



SURFACE VEHICLE STANDARD

J1231™

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(R) Beaded Ends for Hose Connections and Hose Fittings

RATIONALE

General revision to update the standard to current practice. All artwork, figures, and tables have been updated.

1. SCOPE

This SAE Standard provides general and dimensional specifications for beaded ends and hose fittings. These connections are intended for general applications in low-pressure automotive and hydraulic systems on automotive, industrial, and commercial products. The fittings shown are designed to be used with hoses that are intended to be retained by hose clamps.

It is recommended that where step sizes or additional types of fittings are required they be designed to conform with the specifications of this document insofar as they may apply. The following general specifications shall supplement the dimensional data contained in the tables with respect to all unspecified detail.

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 Publications

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

SAE J405	Chemical Compositions of SAE Wrought Stainless Steel
SAE J476	Dryseal Pipe Threads
SAE J846	Coding Systems for Identification of Fluid Conductors and Connectors
SAE J1926-3	Connections for General Use and Fluid Power, Ports and Stud Ends with ASME B1.1 Threads and O-Ring Sealing, Part 3: Light-Duty (L-Series) Stud Ends

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For more information on this standard, visit https://www.sae.org/standards/content/J1231_202607/

Documents



Standard, visit Sharing Hub

2.1.2 ASTM Publications

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 A380 Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems

ASTM B117 Method of Salt Spray (Fog) Testing

2.1.3 ISO Publications

Copies of these documents are available online at <https://webstore.ansi.org/>.

ISO 725 ISO inch screw threads - Basic dimensions

ISO 2768-1 General tolerances - Part 1: Tolerances for linear and angular dimensions without individual tolerance indications

ISO 4759-1 Tolerances for fasteners - Part 1: Bolts, screws, studs and nuts

ISO 5598 Fluid power systems and components - Vocabulary

ISO 9227 Corrosion tests in artificial atmospheres - Salt spray tests

2.1.4 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

ASME B1.1 Unified Screw Threads

ASME B1.20.3 Dryseal Pipe Threads (Inch)

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 SAE Publications

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 J514 Hydraulic Tube Fittings

SAE J516 Hydraulic Hose Fittings

SAE J1273 Recommended Practices for Hydraulic Hose Assemblies

3. DEFINITIONS

For this part of SAE J1231, the definitions given in ISO 5598 and the following shall apply:

3.1 FLUID POWER

Means by which energy is transmitted, controlled, and distributed using a pressurized fluid as the medium (refer to ISO 5598).

3.2 CONNECTOR

Leakproof device to connect pipelines (conductors) to one another or to equipment (refer to ISO 5598).

3.3 FASTENING THREAD

Terminal thread of a complete connector.

3.4 CHAMFER/COUNTERSINK

Removal of a conical portion at the entrance (female) or end (male) of a thread to assist assembly and prevent damage to the start of the thread.

3.5 TORQUES

3.5.1 ASSEMBLY TORQUE

The recommended torque value to be applied in order to achieve a satisfactory final assembly.

3.6 ADJUSTABLE STUD END

A stud end connector that allows for connector orientation before final tightening of the locknut to complete the connection. This type of stud end is typically used on shaped connectors (e.g., tees, crosses, and elbows).

3.7 NONADJUSTABLE STUD END

A stud end connector that does not require specific orientation before final tightening of the connection because it is normally used on straight connectors.

3.8 PREFERRED DESIGN

Connectors shown in the main body of this document.

4. REQUIREMENTS - GENERAL SPECIFICATIONS

The following general specifications supplement the dimensional data contained in Tables 7 to 13 with respect to all unspecified detail.

4.1 Size Designation

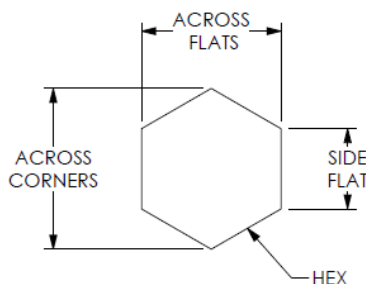
4.1.1 The hose dash size is equivalent to the number of 1/16-inch increments in the hose inside diameter.

4.1.2 The pipe thread dash size is the number of 1/16-inch increments in the nominal pipe thread size.

4.1.3 The O-ring boss thread dash sizes correspond to the number of 1/16-inch increments in the outside diameter of the tubing with which they are designed to be used.

4.2 Dimensions and Tolerances

Except for nominal sizes and thread designations, dimensions and tolerances are given in SI units. Tabulated dimensions shall apply to the finished parts, plated or otherwise processed, as specified by the user. Hex tolerances across flats are listed in Table 1. For machined from bar stock and cold-formed surfaces, hexagonal tolerances across flats shall be in accordance with ISO 4579-1, product grade C. The minimum across-corner hex dimensions shall be 1.092 times the nominal width across flats, and the minimum side flat shall be 0.43 times the nominal width across flats (see Figure 1). 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 the flats.

**Figure 1 - Hex details****Table 1 - Hex tolerances**

Nominal Hex Size Across Flats Millimeters Over	Nominal Hex Size Across Flats Millimeters Include	Nominal Hex Size Across Flats Inches Over	Nominal Hex Size Across Flats Inches Include	Tolerance (Minus Only) Millimeters	Tolerance (Minus Only) Inches
--	19.05	--	0.750	0.3	0.012
19.05	25.40	0.750	1.000	0.4	0.016
25.40	34.92	1.000	1.375	0.5	0.020
34.92	and up	1.375	and up	0.8	0.031

Tolerance on all dimensions not otherwise limited shall be ± 0.4 mm. Fitting seats shall be concentric with straight thread pitch diameters within 0.25 mm full indicator movement (FIM).

Unless otherwise specified, tolerances on hole diameters in the dimensional tables shall be as tabulated in Table 2:

Table 2 - Hole tolerances⁽¹⁾

Hole Size Range Millimeters	Tolerance Millimeters
≤ 6	± 0.1
> 6 and ≤ 30	± 0.2
> 30	± 0.3

⁽¹⁾ See 4.8.

Other tolerances not specified shall be in accordance with ISO 2768-1 as shown in Tables 3 to 5 for designation m (medium).

Table 3 - Linear tolerances (except for broken edges)

> 0.5	> 6	> 30	> 120	> 400	> 1000	> 2000
≤ 6	≤ 30	≤ 120	≤ 400	≤ 1000	≤ 2000	≤ 4000
± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2

NOTE: For nominal sizes below 0.5, the tolerances shall be indicated adjacent to the relevant nominal sizes.

Table 4 - Broken edges tolerances (external radii and chamfer heights)

≥ 0.5	> 3	
≤ 3	≤ 6	> 6
± 0.2	± 0.5	± 1

NOTE: For nominal sizes below 0.5, the tolerances shall be indicated adjacent to the relevant nominal sizes.

Table 5 - Angular tolerances

	> 10	> 50	> 120	
≤ 10	≤ 50	≤ 120	≤ 400	> 400
± 1 degree	± 0 degree 30 minutes	± 0 degree 20 minutes	± 0 degree 10 minutes	± 0 degree 5 minutes

NOTE: Tolerances for ranges of lengths, in millimeters, of the shorter side of the angle concerned.

Angular tolerance on axis of ends on elbows, tees, and crosses shall be ± 2.50 degrees for -2 to -6 tube fittings and ± 1.50 degrees for -8 to -32 OD tube fittings.

Where so illustrated and not otherwise specified, hexagon corners shall be chamfered 15 to 30 degrees to a diameter equal to the width across flats, with a minus tolerance of 0.4 mm; or, where design permits, corners 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.

Alternatively, on connections other than SAE J1926-3 straight thread, a 5-degree chamfer starting at the undercut diameter behind the threads or outside diameter of the threads shall be allowed, provided the hex width at corners is not reduced below that produced by the 30-degree chamfer previously described.

4.3 Passages

Where passages in straight fittings are machined from opposite ends, the offset at the meeting point shall not exceed 0.4 mm. The cross-sectional area at the junction of fluid passages shall not be less than that of the smallest passage. This assembly passage definition does not apply to bent tubes.

4.4 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.

4.5 Contour

Details of contour (e.g., body shape, construction type, etc.) shall be optional with the manufacturer, provided the dimensions and tolerances in this document are maintained. Wrench flats on elbows shall be optional.

4.6 Screw Threads

The screw threads on the tube/hose connection ends of the connectors shall be inch screw threads per ASME B1.1 (refer to ISO 725). Straight threads shall be class 2A or 2B, except external threads that are plated or coated may exceed 2A diameters but shall not exceed maximum 3A diameters. Internal threads of all classes shall be within specified limits after plating or coating.

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

External threads shall be chamfered as specified in the illustrations and dimensional tables.

4.7 Thread Eccentricity Tolerances

The various thread elements of class 2A external threads on hose fittings shall be concentric within the limitations specified under General Specifications in ASME B1.1.

4.8 Pipe Threads

Taper pipe threads designated d_4 in Figures 7 through 11 shall conform to the Dryseal American Standard Taper Pipe Thread (NPTF). Specifications are given in detail in SAE J476 and ASME B1.20.3. At the purchaser's option, the pipe thread may be shortened in conformity with the SAE Short Dryseal Taper Pipe Thread (PTF-SAE Short).

The length of a full form external thread shall not be shorter than L_2 plus one pitch (thread) for Dryseal NPTF and L_2 short plus one pitch (thread) for Dryseal PTF SAE Short; except where the thread is cut through into a relieved body or undercut on the fitting, then the minimum full thread length may be reduced by one pitch (thread).

External pipe threads shall be chamfered from the diameters shown in Table 6 to produce the specified length of chamfered or partial thread.

Table 6 - Dimensions of chamfers on external pipe threads

External Nominal Pipe Thread Inches	Chamfer Dia ⁽¹⁾ Maximum Millimeters	Chamfer Dia ⁽¹⁾ Minimum Millimeters	Length of Chamfered or Partial Thread Maximum Millimeters	Length of Chamfered or Partial Thread Minimum Millimeters
1/8	8.1	7.6	1.40	0.94
1/4	10.7	10.2	2.13	1.42
3/8	14.0	13.4	2.13	1.42
1/2	17.3	16.8	2.72	1.80
3/4	22.6	22.1	2.72	1.80
1	28.4	27.7	3.30	2.21
1-1/4	37.1	36.3	3.30	2.21
1-1/2	43.2	42.4	3.30	2.21
2	55.1	54.4	3.30	2.21

⁽¹⁾ Tabulated diameters conform with Appendix A, SAE J476.

4.9 Material and Manufacture

Unless otherwise specified, fittings shall be made from carbon steel.

Stainless steel fittings shall be made from AISI Type 300 Series stainless steel in accordance with SAE J405. Unless otherwise specified by the purchaser, stainless steel fittings shall be passivated per ASTM A380. Carbon steel and stainless steel fittings fabricated from multiple components must be bonded together with materials having a melting point of not less than 996 °C (1825 °F).

Brass fittings shall be made from C36000 (CA360) 1/2 hard bar stock or extruded shapes or C37700 (CA377) forgings or equivalent materials.

Steel tubing shall be SAE standard single wall intended for general applications in low-pressure automotive and hydraulic systems. When steel tubing is used for a beaded tube connection, the wall thickness shall be the manufacturer's option unless specified by the purchaser.