



SURFACE VEHICLE STANDARD

J1231™

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Beaded Ends for Hose Connections and Hose Fittings

RATIONALE

General revision and update to SAE J1231 to correct the following:

- Document title revised from "Formed Tube Ends for Hose Connection and Hose Fittings." Made appropriate corrections throughout the document.
- Included and revised current tolerance information and corrosion protection requirements.
- Corrected reference in Table 6 to "see Figure 2."
- Corrected PIN in Figure 3C from 430360 to 432260, and Figure 4C from 430392 to 432292.

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.

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Full document details: SAE J1231_202104

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Documents

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2.1.1 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 J476A Dryseal Pipe Threads

SAE J512 Automotive Tube Fittings

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

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 B117 Method of Salt Spray (Fog) Testing

2.1.3 ISO Publications

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

ISO 4759-1 Tolerances for Fasteners - Part 1

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 B1.20.1 General Purpose Pipe 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 J516 Hydraulic Hose Fittings

SAE J1273 Recommended Practices for Hydraulic Hose Assemblies

SAE J514 Hydraulic Tube Fittings

3. SIZE DESIGNATIONS

The hose fitting size is designated in accordance with SAE J846 as follows:

- 3.1 The hose dash size is equivalent to the number of sixteenth inch increments in the hose inside diameter.
- 3.2 The pipe thread dash size is the number of sixteenth inch increments in the nominal pipe thread size.
- 3.3 The O-ring boss thread dash sizes correspond to the number of sixteenth inch increments in the outside diameter of the tubing with which they are designed to be used.

4. DIMENSIONS AND TOLERANCES

Tabulated dimensions shall apply to the finished parts, plated or otherwise processed, as specified by the purchaser. Details of internal construction of fittings are not specified and can be optional with the manufacturer.

4.1 Hex Tolerances Across Flats

Hex tolerances across flats shall be according to ISO 4759-1 product grade C. Minimum across corner hex dimensions are 1.092 times the nominal width across flats. The minimum side flat is 0.43 times the nominal width across flats. See Figure 1.

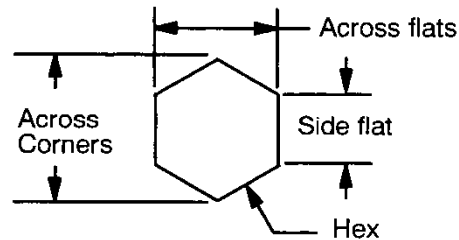


Figure 1 - Hex details

Except for nominal sizes and thread specifications, dimensions and tolerances are given in SI units. Tolerance on all dimensions not otherwise limited shall be ± 0.25 mm. Angular tolerance on axis of ends on elbows shall be ± 2.50 degrees for sizes up to and including 9.52 mm and ± 1.50 degrees for sizes larger than 9.52 mm.

Unless otherwise specified, tolerances on hole diameters designated as a drill in the dimensional tables (Tables 6, 7, and 8) shall conform to Table 1:

Table 1 - Tolerances on drilled holes

Drill Size Range mm	Tolerance, mm	
	Plus	Minus
0.00 to 6.00	0.1	0.1
Over 6.00 to 30.0	0.2	0.2
Over 30.0	0.3	0.3

Other tolerances not specified shall be in accordance with ISO 2768-1 as shown in tables G to I for designation m (medium)

Table 2 - Linear tolerances (except for broken edges)

0.5 up to 6	Over 6 up to 30	Over 30 up to 120	Over 120 up to 400	Over 400 up to 1000	Over 1000 up to 2000	Over 2000 up to 4000
± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2

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

Table 3 - Broken edges tolerances (external radii and chamfer heights)

0.5 up to 3	Over 3 up to 6	Over 6
±0.2	±0.5	±1

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

Table 4 - Angular tolerances

Up to 10	Over 10 up to 50	Over 50 up to 120	Over 120 up to 400	Over 400
±1 degree	±0 degree 30 minutes	±0 degree 20 minutes	±0 degree 10 minutes	±0 degree 5 minutes

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

5. PASSAGES

Where passages in straight fittings are machined from opposite ends, the offset at the meeting point shall not exceed 0.40 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.

6. CONTOUR

Details of contour shall be optional with manufacturer provided the tabulated dimensions are maintained and serviceability of the fittings is not impaired. Wrench flats on elbows shall be optional.

7. STRAIGHT THREADS

Straight threads must be class 2A in accordance with ASME B1.1 screw thread specification. External class 2A threads which are plated or coated may exceed 2A diameters, but shall not exceed maximum 3A diameters.

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.

8. 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.

9. PIPE THREADS

Taper pipe threads designated A in Figures 3A through 3C and Tables 7A through 7C shall conform to the Dryseal American Standard Taper Pipe Thread (NPTF). Specifications are given in detail in SAE J476A. At 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 fullform 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 5 to produce the specified length of chamfered or partial thread.

Table 5 - Dimensions of chamfers on external pipe threads

External Nominal Pipe Thread Inches	Chamfer Dia ⁽¹⁾ maximum mm	Chamfer Dia ⁽¹⁾ minimum mm	Length of Chamfered or Partial Thread maximum mm	Length of Chamfered or Partial Thread minimum mm
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 J476A.

For fittings specified in Figures 3A through 4E, Tables 7A through 8C, unspecified detail with respect to dimensions, tolerances, contours, material, workmanship, and so on, must conform to the general specifications for hydraulic tube fittings per SAE J514.

10. MATERIALS AND MANUFACTURE

Beaded tube hose fittings shall be made from brass, steel, or other materials listed in SAE J846, and specified by the purchaser.

Brass shall be SAE UNS C36000 (half hard), SAE UNS C34500, or SAE UNS C35000 for bar or extruded stock and SAE UNS C37700 for forgings. 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. Dimension D (Nominal ID) in Table 6 does not apply to steel tubing. However, the D dimension shall be the same as the nominal tubing ID.

At the manufacturer's option, parts may be machined or milled from bar, forged, or of multiple component design.

Fittings made from multiple components shall be capable of withstanding 100 psi (minimum) without leakage or failure.

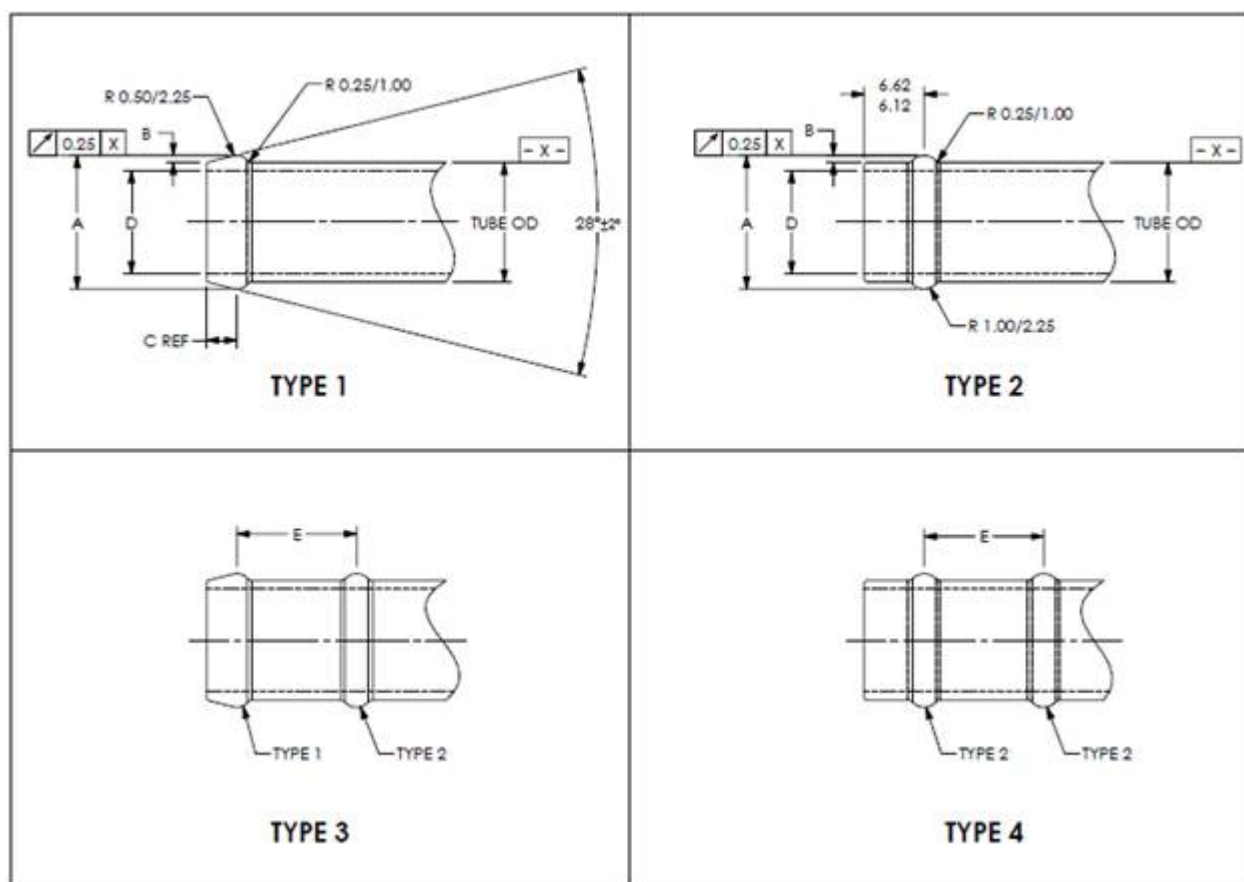


Figure 2 - Beaded tube connection styles

Table 6 - Dimensions for beaded tube hose connections
(see Figure 2)

SAE Hose Dash Size	Tube OD Nominal mm	Tube OD Nominal Inches	A ±0.25 mm	B Reference mm	C Reference mm	D ⁽¹⁾⁽²⁾ Nominal ID mm	E ±1.0 mm
-3	4.76	3/16	5.60	0.40	1.65	3.2	25
-4	6.35	1/4	7.40	0.50	2.05	4.8	25
-5	7.94	5/16	9.15	0.60	2.45	6.4	25
-6	9.52	3/8	10.95	0.70	2.85	7.5	25
-7	11.11	7/16	12.45	0.70	2.85	9.1	25
-8	12.70	1/2	14.20	0.75	3.05	10.3	25
-9	14.29	9/16	15.75	0.75	3.05	11.1	25
-10	15.88	5/8	17.55	0.85	3.40	12.7	25
-12	19.05	3/4	20.85	0.90	3.60	15.9	25
-16	25.4	1	26.90	0.75	4.00	21.4	25
-20	31.75	1-1/4	34.45	1.35	5.40	27.8	25
-24	38.10	1-1/2	41.25	1.60	6.35	34.1	25
-32	50.80	2	54.50	1.85	7.40	46.8	25
-40	63.50	2-1/2	67.95	2.25	8.95		30
-48	76.20	3	80.65	2.25	8.95		30
-56	88.90	3-1/2	93.35	2.25	8.95		30
-64	101.6	4	106.60	2.50	10.05		30
-72	114.3	4-1/2	119.30	2.50	10.05		30
-80	127.0	5	132.00	2.50	10.05		30

⁽¹⁾ See Section 10.⁽²⁾ Internal diameters for size -40 through -80 not included. These sizes are not machined, and internal diameters are result of the tubing wall thickness selected.