The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE STANDARD

SAE J530

REV. MAY95

Issued 1948-02
Revised 1995-05

Superseding J530 MAY94

An American National Standard

AUTOMOTIVE PIPE FITTINGS

***Foreword*—**This Reaffirmed Document has been changed only to reflect the new SAE Technical Standards Board Format.

***1. Scope*—**This SAE Standard includes complete general and dimensional specifications for those types of pipe fittings commonly used in the automotive and other mass production industries where the use of lubricants or sealers is objectionable. The automotive pipe fittings shown in Figures 1 to 17 and Tables 1 to 6 are intended for general automotive and similar applications involving low or medium pressures or in conjunction with automotive tube fittings in piping systems.

2. References

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein. The latest issue 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 J846—Coding Systems for Identification of Fluid Conductors and Connectors
SAE J1615—Thread Sealants

2.1.2 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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2.1.3 AUTOMOTIVE PIPE FITTINGS

NOTE—Unspecified Detail With Respect To Dimensions, Tolerances, Contours, Material, Workmanship, Etc., Must Conform To General Specifications For Automotive Pipe Fittings. Codes Shown In Brackets Adjacent To Figure Numbers Represent Respective Fitting Identification In Accordance With Sae J846 (February, 1979).

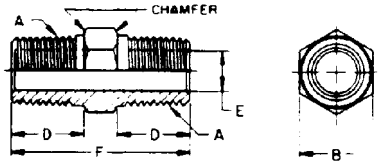

FIGURE 1—HEXAGON NIPPLE (130137)

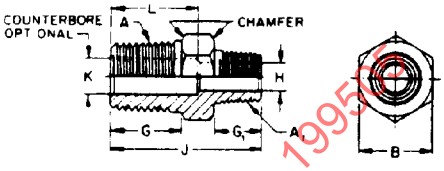

FIGURE 2—HEXAGON REDUCER NIPPLE (130137)

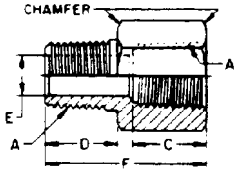

FIGURE 3—ADAPTER (130139)

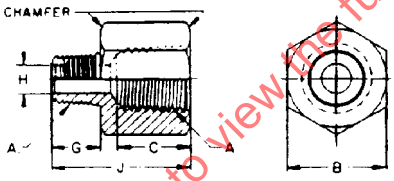

FIGURE 4—REDUCER ADAPTER (130139)

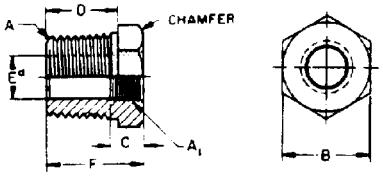

FIGURE 5—REDUCER BUSHING (130140)

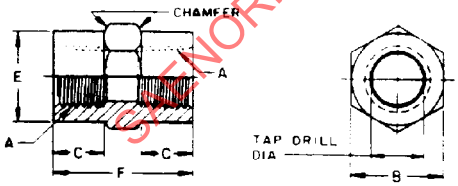

FIGURE 6—COUPLING (130138)

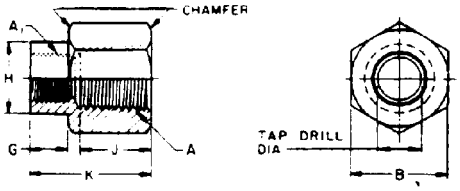

FIGURE 7—REDUCER COUPLING (130138)

TABLE 1—DIMENSIONS OF HEXAGON NIPPLES AND REDUCER NIPPLES (FIGURES 1 AND 2)

Dryseal Taper Thread NPTF[1] in A Hexagon Nipples	Dryseal Taper Thread NPTF[1] in A x A_1 Hexagon Reducer Nipples	All Nipples B Hexagon Width Max mm	All Nipples B Hexagon Width Max in	All Nipples B Hexagon Width Min mm	All Nipples B Hexagon Width Min in	Nipples D Shoulder Length[2] mm	Nipples D Shoulder Length[2] in	Nipples E Drill Dia mm	Nipples E Drill Dia in	Nipples F Overall Length[2] mm	Nipples F Overall Length[2] in
1/16–27	—	8.03	0.316	7.87	0.310	9.7	0.38	3.58	0.141	23.9	0.94
1/8–27	1/8 x 1/16	11.18	0.440	11.02	0.434	9.7	0.38	5.56	0.219	24.6	0.97
1/4–18	1/4 x 1/8	14.38	0.566	14.17	0.558	14.2	0.56	7.92	0.312	35.1	1.38
3/8–18	3/8 x 1/8	17.58	0.692	17.37	0.684	14.2	0.56	11.13	0.438	35.8	1.41
—	3/8 x 1/4	17.58	0.692	17.37	0.684	—	—	—	—	—	—
1/2–14	1/2 x 3/8	22.33	0.879	22.12	0.871	19.0	0.75	14.27	0.562	46.0	1.81 0

Dryseal Taper Thread NPTF[1] in A x A_1 Hexagon Reducer Nipples	Reducer Nipples G Shoulder Length[2] Min mm	Reducer Nipples G Shoulder Length[2] Min in	Reducer Nipples G_1 Shoulder Length[2] Min mm	Reducer Nipples G_1 Shoulder Length[2] Min in	Reducer Nipples H Drill Dia[3] mm	Reducer Nipples H Drill Dia[3] in	Reducer Nipples J Overall Length[2] mm	Reducer Nipples J Overall Length[2] in	Reducer Nipples Counterbore K Max Dia[3] mm	Reducer Nipples Counterbore K Max Dia[3] in	Reducer Nipples Counterbore L Max Depth[2],[3] mm	Reducer Nipples Counterbore L Max Depth[2],[3] in
1/8 x 1/16	9.7	0.38	9.7	0.38	3.58	0.141	24.6	0.97	5.66	0.223	11.9	0.47
1/4 x 1/8	14.2	0.56	9.7	0.38	5.56	0.219	30.2	1.19	8.08	0.310	17.5	0.69
3/8 x 1/8	14.2	0.56	9.7	0.38	5.56	0.219	31.0	1.22	11.28	0.444	17.5	0.69
3/8 x 1/4	14.2	0.56	14.2	0.56	7.92	0.312	35.8	1.41	11.28	0.444	17.5	0.69
1/2 x 3/8	19.0	0.75	14.2	0.56	11.13	0.438	41.1	1.62	14.43	0.568	23.1	0.91

1. Dryseal American Standard Taper Pipe Thread. See General Specifications.
2. Where SAE Short Pipe Thread is authorized by purchaser, dimensions D, F, G, G_1, J, and L are reduced in accordance with reduction of pipe thread length. See General Specifications.
3. At manufacturer's option, through passages may conform with the smaller diameter specified or be counterbored to the larger diameter for the depth specified.

TABLE 2—DIMENSIONS OF ADAPTERS AND REDUCER ADAPTERS (FIGURES 3 AND 4)

Dryseal Taper Thread NPTF[1] in A Adapters	Dryseal Taper Thread NPTF[1] in A x A_1 Reducer Adapters	All Adapters B Hexagon Width Max mm	All Adapters B Hexagon Width Max in	All Adapters B Hexagon Width Min mm	All Adapters B Hexagon Width Min in	All Adapters C Tap Drill Depth[2],[3] Min mm	All Adapters C Tap Drill Depth[2],[3] Min in	Adapters D Shoulder Length[2] Min mm	Adapters D Shoulder Length[2] Min in	Adapters E Dia Drill mm	Adapters E Dia Drill in
1/16–27	—	11.18	0.440	11.02	0.434	9.7	0.38	9.7	0.38	3.58	0.141
1/8–27	1/8 x 1/16	14.38	0.566	14.17	0.558	9.7	0.38	9.7	0.38	5.56	0.219
1/4–18	1/4 x 1/8	19.15	0.754	18.95	0.746	14.2	0.56	14.2	0.56	7.92	0.312
3/8–18	3/8 x 1/4	22.33	0.879	22.12	0.871	14.2	0.56	14.2	0.56	11.13	0.438
1/2–14	1/2 x 3/8	27.13	1.068	26.87	1.058	19.0	0.75	19.0	0.75	14.27	0.562
3/4–14	3/4 x 1/2	35.05	1.380	34.80	1.370	19.0	0.75	19.0	0.75	19.05	0.750
1–11-1/2	1 x 3/4	41.40	1.630	41.15	1.620	23.9	0.94	23.9	0.94	23.82	0.938

Dryseal Taper Thread NPTF[1] in A Adapters	Dryseal Taper Thread NPTF[1] in A x A_1 Reducer Adapters	Adapters F Overall Length[2],[3] mm	Adapters F Overall Length[2] in	Reducer Adapters G Shoulder Length[2] Min mm	Reducer Adapters G Shoulder Length[2] Min in	Reducer Adapters H Dia Drill mm	Reducer Adapters H Dia Drill in	Reducer Adapters J Overall Length[2] mm	Reducer Adapters J Overall Length[2] in
1/16–27	—	21.3	0.84	—	—	—	—	—	—
1/8–27	1/8 x 1/16	22.4	0.88	9.7	0.38	3.58	0.141	21.3	0.84
1/4–18	1/4 x 1/8	31.8	1.25	9.7	0.38	5.56	0.219	26.9	1.06
3/8–18	3/8 x 1/4	31.8	1.28	14.2	0.56	77.92	0.312	31.8	1.25
1/2–14	1/2 x 3/8	42.2	1.66	14.2	0.56	11.13	0.438	37.3	1.47
3/4–14	3/4 x 1/2	42.9	1.69	19.0	0.75	14.27	0.562	42.9	1.69
1–11-1/2	1 x 3/4	52.3	2.06	19.0	0.75	19.05	0.750	47.8	1.88

1. Dryseal American Standard Taper Pipe Thread. See General Specifications.
2. Where SAE SHort Pipe Thread is authorized by purchaser, dimensions C, F, G, and J are reduced in accordance with reduction of pipe thread length. See General Specifications.
3. Tap drill depths given require use of bottoming taps to produce standard full thread lengths. See General Specifications.

2.1.4 AUTOMOTIVE PIPE FITTINGS—CAST TYPE

NOTE—Unspecified Detail With Respect To Dimensions, Tolerances, Contours, Material, Workmanship, Etc., Must Conform To General Specifications For Automotive Pipe Fittings. The Dimensional Designations On The First Figure In Each Group Shall Apply To All Other Figures In That Group Except As Shown Otherwise. Codes Shown In Brackets Adjacent To Figure Numbers Represent Respective Fitting Identification In Accordance, With Sae J846 (February, 1979).

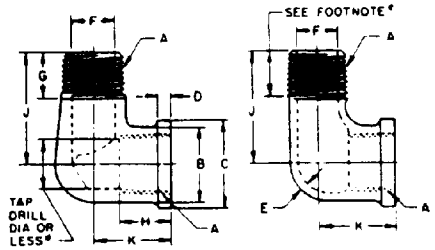

FIGURE 8—90 DEGREE STREET ELBOWS (130239)

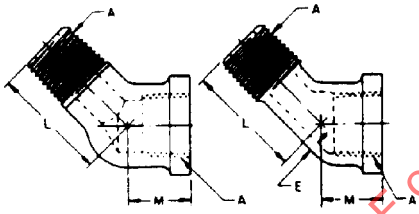

FIGURE 9—45 DEGREE STREET ELBOWS (130339)

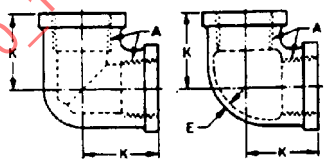

FIGURE 10—90 DEGREE PIPE ELBOWS (130238)

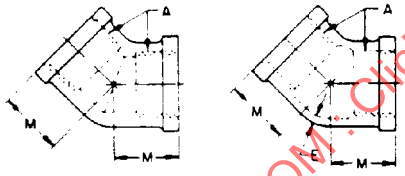

FIGURE 11—45 DEGREE PIPE ELBOWS (130338)

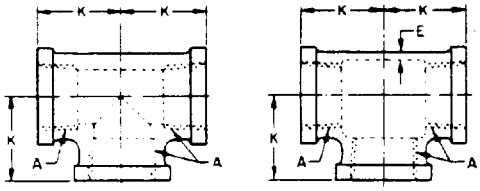

FIGURE 12A—INTERNAL, INTERNAL, INTERNAL TEES (130438)

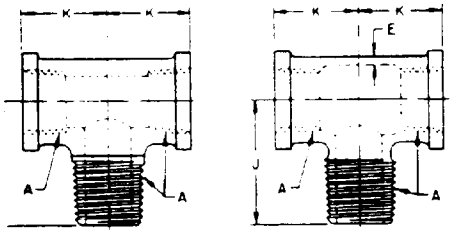

FIGURE 12B—INTERNAL, INTERNAL, EXTERNAL TEES (130425)

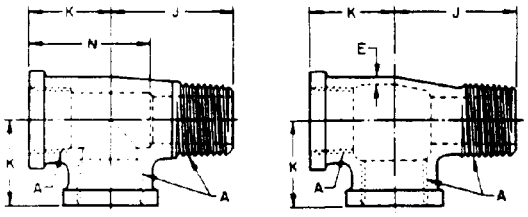

FIGURE 12C—INTERNAL, EXTERNAL, INTERNAL TEES (130424)

Table 3—DIMENSIONS OF REDUCER BUSHINGS (FIGURE 5)

Dryseal Taper Thread NPTF[1], in A x A_1	B Hexagon Width Max mm	B Hexagon Width Max in	B Hexagon Width Min mm	B Hexagon Width Min in	C Tap Drill Depth[2],[3] Min mm	C Tap Drill Depth[2],[3] Min in	D Shoulder Length[2] Min mm	D Shoulder Length[2] Min in	E Hole Dia[4] Min mm	E Hole Dia[4] Min in	F Overall Length[2] mm	F Overall Length[2] in
1/8 x 1/16	11.18	0.440	11.02	0.434	9.7	0.38	9.7	0.38	3.53	0.139	14.2	0.56
1/4 x 1/8	14.38	0.566	14.17	0.558	9.7	0.38	14.2	0.56	5.51	0.217	19.0	0.75
3/8 x 1/8	17.58	0.692	17.37	0.684	9.7	0.38	14.2	0.56	5.51	0.217	19.0	0.75
3/8 x 1/4	19.15	0.754	18.95	0.746	14.2	0.56	14.2	0.56	7.85	0.309	19.0	0.75
1/2 x 1/8	22.33	0.879	22.12	0.871	9.6	0.38	19.0	0.75	5.51	0.217	25.4	1.00
1/2 x 1/4	22.33	0.879	22.12	0.871	14.2	0.56	19.0	0.75	7.85	0.309	25.4	1.00
1/2 x 3/8	22.33	0.879	22.12	0.871	14.2	0.56	19.0	0.75	11.05	0.435	25.4	1.00
3/4 x 1/4	28.70	1.130	28.45	1.120	14.2	0.56	19.0	0.75	7.85	0.309	25.4	1.00
3/4 x 3/8	28.70	1.130	28.45	1.120	14.2	0.56	19.0	0.75	11.05	0.435	25.4	1.00
3/4 x 1/2	28.70	1.130	28.45	1.120	19.0	0.75	19.0	0.75	14.20	0.559	25.4	1.00
1 x 1/2	36.63	1.442	36.37	1.432	19.0	0.75	23.9	0.94	14.20	0.559	33.3	1.31
1 x 3/4	36.63	1.442	36.37	1.432	19.0	0.75	23.9	0.94	18.98	0.747	33.3	1.31

1. Dryseal American Standard Pipe Thread. See General Specifications.
2. Where SAE Short Pipe Thread is authorized by purchaser, dimensions C, D, and F are reduced in accordance with reduction of pipe thread length. See General Specifications.
3. Tap drill depths given require use of bottoming taps to produce standard full thread lengths. See General Specifications.
4. At manufacturer's option, hole may conform to tap drill diameter or may be reduced beyond tap drill depth C, but in no case shall it be smaller than E diameter specified.

2.1.5 AUTOMOTIVE PIPE FITTINGS—EXTRUDED OR BAR STOCK TYPE

NOTE—Unspecified Detail With Respect To Dimensions, Tolerances, Contours, Material, Workmanship, Etc., Must Conform To General Specifications For Automotive Pipe Fittings. The Dimensional Designations On The First Figure In Each Group Shall Apply To All Other Figures In That Group Except As Shown Otherwise. Codes Shown In Brackets Adjacent To Figure Numbers Represent Respective Fitting Identification In Accordanced With Sae J846 (February, 1979).

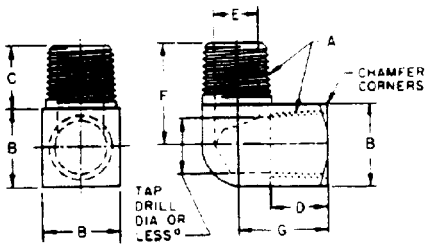

FIGURE 13—90 DEGREE EMSSTREET ELBOW (130239)

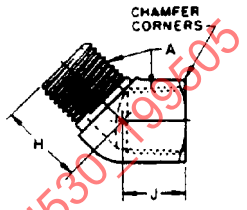

FIGURE 14—45 DEGREE STREET ELBOW (130339)

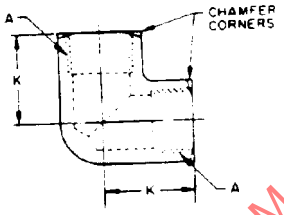

FIGURE 15—90 DEGREE EMSPIPE ELBOW (130238)

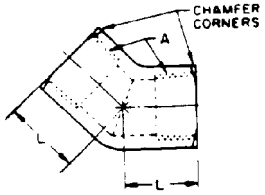

FIGURE 16—45 DEGREE, PIPE ELBOW (130338)

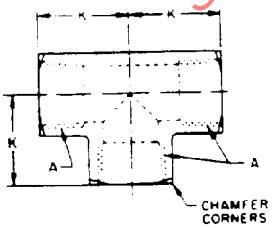

FIGURE 17A—INTERNAL, INTERNAL, INTERNAL (130438)

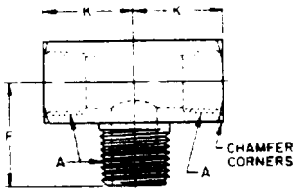

FIGURE 17B—INTERNAL, INTERNAL, EXTERNAL (130425)

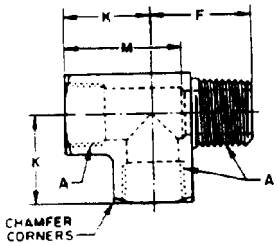

FIGURE 17C—INTERNAL, EXTERNAL, INTERNAL (130424)

TABLE 4—DIMENSIONS OF COUPLINGS AND REDUCER COUPLINGS (FIGURES 6 AND 7)

Dryseal Taper Thread NPTF[1], in A Coupling	Dryseal Taper Thread NPTF[1], in A x A_1 Reducer Coupling	All Couplings B Hexagon Width Max mm	All Couplings B Hexagon Width Max in	All Couplings B Hexagon Width Min mm	All Couplings B Hexagon Width Min in	Couplings C Shoulder Length[2] mm	Couplings C Shoulder Length[2] in	Couplings E Min Body Dia +0.00 −0.5 mm	Couplings E Min Body Dia +0.00 −0.02 in	Couplings F Overall Length[2] mm	Couplings F Overall Length[2] in
1/16–27	—	11.18	0.440	11.02	0.434	7.1	0.28	11.2	0.44	19.0	0.75
1/8–27	1/8 x 1/16	14.38	0.566	14.17	0.558	6.9	0.27	14.2	0.56	19.0	0.75
1/4–18	1/4 x 1/8	19.15	0.754	18.95	0.746	11.2	0.44	19.0	0.75	28.4	1.12
3/8–18	3/8 x 1/8	22.33	0.879	22.12	0.871	10.7	0.42	22.1	0.87	28.4	1.12
—	3/8 x 1/4	22.33	0.879	22.12	0.871	—	—	—	—	—	—
1/2–14	1/2 x 1/8	27.13	1.068	26.87	1.058	15.0	0.59	26.9	1.06	38.1	1.50
—	1/2 x 1/4	27.13	1.068	26.87	1.058	—	—	—	—	—	—
—	1/2 x 3/8	27.13	1.068	26.87	1.058	—	—	—	—	—	—

Dryseal Taper Thread NPTF[1], in A Coupling	Dryseal Taper Thread NPTF[1], in A x A_1 Reducer Coupling	Reducer Couplings G Shoulder Length[2] mm	Reducer Couplings G Shoulder Length[2] in	Reducer Couplings H Min Body Dia +0.00 −0.5 mm	Reducer Couplings H Min Body Dia +0.00 −0.02 in	Reducer Couplings J Min Tap Drill Depth[2],[3] mm	Reducer, Couplings J Min Tap Drill Depth[2],[3] in	Reducer Couplings K Overall Length[2] mm	Reducer Couplings K Overall Length[2] in
1/16–27	—	—	—	—	—	—	—	—	—
1/8–27	1/8 x 1/16	7.9	0.31	11.2	0.44	9.7	0.38	19.8	0.78
1/4–18	1/4 x 1/8	7.9	0.31	14.2	0.56	14.2	0.56	24.6	0.97
3/8–18	3/8 x 1/8	6.4	0.25	14.2	0.56	14.2	0.56	23.9	0.94
—	3/8 x 1/4	11.9	0.47	19.0	0.75	14.2	0.56	29.5	1.16
1/2–14	1/2 x 1/8	6.4	0.25	14.2	0.56	19.0	0.75	30.2	1.19
—	1/2 x 1/4	8.6	0.34	19.0	0.75	19.0	0.75	32.5	1.28
—	1/2 x 3/8	11.2	0.44	22.1	0.87	19.0	0.75	35.1	1.38

NOTE—All inch dimensions, except thread and tubing diameter call out, will be deleted from the catalog in the next publication.

1. Dryseal American Standard Taper Pipe Thread. See General Specifications.
2. Where SAE Short Pipe Thread is authorized by purchaser, dimensions C, F, G, J, and K are reduced in accordance with reduction of pipe thread length. See General Specifications.
3. Tap drill depths given require use of bottoming taps to produce standard full thread length. See General Specifications.

TABLE 5—DIMENSIONS OF CAST TYPE STREET ELBOWS, AND PIPE TEES (FIGURES 8 TO 12)

A Dryseal Taper Thread NPTF[1], in	B Min Body Dia mm	B Min Body Dia in	C Min Collar Dia mm	C Min Collar Dia in	D Min Collar Thick-ness mm	D Min Collar Thick-ness in	E Min Wall Thick-ness mm	E Min Wall Thick-ness in	F Drill Dia[6] mm	F Drill Dia[6] in	G Turned Length[2] Min mm	G Turned Length[2] Min in	H Min Tap Drill Depth[2],[3] mm	H Min Tap Drill Depth[2],[3] in	J Center to End[2] Max mm	J Center to End[2] Max in
1/16-27	11.2	0.44	13.5	0.53	3.0	0.12	2.0	0.08	3.58	0.141	9.7	0.38	9.7	0.38	21.3	0.84
1/8-27	14.2	0.56	17.0	0.67	3.6	0.14	2.0	0.08	5.56	0.219	9.7	0.38	9.7	0.38	24.1	0.95
1/4-18	19.3	0.72	20.6	0.81	4.1	0.16	2.0	0.08	7.92	0.312	14.2	0.56	14.2	0.56	29.2	1.15
3/8-18	22.4	0.88	25.4	1.00	4.3	0.17	2.3	0.09	11.13	0.438	14.2	0.56	14.2	0.56	33.0	1.30
1/2-14	26.2	1.03	29.7	1.17	4.8	0.19	2.3	0.09	14.27	0.562	19.0	0.75	19.0	0.75	39.6	1.56

A Dryseal Taper Thread NPTF[1], in	J Center to End [2] Min mm	J Center to End[2] Min in	K Center to End[2] Max mm	K Center to End[2] Max in	K Center to End[2] Min mm	K Center to End[2] Min in	L Center to End[2] Max mm	L Center to End[2] Max in	L Center to End[2] Min mm	L Center to End[2] Min in	M Center to End[2] Max mm	M Center to End[2] Max in	M Center to End[2] Min mm	M Center to End[2] Min in	N Drill Depth mm	N Drill Depth in
1/16-27	19.8	0.78	13.5	0.53	11.9	0.47	18.3	0.72	16.8	0.66	11.2	0.44	9.7	0.38	16.8	0.66
1/8-27	22.6	0.89	14.7	0.58	13.2	0.52	20.6	0.81	19.0	0.75	11.4	0.45	9.9	0.39	19.0	0.75
1/4-18	27.2	1.07	19.3	0.76	17.3	0.68	23.4	0.92	21.3	0.84	15.2	0.60	13.2	0.52	24.6	0.97
3/8-18	30.5	1.20	22.4	0.88	19.8	0.78	24.6	0.97	22.1	0.87	17.0	0.67	14.5	0.57	—	—
1/2-14	36.6	1.44	27.4	1.08	24.4	0.96	28.4	1.12	25.4	1.00	21.3	0.84	18.3	0.72	—	—

1. Dryseal American Standard Taper Pipe Thread. See General Specifications.
2. Where SAE Short Pipe Thread is authorized by purchaser, dimensions G, H, J, K, L, and M are reduced in accordance with reduction of pipe thread length. See General Specifications.
3. Tap drill depths given requrie use of bottoming taps to produce standard full thread length. See General Specifications.
4. Hole diameters may be reduced beyond tap drill depth H, but shall not be less than F specified for corresponding size. (See Figure 8.)
5. Minimum pipe thread length where body is relieved or undercut shall not be shorter than L2 plus one turn (thread) full thread. Thread length may be reduced one pitch (thread) if thread is cut through into relief or undercut. See SAE J476 and Figure 8.
6. 1/16, 1/8, and 1/4 in size cast fittings are generally produced from solid castings and have drilled passage holes, 3/8 and 1/2 in size cast fittings are generally produced with cored passage holes and may have internal minimum ful thread length of 9.1 and 10.9 mm (0.36 and 0.43 in), respectively.

TABLE 6—DIMENSIONS OF EXTRUDED AND FORGED TYPE STREET ELBOWS, PIPE ELBOWS, AND PIPE TEES (FIGURES 13 TO 17)

A Dryseal Taper Thread NPTF[1], in	B Body Size mm	B Body Size in	C Turned Length[2] Min mm	C Turned Length[2] Min in	D Min Tap Drill Depth[2],[3] mm	D Min Tap Drill Depth[2],[3] in	E Drill Dia[4] mm	E Drill Dia[4] in	F Center to End[2] ±0.8 mm	F Center to End[2] ±0.03 in	G Center to End[2] ±0.8 mm	G Center to End[2] ±0.03 in
1/16-27	11.11	7/16	9.7	0.38	9.7	0.38	3.58	0.141	15.0	0.59	11.4	0.45
1/8-27	14.29	9/16	9.7	0.38	9.7	0.38	5.56	0.219	16.8	0.66	12.2	0.48
1/4-18	17.46	11/16	14.2	0.56	14.2	0.56	7.92	0.312	23.1	0.91	18.3	0.72
3/8-18	20.64	13/16	14.2	0.56	14.2	0.56	11.13	0.438	24.6	0.97	19.8	0.78
1/2-14	25.40	1	19.0	0.75	19.0	0.75	14.27	0.562	31.8	1.25	26.2	1.03
3/4-14	31.75	1-1/4	19.0	0.75	19.0	0.75	19.05	0.750	35.1	1.38	28.4	1.12
1-11-1/2	38.10	1-1/2	23.9	0.94	23.9	0.94	23.82	0.938	42.9	1.69	35.8	1.41

A Dryseal Taper Thread NPTF[1], in	H Center to End[2] ±0.8 mm	H Center to End[2] ±0.03 in	J Center to End[2] ±0.8 mm	J Center to End[2] ±0.03 in	K Center to End[2] ±0.8 mm	K Center to End[2] ±0.03 in	L Center to End[2] ±0.8 mm	L Center to End[2] ±0.03 in	M Drill Depth mm	M Drill Depth in
1/16-27	11.9	0.47	9.7	0.38	12.7	0.50	11.2	0.44	16.8	0.66
1/8-27	12.7	0.50	9.7	0.38	14.0	0.55	11.4	0.45	19.0	0.75
1/4-18	18.3	0.72	14.2	0.56	19.8	0.78	16.8	0.66	26.2	1.03
3/8-18	19.8	0.78	14.2	0.56	21.3	0.84	17.5	0.69	29.7	1.17
1/2-14	25.4	1.00	19.0	0.75	27.7	1.09	23.1	0.91	37.6	1.48
3/4-14	26.9	1.06	19.0	0.75	29.5	1.16	23.9	0.94	42.2	1.66
1-11-1/2	34.0	1.34	23.9	0.94	38.6	1.52	30.2	1.19	53.8	2.12

1. Dryseal American Standard Taper Pipe Thread. See General Specifications.
2. Where SAE Short Pipe Thread is authorized by purchaser, dimensions C, D, F, G, H, J, K, and L are reduced in accordance with reduction of pipe thread length. See General Specifications.
3. Tap drill depths given require use of bottoming taps to produce standard full thread length. See General Specifications.
4. Hole diameter may be reduced beyond tap drill depth D but shall not be less than E specified for corresponding size. (See Figure 13.)

3. *General Specifications*

3.1 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 fittings, plated or otherwise processed, as specified by the purchaser. Unless otherwise specified, maximum and minimum across flats dimensions shall be within the commercial tolerance of bar or extruded stock from which the fittings are produced. The minimum across corner dimensions of external hexagons shall be 1.092 times the nominal width across flats, but shall not result in a side flat width less than 0.43 times the nominal width across flats. The minimum across corner dimensions of external squares shall be 1.25 times the nominal width across flats, but shall not result in a side flat width less than 0.75 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 7.

TABLE 7—DRILL TOLERANCES

Drill Size Range mm	Drill Size Range in	Tolerance on Hole Diameter Plus mm	Tolerance on Hole Diameter Plus in	Tolerance on Hole Diameter Minus mm	Tolerance on Hole Diameter 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

Tolerance on all dimensions not otherwise limited shall be ±0.25 mm (±0.010 in). Angular tolerance on axis of ends on elbows and tees 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.

3.2 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.

3.3 Contour—Details of contour shall be optional with the manufacturer provided 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 8.

3.4 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 smaller passage.

3.5 Pipe Threads—The pipe threads, unless there is specific authorization to the contrary, shall conform with the Dryseal American Standard Taper Pipe Thread (NPTF). At purchaser's option, the pipe thread may be shortened in conformity with the SAE Short Dryseal Taper Pipe Thread (PTF-SAE Short). Specifications for pipe threads are given in detail in SAE J476 (June, 1961). The pipe 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 and pressure-tight joints without lubricant or sealer cannot be assured (per SAE J1615.)

However, the tap drill depths and the overall lengths specified in the tables for fittings with internal taper pipe threads are not consistent with the tap drill depths and the overall thread lengths of the Dryseal American Standard Taper Pipe Threads (NPTF) specified in Table A2, Appendix A of SAE J476. The full-length Dryseal American Standard Taper Pipe Taps specified in Table B2, Appendix B 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 herein are peculiar to automotive pipe fittings. As special tooling is required, caution should be exercised in specifying the deviations for any other products. External pipe threads shall be chamfered from the diameters tabulated in Table 9 to produce the specified length of chamfered or partial thread. Internal pipe threads shall be countersunk 90 degrees included angle, to the diameters shown in Table 9.

3.6 Material and Manufacture—Pipe fittings may be made from cast iron, malleable iron, steel, stainless steel, brass, or aluminum alloy as specified by the purchaser, by casting, forging, milling from the bar, or upsetting from a grade of material free from defects which will affect their serviceability. However, all varieties and sizes of pipe fittings may not be currently available in the aforementioned materials. Nipples, adapters, bushings, and couplings are generally available in brass and steel. Cast elbows and tees are generally available in malleable iron for sizes 1/4 in and over and in brass. Extruded and forged elbows and tees are generally available in brass and steel.

3.7 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 B117. 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.

3.8 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 serviceability.