

# SURFACE VEHICLE STANDARD

**SAE** J534

REV.  
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Superseding J534 JAN81

Submitted for recognition as an American National Standard

## LUBRICATION FITTINGS

1. **Scope**—This SAE Standard covers complete general and dimensional specifications for the various types of lubrication fittings and related threaded components intended for general application in the automotive and allied fields.

(R) 2. **References**

2.1 **Applicable Documents**—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 PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J476a—Dryseal Pipe Threads

2.1.2 ASTM PUBLICATION—Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

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

3. **General Specifications**

3.1 **Designations**—Lubrication fittings are designated by the type and size of the threaded ends and the configuration of the fitting (Figures 1a, 1b, 1c).

3.2 **Dimensions and Tolerances**—Except for nominal sizes and thread designations, dimensions and tolerances are given in both SI units and U.S. customary, as designated in Table 1. Tabulated dimensions shall apply to the finished parts, plated or otherwise processed, as specified by the purchaser. Tolerance on all dimensions not otherwise limited shall be  $\pm 0.3$  mm. The 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 corners dimensions of 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.

3.3 **Check Valve**—All the standard hydraulic lubrication fittings contained herein are supplied with ball check valves. Fittings without valves are not recommended by the lubrication fitting industry.

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**3.4 Contour**—Details of contour shall be optional with the manufacturer, provided the tabulated dimensions are maintained and serviceability of the fittings is not impaired.

**3.5 Pipe Threads**—The pipe threads on fittings, unless there is specific authorization to the contrary, shall conform with the specifications given in detail in SAE J476 for the designated thread series, except that external thread crests may have greater maximum truncation due to manufacturing practices. Experience has shown that the crest of the threads on lubrication fittings, intended for use with grease, does not have to conform to Dryseal American Standard Form to function satisfactorily. The deviations from standard Dryseal practice are peculiar to lubrication fittings and as special considerations are involved, it is not advisable to use them in any other application of pipe thread practice.

External pipe threads shall be chamfered from a diameter (rounded to a two-place decimal) obtained by subtracting 0.41 mm from the minimum minor diameter at the small end, with a minus tolerance on the diameter of 0.5 mm, to produce a length of chamfered or partial thread equivalent to 1 to 1-1/2 times pitch (rounded to a three-place decimal). See Appendix A of SAE J476.

Internal pipe threads shall be countersunk 90 degrees included angle to a diameter (rounded to a two-place decimal) obtained by adding 0.41 mm to the maximum major diameter at the large end with a plus tolerance on the diameter of 0.5 mm. See Appendix A of SAE J476.

Recommended assembly considerations for the various combinations of Dryseal pipe threads are given under the respective standard thread series and the paragraph headed Limitation of Assembly, Appendix D, in SAE J476.

**3.6 1/4-28 Taper Thread**—External taper threads designated SAE-LT shall be Unified Standard Form 1/4-28 with 19.0 mm  $\pm$  1.5 mm, diametral taper per 304.8 mm of length. The pitch diameter measured at start of thread on small end shall be 5.733 to 3.649 mm.

Threads shall be chamfered 0.91 to 1.37 mm long from a diameter of 5.1 mm with a tolerance of -0.5 mm.

It is recommended that SAE-LT taper threads be assembled into 1/4-28 UNF, Class 3B, straight threaded holes having a modified maximum minor diameter of 5.466 mm to insure 75% minimum thread height.

**3.7 Special Thread Forming Threads**—The 1/4-28 special taper thread forming thread and the 1/8-27 pipe special thread forming thread, where specified, shall conform to the dimensions specified in Figure 4 and Table 2. Fittings employing these threads may be driven or spun into unthreaded holes of diameters recommended and they are generally either marked or colored to provide ready identification.

**3.8 Material and Manufacture**—Unless otherwise specified, fittings shall be made from steel standard with the manufacturer. At the manufacturer's option, caps for water pump fittings may be made from brass, steel, or aluminum.

The greasing end of fittings shall be hardened. They shall have a case depth of 0.13 to 0.23 mm and minimum hardness of 83 on the Rockwell 15N scale. The threaded end on special thread forming fittings shall also be hardened.

(R) **3.9 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.

**3.10 Related Fittings**—Figures 5, 6, 7a, and 7b designate special adapters used in conjunction with lubrication fittings.

**3.11 Workmanship**—Fittings shall be free from burrs, loose scale, sharp edges, and all other defects that might affect their serviceability.

#### 4. Notes

**4.1 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.

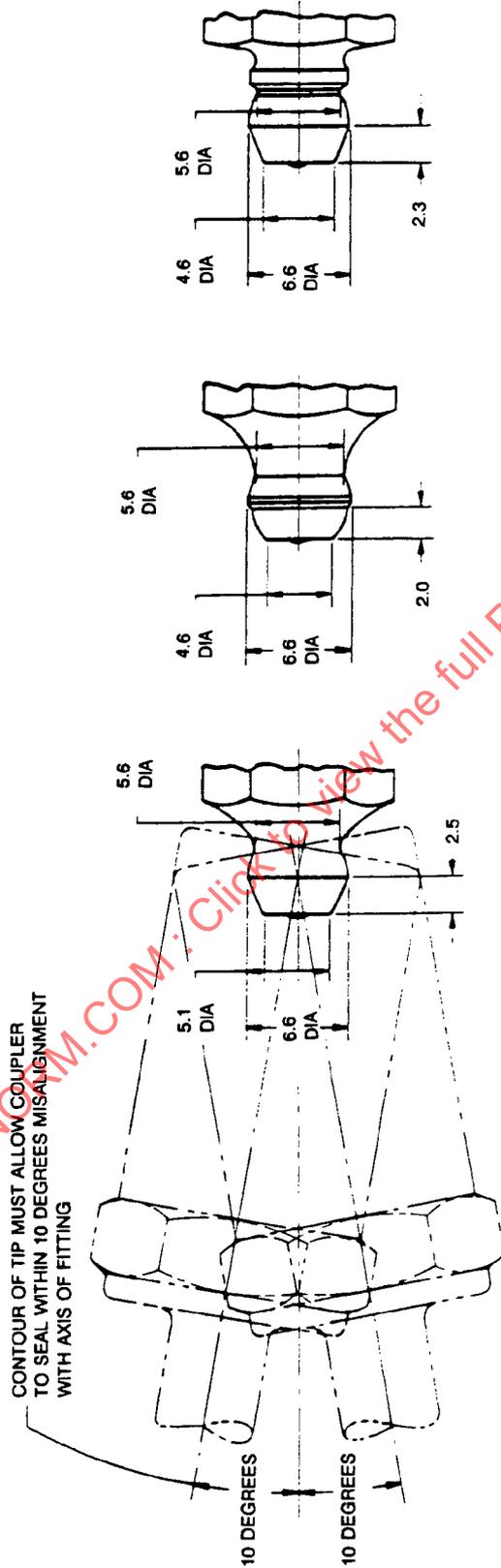


FIGURE 1C

FIGURE 1B

FIGURE 1A

FIGURE 1—OPTIONAL TIPS FOR LUBRICATION FITTINGS

TABLE 1—DIMENSIONS OF STRAIGHT AND ELBOW FITTINGS (FIGURES 2 AND 3)

Type	A Thread	B Angle, ± 3 deg	C Effective Thread Length, min mm	D Hex Width Across Flats, Nom. in	E Shank Dia mm	F Shank Length mm ± 0.8	L Overall Length mm ± 1.0	M Overall Height mm ± 1.0
Straight Fittings	1/8-27 Dryseal-PTF special extra short	---	4.6	7/16	10.2	7.1	16.8	---
	1/8-27 Dryseal-PTF special short	---	5.6	7/16	10.2	19.3	32.0	---
	1/8-27 Dryseal-PTF special short	---	5.6	7/16	10.2	32.5	44.7	---
	1/8-27 Dryseal-PTF special short	---	5.6	7/16	10.2	55.4	66.5	---
	1/8 pipe special thread forming	---	3.6	7/16	10.2	6.1	15.7	---
	1/8-27 Dryseal-NPTF internal thread	---	7.1	1/2	12.2	8.1	25.4	---
	1/4-28 taper thread (SAE-LT)	---	2.5	5/16	6.6	4.6	13.7	---
	1/4-28 taper thread (SAE-LT)	---	5.1	5/16	6.6	8.6	17.3	---
	1/4-28 taper thread (SAE-LT)	---	5.1	5/16	6.6	15.7	23.9	---
	1/4-28 special taper thread forming	---	2.5	5/16	6.50	5.1	14.0	---
Elbow Fittings	1/8-27 Dryseal-PTF special short	30	5.6	7/16	10.2	7.6	22.9	14.2
	1/8-27 Dryseal-PTF special short	30	5.6	7/16	10.2	32.0	53.3	14.2
	1/8 pipe special thread forming	30	3.6	7/16	10.2	5.1	21.8	14.2
	1/8-27 Dryseal-PTF special short	45	5.6	7/16	10.2	7.6	21.8	16.3
	1/4-28 taper thread (SAE-LT)	45	2.5	3/8	6.6	5.1	20.8	14.7
	1/4-28 taper thread (SAE-LT)	45	5.1	3/8	6.6	7.6	23.9	14.7
	1/4-28 special taper thread forming	45	2.5	3/8	6.50	4.8	20.3	14.7
	1/8-27 Dryseal-PTF special short	65	5.6	7/16	10.2	7.6	21.8	18.3
	1/8-27 Dryseal-PTF special short	65	5.6	7/16	10.2	14.2	30.0	18.3
	1/8 pipe special thread forming	65	3.6	7/16	10.2	5.1	19.8	18.3
	1/8-27 Dryseal-PTF special short	90	5.6	7/16	10.2	7.6	21.3	18.3
	1/8-27 Dryseal-PTF special short	90	5.6	7/16	10.2	32.0	46.2	18.3
	1/8 pipe special thread forming	90	3.6	7/16	10.2	5.1	19.3	18.3
	1/4-28 taper thread (SAE-LT)	90	2.5	3/8	6.6	5.1	19.3	16.8
	1/4-28 special taper thread forming	90	2.5	3/8	6.50	4.8	19.3	16.8
	1/8-27 Dryseal-PTF special short	105	5.6	7/16	10.2	7.6	26.9	19.3

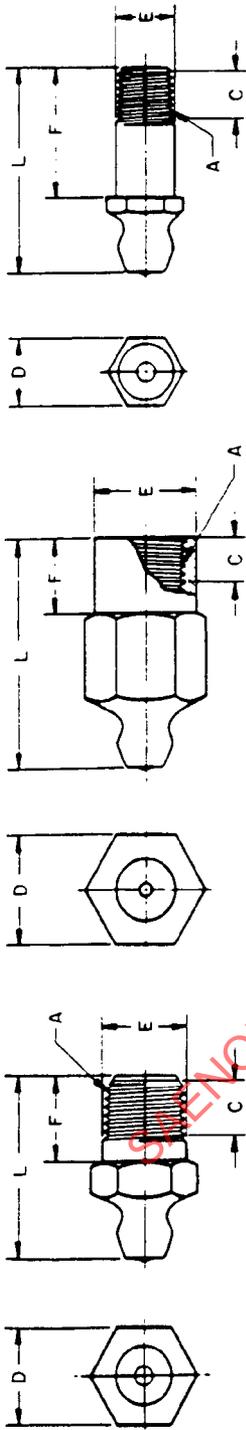


FIGURE 2A—EXTERNAL TAPER PIPE THREAD

FIGURE 2B—INTERNAL TAPER PIPE THREAD

FIGURE 2C—1/4-28 TAPER THREAD

FIGURE 2—STRAIGHT FITTINGS

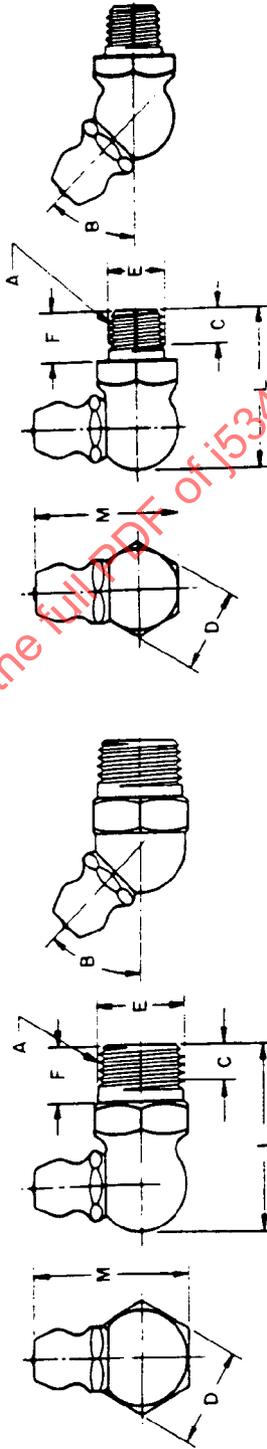


FIGURE 3A—TAPER PIPE THREAD

FIGURE 3B—1/4-28 TAPER THREAD

FIGURE 3—ELBOW FITTINGS

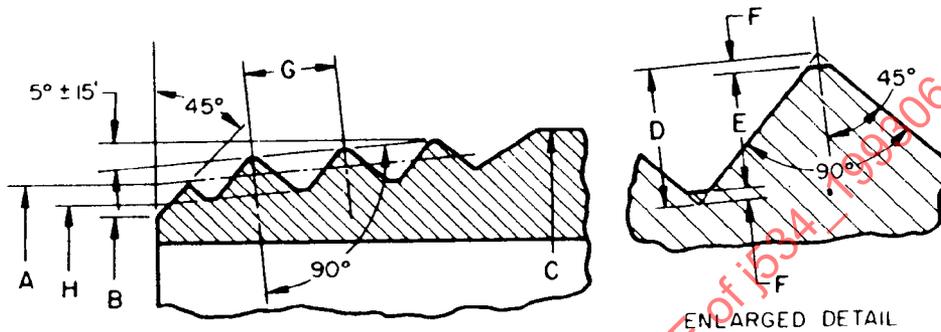


FIGURE 4—SPECIAL THREAD FORMING THREADS

TABLE 2—DIMENSIONS OF SPECIAL THREAD FORMING THREADS (FIGURE 4)

Nominal Thread Size	A	B	C	D	E	F	G	H	Recommended Hole Dia <sup>1</sup> mm
	Pitch Dia at Small End mm	Chamfer Dia mm	Shank Dia mm	Height of Sharp V Thread mm	Height of Truncated Thread mm	Height of Truncated at Crest and Root mm		Root Dia at Small End mm	
1/4-28 Spl Taper	5.654	5.1	6.58	0.452	0.427	0.069	0.907	5.28	5.97
	5.476	4.6	6.43		0.315	0.013		5.11	5.84
1/8-27 Spl Pipe	9.070	8.4	10.24	0.470	0.445	0.074	0.940	8.69	9.65
	8.892	7.9	10.06		0.323	0.013		8.51	9.47