



SURFACE VEHICLE STANDARD

J2405™**SEP2021**

Issued 1997-08
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Superseding J2405 JUL2007

Low-Permeation Fuel Fill and Vent Tube

RATIONALE

This document is being revised to perform corrections to the “end out of squareness” degrees in Table 1, which were unrealistic for manufacturing.

1. SCOPE

This SAE Standard covers the minimum requirements for a low-permeation tubing (100 g/m²/day or less) for use as a low pressure (14.5 kPa) liquid- or vapor-carrying component for use in gasoline or diesel fuel filler, vent, and vapor systems. The construction shall be designed to be functional over a temperature range of -40 to 100 °C for the T1 designation, or -40 to 125 °C for the T2 designation.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of the 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, 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 J1737 Test Procedure to Determine the Hydrocarbon Losses from Fuel Tubes, Hoses, Fittings, and Fuel Line Assemblies by Recirculation

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 D380 Methods of Testing Rubber Hose

ASTM D413 Test Methods for Rubber Property: Adhesion to Flexible Substrate

ASTM D471 Test for Rubber Property: Effect of Liquids

ASTM D1149 Test Method for Rubber Deterioration: Surface Ozone Cracking in a Chamber (Flat Specimens)

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Documents

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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, 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 J30 Fuel and Oil Hoses
- SAE J1645 Fuel Systems and Components - Electrostatic Charge Mitigation
- SAE J1681 Gasoline, Alcohol, and Diesel Fuel Surrogates for Materials Testing
- SAE J2260 Nonmetallic Fuel System Tubing with One or More Layers

2.2.2 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 D257 DC Resistance or Conductance of Insulating Materials
- ASTM D412 Test for Rubber Properties in Tension
- ASTM D573 Test for Rubber: Deterioration in an Air Oven

2.2.3 ARPM Publications

Available from the Association for Rubber Products Manufacturers, Inc. 7321 Shadeland Station Way, Suite 285 Indianapolis, IN 46256 www.arpminc.org

- ARPM IP-2 Hose Handbook, Chapter 6, Hose Test Methods: Electrical Resistance Tests for Hose and Hose Assemblies

3. CONSTRUCTION

The construction typically consists of a smooth bore or laminated tube of one or more synthetic rubber compound(s) and/or thermoplastic material(s) resistant to chemical attack, swelling, and permeation by gasoline, alcohol extended gasoline, or diesel fuel. It may also be covered with a suitable oil, ozone, and heat-resistant synthetic rubber compound or thermoplastic. The specific construction details are to be agreed between the supplier and the original purchaser.

4. DIMENSIONS

- 4.1 The ends of the tube shall be square within 3.0 mm for sizes up to, but excluding, 25.4 mm ID, 6.4 mm for sizes 25.4 mm through 50.8 mm ID, and 9.5 mm for sizes over 50.8 mm ID. See Table 1.
- 4.2 When tubing is supplied in specific cut or long lengths, the length tolerances shall be as in Table 2.
- 4.3 End squareness shall be measured as the angle between a plane intersecting the long and short extremes of the tube end and a plane perpendicular to the tube axis. The allowable maximum out-of-squareness is specified in Table 1.

5. WHEN A TUBE IS SUPPLIED AS A PREFORMED ITEM, THE TOLERANCE SHALL BE AS FOLLOWS

5.1 Squareness of Ends

The tolerance on squareness of ends of preformed parts shall be a minimum 15% of the nominal tube OD on all sizes through 25.4 mm ID, 6.3 mm for sizes over 25.4 mm ID through 50.8 mm ID, and 9.5 mm for sizes over 50.8 mm ID. End squareness shall be measured as described in 4.1.

5.2 Arms Lengths

Measured from end to intersection of nearest centerline. Each end shall be as described in Section 4. These tolerances apply also to the length of an expanded end.

5.3 General Layout

Dimensions locating bend intersections are to establish the theoretical centerline of the tube. Actual outside contour of the tube must be held within 4.8 mm in all planes with respect to the theoretical outside contour. To check contour, tube ends should first be placed in nominal position (it may have to be flexed to correct any distortion caused by handling after vulcanization in the producing plant or in shipment) in a checking fixture made in accordance with user requirements from which contour deviation can be measured. Allowance shall be provided in the end-mounting area of the fixture for the arm length tolerances which are applicable.

When the ID of an end of the tube is enlarged, the wall gauge of the enlarged end normally changes. Allowable change should be +0.8/-0.5 mm. The wall gauge within bends of a preformed tube may differ from the gauge in straight portions. The difference shall not exceed 33%.