SURFACE VEHICLE STANDARD

J534™ AUG2015

Issued 1949-01
Revised 2015-08

Superseding J534 MAY2008

(R) Lubrication Fittings

RATIONALE

SAE J534 has been revised to include an SAE J846 ordering code for lubrication fittings. Performance requirements were included with the addition of extreme angular position, lubricant leakage, and blowout tests. Additional dimensions have been added to the lubrication fitting tip diagram to provide additional definition to the tip. Where applicable, SAE J476 was referenced for pipe thread dimensions. Drawings were updated.

1. SCOPE

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publication

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J476a Dryseal Pipe Threads

2.1.2 ASTM Publication

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org

ASTM B 117 Method of Salt Spray (Fog) Testing

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
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SAE WEB ADDRESS: http://www.sae.org

3. PACKAGING AND MARKING

3.1 Protection

By a method agreed between purchaser and supplier, the lubrication tip and threads (both internal and external) shall be protected by the manufacturer from nicks and scratches detrimental to their function. Fittings must be protected, to prevent entrance of dirt or other contaminants, prior to assembly, for parts distribution, handling, and storage. If caps and plugs are used, they shall not be made of paper.

3.2 SAE J846 Part Identification Number (PIN)

By agreement between the purchaser and supplier, the PIN from SAE J846 may be used to abbreviate the ordering of lubrication fittings. The lubrication fitting PIN consists of a connector style designation code and a style and material modifier. For an example of a lubrication fitting PIN refer to Figure 1. Lubrication fittings deviate from SAE J846 by not including the size designation. The size details are included in the connector style designation code.

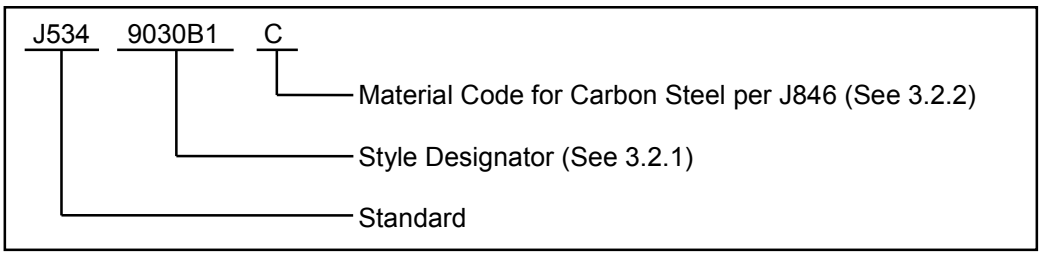

Figure 1 - Lubrication fitting PIN example

3.2.1 Style Designation Code

Lubrication fittings are designated according to SAE J846. The connector designation consists of a basic code symbolizing, in sequence, the following: (a) the connector type, (b) the connector shape, and (c) the connector end connections. For a style designation code example, see Figure 2. The style designation code for each fitting can be found in Table 1.

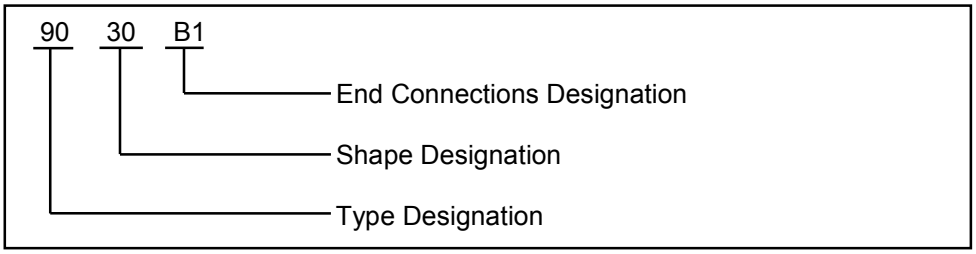

Figure 2 - Lubrication fitting style designation code

3.2.2 Material Modifiers

Modifiers are added to the code to provide additional information. Suffixes are to be added to indicate the style and material. (See SAE J846 for more complete information.)

4. TEST METHODS AND PERFORMANCE REQUIREMENTS

4.1 Test Conditions

4.1.1 Temperature

Unless otherwise specified, tests shall be conducted at local ambient temperature of 25°C±10°C.

4.1.2 Test Fluids

Unless otherwise specified, tests shall be conducted using NLGI (National Lubricating Grease Institute) #2 lithium grease.

4.1.3 Test Fittings

At the start of each test, special care should be taken to ensure an unused fitting is tested.

4.2 Opening Pressure

The check valve shall not require more than 3.1 MPa to open and allow lubricant to flow from the threaded end of the fitting.

4.3 Lubricant Leakage Tests

The fitting shall be tested utilizing a test setup according to Figure 3. Lubricant shall be forced into the fitting until the pressure reaches 3.5 MPa. The pressure shall remain at 3.5 MPa for 60 seconds. After 60 seconds, relieve the pressure and evaluate the amount of leakage. The leakage through the ball check shall not exceed 2 cc. After completing the test at 3.5 MPa, the test shall be repeated at 34.5 MPa using the same fitting.

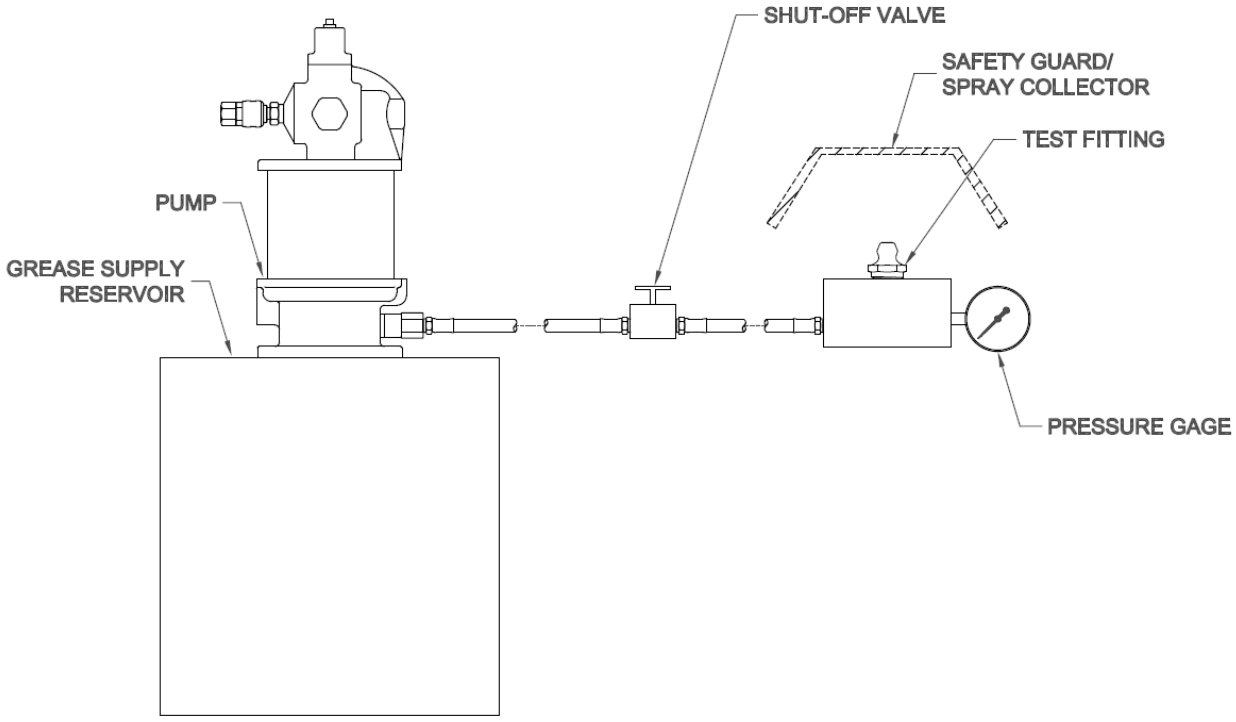

Figure 3 - Lubricant leakage test setup

4.4 Blowout Test

The power lubrication system shall be charged to a pressure of 34.5 MPa. The power control valve shall be opened and lubricant shall be discharged through the fitting for a period of 5 seconds. The coupling shall be disconnected from the inlet tip of the fitting, and the fitting ball-check and spring shall be examined. The ball-check shall have returned to the closed position and there shall be no evidence of loosening, damage, or blowout of component parts.

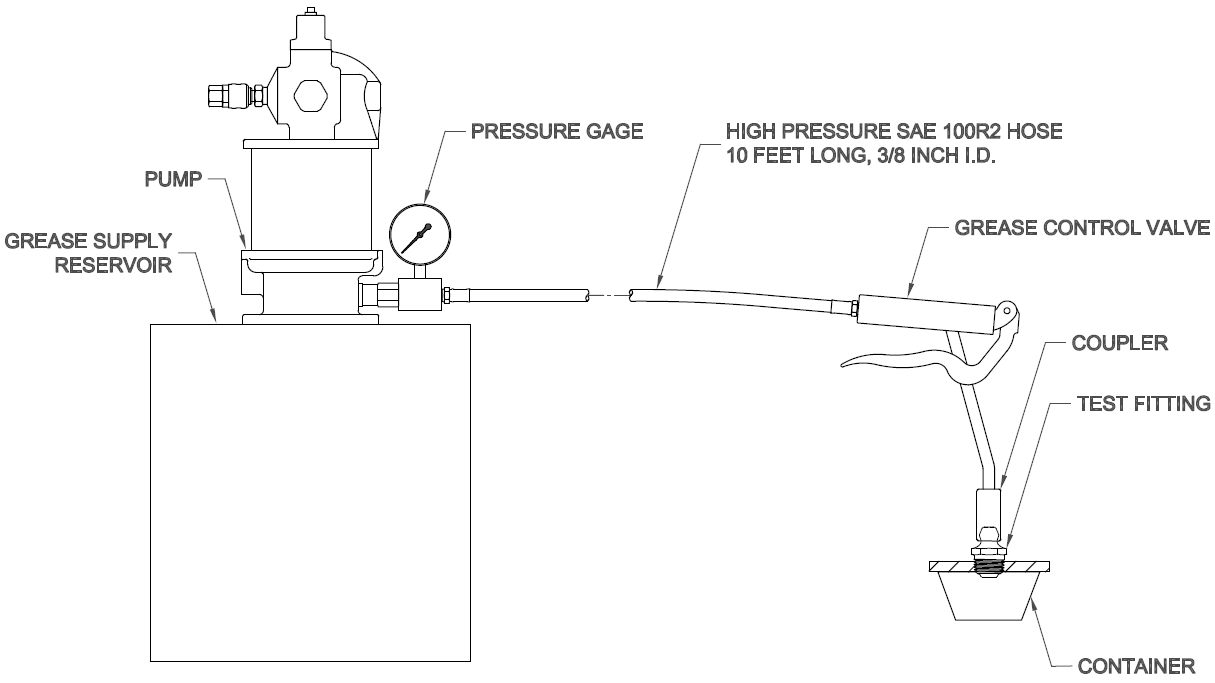

Figure 4 - Blowout test setup

5. GENERAL SPECIFICATIONS

5.1 Dimensions and Tolerances

Except for nominal sizes and thread designations, dimensions and tolerances are given in SI units, 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 ±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.

5.2 Check Valve

All the standard hydraulic lubrication fittings contained herein shall be supplied with check valves. Fittings without valves are not recommended by the lubrication fitting industry.

5.3 Fitting Temperature Rating

Special considerations may be necessary if fittings are used in extreme conditions.

5.4 Contour

Details of contour shall be optional with the manufacturer, provided the dimensions and tolerances in this document are maintained.

5.5 Pipe Threads

The pipe threads on fittings, unless there is specific authorization to the contrary, shall conform to 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.

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.

5.6 1/4-28 Taper Thread

External taper threads designated SAE-LT shall be Unified Standard Form 1/4-28 with 19.0 mm ± 1.5 mm, diametral taper per 304.8 mm of length. The pitch diameter measured at start of thread on small end shall be 5.73 to 5.65 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.

Note: These are special threads and are not covered in other standards.

5.7 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 9 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.

5.8 Recommended Assembly Torque

Consult the manufacturer of the fitting for the appropriate assembly procedures.

5.9 Material and Manufacture

Unless otherwise specified, fitting bodies and internal components shall be made from carbon steel that can meet the minimum performance requirements set forth in this standard.

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.

5.10 Corrosion Protection

5.10.1 Parts manufactured to this document before April 1, 2020 shall have a minimum plating thickness of 0.005 mm of zinc and have a supplementary treatment other than organic coating while being capable of withstanding a minimum of 72 h salt spray test in accordance with ASTM B117.

5.10.2 Parts manufactured to this document beginning April 1, 2020 shall meet the following requirements. The external surfaces and threads of all carbon steel parts shall be plated or coated with a suitable material that passes a salt spray test in accordance with ISO 9227 or ASTM B117. The following requirements shall apply:

- No appearance of corrosion products of the protective coating before 96 h.
- No appearance of corrosion products of the base metal before 144 h.

The following exceptions shall apply:

a. All internal fluid passages.

b. Edges such as hex points, serrations, and crests of threads where there can 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.

Parts manufactured to this standard shall not be cadmium plated and shall not use hexavalent chromate coatings. Internal fluid passages shall be protected from corrosion during storage and shipping. Changes in plating or coating shall be re-qualified to ensure assembly torque is not affected.

5.11 Related Fittings

Figures 10, 11, 12 and 13 designate special adapters used in conjunction with lubrication fittings.

5.12 Workmanship

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

5.13 Lubrication Fitting Tip Dimensions

Refer to Figure 5 for dimensions and tolerances. Circle B shall share a common center with Circle A and be tangent to both front corner radii. This center is the baseline for other dimensions and tolerances. Circle B shall be tangent to both front corner radii. No material shall be present to the left of Line C.

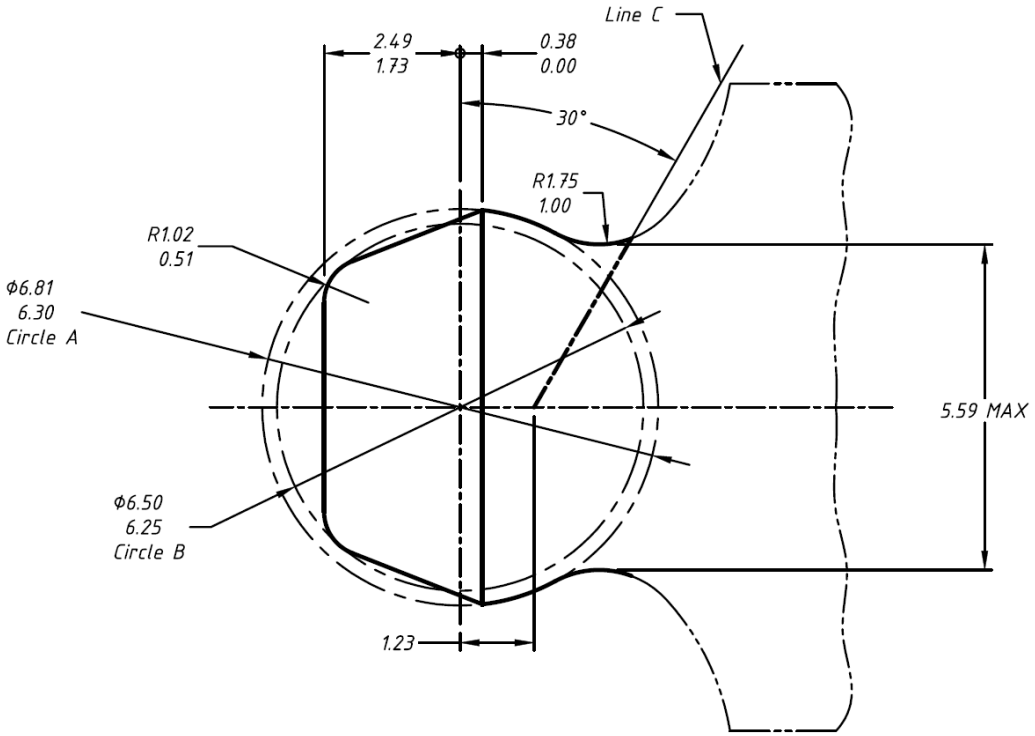

Figure 5 - Lubrication fitting tip

Table 1 - Dimensions of straight and elbow fittings (figures 6, 7, and 8)

Type	T Thread (Style Designation Code, See 3.2.1)	A Angle, ±5 deg	L1 Overall Length mm ±1.0	L2 Shank Length mm ±0.8	L3 Effective Thread Length, min mm	L4 Overall Height mm ±1.0	s Hex Width Across Flats, Nom, in
Straight Fittings	1/8–27 Dryseal-PTF special short (9029B1)	---	17.0	7.3	4.8(1)	---	11.11
	1/8–27 Dryseal-PTF special short (9030B1)	---	32.0	19.5	4.8(1)	---	11.11
	1/8–27 Dryseal-PTF special short (9031B1)	---	44.7	32.5	4.8(1)	---	11.11
	1/8–27 Dryseal-PTF special short (9032B1)	---	66.5	55.4	4.8(1)	---	9.53
	1/8 pipe special thread forming (9001B3)	---	15.7	6.1	3.6	---	11.11
	1/8–27 Dryseal-NPTF internal thread (1601B2)	---	25.4	8.1	7.1(1)	---	12.7
	1/4–28 taper thread (SAE-LT) (9030B4)	---	13.7	4.6	2.5	---	7.94
	1/4–28 taper thread (SAE-LT) (9031B4)	---	17.3	8.8	5.1	---	7.94
	1/4–28 taper thread (SAE-LT) (9032B4)	---	24.0	15.7	5.1	---	7.94
	1/4–28 special taper thread forming (9001B5)	---	14.0	5.1	2.5	---	7.94
Elbow Fittings	1/8–27 Dryseal-PTF special short (9011B1)	30	22.9	7.6	4.8(1)	14.2	11.11
	1/8–27 Dryseal-PTF special short (9035B1)	30	53.3	32.0	4.8(1)	14.2	11.11
	1/8 pipe special thread forming (9011B3)	30	21.8	5.1	3.6	14.2	11.11
	1/8–27 Dryseal-PTF special short (9003B1)	45	22.5	7.6	4.8(1)	16.8	11.11
	1/4–28 taper thread (SAE-LT) (9022B4)	45	20.8	5.1	2.5	14.7	9.53
	1/4–28 taper thread (SAE-LT) (9019B4)	45	23.9	7.6	5.1	14.7	9.53
	1/4–28 special taper thread forming (9003B5)	45	20.3	4.8	2.5	14.7	9.53
	1/8–27 Dryseal-PTF special short (9037B1)	65	21.8	7.6	4.8(1)	18.3	11.11
	1/8–27 Dryseal-PTF special short (9038B1)	65	30.5	14.2	4.8(1)	18.3	11.11
	1/8 pipe special thread forming (9036B3)	65	19.8	5.1	3.6	18.3	11.11
	1/8–27 Dryseal-PTF special short (9014B1)	90	21.3	7.6	4.8(1)	18.3	11.11
	1/8–27 Dryseal-PTF special short (9020B1)	90	46.2	32.0	4.8(1)	18.3	11.11
	1/8 pipe special thread forming (9002B3)	90	19.3	5.1	3.6	18.3	11.11
	1/4–28 taper thread (SAE-LT) (9002B4)	90	19.3	5.1	2.5	17.0	9.53
	1/4–28 special taper thread forming (9002B5)	90	19.3	4.8	2.5	16.8	9.53

1. Reference only. See SAE J476 for toleranced dimensions.

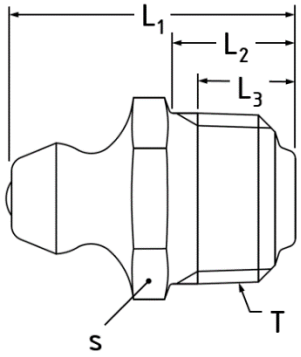

Figure 6 - Straight fittings

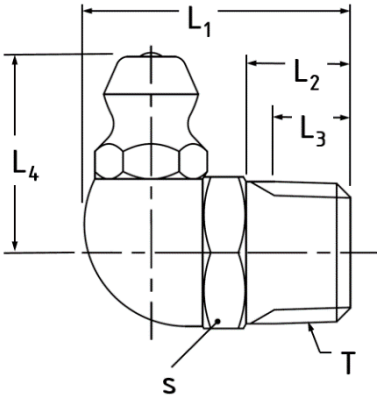

Figure 7 - 90 Degree elbow fittings

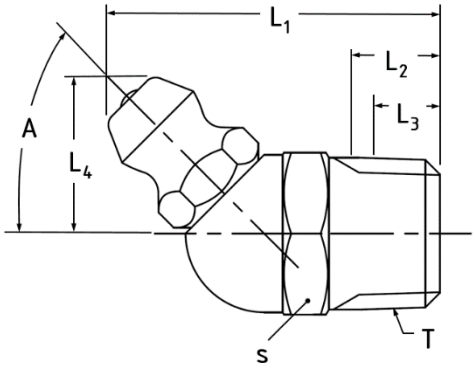

Figure 8 - Other elbow fittings

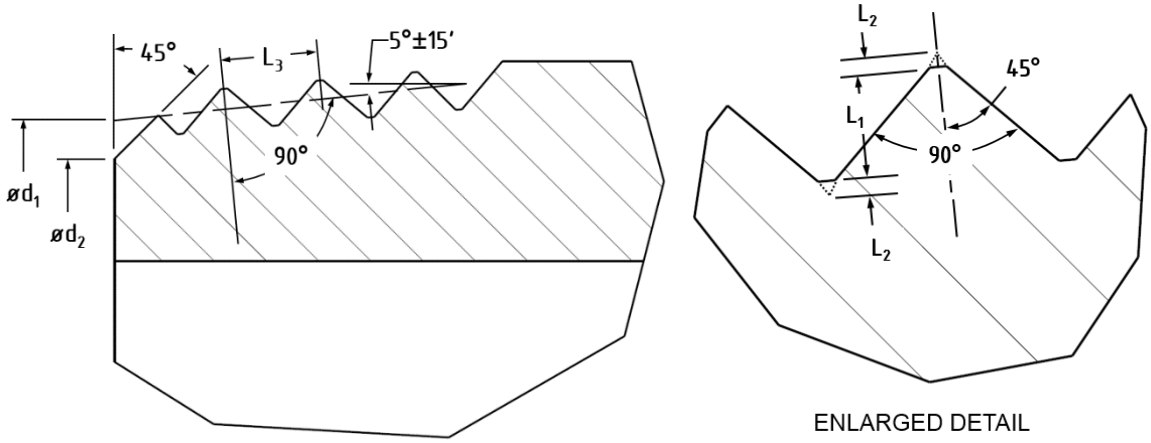

Figure 9 - Special thread forming threads

Table 2 - Dimensions of special thread forming threads (figure 9)

Nominal Thread Size	ød1 Pitch Dia at Small End	ød2 Chamfer Dia	L1 Height of Truncated Thread	L2 Height of Truncation at Crest and Root	L3 Pitch	Recommended Hole Dia (1)
1/4-28	5.654	5.1	0.427	0.069	0.907	5.97
Spl Taper	5.476	4.6	0.315	0.013		5.84
1/8-27	9.070	8.4	0.445	0.074	0.940	9.65
Spl Taper	8.892	7.9	0.323	0.013		9.47

1. It may be desirable to deviate slightly from specified diameters to obtain optimum performance in specific mating materials. Fitting manufacturers should be consulted.

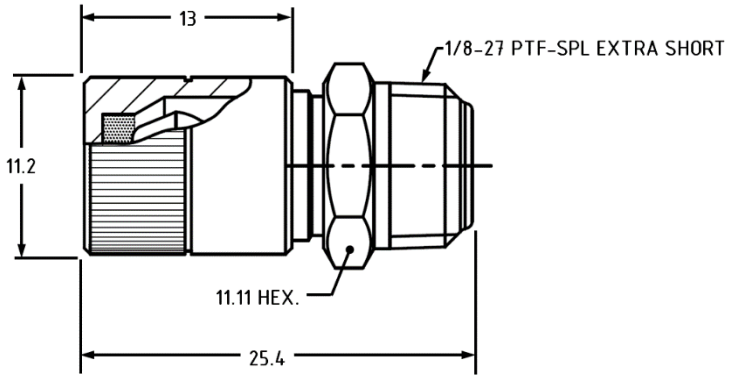

Figure 10 - Water pump fitting

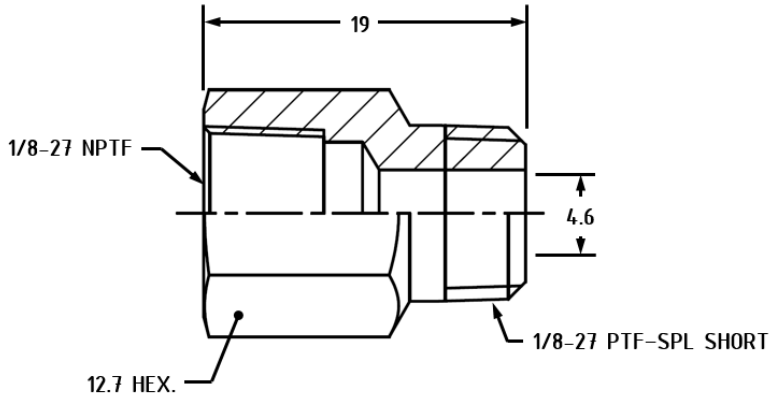

Figure 11 - Extension

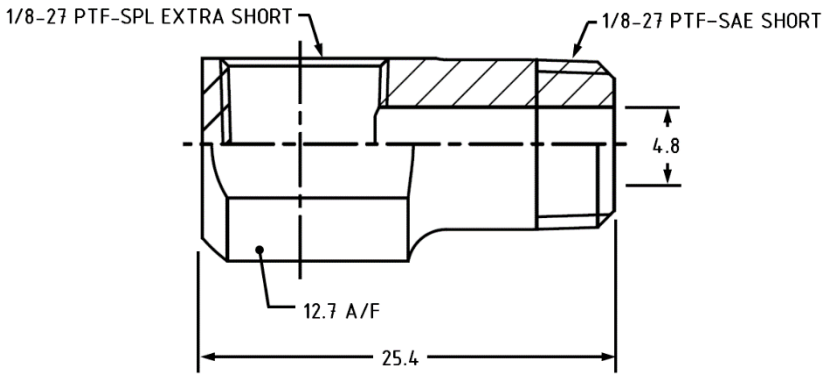

Figure 12 - 90 Degree elbow adapter

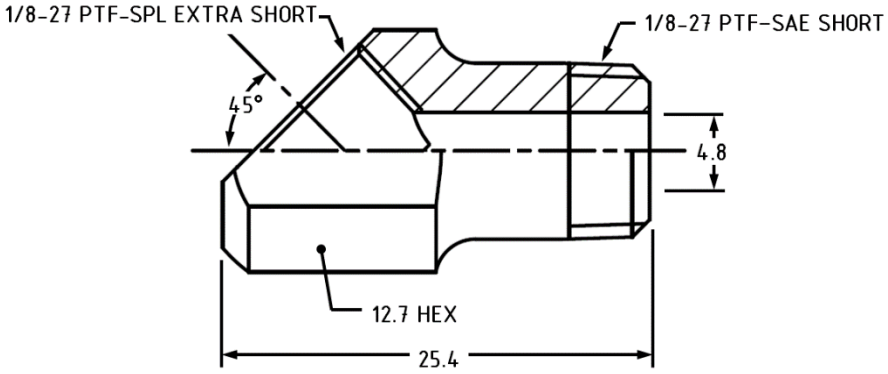

Figure 13 - 45 Degree elbow adapter

NOTE: Unspecified detail with respect to dimensions, tolerances, contours, material, workmanship, etc., must conform to general specifications for lubrication fittings.

6. NOTES

6.1 Marginal Indicia

A change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

PREPARED BY THE SAE FLUID CONDUCTORS AND CONNECTORS TECHNICAL STEERING COMMITTEE C1—HYDRAULIC TUBE FITTINGS