2	2.08	2.08	2.64	2.38	--
5604-24-24-24-FG	1 1/2-11 1/2	1 1/2-11 1/2	1 1/2-11 1/2	2.08	2.08	2.64	--	2.56

PART NO	TAP DRILL (1)	TAP DRILL (2)	D
5604-2-2-2	0.33	0.33	0.19
5604-4-4-4	0.43	0.43	0.28
5604-4-4-4-FG	0.43	0.43	0.28
5604-6-6-6	0.57	0.57	0.41
5604-6-6-6-FG	0.57	0.57	0.41
5604-8-8-8	0.70	0.70	0.53
5604-8-8-8-FG	0.70	0.70	0.53
5604-12-12-8	0.91	0.91	0.53
5604-12-12-12	0.91	0.91	0.72
5604-12-12-12-FG	0.91	0.91	0.72
5604-16-16-16	1.14	1.14	0.94
5604-20-20-20	1.48	1.48	1.25
5604-24-24-24	1.72	1.72	1.50
5604-24-24-24-FG	1.72	1.72	1.68

5605 FEMALE PIPE TEE

SAE J514 140438





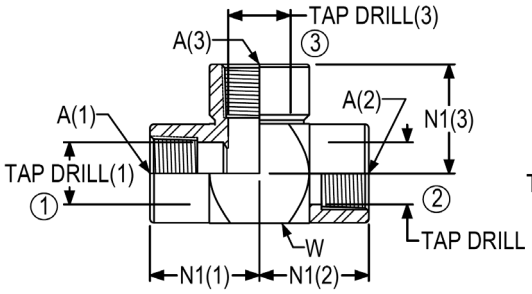
*Non forging parts are brazed construction

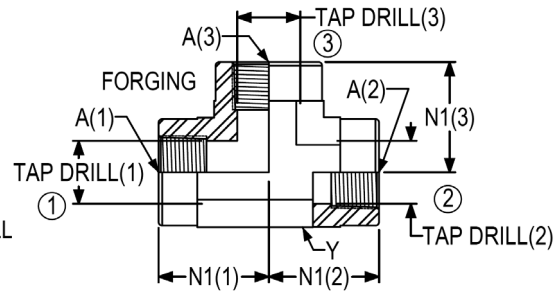
PART NO	A (1) NPTF	A (2) NPTF	A (3) NPTF	N1 (1)	N1 (2)	N1 (3)	W	Y
5605-2-2-2	1/8-27	1/8-27	1/8-27	0.66	0.66	0.66	0.63	--
5605-4-4-2	1/4-18	1/4-18	1/8-27	0.88	0.88	0.72	0.75	--
5605-4-4-4	1/4-18	1/4-18	1/4-18	0.88	0.88	0.88	0.75	--
5605-4-4-4-FG	1/4-18	1/4-18	1/4-18	0.88	0.88	0.88	--	0.75
5605-4-4-6	1/4-18	1/4-18	3/8-18	0.94	0.94	1.02	0.88	--
5605-6-6-6	3/8-18	3/8-18	3/8-18	1.02	1.02	1.02	0.88	--
5605-6-6-6-FG	3/8-18	3/8-18	3/8-18	1.02	1.02	1.02	--	0.75
5605-6-6-8	3/8-18	3/8-18	1/2-14	1.14	1.14	1.23	1.13	--
5605-8-6-6	1/2-14	3/8-18	3/8-18	1.23	1.14	1.14	1.13	--
5605-8-6-8	1/2-14	3/8-18	1/2-14	1.23	1.14	1.23	1.13	--
5605-8-8-6	1/2-14	1/2-14	3/8-18	1.23	1.23	1.14	1.13	--

PART NO	TAP DRILL (1)	TAP DRILL (2)	TAP DRILL (3)
5605-2-2-2	0.33	0.33	0.33
5605-4-4-2	0.43	0.43	0.33
5605-4-4-4	0.43	0.43	0.43
5605-4-4-4-FG	0.43	0.43	0.43
5605-4-4-6	0.43	0.43	0.57
5605-6-6-6	0.57	0.57	0.57
5605-6-6-6-FG	0.57	0.57	0.57
5605-6-6-8	0.57	0.57	0.70
5605-8-6-6	0.70	0.57	0.57
5605-8-6-8	0.70	0.57	0.70
5605-8-8-6	0.70	0.70	0.57

5605 FEMALE PIPE TEE(Con't)

SAE J514 140438





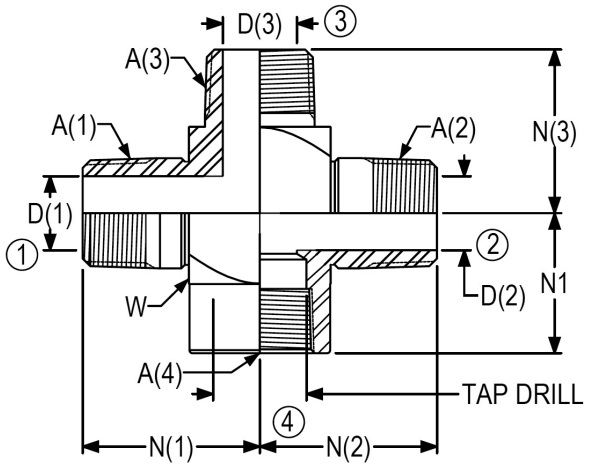
*Non forging parts are brazed construction

PART NO	A (1) NPTF	A (2) NPTF	A (3) NPTF	N1 (1)	N1 (2)	N1 (3)	W	Y
5605-8-8-8	1/2-14	1/2-14	1/2-14	1.23	1.23	1.23	1.13	--
5605-8-8-8-FG	1/4-14	1/2-14	1/2-14	1.23	1.23	1.23	--	1.06
5605-12-12-12	3/4-14	3/4-14	3/4-14	1.36	1.36	1.36	1.38	--
5605-12-12-12-FG	3/4-14	3/4-14	3/4-14	1.36	1.36	1.36	--	1.31
5605-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	1.62	1.62	1.62	1.63	--
5605-20-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	1.70	1.70	1.70	2.00	--
5605-24-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1 1/2-11 1/2	2.08	2.08	2.08	2.38	
5605-24-24-24-FG	1 1/2-11 1/2	1 1/2-11 1/2	1 1/2-11 1/2	2.08	2.08	2.08	--	2.56
5605-32-32-32	2-11 1/2	2-11 1/2	2-11 1/2	2.39	2.39	2.39	2.88	--

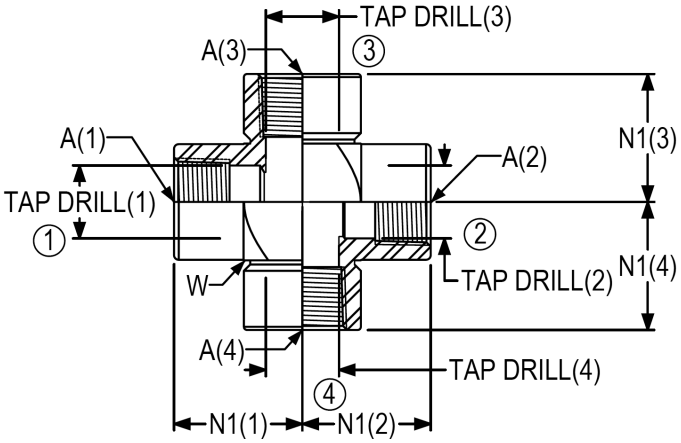
PART NO	TAP DRILL (1)	TAP DRILL (2)	TAP DRILL (3)
5605-8-8-8	0.70	0.70	0.70
5605-8-8-8-FG	0.70	0.70	0.70
5605-12-12-12	0.91	0.91	0.91
5605-12-12-12-FG	0.91	0.91	0.91
5605-16-16-16	1.14	1.14	1.14
5605-20-20-20	1.48	1.48	1.48
5605-24-24-24	1.72	1.72	1.72
5605-24-24-24-FG	1.72	1.72	1.72
5605-32-32-32	2.19	2.19	2.19

5651 FEMALE BRANCH PIPE CROSS

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



5652 FEMALE PIPE CROSS

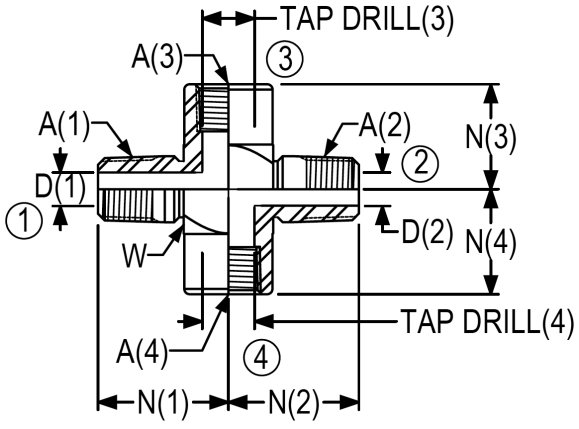


PART NO	A (1) NPTF	A (2) NPTF	A (3) NPTF	A (4) NPTF	N1 (1)	N1 (2)	N1 (3)	N1 (4)	W
5652-2-2-2-2	1/8-27	1/8-27	1/8-27	1/8-27	0.66	0.66	0.66	0.66	0.63
5652-4-4-4-4	1/4-18	1/4-18	1/4-18	1/4-18	0.88	0.88	0.88	0.88	0.75
5652-6-6-6-6	3/8-18	3/8-18	3/8-18	3/8-18	1.02	1.02	1.02	1.02	0.88
5652-8-8-8-8	1/2-14	1/2-14	1/2-14	1/2-14	1.23	1.23	1.23	1.23	1.13
5652-12-12-12-12	3/4-14	3/4-14	3/4-14	3/4-14	1.36	1.36	1.36	1.36	1.38
5652-16-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	1-11 1/2	1.62	1.62	1.62	1.62	1.63
5652-20-20-20-20	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	1 1/4-11 1/2	1.70	1.70	1.70	1.70	2.00
5652-24-24-24-24	1 1/2-11 1/2	1 1/2-11 1/2	1 1/2-11 1/2	1 1/2-11 1/2	2.08	2.08	2.08	2.08	2.38
5652-32-32-32-32	2-11 1/2	2-11 1/2	2-11 1/2	2-11 1/2	2.39	2.39	2.39	2.39	2.88

PART NO	TAP DRILL (1)	TAP DRILL (2)	TAP DRILL (3)	TAP DRILL (4)
5652-2-2-2-2	0.33	0.33	0.33	0.33
5652-4-4-4-4	0.43	0.43	0.43	0.43
5652-6-6-6-6	0.57	0.57	0.57	0.57
5652-8-8-8-8	0.70	0.70	0.70	0.70
5652-12-12-12-12	0.91	0.91	0.91	0.91
5652-16-16-16-16	1.14	1.14	1.14	1.14
5652-20-20-20-20	1.48	1.48	1.48	1.48
5652-24-24-24-24	1.72	1.72	1.72	1.72
5652-32-32-32-32	2.19	2.19	2.19	2.19

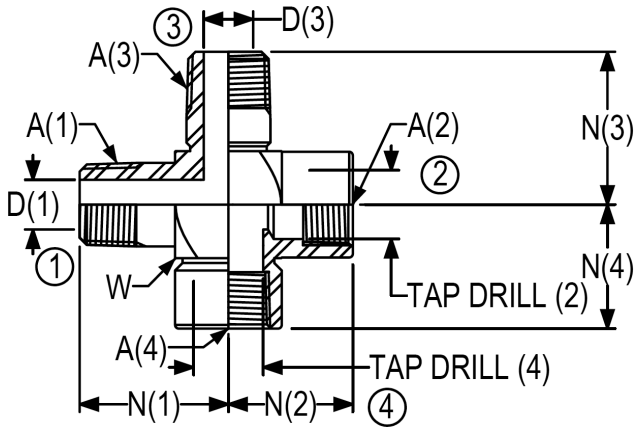
5653 FEMALE BRANCH/ BRANCH PIPE CROSS

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.

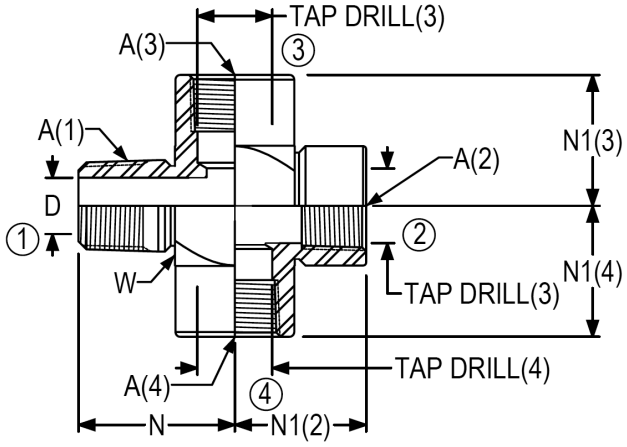


5654 FEMALE RUN/BRANCH PIPE CROSS

INFORMATION AVAILABLE UPON REQUEST.
CALL CUSTOMER SERVICE FOR DETAILS.



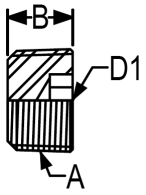
5655 MALE RUN PIPE CROSS



PART NO	A (1) NPTF	A (2) NPTF	A (3) NPTF	A (4) NPTF	N	N1 (2)	N1 (3)	N1 (4)	W	D
5655-4-4-4-4	1/4-18	1/4-18	1/4-18	1/4-18	1.09	0.88	0.88	0.88	0.75	0.28
5655-6-6-6-6	3/8-18	3/8-18	3/8-18	3/8-18	1.22	1.02	1.02	1.02	0.88	0.41
5655-8-8-8-8	1/2-14	1/2-14	1/2-14	1/2-14	1.47	1.23	1.23	1.23	1.13	0.53
5655-16-16-16-16	1-11 1/2	1-11 1/2	1-11 1/2	1-11 1/2	1.97	1.62	1.62	1.62	1.63	0.94

PART NO	TAP DRILL (2)	TAP DRILL (3)	TAP DRILL (4)
5655-4-4-4-4	0.43	0.43	0.43
5655-6-6-6-6	0.57	0.57	0.57
5655-8-8-8-8	0.70	0.70	0.70
5655-16-16-16-16	1.14	1.14	1.14

Long Allen Plugs



PART NO	A NPTF	B	D1
1/16 LONG ALLEN PLUG	1/16-27	0.30	0.16
1/8 LONG ALLEN PLUG	1/8-27	0.30	0.19
1/4 LONG ALLEN PLUG	1/4-18	0.46	0.25
3/8 LONG ALLEN PLUG	3/8-18	0.46	0.31
1/2 LONG ALLEN PLUG	1/2-14	0.61	0.38
3/4 LONG ALLEN PLUG	3/4-14	0.62	0.56
1" LONG ALLEN PLUG	1-11 1/2	0.77	0.63
1 1/4 LONG ALLEN PLUG	1 1/4-11 1/2	0.81	0.75
2" LONG ALLEN PLUG	2-11 1/2	0.89	1.00

Features, Four Bolt Flange Fittings

SAE J518, Code 61 and Code 62 Four-Bolt Split Flange connections are non-threaded port ends which utilize O-Rings for sealing. They are assembled to ports with split flange clamp halves and clamping pressure is provided by bolts or socket head cap screws of SAE Grade 5 material or better as specified in SAE J429. Rated design factor for these connections is dependent on the selected grade for the clamp bolts. Flanged head ends are incorporated into fittings having suitable means for attachment to tubes, pipes or hoses to provide connection ends.

Performance

Four bolt flange ends conform to SAE J518.

Construction

Unless otherwise specified, fittings are machined from carbon steel and may utilize brazed construction for shaped fittings. Standard plating is Zinc with a yellow Dichromate finish per ASTM B633 (Type II SC2) and is rated at 96 hours minimum salt spray resistance.

Threads

Unless otherwise specified, fittings are machined from cold drawn carbon steel barstock and forgings. Standard plating is electrodeposited zinc with a clear trivalent chromate conversion coating in accordance with ASTM B633 (Type V SC2). The minimum salt spray resistance is 240 hours to red corrosion when tested in accordance with ASTM B117.

NPTF Threads: Male and female pipe threads conform to the Dryseal American Standard Taper Pipe Thread (SAE J476a, NPTF) Series which will provide pressure tight joints without the use of a lubricant or sealer. Use of these fittings with non-dryseal NPT pipe or hose ends is not recommended for high-pressure applications.

Note: Where not functionally objectionable, use of a compatible lubricant/sealant is recommended for either NPT or NPTF threads to minimize the possibility of galling in assembly.

NPSM Swivels: Female threads for adapter union swivel nuts conform to the American Standard Straight Pipe Thread (NPSM) Series. These threads mate with either NPT or NPTF Series male threads to provide a mechanical connection between the adapter and mating male end. Sealing is provided by metal to metal contact between the machined 30 degree female seat on the NPT/NPTF male end and the nose of the swivel end. The NPSM swivel threads are not a sealing member.

Caution: For proper sealing, ensure that the mating male end has been machined with the proper 30 degree female seat.

Assembly Information

For assembly instructions, refer to the Technical Data Section for the appropriate fitting end. Also, refer to the Technical Data Section for recommendations regarding tubing pressure ratings, tube flares and hose/tube routing information. Please note the following:

Tubing for single flare tube ends should be either seamless or welded and drawn, fully annealed tubing per SAE J524 or J525. For double flaring, tubing per SAE J356, J524, J525 or J526 may be used.

For proper sealing with 37 degree flared fittings, flares for tubing should conform to the requirements of SAE J533. For heavy wall tubing, the optional tube preparation and single flare configuration specified in SAE J533 is also recommended. This optional configuration provides extended sealing surface contact area versus conventional flares.

In the design and fabrication of tubing or hose runs for any hydraulic system, precautions should be taken to allow for sufficient adjustment of the hose or tubing so that proper alignment can be attained at the fitting connections. Improper fit-up or misalignment should be corrected before final connections are made. Location of fitting connections should be planned to maximize accessibility. Whenever possible, use a torque wrench to tighten connections to the recommended torque.

Ordering Information

Size of fittings are indicated by dash number relating to sixteenths of an inch for the nominal O.D. of the tube size used. Example: 1/2 inch tube = 8/16 or (-8) size.

Order standard fittings from appropriate chart indicating required dash numbers. For example, 6405-8-6-O is 1/2" O-Ring stud end with 3/4-16 straight thread, and 3/8" female pipe thread. Jump size 6405-16-8-O is 1" O-Ring stud end with 1 5/16-12 straight thread and 1/2" female pipe thread. Pictorial views for each fitting style indicate the correct numbering sequence for fitting ends.

If information is needed for jump sizes not shown, please contact customer service for engineering assistance.

Table JF1. Pressure Ratings for 37 Deg. Flared Tube Ends, 37 Deg. Female Swivels, O-Ring Port Plugs and Straight Thread Stud Ends (Inch)										
Nominal Tube Size		Thread Size	Working Pressures							
Nom SAE Dash Size	Nom Inch Tube O.D.	SAE J514 Flared Tube End and SAE J1926/3/ ISO 11926-3 O-Ring Port Thread Size (Notes 1&2)	37 Deg. Flared Tube Ends, Unions and Bulkheads		37 Deg. Female Swivels		SAE J514 (Inch) Port Plugs and Stud Ends Per SAE J1926/3/ISO 11926-3			
							Port Plugs/Non-Adjustable Studs		Adjustable Studs	
			MPa	psi	Mpa	psi	MPa	psi	MPa	psi
-2	1/8	5/16-24 UNF	34.5	5,000	34.5	5,000	34.5	5,000	34.5	5,000
-3	3/16	3/8-24 UNF	34.5	5,000	34.5	5,000	34.5	5,000	34.5	5,000
-4	1/4	7/16-20 UNF	34.5	5,000	31	4,500	34.5	5,000	31.5	4,500
-5	5/16	1/2-20 UNF	34.5	5,000	27.5	4,000	34.5	5,000	27.5	4,000
-6	3/8	9/16-18 UNF	34.5	5,000	27.5	4,000	34.5	5,000	27.5	4,000
-8	1/2	3/4-16 UNF	31	4,500	27.5	4,000	31	4,500	27.5	4,000
-10	5/8	7/8-14 UNF	24	3,500	21	3,000	24	3,500	21	3,000
-12	3/4	1-1/16-12 UN	24	3,500	21	3,000	24	3,500	21	3,000
-14	7/8	1-3/16-12 UN	21	3,000	17	2,500	21	3,000	17	2,500
-16	1	1-5/16-12 UN	21	3,000	17	2,500	21	3,000	17	2,500
-20	1 1/4	1-5/8-12 UN	17	2,500	14	2,000	17	2,500	14	2,000
-24	1 1/2	1-7/8-12 UN	14	2,000	10.5	1,500	14	2,000	10.5	1,500
-32	2	2-1/2-12 UN	10.5	1,500	8	1,125	10.5	1,500	8	1,125

1) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)
2) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts

Table JF2. Pressure Ratings for Fittings With NPTF Pipe Threads and Adapter Unions							
Nominal Pipe Size		Thread Size		Working Pressures			
Nom SAE Dash Size	Nom Inch Pipe O.D.	Dryseal Pipe Thread (NPTF[1]) Male and Female	Straight Pipe Thread (NPSM[2]) Female Swivels	Fittings With NPTF Pipe Threads		Adapter Unions	
				MPa	psi	MPa	psi
-2	1/8	1/8-27	1/8-27	34.5	5,000	34.5	5,000
-4	1/4	1/4-18	1/4-18	27.5	4,000	34.5	5,000
-6	3/8	3/8-18	3/8-18	21	3,000	27.6	4,000
-8	1/2	1/2-14	1/2-14	21	3,000	24.1	3,500
-12	3/4	3/4-14	3/4-14	17	2,500	15.5	2,250
-16	1	1-11-1/2	1-11-1/2	14	2,000	13.8	2,000
-20	1 1/4	1-1/4-11-1/2	1-1/4-11-1/2	8	1,150	11.2	1,625
-24	1 1/2	1-1/2-11-1/2	1-1/2-11-1/2	7	1,000	8.6	1,250
-32	2	2-11-1/2	2-11-1/2	7	1,000	7.8	1,125

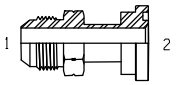
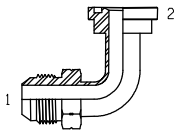
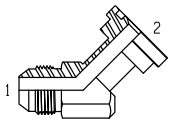
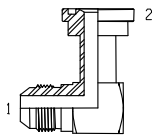
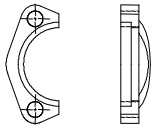
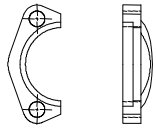
1) Dryseal American Standard Taper Pipe Thread
2) American Standard Straight Pipe Thread for Mechanical Joints

Table JF3. Pressure Ratings for Code 61 Four-Bolt Split Flange Ends								
Nominal Flange Size		Bolt Dimensions			Working Pressures @ Recommended Torque (Note: See Below)			
Nom SAE Dash Size	Nom Inch Pipe O.D.	Thread	Length		Maximum Recommended Working Pressure		Recommended Torque Range	
			mm	inch	MPa	psi	Nm	lb-in
-8	1/2	5/16-18	32	1-1/4	34.5	5,000	20-25	175-225
-12	3/4	3/8-16	32	1-1/4	34.5	5,000	28-40	250-350
-16	1	3/8-16	32	1-1/4	34.5	5,000	37-48	325-425
-20	1 1/4	7/16-14	38	1-1/2	27.6	4,000	48-62	425-550
-24	1 1/2	1/2-13	38	1-1/2	20.7	3,000	62-79	550-700
-32	2	1/2-13	38	1-1/2	20.7	3,000	73-90	650-800

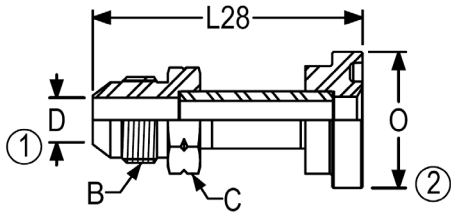
Table JF4. Pressure Ratings for Code 62 Four-Bolt Split Flange Ends								
Nominal Flange Size		Bolt Dimensions			Working Pressures @ Recommended Torque (Note: See Below)			
Nom SAE Dash Size	Nom Inch Pipe O.D.	Thread	Length		Maximum Recommended Working Pressure		Recommended Torque Range	
			mm	inch	MPa	psi	Nm	lb-in
-8	1/2	5/16-18	32	1-1/4	41.4	6,000	20-25	175-225
-12	3/4	3/8-16	38	1-1/2	41.4	6,000	34-45	300-400
-16	1	7/16-14	44	1-3/4	41.4	6,000	56-68	500-600
-20	1 1/4	1/2-13	44	1-3/4	41.4	6,000	85-102	750-900
-24	1 1/2	5/8-11	57	2-1/4	41.4	6,000	158-181	1400-1600
-32	2	3/4-10	70	2-3/4	41.4	6,000	271-294	2400-2600

Note: SAE J518, Code 61 and Code 62 Four-Bolt Split Flange connections are non-threaded port ends w hich utilize O-Rings for sealing. They are assembled to ports with split flange clamp halves and clamping pressure is provided by bolts or socket head cap screws of SAE Grade 5 material or better as specified in SAE J429. Rated design factor for these connections is dependent on the selected grade for the clamp bolts. Flanged head ends are incorporated into fittings having suitable means for attachment to tubes, pipes or hoses to provide connection ends.

Four Bolt Flange Adapters Index

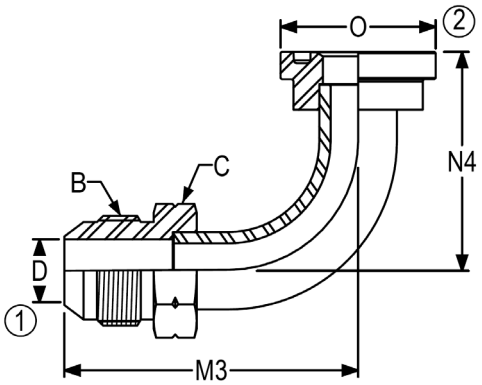
 **1700-**Str. (1)Male Tube (2)O-Ring Flange	 **1701-**90° (1)Male Tube (2)O-Ring Flange	 **1703-**45° (1)Male Tube (2)O-Ring Flange	 **1704-**90° (1)Male Tube (2)O-Ring Flange	 **31205-61-** Code 61 Split Flange Clamp	 **31205-62-** Code 62 Split Flange Clamp	

1700-61 CODE 61 FLANGE ADAPTER



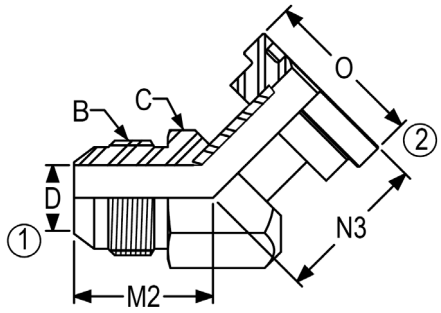
PART NO	TUBE OD	B UN/UNF-2A	L28	C	D	O
1700-61-8-8	1/2	3/4-16	2.36	0.81	0.39	1.19
1700-61-8-12	1/2	3/4-16	2.31	0.94	0.39	1.50
1700-61-12-12	3/4	1 1/16-12	2.63	1.13	0.61	1.50
1700-61-12-16	3/4	1 1/16-12	2.61	1.13	0.61	1.75
1700-61-12-20	3/4	1 1/16-12	2.63	1.38	0.61	2.00
1700-61-16-12	1	1 5/16-12	2.66	1.38	0.61	1.50
1700-61-16-16	1	1 5/16-12	2.66	1.38	0.84	1.75
1700-61-16-20	1	1 5/16-12	2.66	1.38	0.84	2.00
1700-61-16-24	1	1 5/16-12	3.33	1.38	0.84	2.38
1700-61-20-16	1 1/4	1 5/8-12	2.78	1.69	0.84	1.75
1700-61-20-20	1 1/4	1 5/8-12	2.71	1.69	1.08	2.00
1700-61-20-24	1 1/4	1 5/8-12	2.81	1.69	1.08	2.37
1700-61-24-20	1 1/2	1 7/8-12	2.99	2.00	1.08	2.00
1700-61-24-24	1 1/2	1 7/8-12	3.02	2.00	1.31	2.38
1700-61-24-32	1 1/2	1 7/8-12	3.03	2.00	1.31	2.81
1700-61-32-32	2	2 1/2-12	3.45	2.63	1.78	2.81

1701-61 90 DEGREE CODE 61 BENT TUBE FLANGE ADAPTER ELBOW



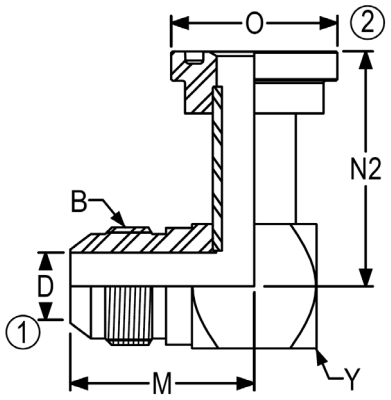
PART NO	TUBE OD	B UN/UNF-2A	N4	M3	C	D	O
1701-61-12-12	3/4	1 1/16-12	2.12	2.84	1.13	0.61	1.50
1701-61-16-16	1	1 5/16-12	2.38	3.14	1.38	0.84	1.75
1701-61-16-20	1	1 5/16-12	2.37	2.79	1.38	0.84	2.00
1701-61-20-16	1 1/4	1 7/8-12	2.38	3.26	1.69	1.08	1.75
1701-61-20-20	1 1/4	1 7/8-12	2.50	3.33	1.69	1.08	2.00
1701-61-24-20	1 1/2	1 7/8-12	2.50	3.52	2.00	1.31	2.00
1701-61-24-24	1 1/2	1 7/8-12	2.75	3.67	2.00	1.31	2.38

1703-61 45 DEGREE CODE 61 FLANGE ADAPTER ELBOW



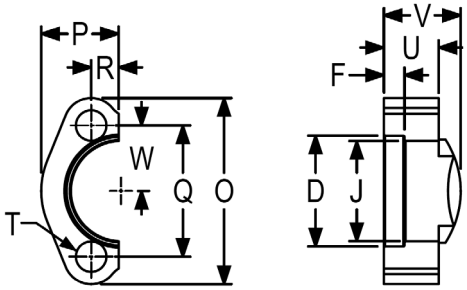
PART NO	TUBE OD	B UN/UNF-2A	N3	M2	C	O	D
1703-61-12-12	3/4	1 1/16-12	1.41	1.28	1.13	1.50	0.61
1703-61-16-16	1	1 5/16-12	1.50	1.47	1.38	1.75	0.84
1703-61-20-20	1 1/4	1 5/8-12	1.63	1.78	1.75	2.00	1.08
1703-61-24-24	1 1/2	1 7/8-12	1.98	1.78	2.00	2.38	1.31
1703-61-32-32	2	2 1/2-12	2.97	2.22	2.63	2.81	1.78

1704-61 90 DEGREE CODE 61 FLANGE ADAPTER ELBOW



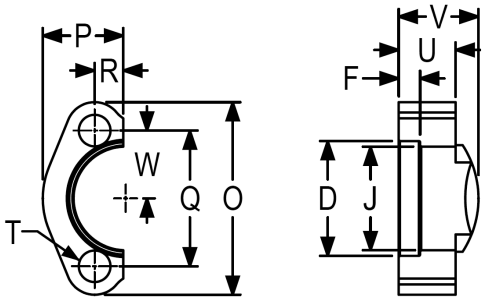
PART NO	TUBE OD	B UN/UNF-2A	N2	M	Y	O	D
1704-61-12-12	3/4	1 1/16-12	2.13	1.66	1.13	1.50	0.61
1704-61-16-16	1	1 5/16-12	2.38	1.81	1.38	1.75	0.84
1704-61-20-20	1 1/4	1 5/8-12	2.50	2.06	1.75	2.00	1.08
1704-61-24-24	1 1/2	1 7/8-12	2.75	2.33	2.00	2.38	1.31
1704-61-32-32	2	2 1/2-12	3.25	3.06	2.63	2.81	1.78

31205-61 CODE 61 SPLIT FLANGE CLAMP



PART NO	FLANGE SIZE	D	F	J	O	P	Q	R	T	U	V
31205-61-8	1/2	1.22	0.24	0.95	2.13	0.86	1.50	0.31	0.35	0.50	0.75
31205-61-12	3/4	1.53	0.24	1.26	2.56	0.98	1.88	0.40	0.42	0.56	0.89
31205-61-16	1	1.78	0.30	1.51	2.75	1.11	2.06	0.48	0.42	0.62	0.94
31205-61-20	1 1/4	2.03	0.30	1.72	3.13	1.39	2.31	0.56	0.47	0.56	0.89
31205-61-24	1 1/2	2.41	0.30	2.00	3.69	1.58	2.75	0.67	0.52	0.62	1.00
31205-61-32	2	2.84	0.35	2.47	4.00	1.86	3.06	0.81	0.52	0.62	1.00
31205-61-40	2 1/2	3.34	0.35	2.95	4.50	2.09	3.50	0.96	0.52	0.75	1.50
31205-61-48	3	4.03	0.35	3.58	5.32	2.53	4.19	1.18	0.66	0.88	1.61

31205-62 CODE 62 SPLIT FLANGE CLAMP



PART NO	FLANGE SIZE	D	F	J	O	P	Q	R	T	U	V
31205-62-8	1/2	1.28	0.28	0.97	2.22	0.89	1.59	0.32	0.35	0.62	0.89
31205-62-12	3/4	1.65	0.32	1.28	2.81	1.14	2.00	0.43	0.42	0.75	1.12
31205-62-16	1	1.91	0.35	1.53	3.19	1.33	2.25	0.51	0.47	0.94	1.32
31205-62-20	1 1/4	2.16	0.39	1.75	3.75	1.48	2.63	0.59	0.52	1.06	1.50
31205-62-24	1 1/2	2.53	0.48	2.03	4.44	1.83	3.13	0.68	0.66	1.19	1.69
31205-62-32	2	3.16	0.48	2.66	5.25	2.20	3.81	0.84	0.81	1.44	2.07

Features, JIC/ORFS Conversion Fittings

O-RIng face seal fittings are intended for general application in industrial and commercial hydraulic systems, where the use of elastomeric seals is acceptable to prevent leakage. These fittings are capable of operating at working pressures from 28 in. Hg (95-kPa) vacuum to 6,000 psi (41.3 MPa) as specified in the tables below. Fitting styles are available to provide connections between tubing, male or female NPTF pipe and SAE J1926/1/ISO-11926-1 O-RIng ports.

ORFS fittings supplied by Air-Way feature the SAE J1453 "Style B" O-RIng groove design for the tube connection end, which provides improved O-RIng retention.

ORFS fittings are typically joined to tubing by means of a braze on tube sleeve and tube nut. Tube preparation and brazing processes follow standard industry practices for high quality braze joints.

The design of the ORFS fitting tube end is identical for either inch or metric tubing. With the exception of stock size, the tube fittings described in this section are interchangeable with equivalent fitting styles (unions, bulkheads, tees, etc.) per ISO 8434-3.

37 degree flared tube fittings provide leakproof, full flow connections in hydraulic systems operating at working pressures as specified in the tables below. A large variety of fitting styles are available to allow connection of flared tube ends, machined male or female 37 degree ends or male or female NPTF pipe or hose ends. Also included in this section are low-pressure beaded hose stem fittings.

37 degree flared fittings are the most commonly used tube connection in worldwide use today. Tube preparation and flaring processes are easily accomplished with either hand or power tools. The large variety of fitting configurations and jump sizes available provide for simplified fabrication requirements and reduced parts count in complex systems.

The design of the 37 degree flared fitting tube end is identical for either inch or metric tubing. With the exception of stock size, the flared tube fittings described in this section are interchangeable with equivalent fitting styles (unions, bulkheads, tees, etc.) per ISO 8434-2.

All 37 degree fitting styles are also available with the optional **FLARE-O®** tube end design. Call for details.

Performance

Where applicable, fittings are designed and qualified to the requirements of SAE J1453 and J514.

Construction

Unless otherwise specified, fittings are machined from cold drawn carbon steel barstock and forgings. Standard plating is electrodeposited zinc with a clear trivalent chromate conversion coating in accordance with ASTM B633 (Type V SC2). The minimum salt spray resistance is 240 hours to red corrosion when tested in accordance with ASTM B117.

Threads

Straight Threads: Internal and external straight threads conform to the Unified National Class 2A and Class 2B Series respectively, with modified minor diameters where specified. Plated external threads may conform to Class 3A maximum diameters after plating.

NPTF Threads: Male and female pipe threads conform to the Dryseal American Standard Taper Pipe Thread (SAE J476a, NPTF) Series which will provide pressure tight joints without the use of a lubricant or sealer. Use of these fittings with non-dryseal NPT pipe or hose ends is not recommended for high-pressure applications.

Note: Where not functionally objectionable, use of a compatible lubricant/sealant is recommended for either NPT or NPTF threads to minimize the possibility of galling in assembly.

Assembly Information

For brazing and assembly instructions, refer to the Technical Data Section for the appropriate fitting end. Also, refer to the Technical Data Section for recommendations regarding tubing pressure ratings and hose/tube routing information.

Tubing for single flare tube ends should be either seamless or welded and drawn, fully annealed tubing per SAE J524 or J525. For double flaring, tubing per SAE J356, J524, J525 or J526 may be used.

For proper sealing with 37 degree flared fittings, flares for tubing should conform to the requirements of SAE J533. For heavy wall tubing, the optional tube preparation and single flare configuration specified in SAE J533 is also recommended. This optional configuration provides extended sealing surface contact area versus conventional flares.

Please note the following:
In the design and fabrication of tubing or hose runs for any hydraulic system, precautions should be taken to allow for sufficient adjustment of the hose or tubing so that proper alignment can be attained at the fitting connections. Improper fit-up or misalignment should be corrected before final connections are made. Location of fitting connections should be planned to maximize accessibility.

Whenever possible, use a torque wrench to tighten connections to the recommended installation torque.

Ordering Information

Size of fittings are indicated by dash number relating to sixteenths of an inch for the nominal O.D of the tube size used. Example: 1/2 inch tube = 8/16 or (-8) size.

Order standard fittings from appropriate chart indicating required dash numbers. For example, FF7403-8-8 is 1/2" ORFS tube end with 13/16-16 straight thread and 1/2" 37deg. male tube end with 3/4-16 straight thread. Jump size FF7403-8-6 is 1/2" ORFS tube end with 13/16-16 straight thread and 3/8" 37 deg male tube end with 9/16-18 straight thread. Pictorial views for each fitting style indicate the correct numbering sequence for fitting ends.

Bulkhead fittings may be ordered with or without lock nuts. To order fittings with lock nut, add (-LN) suffix to base catalog part number.

If information is needed for jump sizes not shown, please contact customer service for engineering assistance. Dimensions are rounded for brevity. Please contact factory for exact dimensions and tolerances.

Table JO1. Pressure Ratings for ORFS Male Tube Ends, Female Swivels and Straight Thread Stud Ends (Inch)

Nominal Tube Size		Thread Size (Notes 1&2)		Working Pressures					
Nom SAE Dash Size	Nom Inch Tube O.D.	SAE J1453 ORFS Tube End	SAE J1926/2/ ISO 11926-2 O-Ring Port Thread Size	ORFS Tube Ends, Unions and Bulkheads		Heavy Duty Stud Ends Per SAE J1926/2/ISO 11926-2			
						Non-Adjustable Studs		Adjustable Studs	
				Mpa	psi	MPa (3)	psi	MPa (3)	psi
-4	**1/4**	9/16-18 UNF	7/16-20 UNF	41.3	6,000	63	9,000	40	6,000
-5	**5/16**	5/8-18 UNF	1/2-20 UNF	41.3	6,000	63	9,000	40	6,000
-6	**3/8**	11/16-16 UNF	9/16-18 UNF	41.3	6,000	63	9,000	40	6,000
-8	**1/2**	13/16-16 UNF	3/4-16 UNF	41.3	6,000	63	9,000	40	6,000
-10	**5/8**	1-14 UNF	7/8-14 UNF	41.3	6,000	63	9,000	40	6,000
-12	**3/4**	1-3/16-12 UN	1-1/16-12 UN	41.3	6,000	40	6,000	40	6,000
-14	**7/8**	1-5/16-12 UN	1-3/16-12 UN	41.3	6,000	40	6,000	40	6,000
-16	**1**	1-7/16-12 UN	1-5/16-12 UN	41.3	6,000	40	6,000	31.5	5,000
-20	**1 1/4**	1-11/16-12 UN	1-5/8-12 UN	27.5	4,000	25	4,000	25	4,000
-24	**1 1/2**	2-12 UN	1-7/8-12 UN	27.5	4,000	25	4,000	20	3,000

1) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)
2) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts
3) MPa ratings for J1926/2/ISO 11926-2 stud ends are rationalized values as published in those standards.

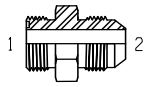
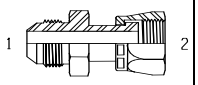
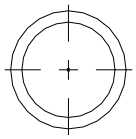
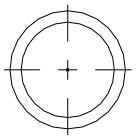
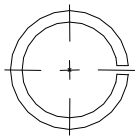
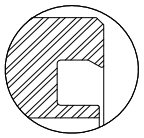
Table JO2. Pressure Ratings for Fittings With NPTF[1] Pipe Threads

Nominal Pipe Size		Thread Size	Working Pressures	
Nom SAE Dash Size	Nom Inch Pipe O.D.	Dryseal Pipe Thread (NPTF) Male and Female	Fittings With NPTF Pipe Threads	
			MPa	psi
-2	**1/8**	1/8-27	34.5	5,000
-4	**1/4**	1/4-18	27.5	4,000
-6	**3/8**	3/8-18	21	3,000
-8	**1/2**	1/2-14	21	3,000
-12	**3/4**	3/4-14	17	2,500
-16	**1**	1-11-1/2	14	2,000
-20	**1 1/4**	1-1/4-11-1/2	8	1,150
-24	**1 1/2**	1-1/2-11-1/2	7	1,000
-32	**2**	2-11-1/2	7	1,000

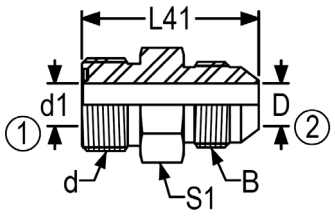
1) Dryseal American Standard Taper Pipe Thread

Table JO3. Pressure Ratings for 37 Deg. Flared Tube Ends, Unions, Bulkheads and 37 Deg. Female Swivels						
Nominal Tube Size		Thread Size	Working Pressures			
Nom SAE Dash Size	Nom Inch Tube O.D.	SAE J514 Flared Tube End and SAE J1926/3/ ISO 11926-3 O-RIng Port Thread Size (Notes 1&2)	37 Deg. Flared Tube Ends, Unions and Bulkheads		37 Deg. Female Swivels	
			MPa	psi	MPa	psi
-2	**1/8**	5/16-24 UNF	34.5	5,000	34.5	5,000
-3	**3/16**	3/8-24 UNF	34.5	5,000	34.5	5,000
-4	**1/4**	7/16-20 UNF	34.5	5,000	31	4,500
-5	**5/16**	1/2-20 UNF	34.5	5,000	27.5	4,000
-6	**3/8**	9/16-18 UNF	34.5	5,000	27.5	4,000
-8	**1/2**	3/4-16 UNF	31	4,500	27.5	4,000
-10	**5/8**	7/8-14 UNF	24	3,500	21	3,000
-12	**3/4**	1-1/16-12 UN	24	3,500	21	3,000
-14	**7/8**	1-3/16-12 UN	21	3,000	17	2,500
-16	**1**	1-5/16-12 UN	21	3,000	17	2,500
-20	**1 1/4**	1-5/8-12 UN	17	2,500	14	2,000
-24	**1 1/2**	1-7/8-12 UN	14	2,000	10.5	1,500
-32	**2**	2-1/2-12 UN	10.5	1,500	8	1,125

1) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)
2) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts

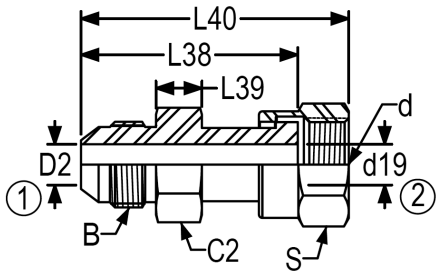
 **FF7403-**Str. (1) Male ORFS (2) Male JIC	 **FF7504-**Str. (1) Male Tube (2) ORFS Female Swivel		(J515CH)  **FF4000-**O-Ring SAE J1453/2/3 Face Seal Ends	(J515CH)  **4000-**O-Ring SAE J1926/2/3 Inch Stud Ends	 **FF9000-**Braze Ring	 **Style B, Dovetail Groove**

FF7403 MALE ORFS ADAPTER/37 DEGREE MALE JIC



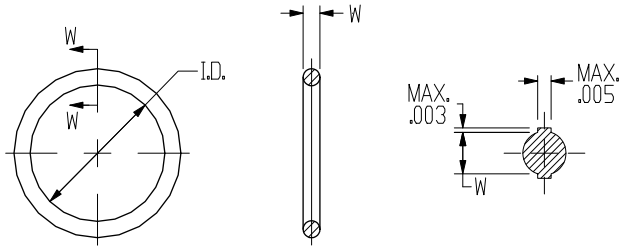
PART NO	TUBE OD	d UN/UNF-2A	B UN/UNF-2A	L41	S1	d1	D
FF7403-4-4	1/4-1/4	9/16-18	7/16-20	1.25	0.63	0.17	0.17
FF7403-6-6	3/8-3/8	11/16-16	9/16-18	1.34	0.75	0.26	0.26
FF7403-8-8	1/2-1/2	13/16-16	3/4-16	1.55	0.88	0.38	0.38
FF7403-10-10	5/8-5/8	1-14	7/8-14	1.83	1.06	0.48	0.48
FF7403-12-12	3/4-3/34	1 3/16-12	1 1/16-12	2.05	1.25	0.61	0.61
FF7403-16-16	1-1	1 7/16-12	1 5/16-12	2.16	1.50	0.81	0.81

FF7504 37 DEGREE MALE JIC/FEMALE ORFS SWIVEL ADAPTER



PART NO	TUBE OD	d UN/UNF-2B	B UN/UNF-2A	L40	L38	L39	C2	S	d19	D2
FF7504-4-4	1/4-1/4	9/16-18	7/16-20	1.50	0.95	0.34	0.56	0.40	0.17	0.17
FF7504-6-6	3/8-3/8	11/16-16	9/16-18	1.61	1.05	0.39	0.69	0.52	0.26	0.26
FF7504-8-8	1/2-1/2	13/16-16	3/4-16	1.90	1.24	0.40	0.88	0.64	0.36	0.36
FF7504-10-10	5/8-5/8	1-14	7/8-14	2.20	1.44	0.50	0.94	0.82	0.45	0.45
FF7504-12-12	3/4-3/4	1 3/16-12	1 1/16-12	2.50	1.64	0.61	1.13	0.98	0.55	0.55
FF7504-16-16	1-1	1 7/16-12	1 5/1612	2.66	1.75	0.64	1.38	1.16	0.78	0.78
FF7504-20-20	1 1/4-1 1/4	1 11/16-12	1 5/8-12	2.80	1.84	0.69	1.69	1.46	1.02	1.02

O-Rings For SAE J-1453/2/3 Face Seal Ends



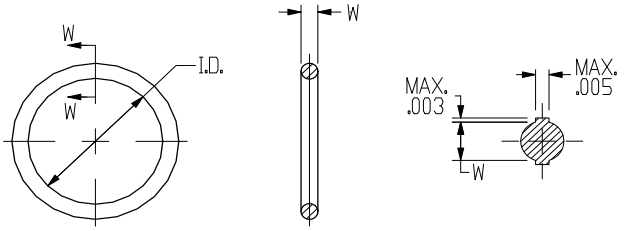
TUBE SIZE	STANDARD A-W PART #	ITEM #	OPTIONAL COMPOUND ITEM #			SAE AS568A REF. #	I.D.	W
	CH (BUNA-N) FF4000	FF64000-	HK (VITON) FF64001-	CH (HI-TEMP)(1) FF64002-	CA (EPDM) FF64006-			
-4	FF4000-4	0100	0100	*	*	011	.301 ±.005	.070 ±.003
-6	FF4000-6	0200	0200	*	*	012	.364 ±.005	.070 ±.003
-8	FF4000-8	0300	0300	*	*	014	.489 ±.005	.070 ±.003
-10	FF4000-10	0400	0400	*	*	016	.614 ±.005	.070 ±.003
-12	FF4000-12	0500	0500	*	*	018	.739 ±.005	.070 ±.003
-16	FF4000-16	0600	0600	*	*	021	.926 ±.006	.070 ±.003
-20	FF4000-20	0700	0700	*	*	025	1.176 ±.006	.070 ±.003
-24	FF4000-24	0800	0800	*	*	029	1.489 ±.010	.070 ±.003
-32	FF4000-32	0900	0900	*	*	135	1.925 ±.017	.103 ±.003

SAE Type CH was SAE Type 1 Type CA was SAE Type 2 and Type HK was SAE Type 3.

Specification	SAE/ASTM Type CH	SAE/ASTM Type CA	SAE/ASTM Type HK
Usage	Nitrile Elastomer, 90 Durometer Hardness, for petroleum based fluids	EPDM Elastomer, 80 Durometer Hardness, for water based hydraulic or nonpetroleum based fluids	Fluorocarbon Elastomer, 90 Durometer Hardness, for petroleum or nonpetroleum based fluids
General Service	High pressure applications of pneumatics, water based hydraulic fluids, lubricating oils, hydraulic oils, and gasoline	High pressure applications of nonflammable hydraulic fluids of phosphate ester base type	High pressure, high temperature applications of pneumatic, water based hydraulic fluids, lubricating oils, hydraulic oils, and fuels
Temperature	-35°C to 125°C (-30°F to 250°F)	-40°C to 125°C (-40°F to 250°F)	-15°C to 275°C (5°F to 525°F)
Shore Hardness	90 pts ±5 pts	80 pts ±5 pts	90 pts ±5 pts
Elongation	100% min	150% min	100% min
Tensile	10 MPa min	10 MPa min	10 MPa min
Compound	Nitrile (Buna-N) to ASTM D 2000 or SAE J200 M4CH910B14E015E35Z1 Z1 = TR 10 temperature –21° C or lower. Alternate Low Temperature Product Test, 5 hours at –30° C, rings compressed 25% of ID, no cracks.	EPDM to ASTM D 2000 or SAE J200 M7CA810A25B35F17	M7HK910A1-11B38EF31E088Z1 Z1 = TR 10 temperature –15°C or lower (similar to MIL-R 83248 Type 1, Class 2)
Lubrication	When assembling Type CH O-Rings with O-Ring style fittings, the O-Ring shall be coated with the fluid used or petrolatum before assembly to ease installation.	When assembling Type CA O-Rings with O-Ring style fittings, lubricate the O-Ring with the fluid used in the system. Do not use a petroleum-based lubricant.	When assembling Type HK O-Rings with O-Ring style fittings, the O-Ring shall be coated with the fluid used or petrolatum before assembly to ease installation.

1. Type CH(HI-TEMP) Air-Way part #FF4002, 90 Durometer Nitrile Compound, temperature range –32°C to 135°C(-25°F to 275°F). Approved compounds National O-Ring Compound C67-90, Parker Seal Groove Compound N1059-90.

O-Rings For SAE J-1926/2/3 Stud Ends



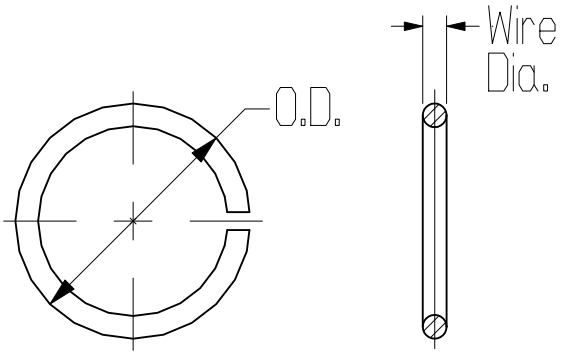
TUBE SIZE	STANDARD A-W PART #	ITEM #	OPTIONAL COMPOUND ITEM #			SAE AS568A REF. #	I.D.	W
	CH (BUNA-N) 4000	4000-	HK (VITON) 4001-	CH (HI-TEMP)(1) 4002-	CA (EPDM) 4006-			
-2	4000-2	0001	*	*	*	902	.239 ±.005	.064 ±.003
-3	4000-3	0002	0002	*	*	903	.301 ±.005	.064 ±.003
-4	4000-4	0003	0003	0200	*	904	.351 ±.005	.072 ±.003
-5	4000-5	0004	0004	0300	*	905	.414 ±.005	.072 ±.003
-6	4000-6	0005	0005	0400	*	906	.468 ±.005	.078 ±.003
-8	4000-8	0006	0006	0500	*	908	.644 ±.009	.087 ±.003
-10	4000-10	0007	0007	0600	*	910	.755 ±.009	.097 ±.003
-12	4000-12	0008	0008	0700	*	912	.924 ±.009	.116 ±.004
-14	4000-14	0009	0009	0800	*	914	1.048 ±.010	.116 ±.004
-16	4000-16	0010	0010	0900	*	916	1.171 ±.010	.116 ±.004
-20	4000-20	0011	0011	1000	*	920	1.475 ±.014	.118 ±.004
-24	4000-24	0012	0012	1100	*	924	1.720 ±.014	.118 ±.004
-32	4000-32	0013	0013	*	*	932	2.337 ±.018	.118 ±.004

SAE Type CH was SAE Type 1 Type CA was SAE Type 2 and Type HK was SAE Type 3.

Specification	SAE/ASTM Type CH	SAE/ASTM Type CA	SAE/ASTM Type HK
Usage	Nitrile Elastomer, 90 Durometer Hardness, for petroleum based fluids	EPDM Elastomer, 80 Durometer Hardness, for water based hydraulic or nonpetroleum based fluids	Fluorocarbon Elastomer, 90 Durometer Hardness, for petroleum or nonpetroleum based fluids
General Service	High pressure applications of pneumatics, water based hydraulic fluids, lubricating oils, hydraulic oils, and gasoline	High pressure applications of nonflammable hydraulic fluids of phosphate ester base type	High pressure, high temperature applications of pneumatic, water based hydraulic fluids, lubricating oils, hydraulic oils, and fuels
Temperature	-35°C to 125°C (-30°F to 250°F)	-40°C to 125°C (-40°F to 250°F)	-15°C to 275°C (5°F to 525°F)
Shore Hardness	90 pts ±5 pts	80 pts ±5 pts	90 pts ±5 pts
Elongation	100% min	150% min	100% min
Tensile	10 MPa min	10 MPa min	10 MPa min
Compound	Nitrile (Buna-N) to ASTM D 2000 or SAE J200 M4CH910B14E015E35Z1 Z1 = TR 10 temperature –21° C or lower. Alternate Low Temperature Product Test, 5 hours at –30° C, rings compressed 25% of ID, no cracks.	EPDM to ASTM D 2000 or SAE J200 M7CA810A25B35F17	M7HK910A1-11B38EF31E088Z1 Z1 = TR 10 temperature –15°C or lower (similar to MIL-R 83248 Type 1, Class 2)
Lubrication	When assembling Type CH O-Rings with O-Ring style fittings, the O-Ring shall be coated with the fluid used or petrolatum before assembly to ease installation.	When assembling Type CA O-Rings with O-Ring style fittings, lubricate the O-Ring with the fluid used in the system. Do not use a petroleum-based lubricant.	When assembling Type HK O-Rings with O-Ring style fittings, the O-Ring shall be coated with the fluid used or petrolatum before assembly to ease installation.

1. Type CH(HI-TEMP) Air-Way part #4002, 90 Durometer Nitrile Compound, temperature range –32°C to 135°C(-25°F to 275°F). Approved compounds National O-Ring Compound C67-90, Parker Seal Groove Compound N1059-90.

ORFS Braze Rings



Inch Tube O.D.	Air-Way Part #	Ring O.D. (in)	Wire Dia. (in)
1/4	FF9000-4	.250	.046
5/16	FF9000-5	.312	.046
3/8	FF9000-6	.375	.046
1/2	FF9000-8	.500	.046
5/8	FF9000-10	.625	.060
3/4	FF9000-12	.750	.060
7/8	FF9000-14	.875	.060
1	FF9000-16	1.000	.060
1 1/4	FF9000-20	1.250	.060
1 1/2	FF9000-24	1.500	.060
2	FF9000-32	2.000	.060

Metric Tube O.D.	Air-Way Part #	Ring O.D. (mm)	Wire Dia. (mm)
6mm	MFF9000-6	6mm	1.168
8mm	MFF9000-8	8mm	1.168
10mm	MFF9000-10	10mm	1.168
12mm	MFF9000-12	12mm	1.168
16mm	MFF9000-16	16mm	1.168
20mm	MFF9000-20	20mm	1.524
22mm	MFF9000-22	22mm	1.524
25mm	MFF9000-25	25mm	1.524
30mm	MFF9000-30	30mm	1.524
38mm	MFF9000-38	38mm	1.524
50mm	MFF9000-50	50mm	1.524

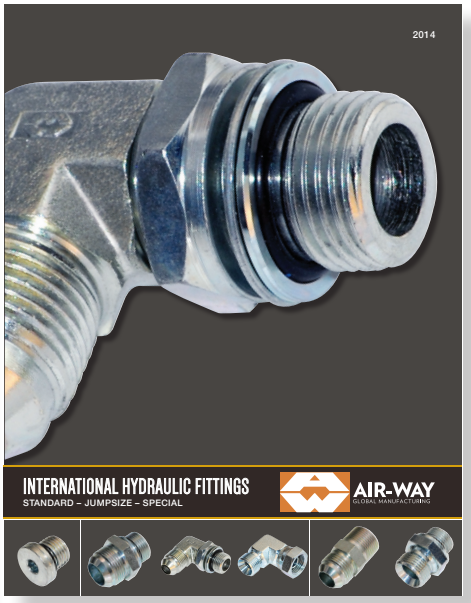
Braze Alloy Specification	**Silvaloy A 50N (BAg-24)**
Industry Specifications Reference	AWS A5.8-BAg-24, ASME-BAg24, AMS-4788
Properties of Brazed Joints	Generally, the joint strength using Silvaloy A-50N will surpass the strengths of the base metals. Strength is a function of the base metals being joined, type of joint, design of joint, joint clearances and brazing procedures. The recommended maximum operating temperature for Silvaloy A-50N brazed assemblies is up to 700°F (370°C).
Usage	Silver brazing alloy for brazing carbon steels or 300 series stainless steels. This alloy contains no cadmium. The addition of nickel to the silver-copper zinc alloy imparts corrosion properties, which retards joint or interface corrosion of the brazed assembly.
Nominal Composition:	
Silver	50.0 +/- 1.0%
Copper	20.0 +/- 1.0%
Zinc	28.0 +/- 2.0%
Nickel	2.0 +/- 0.5%
Total Other Elements	0.15% Max.
Physical Constants:	
Solidus	1220°F (660°C)
Liquidus	1305°F (705°C)
Brazing Range	1310-1550°F (710-843°C)
Specific Gravity	8.98
Density (T.oz./cu.in.)	4.73
Electrical Conductivity (% IACS)	15.0
Electrical Resistivity (Microohm-cm)	11.75
Color	Light Yellow
Safety Information	It is essential that adequate ventilation be provided so that personnel will not inhale gasses and fumes while brazing. Equipment or facility should conform to the provisions of American National Standard (ANSI) Z49.1, “Safety in Welding and Cutting”. For more complete information, refer to the Material Safety Data Sheet for Silvaloy A-50N.

Product Data Notes

Please see our additional product lines and on-line catalog at AIR-WAY.com

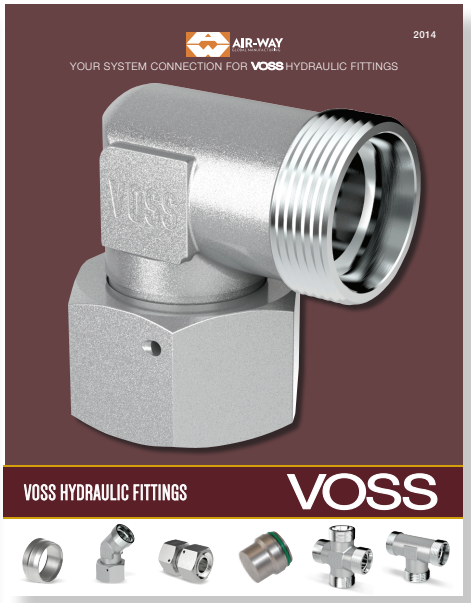
STAINLESS STEEL FITTINGS

include 37° flared tube fittings, Male and Female NPTF pipe, adjustable and O-Ring fittings, adapter unions and braze fittings for tubing.



INTERNATIONAL THREAD HYDRAULIC FITTINGS

are available in various configurations and sizes, including Metric, BSPP, SAEJ2244-1, ISO 6149-1 Ports and Metric JIC Conversion Fittings. We manufacture these fittings to the highest quality standards and stock them for immediate shipping.



THE VOSS LINE

includes soft seal and flared couplings, flange couplings, cutting rings and a wide variety of accessories. These are offered in BSP, Metric, ISO, NPT and SAE threads, while conforming to DIN, ISO, SAE and ANSI/ASME standards. The ZAKO weldless flange product from VOSS offers an outstanding, cost effective solution for flange/tube welding applications.

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BACK

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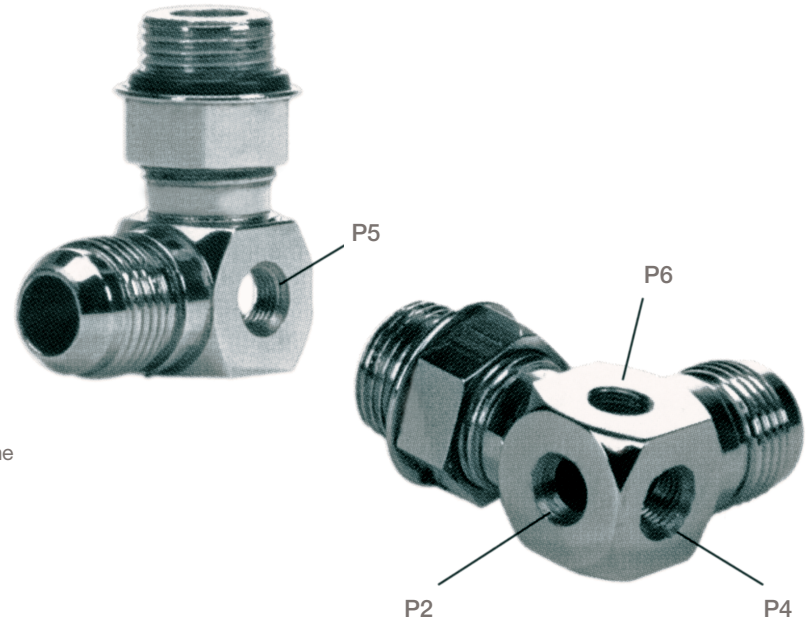
GAUGE LINE CONNECTION PORT

Air-Way simplifies ordering of Gauge Line Connection Port fittings in all shapes and sizes. Use the photograph to select the port location, add the symbol as a suffix to the part number and show the combined symbol.

Example: 6801-8-8-NWO-2P2

6801-8-8-NWO	2	P2
90° Adjustable Elbow	Size	Position



THE AIR-WAY ADVANTAGE

As a global manufacturer, AIR-WAY has the capabilities and equipment to get you what you need, when you need it. Our unique manufacturing and engineering capabilities allow us to fulfill your need for custom fittings and adapters that include: Special Configurations, Cost Reduction and System Simplification. Since 1950, we have served some of the largest and most recognized OEMs in the world.

Our team is dedicated to delivering high quality hydraulic fittings and adapters when and where you want them, all at competitive prices.

Ask about our **AIR-WAY Direct**™ program, which means your order ships the same day it's received. You can take advantage of several benefits including special packaging, shipping and service programs.

Air-Way is an ISO 9001:2008 Certified company.

AIR-WAY Manufacturing | *Adapt to Anything*

ORDER INFORMATION

Sizes of the fittings are indicated by the dash numbers as relating to sixteenth's of an inch measured from the Outside Diameter of the tube size used. For example; 1/2" O.D. (8/16) or – 8. Male or Female pipe sizes are similar in that 1/2" pipe thread is also (8/16) or – 8.

Standard items can be ordered using the appropriate chart and dash numbers. For example: 2501-8-6 is a 1/2" tube end with 3/4-16 straight thread on that end, and 3/8" pipe thread on the other end. 2501-8-12 is a 1/2" tube end with 3/4-16 straight thread on that end, and 3/4" pipe thread on the other end.

Adjustable and O-Ring fittings may be purchased in various stages of assembly. For example: 6801-8-8-NWO would be assembled complete with "N" Nut, "W" Washer, and "O" O-Ring. 6801-8-8-NW would be assembled with "N" Nut, and "W" Washer only.

Many items are available in brazed or forged style construction. If a forged style is preferred, simply add a "G" prefix to the item number or the suffix "FG" after the number.

Special items and configurations are available to order using customer specifications. Pricing and availability of these items can be furnished on request.

AIR-WAY GLOBAL MANUFACTURING

AIR-WAY MANUFACTURING COMPANY | 586 N. MAIN STREET | OLIVET, MI 49076
p 800-253-1036 | p 269-749-2161 | f 269-749-2046 | e sales@AIR-WAY.com | w AIR-WAY.com