

SURFACE VEHICLE STANDARD

Submitted for recognition as an American National Standard

Issued 1936-01
Revised 1997-02

Superseding J513 JAN96

REFRIGERATION TUBE FITTINGS—GENERAL SPECIFICATIONS

1. **Scope**—This SAE Standard covers complete general and dimensional specifications for refrigeration tube fittings of the flare type specified in Figures 1 to 42 and Tables 1 to 15. These fittings are intended for general use with flared annealed copper tubing in refrigeration applications.

Dimensions of single and double 45 degree flares on tubing to be used in conjunction with these fittings are given in Figure 2 and Table 1 of SAE J533.

The following general specifications supplement the dimensional data contained in Tables 1 to 15 with respect to all unspecified details.

2. References

- 2.1 **Applicable Documents**—The following publications form a part of this specification to the extent specified herein. The latest version of SAE publications shall apply.

- 2.1.1 **SAE PUBLICATIONS**—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J476—Dryseal Pipe Threads

SAE J512—Automotive Tube Fittings

SAE J528—Seamless Copper Tube

SAE J533—Flares for Tubing

SAE J846—Coding Systems for Identification of Fluid Conductors and Connectors

- 2.1.2 **ANSI PUBLICATIONS**—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ANSI B1.1—Screw Threads

ANSI B2.1—Pipe Threads

ANSI B70.1—American Standard Refrigeration Flare Type Fittings

- 2.1.3 **ASTM PUBLICATION**—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 117—Method of Salt Spray (Fog) Testing

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SAE J513 Revised FEB97

TABLE 1—STRAIGHT THREAD SPECIFICATION DATA, in

Nominal Size	Series Designation	External Thread Pitch Dia Max	External Thread Pitch Dia Min	Internal Thread Pitch Dia Max	Internal Thread Pitch Dia Min ^a	Internal Thread Minor Dia ^b Max	Internal Thread Minor Dia ^b Min
5/16-24	UNF	0.2843	0.2806	0.2902	0.2854	0.2754	0.2670
3/8 -24	UNF	0.3468	0.3430	0.3528	0.3479	0.3372	0.3300
7/16-20	UNF	0.4037	0.3995	0.4104	0.4050	0.3916	0.3830
1/2 -20	UNF	0.4462	0.4619	0.4731	0.4675	0.4537	0.4460
5/8 -18	UNF	0.5875	0.5828	0.5949	0.5889	0.5730	0.5650
3/4 -16	UNF	0.7079	0.7029	0.7159	0.7094	0.6908	0.6820
7/8 -14	UNF	0.8270	0.8216	0.8356	0.8286	0.8068	0.7980
1-1/16-14	UNS	1.0145	1.0092	1.0230	1.0161	0.9940	0.9850

^a These values are also the basic pitch diameter.

^b Class 3B minor diameter limits

(R) TABLE 2—PIPE THREAD SPECIFICATION DATA

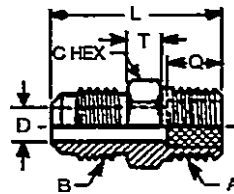
Nominal Pipe Thread Size in	External Thread Chamfer Diameter ^a Max mm	External Thread Chamfer Diameter ^a Max in	External Thread Chamfer Diameter ^a Min mm	External Thread Chamfer Diameter ^a Min in	External Thread Length of Chamfered or Partial Thread Min mm	External Thread Length of Chamfered or Partial Thread Min in
1/8	8.1	0.32	7.6	0.30	0.90	0.037
1/4	10.7	0.42	10.2	0.40	1.42	0.056
3/8	14.0	0.55	13.5	0.53	1.42	0.056
1/2	17.3	0.68	16.8	0.66	1.80	0.071
3/4	22.6	0.89	22.1	0.87	1.80	0.071

Nominal Pipe Thread Size in	External Thread Length of Chamfered or Partial Thread Max mm	External Thread Length of Chamfered or Partial Thread Max in	Internal Thread Countersink Diameter ^a Min mm	Internal Thread Countersink Diameter ^a Min in	Internal Thread Countersink Diameter ^a Max mm	Internal Thread Countersink Diameter ^a Max in
1/8	1.41	0.056	10.7	0.42	11.2	0.44
1/4	2.12	0.083	14.0	0.55	14.5	0.57
3/8	2.12	0.083	17.5	0.69	18.0	0.71
1/2	2.72	0.107	21.6	0.85	22.1	0.87
3/4	2.72	0.107	26.9	1.06	27.4	1.08

^a Tabulated diameters conform with Appendix A, SAE J476.



**FIGURE I-CONNECTOR
(HALF UNION)
(010102) (U1)**



**FIGURE 2—FUSIBLE CONNECTOR
(HALF UNION)
(010163 (FU))**

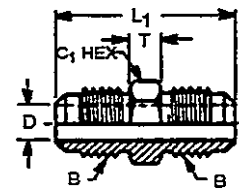
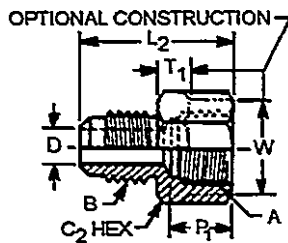
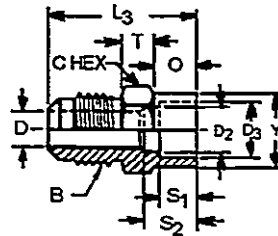


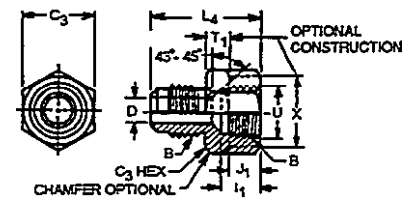
FIGURE 3—UNION
(010101) (U2)



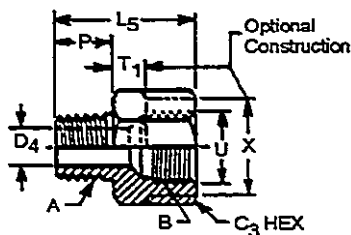
**FIGURE 4—INTERNAL PIPE
THREAD CONNECTOR
(HALF UNION)
(010103) (U3)**



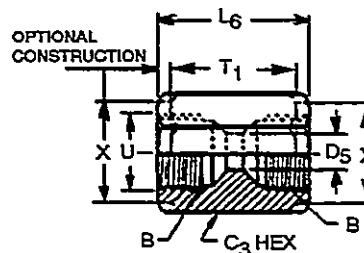
**FIGURE 5—SOLDER
CONNECTOR
(HALF UNION)
(010104) (US3)**



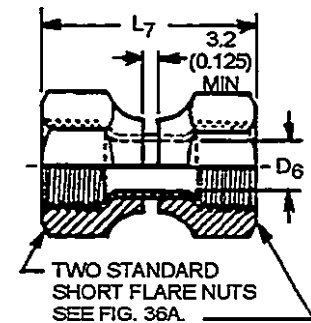
(R) FIGURE 6—INTERNAL
FLARE TO EXTERNAL
FLARE ADAPTER
(010105) (UR3)



**FIGURE 7—INTERNAL FLARE
TO EXTERNAL
PIPE ADAPTER
(010106) (U5)**



(R) FIGURE 8—INTERNAL
FLARE UNION
(010107) (U4)



DIMENSIONS ARE mm (in)

**FIGURE 9—INTERNAL
FLARE SWIVEL UNION
(010108) (US4)**

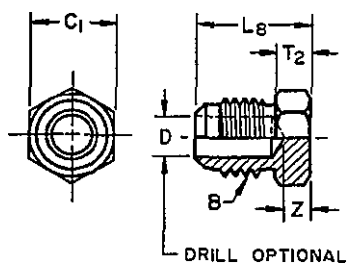
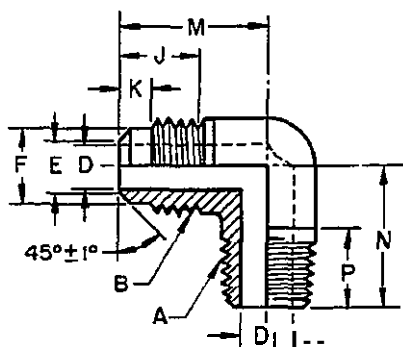


FIGURE 10—PLUG
(010109) (P2)



**FIGURE 11—90 DEGREE ELBOW
(010202) (EI)**

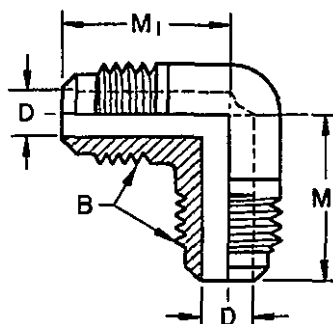
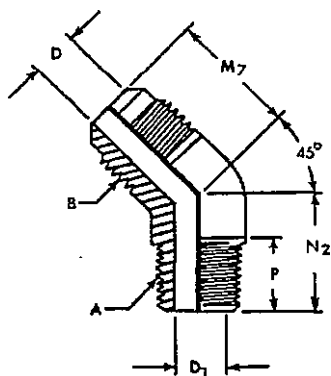
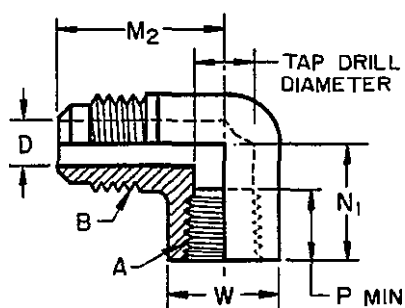


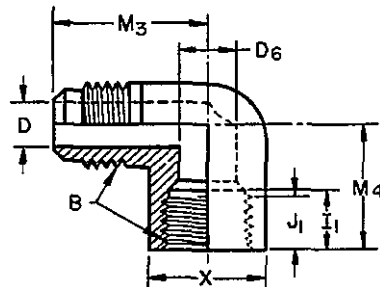
FIGURE 12—90 DEGREE
ELBOW UNION
(010201) (E2)



**FIGURE 13—45 DEGREE
ELBOW
(010302) (E5)**



**FIGURE 14—90 DEGREE
INTERNAL PIPE
THREAD ELBOW
(010203) (E3)**



**FIGURE 15—INTERNAL FLARE
TO EXTERNAL FLARE
90 DEGREE ELBOW
(010205) (E4)**

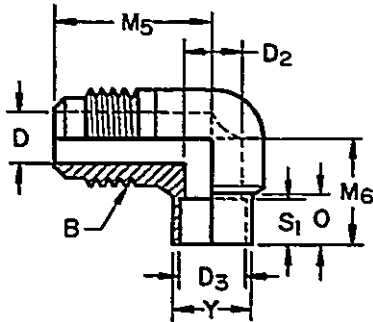


FIGURE 16—90 DEGREE
SOLDER ELBOW
(010204) (ES)

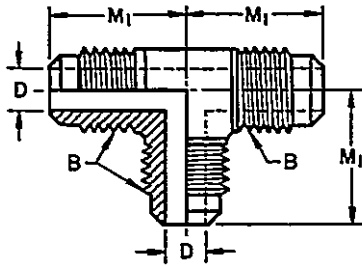


FIGURE 17—THREE-
WAY TEE
(0101401) (T2)

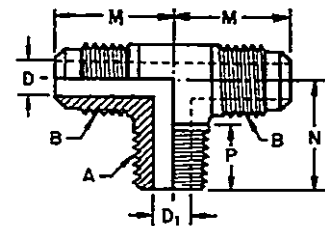


FIGURE 18—TWO-WAY TEE
(010425)

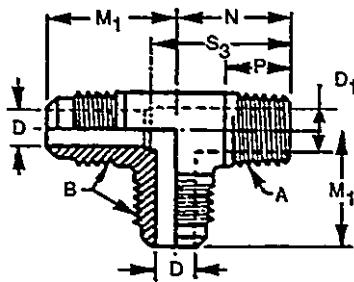


FIGURE 19—RIGHT ANGLE
TWO-WAY TEE
(010424) (T3)

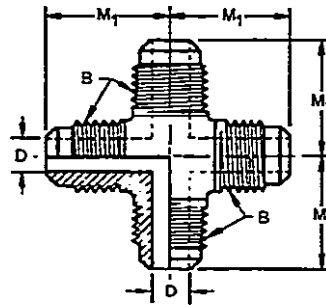


FIGURE 20—CROSS
(010501) (CI)

NOTE—UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOUR, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR REFRIGERATION TUBE FITTINGS. THE DIMENSIONAL DESIGNATIONS IN FIGURES 1, 6, AND 11 AND THE FIRST FIGURE IN EACH GROUP SHALL APPLY TO CORRESPONDING FEATURES OF OTHER FIGURES ON THIS PAGE UNLESS SHOWN OTHERWISE. THE ILLUSTRATIONS ON THIS PAGE APPLY TO TABLE 3. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTING IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FIRST NUMBER) AND ANSI B70.1 (SECOND NUMBER).

(R) TABLE 3-DIMENSIONS OF CONNECTORS, UNIONS, ADAPTORS, ELBOWS, TEES, AND CROSSES
(FIGURES 1 TO 20)^a

Table 1. Dimensions of 1/2-14 UNF-2A Hex Bolts and Nuts											
Nom Tube	A Dryseal Pipe	B Straight Thread	C Hex	C ₁ Hex	C ₂ Hex	C ₃ Hex		De	De	D ₁ e	D ₁ e
OD	Thread	Nominal	in	in	in	in	Drill	Drill	Drill	Drill	
in	NPTF ^b	Size	Nom	Nom	Nom	Nom	mm	in	mm	in	
3/16	1/8	3/8 -24	7/16	3/8	9/16	1/2	3.18	0.125	5.56	0.219	
1/4	1/8	7/16-20	7/16	7/16	9/16	5/8	4.78	0.188	5.56	0.219	
5/16	1/8	1/2 -20	1/2	1/2	9/16	11/16	5.56	0.219	5.56	0.219	
3/8	1/4	5/8 -18	5/8	5/8	11/16	13/16	7.14	0.281	7.92	0.312	
1/2	3/8	3/4 -16	3/4	3/4	13/16	15/16	10.31	0.406	10.31	0.406	
5/8	1/2	7/8 -14	7/8	7/8	1	1- 1/16	12.70	0.500	14.27	0.562	
3/4	1/2	1-1/16-14	1-1/16	1-1/16	1- 1/16	1- 5/16	15.88	0.625	14.27	0.562	
Nom Tube	D ₂	D ₂	D ₃ ^h	D ₃ ^h	D ₄	D ₄	D ₅	D ₅	D ₆ ^j	D ₆ ^j	
OD	Drill	Drill	Dia	Dia	Drill	Drill	Drill	Drill	Tube	Tube	
in	mm	in	mm	in	mm	in	mm	in	ID	ID	
3/16	3.96	0.156	4.864	0.1915	4.78	0.188	4.78	0.188	2.97	0.117	
1/4	4.78	0.188	6.452	0.2540	5.56	0.219	6.35	0.250	4.57	0.180	
5/16	6.35	0.250	8.039	0.3165	5.56	0.219	7.92	0.312	6.15	0.242	
3/8	7.92	0.312	9.627	0.3790	6.74	0.344	9.52	0.375	7.75	0.305	
1/2	11.13	0.438	12.802	0.5040	10.31	0.406	12.70	0.500	10.92	0.430	
5/8	13.89	0.547	15.977	0.6290	14.27	0.562	15.88	0.625	14.10	0.555	
3/4	17.48	0.688	19.152	0.7540	14.27	0.562	19.05	0.750	17.27	0.680	
Nom Tube	E	E	F	F	G ^e	G ^e	I	I	I ₁	I ₁	
OD	Dia	Dia	Dia	Dia	Dia	Dia	mm	in	mm	in	
in	mm	in	mm	in	+0.00	+0.000	mm	in	mm	in	
3/16	3.96	0.156	7.54	0.297	—	—	11.2	0.44	7.1	0.28	
1/4	5.66	0.219	8.74	0.344	—	—	12.7	0.50	8.6	0.34	
5/16	6.35	0.250	10.31	0.406	—	—	14.2	0.56	9.7	0.38	
3/8	7.92	0.312	13.49	0.531	—	—	15.7	0.62	11.2	0.44	
1/2	11.13	0.438	16.28	0.641	16.74	0.659	19.0	0.75	13.5	0.53	
5/8	13.49	0.531	19.05	0.750	19.56	0.770	22.4	0.88	16.8	0.66	
3/4	18.26	0.719	23.83	0.938	24.33	0.958	25.4	1.00	19.8	0.78	

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(R) TABLE 3-DIMENSIONS OF CONNECTORS, UNIONS, ADAPTORS, ELBOWS, TEES, AND CROSSES
(FIGURES 1 TO 20) (CONTINUED)=

Nom Tube OD in	J _c Full Thread Min mm	J _c Full Thread Min in	J ₁ Full Thread Min mm	J ₁ Full Thread Min in	K mm	K in	L mm ±0.8	L in ±0.03	L ₁ mm ±0.8	L ₁ in ±0.03
3/16	9.4	0.37	5.3	0.21	3.0	0.12	25.4	1.00	26.9	1.06
1/4	10.4	0.41	6.6	0.26	4.1	0.16	26.9	1.06	30.2	1.19
5/16	11.9	0.47	7.6	0.30	4.6	0.19	29.5	1.16	34.0	1.34
3/8	13.5	0.53	8.6	0.34	5.6	0.22	36.6	1.44	36.1	1.50
1/2	16.5	0.65	5.4	0.43	6.4	0.25	41.1	1.62	46.0	1.81
5/8	19.3	0.76	13.7	0.54	7.1	0.28	50.8	2.00	53.8	2.12
3/4	23.4	0.88	16.8	0.66	7.1	0.28	55.6	2.19	62.0	2.44

Nom Tube OD in	L ₂ mm ±0.8	L ₂ in ±0.03	L ₃ mm ±0.8	L ₃ in ±0.03	L ₄ mm ±0.8	L ₄ in ±0.03	L ₅ mm ±0.8	L ₅ in ±0.03	L ₆ mm ±0.8	L ₆ in ±0.03
3/16	24.6	0.97	23.9	0.94	23.9	0.94	20.6	0.81	22.4	0.88
1/4	26.2	1.03	25.4	1.00	28.9	1.06	23.1	0.91	25.4	1.00
5/16	26.9	1.06	27.7	1.09	28.4	1.12	23.9	0.94	26.9	1.06
3/8	33.3	1.31	30.2	1.19	33.3	1.31	32.5	1.28	31.8	1.25
1/2	38.1	1.50	36.6	1.44	39.6	1.56	35.1	1.33	36.6	1.44
5/8	46.0	1.81	44.4	1.75	46.0	1.61	42.2	1.66	42.9	1.69
3/4	48.5	1.91	52.3	2.06	52.3	2.06	47.8	1.88	50.8	2.00

Nom Tube OD in	L ₇ Min mm	L ₇ Min in	L ₈ mm ±0.8	L ₈ in ±0.03	M mm ±0.8	M in ±0.03	M ₁ mm ±0.8	M ₁ in ±0.03	M ₂ mm ±0.8	M ₂ in ±0.03
3/16	33.3	1.31	15.0	0.59	19.0	0.75	19.0	0.75	20.6	0.61
1/4	33.3	1.31	17.5	0.69	20.6	0.81	22.4	0.88	22.4	0.68
5/16	35.1	1.38	19.8	0.78	23.1	0.91	23.1	0.91	23.9	0.94
3/8	38.1	1.50	22.4	0.88	25.4	1.00	26.9	1.06	27.7	1.09
1/2	44.4	1.75	26.9	1.06	31.0	1.22	31.0	1.22	32.5	1.28
5/8	50.8	2.00	30.2	1.19	35.8	1.41	35.6	1.41	38.1	1.50
3/4	60.5	2.36	33.3	1.31	41.1	1.62	42.2	1.66	41.1	1.62

(R) TABLE 3-DIMENSIONS OF CONNECTORS, UNIONS, ADAPTORS, ELBOWS, TEES, AND CROSSES
(FIGURES 1 TO 20) (CONTINUED)^a

Nom Tube OD in	M ₃ mm ±0.8	M ₃ in ±0.03	M ₄ mm ±0.8	M ₄ in ±0.03	M ₅ mm ±0.8	M ₅ in ±0.03	M ₆ mm ±0.8	M ₆ in ±0.03	M ₇ mm ±0.8	M ₇ in ±0.03
3/16	—	—	—	—	18.3	0.72	15.0	0.59	15.7	0.62
1/4	23.9	0.94	19.8	0.78	20.6	0.81	15.7	0.62	17.0	0.67
5/16	—	—	—	—	23.1	0.91	16.8	0.66	19.8	0.78
3/8	29.5	1.16	24.6	0.97	26.2	1.03	18.3	0.72	22.6	0.89
1/2	34.0	1.34	28.4	1.12	31.0	1.22	21.3	0.84	26.9	1.06
5/8	—	—	—	—	35.8	1.41	26.2	1.03	31.2	1.23
3/4	—	—	—	—	41.1	1.62	31.8	1.25	35.6	1.41

Nom Tube OD in	N mm ±0.8	N in ±0.03	N ₁ mm ±0.8	N ₁ in ±0.03	N ₂ mm ±0.03	N ₂ in	0 mm	0 in	P Max mm	P Max in	P ₁ mm	P ₁ in
3/16	19.0	0.75	11.2	0.44	13.2	0.52	7.9	0.31	9.7	0.38	9.7	0.38
1/4	19.8	0.78	11.9	0.47	16.3	0.64	7.9	0.31	9.7	0.38	9.7	0.38
5/16	19.6	0.78	11.9	0.47	16.3	0.64	7.9	0.31	9.7	0.38	9.7	0.38
3/8	26.9	1.06	17.5	0.69	21.8	0.86	7.9	0.31	14.5	0.57	14.2	0.56
1/2	26.4	1.12	19.0	0.75	24.1	0.95	9.7	0.38	14.5	0.57	14.2	0.56
5/8	35.1	1.38	25.4	1.00	29.7	1.17	12.7	0.50	19.0	0.75	19.1	0.75
3/4	38.1	1.50	26.9	1.06	30.5	1.20	15.7	0.62	19.0	0.75	19.1	0.75

Nom Tube OD in	Q ^d mm	Q ^d in	S ^e Max mm	S ^e Max in	S ₁ mm	S ₁ in	S ₂ ^e Max mm	S ₂ ^e Max in	S ₃ ^e Min mm	S ₃ ^e Min in
3/16	—	—	12.2	0.48	7.9	0.31	10.4	0.41	21.6	0.85
1/4	—	—	12.2	0.48	7.9	0.31	—	—	23.4	0.92
5/16	—	—	—	—	7.9	0.31	10.7	0.42	—	—
3/8	17.5	0.69	17.5	0.69	7.9	0.31	11.2	0.44	31.5	1.24
1/2	—	—	—	—	9.7	0.38	13.7	0.54	—	—
5/8	23.9	0.94	23.9	0.94	12.7	0.50	17.5	0.69	42.4	1.67
3/4	—	—	31.0	1.22	15.7	0.62	21.3	0.84	51.3	2.02

(R) TABLE 3-DIMENSIONS OF CONNECTORS, UNIONS, ADAPTORS, ELBOWS, TEES, AND CROSSES
(FIGURES 1 TO 20) (CONTINUED)^a

Nom Tube OD in	T ^f Ref mm	T ^f Ref in	T ₁ ^f Min mm	T ₁ ^f Min in	T ₂ ^f Ref mm	T ₂ ^f Ref in	U Dia Min mm	U Dia Min in	U Dia Max mm	U Dia Max in
3/16	4.6	0.16	5.3	0.21	3.8	0.15	9.9	0.39	10.4	0.41
1/4	4.6	0.18	8.1	0.24	4.6	0.18	11.4	0.45	11.9	0.47
5/16	5.3	0.21	6.1	0.24	5.3	0.21	13.0	0.51	13.5	0.53
3/8	6.1	0.24	7.6	0.30	6.1	0.24	16.3	0.64	17.0	0.67
1/2	7.6	0.30	9.4	0.37	7.6	0.30	19.6	0.77	20.3	0.80
5/8	9.4	0.37	10.9	0.43	7.6	0.30	22.9	0.90	23.6	0.93
3/4	10.9	0.43	12.4	0.49	7.6	0.30	27.4	1.08	28.2	1.11

Nom Tube OD in	Wg Dia mm +0.00 -0.5	Wg Dia in +0.00 -0.02	Xg Dia mm +0.00 -0.5	Xg Dia in +0.00 -0.02	Y Dia Min mm	Y Dia Min in	Z Min mm	Z Min in
3/16	14.2	0.56	12.7	0.50	7.1	0.28	1.5	0.06
1/4	14.2	0.56	15.7	0.62	8.6	0.34	1.3	0.05
5/16	14.2	0.56	17.5	0.69	10.2	0.40	1.5	0.06
3/8	17.5	0.69	20.6	0.81	12.2	0.48	1.5	0.06
1/2	20.6	0.81	23.9	0.94	15.2	0.60	2.0	0.08
5/8	25.4	1.00	26.9	1.06	18.8	0.74	2.5	0.10
3/4	26.9	1.06	33.3	1.31	21.8	0.86	2.5	0.10

^a For reducing sizes of unions, internal flare to external flare adaptors, and 90 degree elbow unions, see Table 4; for reducing sizes of solder connectors and 90 degree solder elbows, see Table 5; for reducing sizes of connectors, internal pipe thread connectors, internal flare to external pipe adapters, 90 degree elbow, 45 degree elbow, and internal pipe thread 90 degree elbow, see Table 6; for reducing sizes of tees, see Tables 7 and 8.

^b Dryseal American Standard Taper Pipe Thread.

^c Where thread relief undercut is used, last thread shall be chamfered 1/2 to 1 pitch long from G diameter and dimension J may be reduced by an amount equal to 1/2 pitch.

^d Available with three types of fusible alloys as specified in general specifications.

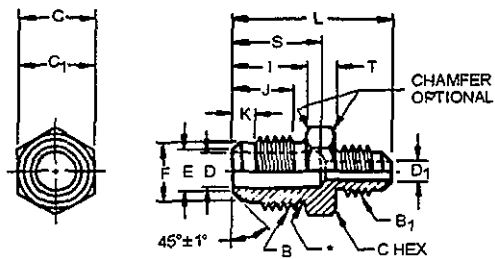
^e At manufacturer's option through passages in fittings shown in Figures 1, 5, and 19 may conform with the smaller diameter specified or be counterbored to the larger diameter from the appropriate end for depths S, S₂ or S₃, respectively.

^f Minimum design thickness, not subject to inspection.

^g Basic dimensions shown shall apply as minimum diameter for bosses or across Rats. The -0.5 mm (-0.02 in) tolerance shall apply only to chamfer diameters on full hexagon versions of fittings shown in Figures 4.5 to 8.

^h ID of solder cup shall not be out of round by more than 0.08 mm (0.0031 in).

ⁱ Refer to SAE J528, Table 1 for copper tube tolerances.



* UNDERCUT TO G DIA OPTIONAL ON FLARE SIZES 1/2 AND LARGER UNLESS OTHERWISE SPECIFIED BY PURCHASER (SEE FOOTNOTE C)

FIGURE 21—REDUCING UNION
(010101) (UR2)

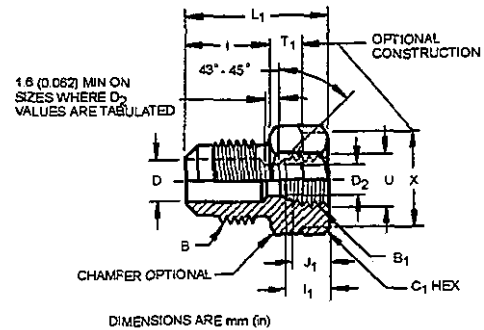


FIGURE 22—INTERNAL FLARE TO EXTERNAL
FLARE REDUCING ADAPTOR
(1010105) (RO3)

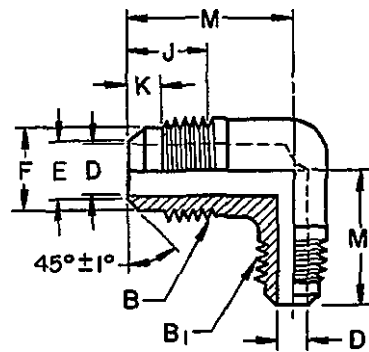


FIGURE 23—90-DEGREE REDUCING ELBOW UNION
(010201) (ER2)

NOTE—UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOUR, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR REFRIGERATION TUBE FITTINGS. THE ILLUSTRATIONS ON THIS PAGE APPLY TO TABLE 4. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTINGS IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FIRST NUMBER) AND ANSI B70.1 (SECOND NUMBER).

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(R) TABLE 4--DIMENSIONS OF REDUCING UNIONS, REDUCING ADAPTERS, AND REDUCING ELBOW UNIONS (FIGURES 21 TO 23)^a

B ^b Nom Tube OD in	B ₁ ^b Nom Tube OD in	C in Nom	C ₁ in Nom	D ^c Drill mm	D ^c Drill in	D ₁ ^c Drill mm	D ₁ ^c Drill in	D ₂ Drill mm	D ₂ Drill in	L mm ±0.8	L in ±0.03	L ₁ mm ±0.8	L ₁ in ±0.03
3/16	1/4	7/16	5/8	3.18	0.125	4.78	0.188	—	—	28.4	1.12	26.2	1.03
3/16	5/16	1/2	11/16	3.18	0.125	5.56	0.219	—	—	31.0	1.22	26.9	1.06
3/16	3/8	5/8	13/16	3.18	0.125	7.14	0.281	—	—	33.3	1.31	30.2	1.19
3/16	1/2	3/4	15/16	3.18	0.125	10.31	0.406	—	—	38.1	1.50	34.0	1.34
3/16	5/8	7/8	1- 1/16	3.18	0.125	12.70	0.500	—	—	42.9	1.69	38.9	1.53
3/16	3/4	1-1/16	1- 5/16	3.18	0.125	15.88	0.625	—	—	47.8	1.88	44.4	1.75

B ^b Nom Tube OD in	B ₁ ^b Nom Tube OD in	Tube				M	M	M ₁	M ₁	S ^c	S ^c	T ^d	T ^d	T ₁	T ₁	X ^e	
		mm ±0.8	in ±0.03	mm ±0.8	in ±0.03	in	Max mm	Max in	Max in	Ref mm	Ref in	Min mm	Min in	Min mm	Min in	+0.0 - 0.5	+0.00 +0.02
3/16	1/4	19.0	0.75	22.4	0.88	15.2	0.60	4.6	0.18	6.1	0.24	15.7	0.62	3/16	1/4	15.7	0.62
3/16	5/16	19.8	0.78	23.1	0.91	17.0	0.67	5.3	0.21	6.1	0.24	17.5	0.69	3/16	5/16	17.5	0.69
3/16	3/8	21.3	0.84	26.9	1.06	19.0	0.75	6.1	0.24	7.6	0.30	20.6	0.81	3/16	3/8	20.6	0.81
3/16	1/2	23.1	0.91	31.0	1.22	23.1	0.91	7.6	0.30	9.4	0.37	23.9	0.94	3/16	1/2	23.9	0.94
3/16	5/8	24.6	0.97	35.8	1.41	27.2	1.07	9.4	0.37	10.9	0.43	26.9	1.06	3/16	5/8	26.9	1.06
3/16	3/4	26.9	1.06	42.2	1.66	31.0	1.22	10.9	0.43	12.4	0.49	33.3	1.31	3/16	3/4	33.3	1.31

B ^b Nom Tube OD in	B ₁ ^b Nom Tube OD in	C in Nom	C ₁ in Nom	D ^c Drill mm	D ^c Drill in	D ₁ ^c Drill mm	D ₁ ^c Drill in	D ₂ Drill mm	D ₂ Drill in	L mm ±0.8	L in ±0.03	L ₁ mm ±0.8	L ₁ in ±0.03
1/4	3/16	7/16	1/2	4.78	0.168	3.18	0.125	—	—	28.4	1.12	24.6	0.97
1/4	5/16	1/2	11/16	4.78	0.188	5.56	0.219	—	—	32.5	1.28	28.4	1.12
1/4	3/8	5/8	13/16	4.78	0.188	7.14	0.281	—	—	35.1	1.38	31.0	1.22
1/4	1/2	3/4	15/16	4.78	0.188	10.31	0.406	—	—	39.6	1.56	35.1	1.38
1/4	5/8	7/8	1- 11/16	4.78	0.188	12.70	0.500	—	—	44.4	1.75	39.6	1.56
1/4	3/4	1-1/16	1- 5/16	4.78	0.188	15.88	0.625	—	—	49.3	1.94	42.9	1.69

B ^b Nom Tube OD in	B ₁ ^b Nom Tube OD in	M	M	M ₁	M ₁	S ^c	S ^c	T ^d	T ^d	T ₁	T ₁	X ^e	
		mm ±0.8	in ±0.03	mm ±0.8	in ±0.03	Max m	Max m	Ref in	Ref in	Min mm	Min in	+0.0 -0.5	+0.00 +0.02
1/4	3/16	22.4	0.88	19.0	0.75	15.2	0.60	4.6	0.16	5.3	0.21	12.7	0.50
1/4	5/16	21.3	0.84	23.1	0.91	17.0	0.67	5.3	0.21	6.1	0.24	17.5	0.69
1/4	3/8	23.1	0.91	26.9	1.06	19.0	0.75	6.1	0.24	7.6	0.30	20.6	0.81
1/4	1/2	24.6	0.97	31.0	1.22	23.1	0.91	7.6	0.30	9.4	0.37	23.9	0.94
1/4	5/8	26.2	1.03	35.6	1.41	27.2	1.07	9.4	0.37	10.9	0.43	26.2	1.06
1/4	3/4	28.4	1.12	42.2	1.66	31.0	1.22	10.9	0.43	12.4	0.49	33.3	1.31

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(R) TABLE 4—DIMENSIONS OF REDUCING UNIONS, REDUCING ADAPTERS, AND REDUCING ELBOW UNIONS (FIGURES 21 TO 23)^a (CONTINUED)

B ^b Nom Tube OD in	B ₁ ^b Nom Tube OD in	C in Nom	C ₁ in Nom	D ^c Drill mm	D ^c Drill in	D ₁ ^c Drill mm	D ₁ ^c Drill in	D ₂ Drill mm	D ₂ Drill in	L mm ±0.8	L in H I . 0 3	L ₁ mm ±0.8	L ₁ in ±0.03
5/16	3/16	1/2	1/2	5.56	0.219	3.18	0.125	4.78	0.188	31.0	1.22	25.4	1.00
5/16	1/4	1/2	5/8	5.56	0.219	4.78	0.188	—	—	32.5	1.28	27.7	1.09
5/16	3/8	5/8	13/16	5.58	0.219	7.14	0.281	—	—	36.8	1.44	31.8	1.25
5/16	1/2	3/4	15/16	5.56	0.219	10.31	0.406	—	—	41.1	1.62	35.8	1.41
5/16	5/8	7/8	1- 1/16	5.56	0.219	12.70	0.500	—	—	46.0	1.81	40.4	1.59
5/16	3/4	1-1/16	1- 5/16	5.56	0.219	15.88	0.625	—	—	50.8	2.00	46.0	1.81

B ^b Nom Tube OD in	B ₁ ^b Nom Tube OD in	M mm ±0.8	M in ±0.03	M ₁ mm ±0.8	M ₁ in ±0.03	S ^c Max mm	S ^c Max in	T ^d Ref mm	T ^d Ref in	T ₁ Min mm	T ₁ Min in	X ^e Dia mm +0.0 -0.5	X ^e Dia in +0.00 +0.02
5/16	3/16	23.1	0.91	19.8	0.78	17.0	0.67	5.3	0.21	5.3	0.21	12.7	0.50
5/16	1/4	23.1	0.91	21.3	0.84	17.0	0.67	5.3	0.21	6.1	0.24	15.7	0.62
5/16	3/8	24.6	0.97	28.9	1.06	19.0	0.75	6.1	0.24	7.6	0.30	20.6	0.81
5/16	1/2	26.2	1.03	31.0	1.22	23.1	0.91	7.6	0.30	9.4	0.37	23.9	0.94
5/16	5/8	27.7	1.09	35.8	1.41	27.2	1.07	9.4	0.37	10.9	0.43	26.9	1.06
5/16	3/4	30.2	1.19	42.2	1.66	31.0	1.22	10.9	0.49	12.4	0.49	33.3	1.31

B ^b Nom Tube OD in	B ₁ ^b Nom Tube OD in	C in Nom	C ₁ in Nom	D ^c Drill mm	D ^c Drill in	D ₁ ^c Drill mm	D ₁ ^c Drill in	D ₂ Drill mm	D ₂ Drill in	L mm ±0.8	L in ±0.03	L ₁ mm ±0.8	L ₁ in ±0.03
3/8	3/16	5/8	5/8	7.14	0.281	3.18	0.125	4.78	0.188	33.3	1.31	26.2	1.03
3/8	1/4	5/8	5/8	7.14	0.281	4.78	0.188	6.35	0.250	35.1	1.38	28.4	1.12
3/8	5/16	5/8	11/16	7.14	0.281	5.56	0.219	—	—	38.6	1.44	30.2	1.19
3/8	1/2	3/4	15/16	7.14	0.281	10.31	0.406	—	—	42.9	1.69	38.6	1.44
3/8	5/8	7/8	1- 1/16	7.14	0.281	12.70	0.500	—	—	47.8	1.88	41.1	1.62
3/8	3/4	1-1/16	1- 5/16	7.14	0.281	15.89	0.625	—	—	52.3	2.06	46.7	1.84

(R) TABLE 4-DIMENSIONS OF REDUCING UNIONS, REDUCING ADAPTERS, AND REDUCING ELBOW UNIONS (FIGURES 21 TO 23)^a (CONTINUED)

B ^b Nom Tube	B ₁ ^b Nom Tube	Tube				M	M	M ₁	M ₁	S ^c	S ^c	T ^d	T ^d	T ₁	T ₁	X ^e	
OD	OD	mm	in	mm	in	Max	Max	Max	Max	Ref	Ref	Ref	Ref	Min	Min	Dia	Dia
in	in	±0.8	±0.03	±0.8	±0.03	mm	in	mm	in	mm	mm	in	in	mm	in	+0.0	+0.00
3/8	3/16	26.9	1.06	21.3	0.84	19.0	0.75	6.1	0.24	6.1	0.24	15.7	0.62				
3/8	1/4	28.9	1.06	23.1	0.91	19.0	0.75	6.1	0.24	6.1	0.24	15.7	0.62				
3/8	5/16	26.9	1.06	24.6	0.97	19.0	0.75	6.1	0.24	6.1	0.24	17.5	0.69				
3/8	1/2	27.7	1.09	31.0	1.22	23.1	0.91	7.8	0.30	9.4	0.37	23.9	0.94				
3/8	5/8	29.5	1.16	35.8	1.41	27.2	1.07	9.4	0.37	10.9	0.43	26.9	1.06				
3/8	3/4	31.8	1.25	42.2	1.66	31.0	1.22	10.9	0.43	12.4	0.49	33.3	1.31				

B ^b Nom Tube	B ₁ ^b Nom Tube	Tube		C	C ₁	D ^c	D ^c	D ₁ ^c	D ₁ ^c	D ₂	D ₂	L	L	L ₁	L ₁
OD	OD	in	in	Drill	Drill	Drill	Drill	Drill	Drill	Drill	Drill	mm	in	mm	in
in	in	Nom	Nom	mm	in	mm	in	mm	in	mm	in	±0.8	±0.03	±0.8	±0.03
1/2	3/16	3/4	3/4	10.31	0.406	3.18	0.125	4.78	0.188	38.1	1.50	29.5	1.16		
1/2	1/4	3/4	3/4	10.31	0.406	4.78	0.188	6.35	0.250	39.6	1.56	31.8	1.25		
1/2	5/16	3/4	3/4	10.31	0.406	5.56	0.219	7.92	0.312	41.1	1.62	32.5	1.28		
1/2	3/8	3/4	13/16	10.31	0.406	7.14	0.281	9.52	0.375	42.9	1.69	35.8	1.41		
1/2	5/8	7/8	1- 11/16	10.31	0.406	12.70	0.500	—	—	50.8	2.00	42.9	1.69		
1/2	3/4	1-1/16	1- 5/16	10.31	0.406	15.88	0.625	—	—	55.6	2.19	48.5	1.91		

B ^b Nom Tube	B ₁ ^b Nom Tube	Tube				M	M	M ₁	M ₁	S ^c	S ^c	T ^d	T ^d	T ₁	T ₁	X ^e	
OD	OD	mm	in	mm	in	Max	Max	Max	Max	Ref	Ref	Ref	Ref	Min	Min	Dia	Dia
in	in	±0.8	±0.03	±0.8	±0.03	mm	in	mm	in	mm	mm	in	in	mm	in	+0.0	+0.00
1/2	3/16	31.0	1.22	23.1	0.91	23.1	0.91	7.6	0.30	7.6	0.30	19.0	0.75				
1/2	1/4	31.0	1.22	24.8	0.97	23.1	0.91	7.6	0.30	7.6	0.30	19.0	0.75				
1/2	5/16	31.0	1.22	26.2	1.03	23.1	0.91	7.6	0.30	7.6	0.30	19.0	0.75				
1/2	3/8	31.0	1.22	27.7	1.09	23.1	0.91	7.8	0.30	7.6	0.30	20.6	0.81				
1/2	5/8	32.5	1.28	35.8	1.41	27.2	1.07	9.4	0.37	10.9	0.43	26.9	1.06				
1/2	3/4	35.1	1.38	42.2	1.66	31.0	1.22	10.9	0.43	12.4	0.49	33.3	1.31				

(R) TABLE 4-DIMENSIONS OF REDUCING UNIONS, REDUCING ADAPTERS, AND REDUCING ELBOW UNIONS (FIGURES 21 TO 23)^a (CONTINUED)

B ^b Nom Tube	B ₁ ^b Nom Tube	C	C ₁	D ^c	D ^c	D ₁ ^c	D ₁ ^c	D ₂	D ₂	L	L	L ₁	L ₁
OD in	OD in	in Nom	in Nom	Drill mm	Drill in	Drill mm	Drill in	Drill mm	Drill in	mm ±0.8	in ±0.03	mm ±0.8	in ±0.03
5/8	3/16	7/8	7/8	12.70	0.500	3.18	0.125	4.78	0.188	42.9	1.69	31.8	1.25
5/8	1/4	7/8	7/8	12.70	0.500	4.78	0.188	6.35	0.250	44.4	1.75	33.3	1.31
5/8	5/16	7/8	7/8	12.70	0.500	5.56	0.219	7.92	0.312	46.0	1.81	35.1	1.38
5/8	3/8	7/8	7/8	12.70	0.500	7.14	0.281	9.52	0.375	47.8	1.88	37.3	1.47
5/8	1/2	7/8	15/16	12.70	0.500	10.31	0.406	—	—	50.8	2.00	41.1	1.62
5/8	3/4	1-1/16	1- 5/16	12.70	0.500	15.88	0.625	—	—	58.7	2.31	50.0	1.97

B ^b Nom Tube	B ₁ ^b Nom Tube	M	M	M ₁	M ₁	S ^c	S ^c	T ^d	T ^d	T ₁	T ₁	X ^e Dia	X ^e Dia
OD in	OD in	mm ±0.8	in ±0.03	mm ±0.8	in ±0.03	Max mm	Max in	Ref mm	Ref in	Min mm	Min in	+0.0 -0.5	+0.00 +0.02
5/8	3/16	35.8	1.41	24.6	0.97	27.2	1.07	9.4	0.37	9.4	0.37	22.4	0.88
5/8	1/4	35.8	1.41	26.2	1.03	27.2	1.07	9.4	0.37	9.4	0.37	22.4	0.88
5/8	5/16	35.8	1.41	27.7	1.09	27.2	1.07	9.4	0.37	9.4	0.37	22.4	0.88
5/8	3/8	35.8	1.41	29.5	1.16	27.2	1.07	9.4	0.37	9.4	0.37	22.4	0.88
5/8	1/2	35.8	1.41	32.5	1.28	27.2	1.07	9.4	0.37	9.4	0.37	23.9	0.94
5/8	3/4	38.1	1.50	42.2	1.66	31.0	1.22	10.9	0.43	12.4	0.49	33.3	1.31

B ^b Nom Tube	B ₁ ^b Nom Tube	C	C ₁	D ^c	D ^c	D ₁ ^c	D ₁ ^c	D ₂	D ₂	L	L	L ₁	L ₁
OD in	OD in	in Nom	in Nom	Drill mm	Drill in	Drill mm	Drill in	Drill mm	Drill in	mm ±0.8	in ±0.03	mm ±0.8	in ±0.03
3/4	3/16	1-1/16	1-1/16	15.88	0.625	3.18	0.125	4.78	0.188	47.8	1.88	36.6	1.44
3/4	1/4	1-1/16	1-1/16	15.88	0.625	4.78	0.188	6.35	0.250	49.3	1.94	36.6	1.44
3/4	5/16	1-1/16	1-1/16	15.88	0.625	5.56	0.219	7.92	0.312	50.8	2.00	36.6	1.44
3/4	3/8	1-1/16	1-1/16	15.88	0.626	7.14	0.281	9.52	0.375	52.3	2.06	38.9	1.53
3/4	1/2	1-1/16	1-1/16	15.88	0.625	10.31	0.406	12.70	0.500	55.6	2.19	42.9	1.69
3/4	5/8	1-1/16	1-1/16	15.88	0.625	12.70	0.500	—	—	58.7	2.31	47.8	1.88

(R) TABLE 4-DIMENSIONS OF REDUCING UNIONS, REDUCING ADAPTERS, AND REDUCING ELBOW UNIONS (FIGURES 21 TO 23)^a (CONTINUED)

B ^b Nom Tube	B ₁ ^b Nom Tube	Tube		M	M	M ₁	M ₁	S ^c	S ^c	T ^d	T ^d	T ₁	T ₁	X ^e Dia mm	X ^e Dia in
OD	OD	mm	in	mm	in	Max	Max	Max	Ref	Ref	Min	Min	Min	+0.0 -0.5	+0.00 +0.02
in	in	±0.8	±0.03	±0.8	±0.03	mm	in	mm	mm	in	mm	in	mm		
3/4	3/16	42.2	1.66	26.9	1.06	31.0	1.22	10.9	0.43	10.9	0.43	26.9	1.06		
3/4	1/4	42.2	1.66	28.4	1.12	31.0	1.22	10.9	0.43	10.9	0.43	26.9	1.06		
3/4	5/16	42.2	1.66	30.2	1.19	31.0	1.22	10.9	0.43	10.9	0.43	26.9	1.06		
3/4	3/8	42.2	1.66	31.8	1.25	31.0	1.22	10.9	0.43	10.9	0.43	26.9	1.06		
3/4	1/2	42.2	1.66	35.1	1.38	31.0	1.22	10.9	0.43	10.9	0.43	28.9	1.06		
3/4	5/8	42.2	1.66	38.1	1.50	31.0	1.22	10.9	0.43	10.9	0.43	26.9	1.06		

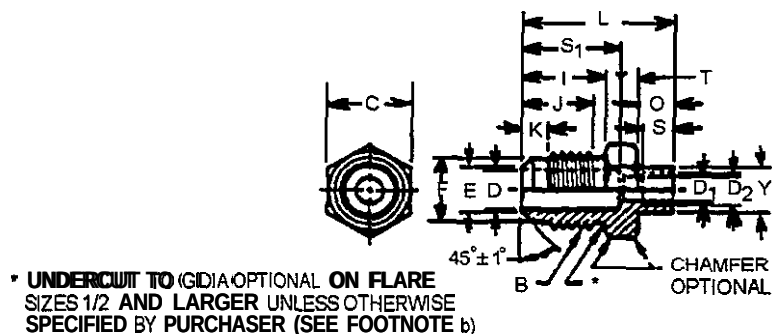
^a For flare dimensions shown on Figures 21 to 23 but not covered in Table 4, see corresponding dimensions for the specified Tube OD in Table 3.

^b Where thread relief undercut is used last thread shall be chamfered 1/2 to 1 pitch long from G diameter and dimension J may be reduced by an amount equal to 1/2 pitch.

^c At manufacturer's option through passages in fittings shown in Figure 21 may conform with the smaller diameter specified or be counterbored to the larger diameter from the appropriate end for depth S.

^d Minimum design thickness, not subject to inspection.

^e Basic dimensions shown shall apply as minimum for bosses. The -0.51 mm (-0.02 in) tolerance shall apply only to chamfer diameter on full hexagon version of fittings in Figure 22.



(R) FIGURE 24—FLARE TO SOLDER
REDUCING CONNECTOR
(HALF UNION)
(010104) (US3)

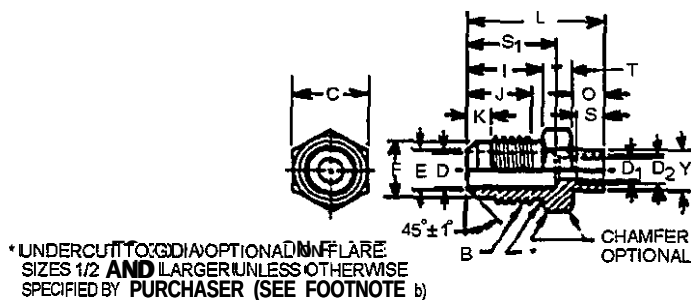


FIGURE 25—FLARE TO
SOLDER 90 DEGREE
REDUCING ELBOW
(010204) (ES)

(R) NOTE—UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOUR, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR REFRIGERATION TUBE FITTINGS. THE ILLUSTRATIONS ON THIS PAGE APPLY TO TABLE 5. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTING IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FIRST NUMBER) AND ANSI B70.1 (SECOND NUMBER).

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TABLE 5—DIMENSIONS OF REDUCING SOLDER CONNECTORS AND REDUCING SOLDER ELBOWS
(FIGURES 24 AND 25)^a

B Nom Tube	Solder Tube	C Hex in	D ^c Drill mm	D ^c Drill in	D ₁ ^c Drill mm	D ₁ ^c Drill in	D ₂ ^e Dia mm	D ₂ ^e Dia in	L mm	L in	M mm	M in
OD in	OD in	Nom	mm	in	mm	in	±0.025	±0.0010	±0.8	±0.03	±0.8	±0.03
3/16	1/8	3/8	3.18	0.125	2.39	0.094	3.277	0.1290	23.1	0.91	1a.3	0.72
3/16	1/4	7/16	3.18	0.125	4.78	0.188	6.452	0.2540	23.9	0.94	18.3	0.72
3/16	5/16	7/16	3.18	0.125	6.35	0.250	8.039	0.3165	23.9	0.94	19.0	0.75
3/16	3/8	1/2	3.18	0.125	7.92	0.312	9.627	0.3790	23.9	0.94	19.8	0.78
3/16	1/2	5/8	3.18	0.125	11.13	0.438	12.802	0.5040	26.2	1.03	21.3	0.84
3/16	5/8	3/4	3.18	0.125	13.89	0.547	15.977	0.6290	30.2	1.19	23.1	0.91
3/16	3/4	7/8	3.18	0.125	17.46	0.688	19.152	0.7546	35.1	1.38	24.6	0.97
3/16	7/8	1	3.18	0.125	19.64	0.781	22.327	0.8790	39.6	1.56	26.9	1.06

B Nom Tube	Solder Tube	M ₁ mm	M ₁ in	0 mm	0 in	S mm	S in	S ₁ ^c Max mm	S ₁ ^c Max in	T ^d Ref mm	T ^d Ref in	Y Dia Min mm	Y Dia Min in
OD in	OD in	±0.8	±0.03	mm	in	mm	in	mm	in	mm	in	mm	in
3/16	1/8	15.0	0.59	7.9	0.31	7.9	0.31	13.2	0.52	3.6	0.15	5.6	0.22
3/16	1/4	15.0	0.59	7.9	0.31	7.9	0.31	10.4	0.41	4.6	0.18	8.6	0.34
3/16	5/16	15.7	0.62	7.9	0.31	7.9	0.31	10.4	0.41	4.6	0.18	10.2	0.40
3/16	3/8	16.8	0.66	7.9	0.31	7.9	0.31	10.4	0.41	4.6	0.18	12.2	0.48
3/16	1/2	19.8	0.78	9.7	0.38	9.7	0.38	12.4	0.49	5.3	0.21	15.2	0.60
3/16	5/8	24.6	0.97	12.7	0.50	12.7	0.50	16.0	0.63	6.1	0.24	18.8	0.74
3/16	3/4	29.5	1.16	15.7	0.62	15.7	0.62	19.8	0.78	7.6	0.30	21.8	0.86
3/16	7/8	35.1	1.38	19.0	0.75	19.0	0.75	23.9	0.94	9.4	0.37	24.9	0.98

B Nom Tube	Solder Tube	C Hex in	D ^c Drill mm	D ^c Drill in	D ₁ ^c Drill mm	D ₁ ^c Drill in	D ₂ ^e Dia mm	D ₂ ^e Dia in	L mm	L in	M mm	M in
OD in	OD in	Nom	mm	in	mm	in	±0.025	±0.0010	±0.8	±0.03	±0.8	±0.03
1/4	1/8	7/16	4.78	0.188	2.39	0.094	3.277	0.1290	25.4	1.00	20.6	0.81
1/4	3/16	7/16	4.78	0.188	4.78	0.188	4.864	0.1915	25.4	1.00	20.6	0.81
1/4	5/16	7/16	4.76	0.188	6.35	0.250	8.039	0.3165	25.4	1.00	20.6	0.81
1/4	3/8	1/2	4.78	0.188	7.92	0.312	9.827	0.3790	25.4	1.00	21.3	0.84
1/4	1/2	5/8	4.78	0.188	11.13	0.438	12.802	0.5040	27.7	1.09	23.1	0.91
1/4	5/8	3/4	4.78	0.188	13.89	0.547	15.977	0.6290	31.8	1.25	24.6	0.97
1/4	3/4	7/8	4.76	0.188	17.48	0.688	19.152	0.7540	36.6	1.44	26.2	1.03
1/4	7/8	1	4.78	0.188	19.84	0.781	22.327	0.8790	41.1	1.62	28.4	1.12

TABLE 5-DIMENSIONS OF REDUCING SOLDER CONNECTORS AND REDUCING SOLDER ELBOWS
(FIGURES 24 AND 25)^a (CONTINUED)

B Nom Tube	Solder Tube	M ₁ mm ±0.8	M ₁ in ±0.03	O mm m	O in m	S mm	S in	S ₁ ^c Max mm	S ₁ ^c Max in	T ^d Ref mm	T ^d Ref in	Y Dia Min mm	Y Dia Min in
1/4	1/8	15.7	0.62	7.9	0.31	7.9	0.31	15.2	0.60	4.6	0.18	5.6	0.22
1/4	3/16	15.7	0.62	7.9	0.31	7.9	0.31	15.2	0.60	4.6	0.18	7.1	0.28
1/4	5/16	15.7	0.62	7.9	0.31	7.9	0.31	10.4	0.41	4.6	0.18	10.2	0.40
1/4	3/8	16.8	0.66	7.9	0.31	7.9	0.31	10.4	0.41	4.6	0.18	12.2	0.48
1/4	1/2	19.8	0.78	9.7	0.38	9.7	0.38	12.4	0.49	5.3	0.21	15.2	0.60
1/4	5/8	24.6	0.97	12.7	0.50	12.7	0.50	16.0	0.63	6.1	0.24	18.8	0.74
1/4	3/4	29.5	1.16	15.7	0.62	15.7	0.62	19.8	0.78	7.6	0.30	21.8	0.86
1/4	7/8	35.1	1.38	19.0	0.75	19.0	0.75	23.9	0.94	9.4	0.37	24.9	0.98

B Nom Tube	Solder Tube	C Hex in Nom	DC Drill mm	DC Drill in	D ₁ ^c Drill mm	D ₁ ^c Drill in	D ₂ ^e Dia mm ±0.025	D ₂ ^e Dia in ±0.0010	L mm ±0.8	L in 0.03	M mm ±0.8	M in ±0.03
5/16	1/8	1/2	5.56	0.219	2.39	0.094	3.277	0.1290	27.7	1.09	23.1	0.91
5/16	3/16	1/2	5.56	0.219	3.96	0.156	4.864	0.1915	27.7	1.09	23.1	0.91
5/16	1/4	1/2	5.56	0.219	4.78	0.188	6.452	0.2540	27.7	1.09	23.1	0.91
5/16	3/8	1/2	5.56	0.219	7.92	0.312	9.627	0.3790	27.7	1.09	23.1	0.91
5/16	1/2	5/8	5.56	0.219	11.13	0.438	12.802	0.5040	29.5	1.16	24.6	0.97
5/16	5/8	3/4	5.56	0.219	13.89	0.547	15.977	0.6290	33.3	1.31	26.2	1.03
5/16	3/4	7/8	5.56	0.219	17.46	0.688	19.152	0.7540	38.1	1.50	27.7	1.09
5/16	7/8	1	5.56	0.219	19.84	0.781	22.327	0.8790	42.9	1.69	30.2	1.19

B Nom Tube	Solder Tube	M ₁ mm ±0.8	M ₁ in ±0.03	O mm m	O in m	S mm	S in	S ₁ ^c Max mm	S ₁ ^c Max in	T ^d Ref mm	T ^d Ref in	Y Dia Min mm	Y Dia Min in
5/16	1/8	16.8	0.66	7.9	0.31	7.9	0.31	17.0	0.67	5.3	0.21	5.6	0.22
5/16	3/16	16.8	0.66	7.9	0.31	7.9	0.31	17.0	0.67	5.3	0.21	7.1	0.28
5/16	1/4	16.8	0.66	7.9	0.31	7.9	0.31	17.0	0.67	5.3	0.21	6.6	0.34
5/16	3/8	16.8	0.66	7.9	0.31	7.9	0.31	10.7	0.42	5.3	0.21	12.2	0.48
5/16	1/2	19.8	0.78	9.7	0.38	9.7	0.38	12.4	0.49	5.3	0.21	15.2	0.60
5/16	5/8	24.6	0.97	12.7	0.50	12.7	0.50	16.0	0.63	6.1	0.24	18.6	0.74
5/16	3/4	29.5	1.16	15.7	0.62	15.7	0.62	19.8	0.78	7.6	0.30	21.8	0.86
5/16	7/8	35.1	1.38	19.0	0.75	19.0	0.75	23.9	0.94	9.4	0.37	24.9	0.98

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TABLE 5-DIMENSIONS OF REDUCING SOLDER CONNECTORS AND REDUCING SOLDER ELBOWS
(FIGURES 24 AND 25)^a (CONTINUED)

B Nom	Solder	C					D ₂ ^e	D ₂ ^e					
Tube	Tube		Hex	D ^c	D ^c	D ₁ ^c	D ₁ ^c	Dia	Dia	L	L	M	M
OD	OD	in	Drill	Drill	Drill	Drill		mm	in	mm	in	mm	in
in	in	Nom	mm	in	mm	in		±0.025	±0.0010	±0.8	±0.03	±0.8	±0.03
3/8	1/8	5/8	7.14	0.281	2.39	0.094		3.277	0.1290	30.2	1.19	26.2	1.03
3/8	3/16	5/8	7.14	0.281	3.96	0.156		4.864	0.1915	30.2	1.19	26.2	1.03
3/8	1/4	5/8	7.14	0.281	4.78	0.188		6.452	0.2540	30.2	1.19	26.2	1.03
3/8	5/16	5/8	7.14	0.281	6.35	0.250		8.039	0.3165	30.2	1.19	26.2	1.03
3/8	1/2	5/8	7.14	0.281	11.13	0.438		12.802	0.5040	31.8	1.25	26.2	1.03
3/8	5/8	3/4	7.14	0.281	13.89	0.647		15.977	0.6290	35.1	1.38	27.7	1.09
3/8	3/4	7/8	7.14	0.281	17.48	0.688		19.152	0.7540	39.6	1.56	29.5	1.16
3/8	7/8	1	7.14	0.281	19.84	0.781		22.327	0.8790	44.4	1.75	31.8	1.25

B Nom Tube	Solder Tube	M ₁	M ₁	0	0	S	S	S ₁ ^c	S ₁ ^c	T ^d	T ^d	Y Dia	Y Dia
OD in	OD in	mm ±0.8	in ±0.03	mm	mm	in	mm	Max in	Max in	Ref mm	Ref in	Min mm	Min in
3/8	1/8	18.3	0.72	7.9	0.31	7.9	0.31	19.0	0.75	6.1	0.24	5.6	0.22
3/8	3/16	18.3	0.72	7.9	0.31	7.9	0.31	19.0	0.75	6.1	0.24	7.1	0.28
3/8	1/4	18.3	0.72	7.9	0.31	7.9	0.31	19.0	0.75	6.1	0.24	8.6	0.34
3/8	5/16	18.3	0.72	7.9	0.31	7.9	0.31	19.0	0.75	6.1	0.24	10.2	0.40
3/8	1/2	19.8	0.78	9.7	0.38	9.7	0.38	13.0	0.51	6.1	0.24	15.2	0.60
3/8	5/8	24.6	0.97	12.7	0.50	12.7	0.50	16.0	0.63	6.1	0.24	18.8	0.74
3/8	3/4	29.5	1.16	15.7	0.62	15.7	0.62	19.8	0.78	7.6	0.30	21.8	0.86
3/8	7/8	31.8	1.25	19.0	0.75	19.0	0.75	23.9	0.94	9.4	0.37	24.9	0.98

B												
Nom	Solder	C					D ₂ ^e	D ₂ ^e			M	M
Tube	Tube	Hex		D ^c	D ^c	D ₁ ^c	Dia	Dia	L	L	M	M
OD	OD	in	Drill	Drill	Drill	Drill	mm	in	mm	in	mm	in
in	in	Nom	mm	in	mm	in	±0.025	±0.0010	±0.8	±0.03	±0.8	±0.03
1/2	1/8	3/4	10.31	0.406	2.39	0.094	3.277	0.1290	35.1	1.38	31.0	1.22
1/2	3/16	3/4	10.31	0.406	3.96	0.156	4.864	0.1915	35.1	1.38	31.0	1.22
1/2	1/4	3/4	10.31	0.406	4.78	0.188	6.452	0.2540	35.1	1.38	31.0	1.22
1/2	5/16	3/4	10.31	0.406	6.35	0.250	8.039	0.3165	35.1	1.38	31.0	1.22
1/2	3/8	3/4	10.31	0.406	7.92	0.312	9.627	0.3790	35.1	1.38	31.0	1.22
1/2	5/8	3/4	10.31	0.406	13.89	0.547	15.977	0.6290	39.6	1.56	31.0	1.22
1/2	3/4	7/8	10.31	0.406	17.46	0.688	19.152	0.7540	42.9	1.69	32.5	1.28
1/2	7/8	1	10.31	0.406	19.84	0.781	22.327	0.8790	47.8	1.88	35.1	1.38

TABLE S-DIMENSIONS OF REDUCING SOLDER CONNECTORS AND REDUCING SOLDER ELBOWS
(FIGURES 24 AND 25)^a (CONTINUED)

B Nom Tube	Solder Tube	M ₁ mm ±0.8	M ₁ in ±0.03	O mm m	O in m	S mm	S in	S ₁ ^c Max mm	S ₁ ^c Max in	T _d Ref mm	T _d Ref in	Y Dia Min mm	Y Dia Min in
1/2	1/8	19.8	0.78	7.9	0.31	7.9	0.31	23.1	0.91	7.6	0.30	5.8	0.22
1/2	3/16	19.8	0.78	7.9	0.31	7.9	0.31	23.1	0.91	7.6	0.30	7.1	0.28
1/2	1/4	19.8	0.78	7.9	0.31	7.9	0.31	23.1	0.91	7.6	0.30	8.8	0.34
1/2	5/16	19.8	0.78	7.9	0.31	7.9	0.31	23.1	0.91	7.6	0.30	10.2	0.40
1/2	3/8	19.8	0.78	7.9	0.31	7.9	0.31	23.1	0.91	7.6	0.30	12.2	0.48
1/2	5/8	24.6	0.97	12.7	0.50	12.7	0.50	16.8	0.66	7.6	0.30	18.8	0.74
1/2	3/4	29.5	1.16	15.7	0.62	15.7	0.62	19.8	0.78	7.6	0.30	21.6	0.86
1/2	7/8	35.1	1.38	19.0	0.75	19.0	0.75	23.9	0.94	9.4	0.37	24.9	0.98

B Nom Tube	Solder Tube	C Hex in No	D _c Drill mm	D _c Drill in	D ₁ ^c Drill mm	D ₁ ^c Drill in	D ₂ ^e Dia mm ±0.025	D ₂ ^e Dia in ±0.0010	L mm ±0.8	L in ±0.03	M mm ±0.8	M in ±0.03
5/8	1/8	7/8	12.70	0.500	2.39	0.094	3.277	0.1290	39.8	1.56	35.6	1.41
5/8	3/16	7/8	12.70	0.500	3.96	0.156	4.664	0.1915	39.6	1.56	35.8	1.41
5/8	1/4	7/8	12.70	0.500	4.78	0.188	6.452	0.2540	39.6	1.56	35.6	1.41
5/8	5/16	7/8	12.70	0.500	6.35	0.250	8.039	0.3165	39.6	1.56	35.6	1.41
5/8	3/8	7/8	12.70	0.500	7.92	0.312	9.627	0.3790	39.6	1.56	35.6	1.41
5/8	1/2	7/8	12.70	0.500	11.13	0.438	12.802	0.5040	41.1	1.62	35.6	1.41
5/8	3/4	7/8	12.70	0.500	17.46	0.688	19.152	0.7540	47.6	1.66	35.6	1.41
5/8	7/8	1	12.70	0.500	19.64	0.781	22.327	0.8790	50.8	2.00	38.1	1.50

B Nom Tube	Solder Tube	M ₁ mm ±0.8	M ₁ in ±0.03	O mm m	O in m	S mm	S in	S ₁ ^c Max mm	S ₁ ^c Max in	T _d Ref mm	T _d Ref in	Y Dia Min mm	Y Dia Min in
5/8	1/8	21.3	0.84	7.9	0.31	7.9	0.31	27.2	1.07	9.4	0.37	5.6	0.22
5/8	3/16	21.3	0.84	7.9	0.31	7.9	0.31	27.2	1.07	9.4	0.37	7.1	0.28
5/8	1/4	21.3	0.84	7.9	0.31	7.9	0.31	27.2	1.07	9.4	0.37	8.6	0.34
5/8	5/16	21.3	0.84	7.9	0.31	7.9	0.31	27.2	1.07	9.4	0.37	10.2	0.40
5/8	3/8	21.3	0.84	7.9	0.31	7.9	0.31	27.2	1.07	9.4	0.37	12.2	0.48
5/8	1/2	23.1	0.91	9.7	0.38	9.7	0.38	27.2	1.07	9.4	0.37	15.2	0.60
5/8	3/4	29.5	1.16	15.7	0.62	15.7	0.62	20.6	0.81	9.4	0.37	21.6	0.86
5/8	7/8	35.1	1.38	19.0	0.75	19.0	0.75	23.9	0.94	9.4	0.37	24.9	0.98

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TABLE 5-DIMENSIONS OF REDUCING SOLDER CONNECTORS AND REDUCING SOLDER ELBOWS
(FIGURES 24 AND 25)^a (CONTINUED)

B Nom Tube OD in	Solder Tube OD in	C Hex in Nom	D ^c Drill mm	D ^c Drill in	D ₁ ^c Drill mm	D ₁ ^c Drill in	D ₂ ^e Dia mm ±0.025	D ₂ ^e Dia in ±0.0010	L mm ±0.8	L in ±0.03	M mm ±0.8	M in ±0.03
3/4	1/8	1-1/16	15.88	0.625	2.39	0.094	3.277	0.1290	44.4	1.75	41.1	1.62
3/4	3/16	1-1/16	15.88	0.625	3.96	0.156	4.684	0.1915	44.4	1.75	41.1	1.62
3/4	1/4	1-1/16	15.88	0.625	4.76	0.188	8.452	0.2540	44.4	1.75	41.1	1.62
3/4	5/16	1-1/16	15.66	0.625	6.35	0.250	8.039	0.3165	44.4	1.75	41.1	1.62
3/4	3/8	1-1/16	15.88	0.625	7.92	0.312	9.627	0.3790	44.4	1.75	41.1	1.62
3/4	1/2	1-1/16	15.86	0.625	11.13	0.438	12.802	0.5040	46.0	1.61	41.1	1.62
3/4	5/8	1-1/16	15.88	0.625	13.69	0.547	15.977	0.6290	49.3	1.94	41.1	1.62
3/4	3/4	1-1/16	15.88	0.625	19.64	0.781	22.327	0.8790	55.6	2.19	41.1	1.62

Nom Tube OD in	Solder Tube OD in	M ₁ mm ±0.8	M ₁ in ±0.03	O mm	O in	S mm	S in	S ₁ ^c Max mm	S ₁ ^c Max in	T ^d Ref mm	T ^d Ref in	Y Dia Min mm	Y Dia Min in
3/4	1/8	23.9	0.94	7.9	0.31	7.9	0.31	31.0	1.22	10.9	0.43	5.6	0.22
3/4	3/16	23.9	0.94	7.9	0.31	7.9	0.31	31.0	1.22	10.9	0.43	7.1	0.28
3/4	1/4	23.9	0.94	7.9	0.31	7.9	0.31	31.0	1.22	10.9	0.43	6.6	0.34
3/4	5/16	23.9	0.94	7.9	0.31	7.9	0.31	31.0	1.22	10.9	0.43	10.2	0.40
3/4	3/8	23.9	0.94	7.9	0.31	7.9	0.31	31.0	1.22	10.9	0.43	12.2	0.48
3/4	1/2	25.4	1.00	9.7	0.38	9.7	0.38	31.0	1.22	10.9	0.43	15.2	0.60
3/4	5/8	26.4	1.12	12.7	0.50	12.7	0.50	31.0	1.22	10.9	0.43	16.6	0.74
3/4	7/8	35.1	1.36	19.0	0.75	19.0	0.75	24.6	0.97	10.9	0.43	24.9	0.98

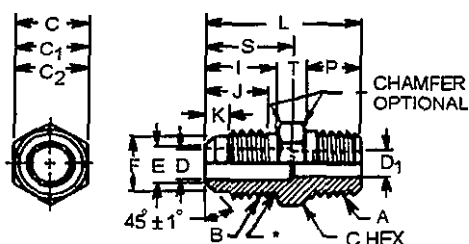
^a For flare dimensions shown on Figures 24 and 25 but not covered in Table 5, see corresponding dimensions for the specified Tube OD in Table 3.

^b Where thread relief undercut is used, last thread shall be chamfered 1/2 to 1 pitch long from G diameter and dimension J may be reduced by an amount equal to 1/2 pitch.

^c At manufacturer's option through passages in fittings shown in Figure 24 may conform with the smaller diameter specified or be counterbored to the larger diameter from appropriate end for depth S₁.

^d Minimum design thickness, not subject to inspection.

^e ID of solder cup shall not be out of round by more than 0.08 (0.003 in).



* UNDERCUT TO G DIA OPTIONAL
UNLESS OTHERWISE SPECIFIED BY
PURCHASER (SEE FOOTNOTE C).

(R) FIGURE 26—REDUCING
CONNECTOR
(HALF UNION)
(010102) (U1)

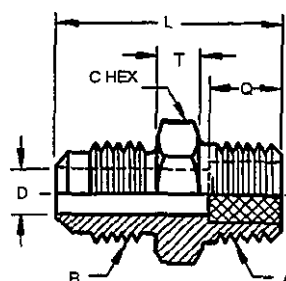


FIGURE 27—FUSIBLE
REDUCING CONNECTOR
(HALF UNION)
(101063) (FU)

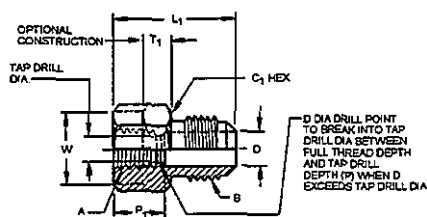
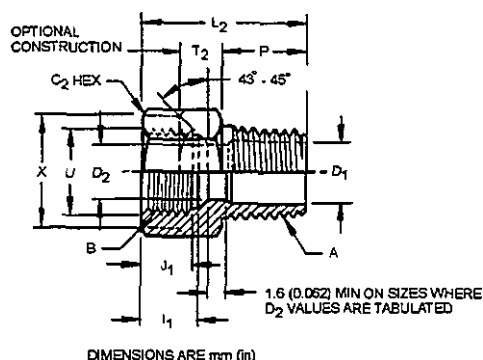


FIGURE 28—INTERNAL THREAD
REDUCING CONNECTOR
(HALF UNION)
(010103) (U3)



(R) FIGURE 29—INTERNAL
FLARE TO EXTERNAL
PIPE REDUCING ADAPTER
(010106) (U5)

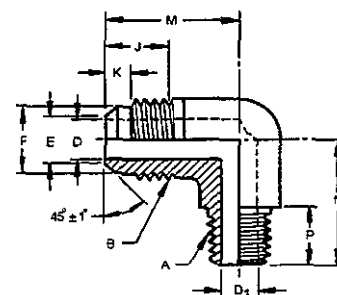


FIGURE 30—90 DEGREE
REDUCING ELBOW
(010202) (EI)

NOTE—UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOUR, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR REFRIGERATION TUBE FITTINGS. THE DIMENSIONAL DESIGNATIONS IN FIGURES 1 AND 30 SHALL APPLY TO CORRESPONDING FEATURES OF OTHER FIGURES ON THIS PAGE UNLESS SHOWN OTHERWISE. THE ILLUSTRATIONS ON THIS PAGE APPLY TO TABLE 6. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTING IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FIRST NUMBER) AND ANSI B70.1 (SECOND NUMBER).

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(R) TABLE S-DIMENSIONS OF REDUCING CONNECTORS, REDUCING ADAPTERS, AND REDUCING ELBOWS (FIGURES 26 TO 32)^a

B	A	C	C ₁	C ₂										
Nom	Dryseal	Hex	Hex	Hex			D ^d	D ^d	D ₁ ^d	D ₁ ^d	D ₂	D ₂	L	L
Tube	Pipe													
OD	Thread	in	in	in	Drill	Drill	Drill	Drill	Drill	Drill	Drill	mm	mm	in
in	NPTF ^b	Nom	Nom	Nom	mm	in	mm	in	mm	in	in	±0.8	±0.03	
3/16	1/4	9/16	1116	9/16	3.18	0.125	7.92	0.312	4.76	0.188	30.2	1.19		
3/16	3/8	11/16	13/16	11/16	3.18	0.125	10.31	0.406	4.76	0.188	31.8	1.22		
3/16	1/2	7/8	1	7/8	3.18	0.125	14.27	0.562	4.76	0.188	38.1	1.44		
3/16	3/4	1- 1/16	1- 1/4	1- 1116	3.18	0.125	19.05	0.750	4.76	0.188	41.1	1.50		

B Nom Tube OD in	L ₁ mm ±0.8	L ₁ in ±0.03	L ₂ mm ±0.8	L ₂ in ±0.03	M mm ±0.8	M in ±0.03	M ₁ mm ±0.8	M ₁ in ±0.03	M ₂ mm ±0.8	M ₂ in ±0.03	N mm ±0.8	N in ±0.03
3/16	30.2	1.19	23.9	0.94	20.6	0.81	23.1	0.91	18.0	0.71	24.6	0.97
3/16	31.0	1.22	21.3	0.84	22.4	0.88	24.6	0.97	19.0	0.75	25.4	1.00
3/16	36.6	1.44	26.9	1.06	24.6	0.97	26.9	1.06	20.3	0.80	32.5	1.28
3/16	36.1	1.50	30.2	1.19	26.9	1.06	31.0	1.22	21.3	0.84	35.1	1.38

B Nom Tube OD in	N ₁ mm ±0.8	N ₁ in ±0.03	N ₂ mm ±0.8	N ₂ in ±0.03	P Max mm	P Max in	Q ^e mm	Q ^e in	S ^d Max mm	S ^d Max in	T ^f Ref mm	T ^f Ref in
3/16	15.8	0.62	21.8	0.86	14.2	0.56	—	—	16.8	0.66	4.6	0.18
3/16	15.8	0.62	24.1	0.95	14.2	0.56	—	—	17.5	0.69	6.1	0.24
3/16	20.6	0.81	29.7	1.17	19.0	0.75	—	—	23.1	0.91	7.6	0.30
3/16	20.6	0.81	30.5	1.20	19.0	0.75	—	—	24.6	0.97	10.9	0.43

B Nom Tube OD in	T ₁ Min mm	T ₁ Min in	T ₂ Min mm	T ₂ Min in	W _g mm +0.0 -6.5	W _g in +0.00 -0.02	X _g mm +0.0 -0.5	X _g in +0.00 -0.02
3/16	6.1	0.24	5.3	0.21	17.5	0.69	14.2	0.56
3/16	7.6	0.30	6.1	0.24	20.6	0.81	17.5	0.69
3/16	9.4	0.37	7.6	0.30	25.4	1.00	22.4	0.88
3/16	12.4	0.49	10.9	0.43	31.8	1.25	26.9	1.06

TABLE 6—DIMENSIONS OF REDUCING CONNECTORS, REDUCING ADAPTERS, AND REDUCING ELBOWS (FIGURES 26 TO 32)^a (CONTINUED)

B Nom Tube OD in	A Dryseal Pipe Thread NPTF ^b	C Hex in Nom	C ₁ Hex in Nom	C ₂ Hex in Nom	Drill mm	Drill in	D ^d Drill mm	D ^d Drill in	D ₁ ^d Drill mm	D ₁ ^d Drill in	D ₂ Drill in	D ₂ mm	L mm ±0.8	L in ±0.03
1/4	1/4	9/16	11/16	5/8	4.76	0.188	7.92	0.312	6.35	0.250	31.6	1.25		
1/4	3/8	11/16	13/16	11/16	4.76	0.188	10.31	0.406	6.35	0.250	33.3	1.31		
1/4	1/2	7/8	1	7/8	4.76	0.188	14.27	0.562	6.35	0.250	39.6	1.56		
1/4	3/4	1- 11/16	1- 1/4	1- 1/16	4.76	0.188	19.05	0.750	6.35	0.250	42.9	1.69		

B Nom Tube OD in	L ₁ mm ±0.8	L ₁ in ±0.03	L ₂ mm ±0.8	L ₂ in ±0.03	M mm ±0.8	M in ±0.03	M ₁ mm ±0.8	M ₁ in ±0.03	M ₂ mm ±0.8	M ₂ in ±0.03	N mm ±0.8	N in ±0.03
1/4	31.8	1.25	26.2	1.03	23.1	0.91	24.6	0.97	19.0	0.75	23.9	0.94
1/4	32.5	1.28	23.9	0.94	23.9	0.94	26.2	1.03	20.1	0.79	26.2	1.03
1/4	38.1	1.50	26.9	1.06	26.2	1.03	26.4	1.12	21.6	0.85	32.5	1.28
1/4	39.6	1.56	30.2	1.19	26.4	1.12	32.5	1.28	22.6	0.89	35.1	1.38

B Nom Tube OD in	N ₁ mm ±0.8	N ₁ in ±0.03	N ₂ mm ±0.8	N ₂ in ±0.03	P Min mm	P Min in	P ₁ mm	P ₁ in	Q ^e mm	Q ^e in	S ^d Max mm	S ^d Max in
1/4	16.8	0.66	24.1	0.95	14.2	0.56	14.2	0.56	17.5	0.69	17.5	0.69
1/4	21.3	0.84	29.7	1.17	19.0	0.75	14.2	0.56	—	—	23.1	0.91
1/4	21.3	0.84	30.5	1.20	19.0	0.75	19.1	0.75	—	—	24.6	0.97
1/4	21.3	0.84	30.5	1.20	19.0	0.75	19.1	0.75	—	—	24.6	0.97

B Nom Tube OD in	T ^f Ref mm	T ^f Ref in	T ₁ Min mm	T ₁ Min in	T ₂ Min mm	T ₂ Min in	W ^g mm +0.0 -0.5	W ^g in +0.00 -0.02	X ^g mm +0.0 -0.5	X ^g in +0.00 -0.02
1/4	4.6	0.18	6.1	0.24	6.1	0.24	17.5	0.69	15.7	0.62
1/4	6.1	0.24	7.6	0.30	6.1	0.24	20.6	0.81	17.5	0.69
1/4	7.6	0.30	9.4	0.37	7.6	0.30	25.4	1.00	22.4	0.88
1/4	10.9	0.43	12.4	0.49	10.9	0.43	31.8	1.25	26.9	1.06

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TABLE 6—DIMENSIONS OF REDUCING CONNECTORS, REDUCING ADAPTERS, AND REDUCING ELBOWS (FIGURES 26 TO 32)^a (CONTINUED)

B	A	C	C ₁	C ₂										
Nom	Dry-seal						D ^d	D ^d	D ₁ ^d	D ₁ ^d	D ₂	D ₂	L	L
Tube	Pipe	Hex	Hex	Hex			Drill	Drill	Drill	Drill	Drill	Drill	mm	in
OD	Thread	in	in	in	Drill	Drill	mm	in	mm	mm	in	in	±0.8	±0.03
in	NPTF ^b	Nom	Nom	Nom	mm	in	mm	in	mm	mm	in	in		
5/16	1/4	9/16	11/16	11/16	5.56	0.219	7.92	0.312	7.92	0.312	0.312	34.0	1.34	
5/16	3/8	11/16	13/16	11/16	5.56	0.219	10.31	0.406	7.92	0.312	0.312	35.1	1.38	
5/16	1/2	7/8	1	7/8	5.56	0.219	14.27	0.562	7.92	0.312	0.312	41.1	1.62	
5/16	3/4	1- 1/16	1- 1/4	1- 1/16	5.56	0.219	19.05	0.750	7.92	0.312	0.312	44.4	1.75	

B Nom Tube OD in	L ₁ mm ±0.8	L ₁ in ±0.03	L ₂ mm ±0.8	L ₂ in ±0.03	M mm ±0.8	M in ±0.03	M ₁ mm ±0.8	M ₁ in ±0.03	M ₂ mm ±0.8	M ₂ in ±0.03	N mm ±0.8	N in ±0.03
5/16	32.5	1.28	27.7	1.09	24.6	0.97	26.2	1.03	20.6	0.81	23.9	0.94
5/16	33.3	1.31	25.4	1.00	25.4	1.00	27.7	1.09	21.6	0.85	26.2	1.03
5/16	36.9	1.53	26.4	1.12	27.7	1.09	30.2	1.19	23.1	0.91	32.5	1.28
5/16	40.4	1.52	30.2	1.19	30.2	1.19	34.0	1.34	24.1	0.95	35.1	1.38

Nom Tube OD in	N ₁ mm ±0.8	N ₂ in ±0.03	N ₂ mm ±0.8	N ₂ in ±0.03	P Min mm	P Min in	P ₁ mm	P ₁ in	Q ^e mm	Q ^e in	S ^d Max mm	S ^d Max in
5/16	16.8	0.66	21.8	0.86	14.2	0.56	14.2	0.56	—	—	17.0	0.67
5/16	16.8	0.66	24.1	0.95	14.2	0.56	14.2	0.56	—	—	17.5	0.69
5/16	21.3	0.84	29.7	1.17	19.0	0.75	19.1	0.75	—	—	23.1	0.91
5/16	21.3	0.84	30.5	1.20	19.0	0.75	19.1	0.75	—	—	24.6	0.97

B Nom Tube OD in	T ^f Ref mm	T ^f Ref in	T ₁ Min mm	T ₁ Min in	T ₂ Min mm	T ₂ Min in	W _g mm +0.0 -0.5	W _g in +0.00 -0.02	X _g mm +0.0 -0.5	X _g in +0.00 -0.02
5/16	5.3	0.21	6.1	0.24	6.1	0.24	17.5	0.69	17.5	0.69
5/16	6.1	0.24	7.6	0.30	6.1	0.24	20.6	0.81	17.5	0.69
5/16	7.6	0.30	9.4	0.37	7.6	0.30	25.4	1.00	22.4	0.88
5/16	10.9	0.43	12.4	0.49	10.9	0.43	31.8	1.25	26.9	1.06

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TABLE 6—DIMENSIONS OF REDUCING CONNECTORS, REDUCING ADAPTERS, AND REDUCING ELBOWS (FIGURES 26 TO 32)^a (CONTINUED)

Nom Tube OD in	Dryseal Pipe Thread NPTF ^b	C Hex in Nom	C ₁ Hex in Nom	C ₂ Hex in Nom	Drill mm	Drill in	D ^d Drill mm	D ^d Drill in	D ₁ ^d Drill mm	D ₁ ^d Drill in	D ₂ Drill in	D ₂ mm ±0.8	L in ±0.03
3/8	1/8	5/8	5/8	13/16	7.14	0.281	5.56	0.219	—	—	—	31.8	1.25
3/8	3/8	11/16	13/16	13/16	7.14	0.281	10.31	0.406	9.52	0.375	0.375	36.6	1.44
3/8	1/2	7/8	1	7/8	7.14	0.281	14.27	0.562	9.52	0.375	0.375	42.9	1.69
3/8	3/4	1- 1/16	1- 1/4	1- 11/16	7.14	0.281	19.05	0.750	9.52	0.375	0.375	46.0	1.81

B Nom Tube OD in	L ₁ mm ±0.8	L ₁ in ±0.03	L ₂ mm ±0.8	L ₂ in ±0.03	M mm ±0.8	M in ±0.03	M ₁ mm ±0.8	M ₁ in ±0.03	M ₂ mm ±0.8	M ₂ in ±0.03	N mm ±0.8	N in ±0.03
3/8	26.4	1.12	27.7	1.09	26.2	1.03	26.9	1.06	22.6	0.89	23.1	0.91
3/8	35.1	1.38	26.4	1.12	26.9	1.06	29.5	1.16	23.6	0.93	27.7	1.09
3/8	41.1	1.62	31.8	1.25	29.5	1.16	31.8	1.25	25.1	0.99	32.5	1.28
3/8	42.2	1.66	30.2	1.19	31.8	1.25	35.6	1.41	26.2	1.03	35.1	1.38

B Nom Tube OD in	N ₁ mm ±0.8	N ₁ in ±0.03	N ₂ mm ±0.8	N ₂ in ±0.03	P Min mm	P Min in	P ₁ mm	P ₁ in	Q ^e mm	Q ^e in	S ^d Max mm	S ^d Max in
3/8	12.7	0.50	17.0	0.67	9.7	0.38	9.7	0.38	—	—	19.0	0.75
3/8	17.5	0.69	24.1	0.95	14.2	0.56	14.2	0.56	17.5	0.69	17.5	0.69
3/8	22.4	0.88	29.7	1.17	19.0	0.75	19.1	0.75	—	—	23.1	0.91
3/8	22.4	0.88	30.5	1.20	19.0	0.75	19.1	0.75	—	—	24.6	0.97

B Nom Tube OD in	T ^f Ref mm	T ^f Ref in	T ₁ Min mm	T ₁ Min in	T ₂ Min mm	T ₂ Min in	W _g mm +0.0 -0.5	W _g in +0.00 -0.02	X _g mm +0.0 -0.5	X _g in +0.00 -0.02
3/8	6.1	0.24	6.1	0.24	7.6	0.30	15.7	0.62	20.6	0.81
3/8	6.1	0.24	7.6	0.30	7.6	0.30	20.6	0.81	20.6	0.81
3/8	7.6	0.30	9.4	0.37	7.6	0.30	25.4	1.00	22.4	0.88
3/8	10.9	0.43	12.4	0.49	10.9	0.43	31.8	1.25	26.9	1.06

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TABLE 6-DIMENSIONS OF REDUCING CONNECTORS, REDUCING ADAPTERS, AND REDUCING ELBOWS (FIGURES 26 TO 32)^a (CONTINUED)

B Nom Tube OD in	A Dryseal Pipe Thread NPTFb	C Hex in Nom	C ₁ Hex in Nom	C ₂ Hex in Nom	D ^d Drill mm	D ^d Drill in	D ₁ ^d Drill mm	D ₁ ^d Drill in	D ₂ Drill mm	D ₂ Drill in	L mm ±0.8	L in ±0.03
1/2	1/8	3/4	3/4	15/16	10.31	0.406	5.56	0.219	—	—	36.6	1.44
1/2	1/4	3/4	3/4	15/16	10.31	0.406	7.92	0.312	—	—	41.1	1.62
1/2	1/2	7/8	1	15/16	10.31	0.406	14.27	0.562	12.70	0.500	46.0	1.81
1/2	3/4	1-1/16	1-1/4	1- 1/16	10.31	0.406	19.05	0.750	12.70	0.500	49.3	1.94

N o m Tube OD in	L ₁ mm ±0.8	L ₁ in ±0.03	L ₂ mm ±0.8	L ₂ in ±0.03	M mm ±0.8	M in ±0.03	M ₁ mm ±0.8	M ₁ in ±0.03	M ₂ mm ±0.8	M ₂ in ±0.03	N mm ±0.8	N in ±0.03
1/2	30.2	1.19	31.8	1.25	31.0	1.22	31.0	1.22	26.9	1.06	25.4	1.00
1/2	35.6	1.41	34.0	1.34	31.0	1.22	31.0	1.22	26.9	1.06	30.2	1.19
1/2	44.4	1.75	37.3	1.47	32.5	1.28	35.1	1.38	26.4	1.12	35.1	1.38
1/2	45.0	1.81	35.1	1.38	35.1	1.38	36.9	1.53	29.5	1.16	35.1	1.38

B Nom Tube OD in	N ₁ mm ±0.8	N ₁ in ±0.03	N ₂ mm ±0.8	N ₂ in ±0.03	P Min mm	P Min in	P ₁ mm	P ₁ in	Q ^e mm	Q ^e in	S ^d Max mm	S ^d Max in
1/2	14.2	0.56	19.3	0.76	9.7	0.38	9.7	0.38	—	—	23.1	0.91
1/2	19.0	0.75	24.1	0.95	14.2	0.56	14.2	0.56	—	—	23.1	0.91
1/2	23.9	0.94	29.7	1.17	19.0	0.75	19.1	0.75	—	—	23.1	0.91
1/2	23.9	0.94	30.5	1.20	19.0	0.75	19.1	0.75	—	—	24.6	0.97

B Nom Tube OD in	T ^f Ref mm	T ^f Ref in	T ₁ Min mm	T ₁ Min in	T ₂ Min mm	T ₂ Min in	W ₉ mm +0.0 -0.5	W ₉ in +0.00 -0.02	X ₉ mm +0.0 -0.5	X ₉ in +0.00 -0.02
1/2	7.6	0.30	7.6	0.30	9.4	0.37	19.0	0.75	23.9	0.94
1/2	7.6	0.30	7.6	0.30	9.4	0.37	19.0	0.75	23.9	0.94
1/2	7.6	0.30	9.4	0.37	9.4	0.37	25.4	1.00	23.9	0.94
1/2	10.9	0.43	12.4	0.49	10.9	0.43	31.8	1.25	26.9	1.06

TABLE 6-DIMENSIONS OF REDUCING CONNECTORS, REDUCING ADAPTERS, AND REDUCING ELBOWS (FIGURES 26 TO 32)^a (CONTINUED)

B Nom Tube OD in	A Dryseal Pipe Thread NPTF ^b	C Hex in Nom	C ₁ Hex in Nom	C ₂ Hex in Nom	Drill mm	Drill in	D ^d Drill mm	D ^d Drill in	D ₁ ^d Drill in	D ₁ ^d Drill mm	D ₂ Drill in	D ₂ Drill mm	L mm ±0.8	L in ±0.03
5/8	1/8	7/8	7/8	1-1/16	12.70	0.500	5.56	0.219	—	—	—	—	41.1	1.62
5/8	1/4	7/8	7/8	1-1/16	12.70	0.500	7.92	0.312	—	—	—	—	46.0	1.81
5/8	3/8	7/8	7/8	1-1/16	12.70	0.500	10.31	0.406	—	—	—	—	46.0	1.81
5/8	3/4	1-1/16	1-1/4	1-1/16	12.70	0.500	19.05	0.750	15.88	0.625	—	—	52.3	2.06

B Nom Tube OD in	L ₁ mm ±0.8	L ₁ in ±0.03	L ₂ mm ±0.8	L ₂ in ±0.03	M mm ±0.8	M in ±0.03	M ₁ mm ±0.8	M ₁ in ±0.03	M ₂ mm ±0.8	M ₂ in ±0.03	N mm ±0.8	N in ±0.03
5/8	32.5	1.28	35.8	1.41	35.6	1.41	35.8	1.41	31.2	1.23	26.9	1.06
5/8	38.1	1.50	38.9	1.53	35.6	1.41	35.6	1.41	31.2	1.23	31.8	1.25
5/8	40.4	1.59	39.8	1.56	35.8	1.41	35.8	1.41	31.2	1.23	31.6	1.25
5/8	48.5	1.91	42.2	1.66	36.6	1.44	42.2	1.66	32.3	1.27	38.1	1.50

Nom Tube OD in	N ₁ mm ±0.8	N ₁ in ±0.03	N ₂ mm ±0.8	N ₂ in ±0.03	P Min mm	P Min in	P ₁ mm	P ₁ in	Q ^e mm	Q ^e in	S ^d Max mm	S ^d Max in
5/8	15.7	0.62	20.1	0.79	9.7	0.38	9.7	0.38	—	—	27.2	1.07
5/8	20.6	0.81	24.9	0.98	14.2	0.56	14.2	0.56	—	—	27.2	1.07
5/8	20.6	0.81	24.9	0.98	14.2	0.56	14.2	0.56	—	—	27.2	1.07
5/8	25.4	1.00	30.5	1.20	19.0	0.75	19.1	0.75	—	—	24.6	0.97

B Nom Tube OD in	T ^f Ref mm	T ^f Ref in	T ₁ Min mm	T ₁ Min in	T ₂ Min mm	T ₂ Min in	W _g mm +0.0 -0.5	W _g in +0.00 -0.02	X _g mm +0.0 -0.5	X _g in +0.00 -0.02
5/8	9.4	0.37	9.4	0.37	10.9	0.43	22.4	0.88	26.9	1.06
5/8	9.4	0.37	9.4	0.37	10.9	0.43	22.4	0.88	26.9	1.06
5/8	9.4	0.37	9.4	0.37	10.9	0.43	22.4	0.88	26.9	1.06
5/8	10.9	0.43	12.4	0.49	10.9	0.43	31.4	1.25	26.9	1.06

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TABLE 6-DIMENSIONS OF REDUCING CONNECTORS, REDUCING ADAPTERS, AND REDUCING ELBOWS (FIGURES 26 TO 32)^a (CONTINUED)

B Nom Tube OD in	A Dryseal Pipe Thread NPTF ^b	C Hex in Nom	C ₁ Hex in Nom	C ₂ Hex in Nom	Drill mm	Drill in	D ^d Drill mm	D ^d Drill in	D ₁ ^d Drill mm	D ₁ ^d Drill in	D ₂ Drill in	D ₂ mm ±0.8	L in ±0.03
3/4	1/8	1-1/16	1-1/16	1-5/16	15.88	0.625	5.56	0.219	—	—	—	46.0	1.81
3/4	1/4	1-1/16	1-1/16	1-5/16	15.68	0.625	7.92	0.312	—	—	—	50.8	2.00
3/4	3/8	1-1/16	1-1/16	1-5/16	16.88	0.625	10.31	0.406	—	—	—	50.8	2.00
3/4	3/4	1-1/16	1-1/4	1-5/16	15.88	0.625	19.05	0.750	—	—	—	55.6	2.19

B Nom Tube OD in	L ₁ mm ±0.8	L ₁ in ±0.03	L ₂ mm ±0.8	L ₂ in ±0.03	M mm ±0.8	M in ±0.03	M ₁ mm ±0.8	M ₁ in ±0.03	M ₂ mm ±0.8	M ₂ in ±0.03	N mm ±0.8	N in ±0.03
3/4	35.1	1.38	41.1	1.62	41.1	1.62	40.4	1.59	35.8	1.41	31.0	1.22
3/4	39.6	1.56	44.4	1.75	41.1	1.62	40.4	1.59	35.6	1.41	35.6	1.41
3/4	42.2	1.66	45.2	1.78	41.1	1.62	40.4	1.59	35.8	1.41	35.8	1.41
3/4	50.0	1.97	45.2	1.78	40.4	1.69	45.2	1.78	35.8	1.41	41.1	1.62

B Nom Tube OD in	N ₁ mm ±0.8	N ₁ in ±0.03	N ₂ mm ±0.8	N ₂ in ±0.03	P Min mm	P Min in	P ₁ mm	P ₁ in	Q ^e mm	Q ^e in	S ^d Max mm	S ^d Max in
3/4	17.5	0.69	20.8	0.82	9.7	0.38	9.7	0.38	—	—	31.0	1.22
3/4	22.4	0.88	25.7	1.01	14.2	0.56	14.2	0.56	—	—	31.0	1.22
3/4	22.4	0.88	25.7	1.01	14.2	0.56	14.2	0.56	—	—	31.0	1.22
3/4	26.9	1.06	30.5	1.20	19.0	0.75	19.1	0.75	—	—	24.6	0.97

TABLE 6-DIMENSIONS OF REDUCING CONNECTORS, REDUCING ADAPTERS, AND REDUCING ELBOWS
(FIGURES 26 TO 32)^a (CONTINUED)

B Nom Tube OD in	T ^f Ref mm	T ^f Ref in	T ₁ Min mm	T ₁ Min in	T ₂ Min mm	T ₂ Min in	W ₉ mm +0.0 -0.5	W ₉ in +0.00 -0.02	X ₉ mm +0.0 -0.5	X ₉ in +0.00 -0.02
3/4	10.9	0.43	10.9	0.43	12.4	0.49	26.9	1.06	33.3	1.31
3/4	10.9	0.43	10.9	0.43	12.4	0.49	26.9	1.06	33.3	1.31
3/4	10.9	0.43	10.8	0.43	12.4	0.49	28.9	1.06	33.3	1.31
3/4	10.9	0.43	12.4	0.49	12.4	0.49	31.8	1.25	33.3	1.31

^a For flare dimensions shown on Figures 26 to 32 but not given in Table 6, see corresponding dimensions for the specified Tube OD in Table 3.

^b Dryseal American Standard Taper Pipe Thread.

^c Where thread relief undercut is used, last thread shall be chamfered 1/2 to 1 pitch long from G diameter and dimension J may be reduced by an amount equal to 1/2 pitch.

^d At manufacturer's option, through passages in fittings shown in Figure 26 may conform with the smaller diameter specified or be counterbored to the larger diameter from the appropriate end for depth S.

^e Available with three types of fusible alloys as specified in General Specifications.

^f Minimum design thickness, not subject to inspection.

^g Basic dimensions shown shall apply as minimum for bosses. The -0.51 mm (-0.02 in) tolerance shall apply only to chamfer diameters on full hexagon versions of fittings shown in Figures 28 and 29.

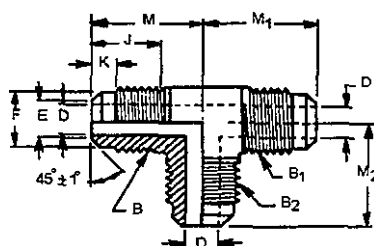


FIGURE 33—THREE-WAY
REDUCING TEE
(010401) (TR2)

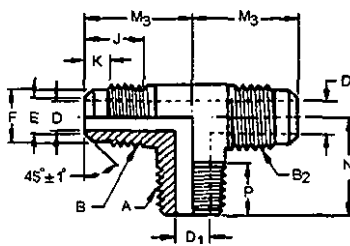


FIGURE 34—TWO-WAY REDUCING
TEE (100425) (T1)

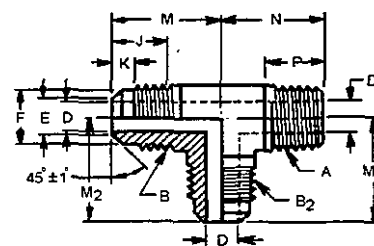


FIGURE 35—RIGHT ANGLE
TWO-WAY REDUCING TEE
(1010424) (T3)

NOTE—UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOUR, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR REFRIGERATION TUBE FITTINGS. THE ILLUSTRATIONS ON THIS PAGE APPLY TO TABLE 7 TO 10. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTING IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FIRST NUMBER) AND ANSI B70.1 (SECOND NUMBER).

TABLE 7—END TO CENTER DIMENSIONS OF FLARE TO FLARE ENDS ON REDUCING TEES=

□ and B ₁ Tube OD of Run in	End to Center ±0.8 mm ±0.03 in	B ₂ Nominal Flare Sizes Of Branch in 3/16 mm	B ₂ Nominal Flare Sizes Of Branch in 3/16 in	B ₂ Nominal Flare Sizes Of Branch in 1/4 mm	B ₂ Nominal Flare Sizes of Branch in 1/4 in	B ₂ Nominal Flare Sizes Of Branch in 5/16 mm	B ₂ Nominal Flare Sizes Of Branch in 5/16 in
3/16	M or M ₁	19.0	0.75	19.0	0.75	19.8	0.78
3/16	M ₂	19.0	0.75	22.4	0.88	23.1	0.91
1/4	M or M ₁	22.4	0.88	22.4	0.88	21.3	0.84
1/4	M ₂	19.0	0.75	22.4	0.88	23.1	0.91
5/16	M or M ₁	23.1	0.91	23.1	0.91	23.1	0.91
5/16	M ₂	19.8	0.78	21.3	0.84	23.1	0.91
3/8	M or M ₁	26.9	1.06	28.9	1.06	28.9	1.06
3/8	M ₂	21.3	0.84	23.1	0.91	24.6	0.97
1/2	M or M ₁	31.0	1.22	31.0	1.22	31.0	1.22
1/2	M ₂	23.1	0.91	24.6	0.97	28.2	1.03
5/8	M or M ₁	35.8	1.41	35.8	1.41	35.8	1.41
5/8	M ₂	24.6	0.97	26.2	1.03	27.7	1.09
3/4	M or M ₁	42.2	1.66	42.2	1.66	42.2	1.66
3/4	M ₂	26.9	1.06	28.4	1.12	30.2	1.19

Band B ₁ Tube OD Of Run in	End to center ±0.8 mm ±0.03 in	B ₂ Nominal Flare Sizes of Branch in 3/8 mm	B ₂ Nominal Flare Sizes Of Branch in 3/8 in	B ₂ Nominal Flare Sizes Of Branch in 1/2 mm	B ₂ Nominal Flare Sizes Of Branch in 1/2 in	B ₂ Nominal Flare Sizes Of Branch in 5/8 mm	B ₂ Nominal Flare Sizes Of Branch in 5/8 in	B ₂ Nominal Flare Sizes Of Branch in 3/4 mm	B ₂ Nominal Flare Sizes Of Branch in 3/4 in
3/16	M or M ₁	21.3	0.84	23.1	0.91	24.6	0.97	28.9	1.06
3/16	M ₂	26.9	1.06	31.0	1.22	35.8	1.41	42.2	1.66
1/4	M or M ₁	23.1	0.91	24.6	0.97	26.2	1.03	28.4	1.12
1/4	M ₂	28.9	1.06	31.0	1.22	35.8	1.41	42.2	1.66
5/16	M or M ₁	24.6	0.97	28.2	1.03	27.7	1.09	30.2	1.19
5/16	M ₂	26.9	1.06	31.0	1.22	35.8	1.41	42.2	1.66
3/8	M or M ₁	28.9	1.06	27.7	1.09	29.6	1.16	31.8	1.25
3/8	M ₂	28.9	1.06	31.0	1.22	35.8	1.41	42.2	1.66
1/2	M or M ₁	31.0	1.22	31.0	1.22	32.5	1.28	35.1	1.38
1/2	M ₂	27.7	1.09	31.0	1.22	35.8	1.41	42.2	1.66
5/8	M or M ₁	35.8	1.41	35.8	1.41	35.8	1.41	38.1	1.50
5/8	M ₂	29.6	1.16	32.5	1.28	35.8	1.41	42.2	1.88
3/4	M or M ₁	42.2	1.66	42.2	1.68	42.2	1.66	42.2	1.66
3/4	M ₂	31.8	1.25	35.1	1.38	38.1	1.60	42.2	1.66

^a For flare and pipe thread dimensions shown on Figures 33 to 35, see corresponding dimensions for specified Tube OD and specified pipe thread size in Table 3. For passage diameters, see Tables 9 and 10.

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TABLE 8—END TO CENTER DIMENSIONS OF FLARE TO PIPE ENDS ON REDUCING TEES^a

B B ₁ or B ₂ Tube OD	End to Center ±0.8 mm ±0.03 in	A ₁ Dryseal Taper Thread NPTF ^b	A ₁ Dryseal Taper Thread NPTF ^b	A ₁ Dryseal Taper Thread NPTF ^b	A ₁ Dryseal Taper Thread NPTF ^b	A ₁ Dryseal Taper Thread NPTF ^b	A ₁ Dryseal Taper Thread NPTF ^b	A ₁ Dryseal Taper Thread NPTF ^b	A ₁ Dryseal Taper Thread NPTF ^b	A ₁ Dryseal Taper Thread NPTF ^b	A ₁ Dryseal Taper Thread NPTF ^b
		in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm
3/16	M ₃	19.0	0.75	20.6	0.81	22.4	0.88	24.6	0.97	26.9	1.06
3/16	N	19.0	0.75	24.6	0.97	25.4	1.00	32.5	1.28	35.1	1.38
1/4	M ₃	20.6	0.81	23.1	0.91	23.9	0.94	26.2	1.03	28.4	1.12
1/4	N	19.8	0.78	23.9	0.94	26.2	1.03	32.5	1.23	35.1	1.38
5/16	M ₃	23.1	0.91	24.6	0.97	25.4	1.00	27.7	1.09	30.2	1.19
5/16	N	19.8	0.78	23.9	0.94	26.2	1.03	32.5	1.28	35.1	1.38
3/8	M ₃	26.2	1.03	25.4	1.00	26.9	1.06	29.5	1.16	31.8	1.25
3/8	N	23.1	0.91	26.9	1.06	27.7	1.09	32.5	1.28	35.1	1.38
1/2	M ₃	31.0	1.22	31.0	1.22	31.0	1.22	32.5	1.28	35.1	1.36
1/2	N	25.4	1.00	30.2	1.19	28.4	1.12	35.1	1.38	35.1	1.36
5/8	M ₃	35.8	1.41	35.8	1.41	35.8	1.41	35.8	1.41	36.6	1.44
5/8	N	26.9	1.06	31.8	1.25	31.8	1.25	35.1	1.38	38.1	1.50
3/4	M ₃	41.1	1.62	41.1	1.62	41.1	1.62	41.1	1.62	40.4	1.59
3/4	N	31.0	1.22	35.8	1.41	35.8	1.41	36.1	1.50	41.1	1.62

^a For flare and pipe thread dimensions shown on Figures 33 to 35, see corresponding dimensions for specified Tube OD and specified pipe thread size in Table 3. For passage diameters, see Tables 9 and 10.

^b Dryseal American Standard Taper Pipe Thread.

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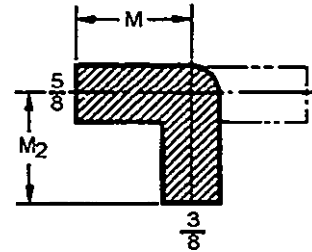
TO DETERMINE CORRECT END TO CENTER LENGTHS ON TEES, EACH 90 DEGREES MUST BE FIGURED SEPARATELY AS AN ELBOW AND THE LARGER OF THE TWO BRANCH LENGTHS SHALL APPLY. SEE EXAMPLES BELOW.

EXAMPLE: Find lengths for 5/8x1/2x3/8 in three-way reducing tee.

1. From Table 7 obtain values for each 90 degrees separately.
2. Use larger of two M_2 dimensions as found.

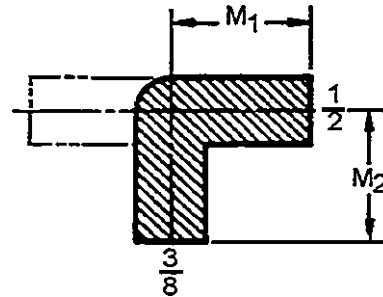
FROM TABLE 7

B Nominal Tube OD in	End to Center	B₂ 3/8 mm	B₂ 3/8 in
5/8	M	36.6	1.41
5/8	M ₂	29.5	1.16



FROM TABLE 7

B₁ Nominal Tube OD in	End to Center	B₂ 3/8 mm	B₂ 3/8 in
1/2	M ₁	31.0	1.22
1/2	M ₂	27.7	1.09



Result:

Dimension		mm	in
M	=	35.8	1.41
M ₁	=	31.0	1.22
M ₂	=	29.5	1.16

(R) FIGURE 34A—THREE-WAY REDUCING TEE (010401) (TR2)

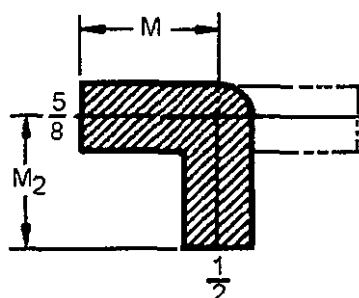
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EXAMPLE: Find lengths for 5/8 x 3/8 x 1/2 in right angle two-way tee.

1. From Tables 7 and 8 obtain values for each 90 degrees separately.
2. Use the larger dimension M_2 or M_3 as found.

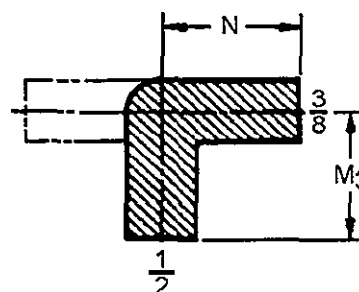
FROM TABLE 7

B Nominal Tube OD in	Center End to Center	B ₂ 1/2 mm	B ₂ 1/2 in
5/8	M	35.8	1.41
5/8	M ₂	32.5	1.28



FROM TABLE 9

Nominal Tube OD in	End to Center	A 3/8 mm	A 3/8 in
1/2	M ₃	31.0	1.22
1/2	N	28.4	1.12



Result:

Dimension		mm	in
M	=	35.8	1.41
N	=	20.4	1.12
M ₃	=	32.5	1.28

(R) FIGURE 35A—RIGHT ANGLE TWO-WAY REDUCING TEE (010424) (T3)

NOTE—UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOUR, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR REFRIGERATION TUBE FITTINGS. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTING IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FIRST NUMBER) AND ANSI B70.1 (SECOND NUMBER).

TABLE 9—PASSAGE DIAMETERS THROUGH FLARE ENDS

Nom Tube OD in	Da Dia Drill mm	Da Dia Drill in
3/16	3.18	0.125
1/4	4.78	0.188
5/16	5.56	0.219
3/8	7.14	0.281
1/2	10.31	0.406
5/8	12.70	0.500
3/4	15.88	0.625

^a At manufacturer's option, through passages in tees shown in Figures 33 to 35 having varying diameters at opposite ends may conform to the smaller diameters specified or be counterbored to the larger diameter from the appropriate end for a minimum depth equivalent to the maximum end to center length of that end, plus 1/2 the *maximum* passage through branch plus 0.3 mm (0.01 in).

TABLE 10—PASSAGE DIAMETERS THROUGH PIPE THREAD ENDS

Nom Pipe Size in	Da Dia Drill mm	Da Dia Drill in
1/8	5.56	0.219
1/4	7.92	0.312
3/8	10.31	0.406
1/2	14.27	0.562
3/4	19.05	0.750

^a At manufacturer's option, through passages in tees shown in Figures 33 to 35 having varying diameters at opposite ends may conform to the smaller diameters specified or be counterbored to the larger diameter from the appropriate end for a minimum depth equivalent to the maximum end to center length of that end, plus 1/2 the maximum passage through branch plus 0.3 mm (0.01 in).

TABLE 11-DIMENSIONS FOR STANDARD SIZES OF SHORT AND LONG FLARE NUTS
(FIGURES 36A AND 36B)

Nom Tube OD in	Straight Thread Nom Size in	C Hex in Nom	D Dia mm +0.13 -0.00	D Dia in +0.005 -0.000	E Dia Min mm	E Dia Min in	I mm	I in	J Full Thread Min mm	J Full Thread Min in
3/16	3/8 -24	1/2	4.88	0.192	10.4	0.41	7.1	0.28	5.6	0.22
1/4	7/16-20	5/8	6.48	0.255	11.9	0.47	8.6	0.34	6.9	0.27
5/16	1/2 -20	11/16	8.05	0.317	11.9	0.47	9.7	0.38	7.6	0.30
3/8	5/8 -18	13/16	9.65	0.380	15.0	0.59	11.2	0.44	6.6	0.34
1/2	3/4 -16	15/16	12.83	0.505	19.0	0.75	13.5	0.53	11.2	0.44
5/8	7/8 -14	1- 1/16	16.00	0.630	23.9	0.94	16.8	0.66	14.0	0.56
3/4	1-1/16-14	1- 5/16	19.18	0.755	28.4	1.12	19.8	0.78	17.0	0.67

Nom Tube OD in	L mm ±0.8	L in ±0.03	L ₁ mm +2.3 -0.0	L ₁ in +0.09 -0.00	T mm ±0.8	T in ±0.03	U Dia Min mm	U Dia Min in	U Dia Max mm	U Dia Max in	X mm +0.0 -0.8	X in +0.00 -0.03
3/16	22.4	0.88	13.5	0.53	9.7	0.38	9.9	0.39	10.4	0.41	12.7	0.50
1/4	23.9	0.94	15.0	0.59	11.2	0.44	11.4	0.45	11.9	0.47	15.7	0.62
5/16	23.9	0.94	15.7	0.62	11.2	0.44	13.0	0.51	13.5	0.53	17.5	0.69
3/8	26.9	1.06	17.5	0.69	12.7	0.50	16.3	0.64	17.0	0.67	20.6	0.81
1/2	30.2	1.19	20.6	0.81	14.2	0.56	19.6	0.77	20.3	0.80	23.9	0.34
5/8	36.6	1.44	23.9	0.94	19.0	0.75	22.9	0.90	23.6	0.93	26.9	1.06
3/4	44.5	1.75	26.4	1.12	25.4	1.00	27.4	1.08	28.2	1.11	33.3	1.31

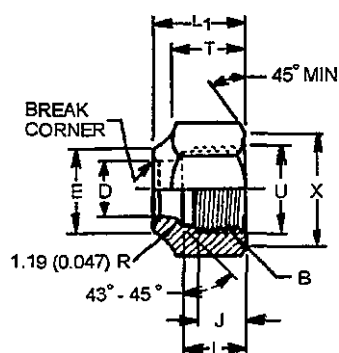


FIGURE 36A—SHORT NUTS
(010166) (NS4)

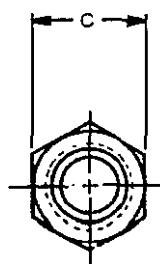


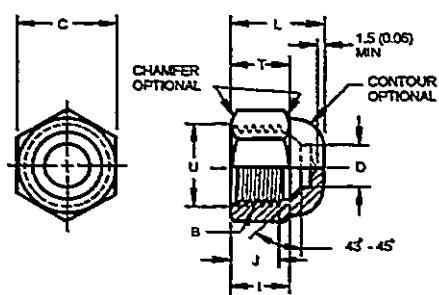
FIGURE 36B—LONG NUTS
(010167) (N4)

(R) FIGURE 36—FLARE NUTS

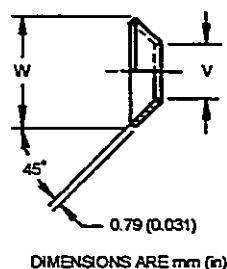
TABLE 12-DIMENSIONS OF FLARE CAP, FLARE GASKET, AND FLARE SEAL BONNET
(FIGURES 37 TO 39)

Nom Tube OD In	B Straight Thread Nom Size Class 2B Int	C Hex in Nom	D Dia mm	D Dia in	I mm	I in	J Full Thread Min mm	J Full Thread Min in	L mm	L in	T Min mm	T Min in
3/16	3/8 -24	1/2	3.0	0.12	7.1	0.28	5.3	0.21	11.9	0.47	6.9	0.27
1/4	7/16-20	9/16	4.3	0.19	8.6	0.34	6.4	0.25	13.5	0.53	10.2	0.40
5/16	1/2 -20	5/8	5.6	0.22	9.7	0.38	7.4	0.29	15.7	0.62	10.2	0.40
3/8	5/8 -18	3/4	7.1	0.28	11.2	0.44	8.6	0.34	17.5	0.59	11.7	0.46
1/2	3/4 -16	7/8	10.4	0.41	13.5	0.53	10.9	0.43	21.3	0.84	13.2	0.52
5/8	7/8 -14	1-1/16	12.7	0.50	16.8	0.66	13.7	0.54	24.6	0.97	15.7	0.62
3/4	1-1/16-14	1-5/16	15.7	0.62	19.8	0.78	16.8	0.66	27.7	1.09	18.8	0.74

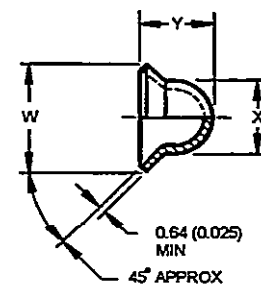
Nom Tube OD In	U Dia Min mm	U Dia Min in	U Dia Max mm	U Dia Max in	V Dia mm ±0.8	V Dia in ±0.03	W Dia Max mm	W Dia Max in	X mm ±0.5	X in ±0.02	Y Min mm	Y Min in
3/16	9.9	0.39	10.4	0.41	3.0	0.12	7.9	0.31	4.1	0.16	4.1	0.15
1/4	11.4	0.45	11.9	0.47	4.8	0.19	9.1	0.36	5.6	0.22	5.6	0.22
5/16	13.0	0.51	13.5	0.53	5.6	0.22	10.7	0.42	7.1	0.28	7.1	0.28
3/8	16.3	0.64	17.0	0.67	7.1	0.28	14.0	0.55	9.1	0.36	8.6	0.34
1/2	19.6	0.77	20.3	0.80	10.4	0.41	16.8	0.66	11.9	0.47	10.4	0.41
5/8	22.9	0.90	23.6	0.93	12.7	0.50	19.6	0.77	15.5	0.61	11.2	0.44
3/4	27.4	1.08	28.2	1.11	15.7	0.52	24.1	0.95	18.3	0.72	14.2	0.66



DIMENSIONS ARE mm (in)

(R) FIGURE 37—FLARE CAP
(010112) (N5)

DIMENSIONS ARE mm (in)

FIGURE 38—FLARE
GASKET
(010113) (B2)

DIMENSIONS ARE mm (in)

FIGURE 39—FLARE SEAL
BONNET
(010114) (B1)

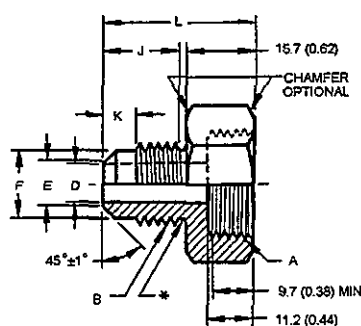
TABLE 13-DIMENSIONS OF DRUM ADAPTERS^a (FIGURE 40)

Nom Tube OD in	A Straight internal Pipe Thread NPSM ^b	C Hex in Nom	D Drill mm	D Drill in	L mm ±0.8	L in ±0.03
1/4	1/2	1-1/8	4.78	0.188	28.4	1.12
1/4	3/4	1-1/4	4.78	0.188	28.4	1.12
3/8	3/4	1-1/4	71.4	0.281	31.8	1.25
1/2	3/4	1-1/4	10.31	0.406	35.1	1.38

^a For flare and dimensions shown on Figure 40 but not specified in Table 13, see corresponding dimensions for the specified Tube OD in Table 3. Drum adaptor fittings are normally supplied with seal gasket for pipe thread end.

^b American Standard Straight Pipe Thread for Mechanical Joints.

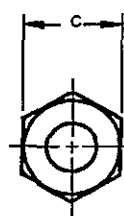
^c Where thread relief undercut is used, last thread shall be chamfered 1/2 to 1 pitch long from G diameter and dimension J may be reduced by an amount equal to 1/2 pitch.



DIMENSIONS ARE mm (in)

* UNDERCUT TO G DIA OPTIONAL
UNLESS OTHERWISE SPECIFIED BY
PURCHASER (SEE FOOTNOTE C).

FIGURE 40—DRUM ADAPTOR
(010165) (K)



DIMENSIONS ARE mm (in)

FIGURE 41—FUSIBLE PIPE PLUG
(010164) (FP)

NOTE—UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOUR, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR REFRIGERATION TUBE FITTINGS. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTING IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FIRST NUMBER) AND ANSI 870.1 (SECOND NUMBER).

TABLE 14-DIMENSIONS OF FUSIBLE PIPE PLUGS= (FIGURE 41)

A Dryseal Pipe Thread NPTF ^b	C Hex in Nom	D Dia mm	D Dia in	L mm	L in	T mm	T in
1/8	7/16	5.6	0.219	14.2	0.56	4.8	0.19
1/4	9/16	6.4	0.250	19.0	0.75	4.8	0.19
3/8	3/4	9.5	0.375	19.8	0.78	5.6	0.22

^a Plugs are available with three types of fusible alloys as specified in general specifications.

^b Dryseal American Standard Taper Pipe Thread.

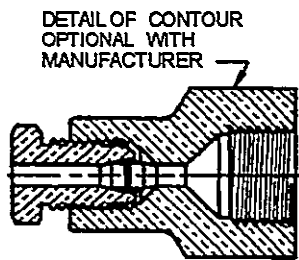


FIGURE 42A—CAPILLARY
TUBE CONNECTION ASSEMBLY
(450101BA)

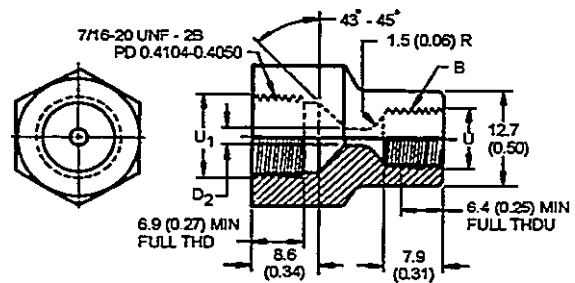
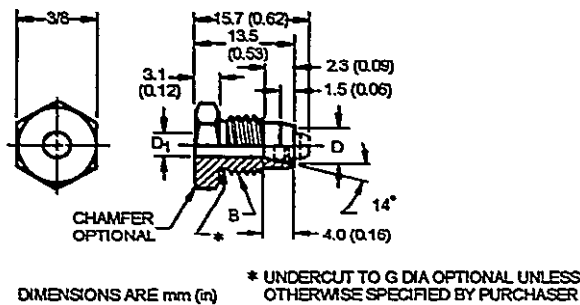


FIGURE 42B—CAPILLARY TUBE BODY
(450101) (CTN)



(R) FIGURE 42C—CAPILLARY TUBE
COMPRESSION SCREW
(450110) (CTN)

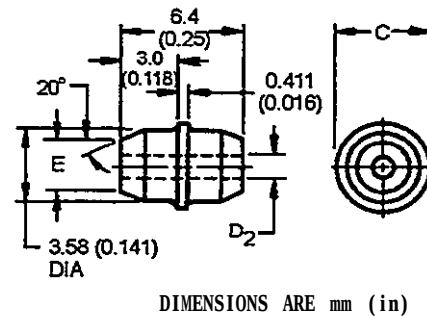


FIGURE 42D—CAPILLARY TUBE SLEEVE
(450115) (CTN)

FIGURE 42—CAPILLARY TUBE CONNECTION

NOTE—UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOUR, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR REFRIGERATION TUBE FITTINGS. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTING IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FIRST NUMBER) AND ANSI B70.1 (SECOND NUMBER).

(R) TABLE 15—CAPILLARY TUBE CONNECTION (FIGURE 42)

Nom Tube OD in	B Straight Thread Nominal Size in	C Dia in Nom	D Dia mm ± 0.13	D Dia in ± 0.005	D ₁ Drill mm ± 0.13	D ₁ Drill in ± 0.005	D ₂ Drill mm ± 0.05	D ₂ Drill in ± 0.002
0.081	5/16-24	11/64	4.7	0.187	2.6	0.104	2.16	0.085
0.093	5/16-24	11/64	4.7	0.187	2.6	0.104	2.46	0.097

Nom Tube OD in	E Dia mm ± 0.8	E Dia in ± 0.003	G ^a Dia mm $+0.00$ -0.25	G ^a Dia in $+0.000$ -0.010	U Dia mm $+0.5$ -0.0	U Dia in $+0.02$ -0.00	U ₁ Dia mm $+0.5$ -0.0	U ₁ Dia in $+0.02$ -0.00
0.081	2.67	0.105	6.35	0.250	8.4	0.33	11.4	0.45
0.093	2.67	0.105	6.35	0.250	8.4	0.33	11.4	0.45

^a Where thread relief undercut is used, the last thread shall be chamfered 1/2 to 1 pitch thread long from the G diameter.

3. **Pressure Ratings and Service Limitations**—Fittings covered by this document are satisfactory for operating pressures up to 3450 kPa (500 psi) and are suitable for use in systems conducting most fluorinated hydrocarbon refrigerants. Fitting manufacturers should be consulted for recommendations.
4. **Size Designations**—Fitting sizes throughout the dimensional tables are designated by the corresponding outside diameter of the tubing for flared type or solder type tube ends and by the corresponding standard nominal pipe size for pipe thread ends.
5. **Dimensions and Tolerances**—Except for nominal sizes and thread specifications, dimensions and tolerances are given in both SI and U.S. customary units as designated. Tabulated dimensions shall apply to the finished parts, plated or otherwise processed, as specified by the purchasers. Unless otherwise specified, the maximum and minimum across flat dimensions shall be within the commercial tolerance of bar or extruded stock from which the fittings are produced. The minimum across corners dimensions of hexagons shall be 1.092 times the nominal width across flats, but shall not result in a size flat width less than 0.43 times the nominal width across flats.

Unless otherwise specified, tolerance on hole diameters designated drill in the dimensional tables shall be as tabulated in Table 16.

TABLE 16—DIMENSIONS AND TOLERANCES

Drill Size Range mm	Drill Size Range in	Tolerance Plus mm	Tolerance Plus in	Tolerance Minus mm	Tolerance Minus in
0.343 thru 4.699	0.0135 thru 0.1850	0.08	0.003	0.05	0.002
4.762 thru 6.299	0.1875 thru 0.2480	0.10	0.004	0.05	0.002
6.350 thru 19.050	0.2500 thru 0.7500	0.15	0.006	0.08	0.003
19.25 thru 25.400	0.7579 thru 1.0000	0.18	0.007	0.10	0.004

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Tolerance on all dimensions not otherwise limited shall be ± 0.25 mm (± 0.010 in). Fitting seats shall be concentric with the straight thread pitch diameters within 0.25 mm (0.010 in) full indicator reading (FIR). Angular tolerance on axis of ends on elbows, tees, and crosses shall be ± 2.50 degrees for sizes up to and including 3/8 in, and ± 1.50 degrees for sizes larger than 3/8 in.

Where so illustrated and not otherwise specified, hexagon comers shall be chamfered 30 degrees ± 5 degrees, to a diameter equal to the nominal width across flats, with a tolerance of -0.41 mm (-0.016 in); or where design permits, comers may be chamfered to the diameter of the abutting surface provided the length of chamfer does not exceed that produced by the 30 degree chamfer previously described.

6. **Passages**—Where passages in straight fittings are machined from opposite ends, the offset at the meeting point shall not exceed 0.38 mm (0.015 in). The cross-sectional area at the junction of passages in angle fittings shall not be less than that of the smallest passage. Where the passage is specified as a maximum or as tap drill diameter or less, the minimum shall be no less than the minimum diameter of the smallest passage in the fitting.
7. **Wall Thickness**—Unless otherwise designated, the wall thickness at any point on fittings shall not be less than the thickness established by the specified dimensions, tolerances, and eccentricities for inner and outer surfaces.
8. **Contour**—Details of contour shall be optional with the manufacturer, providing the tabulated dimensions are maintained and serviceability of the fittings is not impaired. Wrench flats on elbows and tees shall be optional. Where extruded or forged shapes are reduced to conserve material, the wall thickness, unless otherwise specified, shall not be less than the respective minimum values tabulated in Table 17.

TABLE 17—WALL THICKNESS

Nominal Tube OD in	Wall Thickness Min Extruded Shapes ^a mm	Wall Thickness Min Extruded Shapes ^a in	Wall Thickness Min Forged Shapes ^a mm	Wall Thickness Min Forged Shapes ^a in
3/16	1.0	0.04	1.52	0.060
1/4	1.0	0.04	1.90	0.075
5/16	1.3	0.05	1.90	0.075
3/8	1.3	0.05	2.16	0.065
1/2	1.5	0.06	2.29	0.090
5/8	2.0	0.08	2.54	0.100
3/4	2.0	0.08	2.54	0.100

^a Applies to reduction in one plane of shape only.

9. **Straight Threads**—Unified Standard Class 2A external and Class 2B internal threads with minor diameters, where specified, modified to Class 3B limits shall apply to plain finish (unplated) fittings of all types. For externally threaded parts with additive finish, the maximum diameters of Class 2A may be exceeded by the amount of the allowance, that is, the basic diameters (Class 2A maximum diameters plus the allowance) shall apply after plating. For internally threaded parts with additive finish, the Class 2B diameters and modified minor diameters shall apply after plating.

The pitch diameter tolerance shall be the same as the corresponding diameter-pitch combination and class of the Unified fine thread series or for special diameter-pitch combinations shall be based on diameter, pitch, and a length of engagement of 9 times the pitch. See ANSI B1.1.

For convenient reference, the data generally required to specify threads are given in Table 1. (Inasmuch as threads are normally produced and gaged with equipment made to the inch system of measurement, conversion of size designations and dimensions to SI units is considered unnecessary.)

Where external threads are produced by roll threading and the body is not undercut, the unthreaded portion of body adjacent to the shoulder may be reduced to the minimum pitch diameter.

External threads shall be chamfered to the diameter of abutting surfaces, or to the diameters specified, to produce a length of chamfered or partial thread equivalent to $3/4$ to $1-1/4$ times the pitch (rounded to a three-place decimal).

Internal threads shall be countersunk 90 degrees included angle to the diameters specified in the dimensional tables.

10. Thread Eccentricity Tolerances—The various thread elements of Class 2A external and Class 2B modified internal threads on tube fittings shall be concentric within the limitations specified in SAE J512.

11. Pipe Threads—Taper pipe threads, unless there is specific authorization to the contrary, shall conform to the Dryseal American Standard Taper Pipe Thread (NPTF). Specifications for pipe threads are given in detail in SAE J476.

The length of full form external thread shall not be shorter than L_2 plus one pitch (thread), except that where thread is cut through into a relieved body or undercut on the fitting, the minimum full thread length may be reduced by one pitch (thread).

Where external pipe threads are produced by roll threading, the diameter of the unthreaded portion of shank adjacent to shoulder may be reduced to the E_2 basic pitch diameter.

The tube fitting dimensions tabulated herein are based on length of the Dryseal American Standard Taper Pipe Thread (NPTF), it being the consensus of manufacturers and users that trouble-free assembly cannot be assured unless full length thread is used. However, the tap drill depths and overall lengths specified in the tables for fittings with internal taper pipe threads are not consistent with the tap drill depths and overall thread lengths of the Dryseal American Standard Taper Pipe Threads (NPTF) given in Table A2, Appendix A of SAE J476. The full length Dryseal American Standard Taper Pipe Taps specified in Table B2 of SAE J476 cannot be used, as the tap drill depths and overall lengths of the fittings have been reduced to the minimum required by bottoming taps to produce standard full thread length. The deviations described previously are peculiar to these tube fittings and as special tooling is required, caution should be exercised in specifying such deviations for any other products.

Straight pipe threads, where specified, shall conform to American Standard Straight Pipe Threads for Mechanical Joints (NPSM) in ANSI B2.1.

External pipe threads shall be chamfered from the diameters tabulated in Table 2 to produce the specified length of chamfered or partial thread. Internal pipe threads shall be countersunk 90 degrees included angle to the diameters tabulated in Table 2.

12. Material and Manufacture—Fittings shall be made from SAE CA360 brass (half-hard), CA345, or CA350 brass bar or extruded shapes or from SAE CA377 brass forgings in accordance with the manufacturer's processes. Nuts may be made from SAE CA377 brass forging, or steel as specified by the purchaser. Seal bonnets and gaskets shall be made from copper conforming to SAE CA102, CA110, or CA122. As specified by purchaser, fusible metal alloys shall be supplied for temperature ranges 70 to 74, 95 to 104, 135 to 143 °C (158 to 165, 203 to 219, or 275 to 290 °F).

13. Finish—The external surfaces and threads of all carbon steel parts shall be plated or coated with a suitable material that passes a 72 h salt spray test in accordance with ASTM B 117. Any appearance of red rust during the 72 h salt spray test shall be considered failure, except for the following:

- a. All internal fluid passages.
- b. Edges such as hex points, serrations, and crests of threads where there may be mechanical deformation of the plating or coating typical of mass-produced parts or shipping effects.
- c. Areas where there is mechanical deformation of the plating or coating caused by crimping, flaring, bending, and other post-plate metal forming operations.
- d. Areas where the parts are suspended or affixed in the test chamber where condensate can accumulate.

NOTE—Cadmium plating is not preferred due to environmental reasons. Parts manufactured to this standard after January 1, 1997, shall not be cadmium plated. Internal fluid passages shall be protected from corrosion during storage. Changes in plating may affect assembly torques and require requalification, when applicable.

14. Workmanship—Workmanship shall conform to the best commercial practice to produce high-quality fittings. Fittings shall be free from all hanging burrs, loose scale, and slivers which might become dislodged in usage and all other defects which might affect their serviceability. All sealing surfaces must be smooth except that annular tool marks up to 2.5 µm (100 pin) maximum shall be permissible.

15. Assembly Considerations—Torque loads experienced during the assembly of the nut onto the flared ends of the fittings are variable due to the different metals used in the fittings and nuts, hardness of the tubing, manufacturing tolerances and conformance to the manufacturing recommendations. Therefore, it is recommended that flare nuts be assembled to the flared ends one quarter (1/4) turn past finger-tight. In the case of slight side loads which may exist during assembly, it may be necessary to "snug up" the mating parts with a wrench to achieve a finger-tight condition. The use of lubricants is not recommended.

16. Manufacturing Recommendations—Only circular tool marks concentric to the centerline of the sealing face will be permitted. Any such tool marks on the sealing face must be smooth within the limits of 2.5 µm (100 pin).

Flare fittings should be handled, shipped, and stored in a manner that protects the sealing surface from damage.

17. Notes

17.1 Marginal Indicia—The (R) is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

PREPARED BY THE SAE FLUID CONDUCTORS AND CONNECTORS TECHNICAL COMMITTEE

SAE J513 Revised FEB97

Rationale—The following are the changes for SAE J513:

Figure 6 - Moved 43" - 45" to the right and down. Also added the ion to construction.

Figure 8 - Added T_1 , X and Optional Construction. Also added some dimension lines.

Figure 19 - Fixed the dimension lines

Table 3 Footnote a was added in the Title by (Figures 1 to 20), the Columns P were changed from Min to Max and the 3/8 and 1/2 row were changed under P, and footnote h was changed from 0.0003 in to 0.0031 in.

Figure 20 was moved to page 5.

Table 4 - Original footnote b was deleted.

Figure 23 was moved to page 10 and under NOTE, 2nd line, "The illustrations on this page apply to Table 4," was changed to "apply to Table 5."

Figure 25 was moved to page 16.

Figure 26 - P_1 was changed to P

Figure 29 - P_1 was changed to P

Table 6 - Column P was changed from Min to Max. Column P_1 was deleted.

Figures 31 and 32 were moved to page 22.

Figures 34 and 35 were moved to page 30.

Figures 34a and 35a were changed.

Figure 37 was changed to read 1.5 (0.06).

Figure 42C was changed to read 3.1 (0.12)

Table 15 - Figure 42 was added to title.

Relationship of SAE Standard to ISO Standard-Not applicable.

Application-This SAE Standard covers complete general and dimensional specifications for refrigeration tube fittings of the flare type specified in Figures 1 to 42 and Tables 1 to 15. These fittings are intended for general use with flared annealed copper tubing in refrigeration applications.

Dimensions of single and double 45 degree flares on tubing to be used in conjunction with these fittings are given in Figure 2 and Table 1 of SAE J533.

The following general specifications supplement the dimensional data contained in Tables 1 to 15 with respect to all unspecified details.

Reference Section

SAE J476—Dryseal Pipe Threads

SAE J512—Automotive Tube Fittings

SAE J528—Seamless Copper Tube

SAE J533—Flares for Tubing

SAE J846—Coding Systems for Identification of Fluid Conductors and Connectors

ANSI B1.1—Screw Threads

ANSI B2.1—Pipe Threads

ANSI **B70.1—American** Standard Refrigeration Flare Type **Fittings**

ASTM **B117—Method** of Salt Spray (Fog) Testing

Developed by the **SAE Fluid Conductors and Connectors** Technical Committee