

	SURFACE VEHICLE STANDARD		SAE J2467	REV. FEB2008
			Issued 1999-04 Revised 2008-02	
			Superseding J2467 APR1999	
Welded and Cold-Drawn, SAE 1021 Carbon Steel Tubing Normalized for Bending and Flaring				

RATIONALE

This five year review of this standard resulted in changes identified by the bar on the left side of the page and are described as follows:

- Added SAE and other international standards to the "Related Publications" section because these documents are related to SAE J2467 tubing.
- In Section 8, Performance Requirements, removed un-needed SAE J1677 paragraph numbering to eliminate unnecessary confusion.
- In Section 8, Performance Requirements, added elongation test.

1. SCOPE

The SAE Standard covers normalized electric resistance welded, cold-drawn, single-wall, SAE 1021 carbon steel pressure tubing intended for use as pressure lines and in other applications requiring tubing of a quality suitable for bending, flaring, forming, and brazing.

The grade of material produced to this specification is higher in carbon content and manganese content than the grade of material specified in SAE J525. The material produced to this specification is intended to service higher pressure applications than like sizes of SAE J525. Due to the higher carbon and manganese content, however, the forming characteristics of the finished tube is diminished somewhat when compared to SAE J525. Special attention to the overall forming requirements of the finished assembly should be taken into consideration when utilizing material produced to this specification.

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 SAE publications shall apply.

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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 724-776-4970 (outside USA), www.sae.org.

SAE J409 Product Analysis—Permissible Variations from Specified Chemical Analysis of a Heat or Cast of Steel

SAE J525 Welded and Cold Drawn Low-Carbon Steel Tubing Annealed for Bending and Flaring

SAE J1677 Tests and Procedures for Steel and Copper Nickel Tubing

2.2 Related Publications

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

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 724-776-4970 (outside USA), www.sae.org.

SAE J514 Hydraulic Tube Fittings

SAE J533 Flares for Tubing

SAE J1065 Nominal Reference Working Pressures for Steel Hydraulic Tubing

SAE J1453 Fitting—O-Ring Face Seal

SAE J2551 Recommended Practices for Fluid Conductor Metallic Tubing Applications

SAE J2592 Carbon Steel Tubing for General Use—Understanding Nondestructive Testing for Carbon Steel Tubing

SAE J2658 Metallic Tube Conductor Assemblies for Fluid Power and General Use—Test Methods for Hydraulic Fluid Power Metallic Tube Assemblies

2.2.2 ISO Publications

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 3305 Plain end welded precision steel tubes—Technical conditions for delivery

ISO 5598 Fluid power systems and components—Vocabulary

ISO 8434-2 Metallic tube connections for fluid power and general use—Part: 2 37° flare fittings

ISO 8434-3 Metallic tube connections for fluid power and general use—Part: 3 ORFS fittings

ISO 10583 Hydraulic fluid power—Test methods for tube connections

ISO 10763 Hydraulic fluid power—Plain-end, seamless and welded steel tubes—Dimensions and nominal working pressures

2.2.3 ASTM Publications

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

ASTM A 513 Electric-Resistance-Welded Carbon and Alloy Steel Tubing

ASTM A 450/A 450M Standard Specifications for General Requirements for Carbon, Ferritic Alloy and Austenitic Alloy Steel Tubing

3. MANUFACTURE

The tubing shall be made from flat rolled steel shaped into a tubular form, the edges of which are joined and fused together by electric resistance welding. After forming and welding, the tubing shall be normalized and subjected to a cold drawing operation that shall result in a 15% minimum reduction in cross sectional area, of which 8% shall consist in a reduction of wall thickness. Subsequent to cold drawing, the tubing shall be *normalized* via an atmospherically controlled method to produce a finished product that will meet all requirements of this document.

4. DIMENSIONS AND TOLERANCES

The tolerances applicable to the tubing outside diameter and inside diameter are shown in Table 1. The tolerances applicable to tubing wall thickness are shown in Table 2. Dimensional tolerances can only apply to two of the three tubing dimensions (OD, ID, or wall). Unless otherwise agreed upon between the purchaser and tube producer, dimensional tolerances shall apply to the tube *OD* and *wall* dimension.

TABLE 1 - TUBING DIAMETER TOLERANCES

Nominal Tubing OD ⁽¹⁾⁽²⁾ mm	Tube OD Tolerance ±mm	TUBE ID Tolerance ±mm
Up to 9.50	0.05	0.05
Over 9.50 to 15.88	0.06	0.06
Over 15.88 to 50.80	0.08	0.08
Over 50.80 to 63.50	0.10	0.10
Over 63.50 to 76.20	0.13	0.13
Over 76.20 to 100.00	0.15	0.15

1. OD measurements shall be taken at least 50 mm from the end of the tubing.

2. Refer to SAE J514 for nominal tubing OD to be used in conjunction with standard hydraulic tube fittings and SAE J533 for recommended maximum nominal wall thickness for double flaring.

TABLE 2 - TUBING WALL THICKNESS TOLERANCES

Nominal Wall Thickness ⁽¹⁾	Nominal Tubing Outside Diameter Through 22 mm ± mm	Nominal Tubing Outside Diameter Over 22 mm Through 48 mm ± mm	Nominal Tubing Outside Diameter Over 48 mm Through 100 mm ± mm
0.89	0.05/0.05	0.05/0.05	0.05/0.05
1.00	0.05/0.05	0.05/0.08	0.05/0.08
1.25	0.05/0.05	0.05/0.08	0.05/0.08
1.50	0.05/0.05	0.05/0.08	0.05/0.08
1.65	0.05/0.05	0.05/0.08	0.05/0.08
2.00	0.05/0.05	0.05/0.08	0.08/0.08
2.11	0.05/0.05	0.05/0.08	0.08/0.08
2.41	0.05/0.05	0.05/0.08	0.08/0.08
2.50	0.05/0.08	0.05/0.10	0.08/0.08
2.77	0.05/0.08	0.05/0.10	0.08/0.08
3.00	0.08/0.08	0.05/0.10	0.08/0.08
3.05	0.08/0.08	0.05/0.10	0.08/0.08
3.40	—	0.05/0.10	0.08/0.08
3.75	—	0.05/0.10	0.08/0.08
4.00	—	0.08/0.10	0.08/0.10
4.19	—	0.08/0.10	0.08/0.10
4.57	—	0.10/0.10	0.08/0.13
5.00	—	0.10/0.13	0.10/0.13
5.16	—	0.10/0.13	0.10/0.13
5.59	—	0.10/0.15	0.10/0.15
6.00	—	0.13/0.15	0.13/0.15
6.05	—	0.13/0.15	0.13/0.15
6.58	—	0.13/0.15	0.13/0.15

1. For intermediate wall thickness, the tolerance for the next heavier wall thickness shall apply.

5. MANUFACTURING STANDARDS

5.1 Straightness

Tubing shall be straightened to a tolerance of 0.8 mm in 1000 mm. Straightness tolerances shall be measured by placing a 915 mm straight edge against the tube while lying on its neutral axis. The point of maximum deflection of the tube from the straight edge should not be more than allowed by the specification when measured with a feeler gauge.

5.2 Tubing End Condition

The tubing will be produced using normal mill cut-off practices. This will include, but is not limited to double-cut ends, saw-cut, and rotary-cut ends. Care will be taken to minimize the distortion of the tube ends. Distortion of the tube ends must not affect the normal re-cutting processes that will be performed by the end user. Ends that require further processing will be by agreement between the producer and tube purchaser.