



SURFACE VEHICLE STANDARD

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Dimensional Specifications for Non-Metallic Body Push-to-Connect Fittings
Used On a Vehicular Air Brake System

RATIONALE

This document provides maximum envelope dimensions and general design guidance only. The document has been determined to cover products which are mature and not likely to change in the foreseeable future.

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1. Scope—This SAE Standard covers general dimensional specifications for non-metallic body reusable push to connect tube fittings for use in the piping of air brake systems on automotive vehicles. This type of fitting is intended for use with nylon tubing per SAE J844. It is not intended to restrict or preclude other designs of a tube fitting for use with SAE J844. Performance requirements for SAE J844 are covered in SAE J1131. See SAE J2494-3 for the performance requirements of Reusable (push-to-connect) fittings intended for use in Automotive Air Brake Systems and U.S. Department of Transportation FMVSS 571.106.

2. References

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein. Unless otherwise specified, the latest issue of publication shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J476—Dryseal Pipe Threads

SAE J512—Automotive Tube Fittings

SAE 844—Nonmetallic Air Brake System Tubing

SAE J1131—Performance Requirements for SAE J844 Nonmetallic Tubing and Fitting Assemblies Used in Automotive Air Brake Systems

SAE 2494-3—Performance Requirements for SAE J844 Nonmetallic Air Brake Tubing and Push-To-Connect Fitting Assemblies used in Vehicular Air Brake Systems

2.1.2 ANSI PUBLICATIONS—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ANSI B1.1—Unified Inch Screw Thread

2.1.3 ISO PUBLICATIONS—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 7-1—Pipe threads where pressure-tight joints are made on the threads—Part 1: Dimensions, tolerances and designation

ISO 228—Pipe threads where pressure-tight joints are not made on the threads.

ISO 261—General purpose metric screw threads—General plan

- 2.1.4 **FEDERAL PUBLICATIONS**—Available from the Superintendent of Documents, U.S. Printing Office, Washington, DC

FMVSS 571.106

- 2.2 **Related Publications**—The following publications are for information purposes only and are not a required part of this document.

- 2.2.1 **ANSI PUBLICATIONS**—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002

ANSI B1.20.3—Dryseal Pipe Threads

ANSI B18.2.2—Square and Hex Nuts Inch Series

- 2.2.2 **ASTM PUBLICATION**—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 249—Specification for Wrought Copper and Copper Alloy Rod Bar and Shape

3. **Size Designations**—Fitting sizes are designated by the corresponding nominal outside diameter of the tubing for the various sizes of the tube ends and by the corresponding standard nominal pipe size for pipe thread ends.
4. **Fitting Identification**—Any component of the fitting shall be permanently and legibly marked according to the current U.S. Department of Transportation FMVSS 571.106 Regulation (NHTSA). The location of such markings shall be optional with manufacturer.
5. **Dimensions and Tolerances**—Except for nominal size and thread specifications, dimensions and tolerances are given in both SI units and U.S. customary as designated.

Unless otherwise specified, tolerances on all dimensions shall be ± 0.4 mm [0.016 in]. Tabulated dimensions shall apply to the finish parts. Dimensions over external contour of fittings shown in Appendix A, Tables A1 through A10 reflect the maximum envelope of products available. Details of internal construction of the attaching portion of fittings are not specified and shall be optional with the manufacturer, providing the fittings, properly assembled onto the appropriate tube, will meet the requirements specified in SAE J2494-3.

Wrenching surfaces shall fit standard wrench size openings. The minimum across corners dimensions of external hexagon shall be 1.092 times the nominal width across flat, but shall not result in a side flat width of less than 0.43 times the nominal width across flats.

Tabulated dimensions apply to measurements taken when the release mechanism is in the “in” position

6. **Passages**—The minimum flow diameter through any section of the air brake fitting shall not be less than 66% of the nominal inside diameter of the air brake tubing.

Where passages in straight fittings are formed from opposite ends, the offset at the meeting point shall not exceed 0.38 mm (0.015 in). On angle fittings, the cross-sectional area at the junction of fluid passages shall not be less than that of the smallest passage. At manufacturer's option, all passages in a particular fitting may conform with the smallest diameter specified for that fitting.

7. **Contour**—Details of contour shall be optional with manufacturer, provided the dimensions Appendix A, Tables A1 through A10 are maintained and serviceability of the fitting is not impaired.

8. Straight Threads—Unified straight threads shall be manufactured in accordance with ANSI B1.1.

Unified standard Class 2A external and Class 2B internal threads shall apply to plain finish (unplated) fittings of all types. For internally threaded parts with additive finish, the Class 2B diameters shall apply after plating.

Metric straight threads may be used and shall be manufactured in accordance with ISO 261 or ISO 228; however, this is not intended to preclude the use of other threads described in internationally accepted standards.

Where external threads are produced by roll threading, and the body is not undercut, the unthreaded portion of the body adjacent to the shoulder may be reduced to the minimum pitch diameter. See Figure 1.

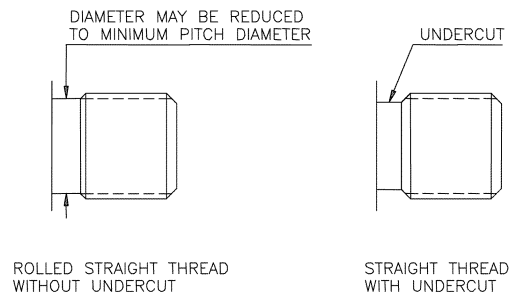


FIGURE 1—ROLLED STRAIGHT THREAD WITH OR WITHOUT UNDERCUT

External threads shall be suitably chamfered to allow for ease of assembly.

Internal threads shall be countersunk 90 degrees included angle to the diameters specified.

9. Thread Eccentricity Tolerances—The various thread elements of external and internal straight threads on tube fittings shall be concentric within the limitations specified in the General Specifications of SAE J512.

10. Pipe Threads—Taper pipe threads, unless there is specific authorization to the contrary, shall conform to the specifications found in SAE J476.

Where external pipe threads are produced by roll threading, the diameter of the unthreaded portion of shank adjacent to shoulder may be reduced to the E2 basic pitch diameter. See Figure 2.

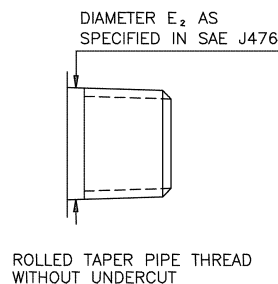


FIGURE 2—ROLLED TAPER PIPE THREAD WITHOUT UNDERCUT

External pipe threads shall be chamfered to allow ease of assembly. Internal pipe threads shall be countersunk 90 degrees included angle, to the diameters tabulated in Table 1.

TABLE 1—CHAMFER SPECIFICATION OF DRYSEAL PIPE THREAD

Nominal Pipe Thread Size in	Internal Thread Countersink Dia Max mm	Internal Thread Countersink Dia Max (in)	Internal Thread Countersink Dia Min mm	Internal Thread Countersink Dia Min (in)
1/8	11.2	0.44	10.7	0.42
1/4	14.5	0.57	14.0	0.55
3/8	18.0	0.71	17.5	0.69
1/2	22.1	0.87	21.6	0.85
3/4	27.4	1.08	26.9	1.06
1	34.5	1.36	34.0	1.34

British pipe threads may be used and shall be manufactured in accordance with ISO 7-1.

- 11. Materials**—Fitting bodies shall be made from 100% virgin (no internal regrind) thermoplastic materials. Material shall be chosen such that the fitting will meet the performance requirements of SAE J2494-3.

For positionable threaded fitting, the base is to be made from one of the alloys shown as follows.

a. Allowable Base Materials

UNS C34500
UNS C35000
ISO 426/2 CuZn 39Pb₃
JIS H3250 C3604B

- 12. Workmanship**—Workmanship shall conform to the best commercial practice to produce high-quality fittings. Fittings shall be free from all processing materials, chips, hanging burrs, loose flash, and slivers which might become dislodged in usage and all other defects, which might affect their serviceability.
- 13. Pipe Thread Sealant**—Where it is not objectionable from a function or production standpoint, the use of a compatible lubricant or sealant may be desirable in assembling Dryseal pipe threads on tube fittings to minimize galling and affect a pressure-tight seal.

PREPARED BY THE SAE AIR BRAKE TUBING AND TUBE FITTINGS SUBCOMMITTEE
OF THE SAE FLUID CONDUCTORS AND CONNECTORS COMMITTEE