



# SURFACE VEHICLE STANDARD

**J526™****SEP2022**Issued 1952-01  
Revised 2022-09

Superseding J526 NOV2016

Welded Low-Carbon Steel Tubing Suitable for  
Bending, Flaring, Beading, Forming, and Brazing

## RATIONALE

This Five-Year Review of the SAE J526 standard incorporate revisions requested by producers, fabricators, and users of the material type. The updates include revised Tables 1 and 2 to include inch sizes and updated verbiage.

### 1. SCOPE

The SAE J526 Standard covers electric-resistance welded single-wall low-carbon steel pressure tubing intended for general automotive, refrigeration, hydraulic, and other similar applications requiring tubing of a quality suitable for bending, flaring, beading, forming, and brazing. Material produced to this specification is not intended to be used for single flare applications due to the potential leak path that would be caused by the ID weld bead or scarfed region. Assumption of risks when using this material for single flare applications shall be defined by agreement between the producer and tube purchaser. The material produced to this specification is intended to service pressure applications where severe forming and bending is not required. As this material may exhibit mechanical properties that reduce some desired forming characteristics versus SAE J356, the severity of the forming requirements of the finished assembly should be considered when utilizing material produced to this specification.

In an effort to standardize within a global marketplace and ensure that companies can remain competitive in an international market, it is the intent to convert to metric tube sizes, which will:

- Lead to one global system
- Guide users to preferred system
- Reduce complexity
- Eliminate inventory duplications

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[https://www.sae.org/standards/content/J526\\_202209/](https://www.sae.org/standards/content/J526_202209/)

## 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: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

SAE J356	Welded, Flash-Controlled, Low-Carbon Steel Tubing Normalized for Bending, Double Flaring, Beading, Forming, and Brazing
SAE J403	Chemical Compositions of SAE Carbon Steels
SAE J409	Product Analysis—Permissible Variations from Specified Chemical Analysis of a Heat or Cast of Steel
SAE J514/1	Metallic Connections for Fluid Power and General use - Part 1: 37 Degree Flared Fittings
SAE J533	Flares for Tubing
SAE J1677	Tests and Procedures for Carbon Steel and High Strength Low Alloy Steel Tubing

### 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](http://www.sae.org).

SAE J516	Hydraulic Hose Fittings
SAE J1065	Nominal Reference Working Pressures for Steel Hydraulic Tubing
SAE J1290	Automotive Hydraulic Brake System - Metric Tube Connections
SAE J1453-1	Specification for O-Ring Face Seal Connectors: Part 1 - Tube Connection Details and Common Requirements for Performance and Tests
SAE J1453-2	Specification for O-Ring Face Seal Connectors: Part 2 - Requirements, Dimensions, and Tests For Steel Unions, Bulkheads, Swivels, Braze Sleeves, Braze-on Tube Ends, Caps, and Connectors with ISO 6149-2 Metric Stud Ends and ISO 6162 4-Bolt Flange Heads
SAE J1453-3	Specification for O-Ring Face Seal Connectors: Part 3 - Requirements, Dimensions, and Tests for Steel Unions, Bulkheads, Swivels, Braze Sleeves, Caps, and Connectors with SAE J1926-2 Inch Stud Ends
SAE J2551-1	Recommended Practices for Fluid Conductor Carbon, Alloy and High Strength Low Alloy Steel Tubing Applications - Part 1: Design and Fabrication
SAE J2551-2	Recommended Practices for Fluid Conductor Carbon, Alloy and High Strength Low Alloy Steel Tubing Applications - Part 2: General Specifications and Performance Requirements

SAE J2551-3	Recommended Practices for Fluid Conductor Carbon, Alloy and High Strength Low Alloy Steel Tubing Applications - Part 3: Procurement
SAE J2592	Carbon Steel Tubing for General Use - Understanding Nondestructive Testing for Carbon Steel Tubing

### 2.2.2 ISO Publications

Copies of these documents are available online at <http://webstore.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 Degree Flare Fittings
ISO 8434-3	Metallic Tube Connections for Fluid Power and General Use - Part: 3 O-Ring Face Seal Connectors
ISO 10583	Hydraulic Fluid Systems - Test Methods for Tube/Fitting Assemblies
ISO 10763	Hydraulic Fluid Power - Plain-End, Seamless and Welded Precision Steel Tubes - Dimensions and Nominal Working Pressures
ISO 19879	Metallic Tube Connections for Fluid Power and General Use - Test Methods For Hydraulic Fluid Power Connections
EN 10305-3	Steel Tubes for Precision Applications – Technical Delivery Conditions – Part 5: Welded Cold Sized Square and Rectangular Tubes
JIS G 3454	Carbon Steel Pipes for Pressure Service

### 2.2.3 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](http://www.astm.org).

ASTM A513/A513M	Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
ASTM A450/A450M	Standard Specifications for General Requirements for Carbon And Low Alloy Steel Tubes

## 3. MANUFACTURE

The tubing shall be made from a single strip of flat-rolled steel shaped into a tubular form, the edges of which are joined and fused by electric resistance welding. After welding, the outside flash shall be removed to provide a smooth round surface and the tubing shall be processed in such a manner as to produce a finished product that shall meet all requirements of this document. Typically, this type of tubing is available in both coiled and straight condition.

#### 4. DIMENSIONS AND TOLERANCES

The tolerances applicable to tubing outside diameter are shown in Table 1. The tolerances applicable to tubing wall thickness are shown in Table 2. Particular attention should be given to areas adjacent to the weld to ensure against thin spots and/or sharp indentations.

**Table 1 - Tube outside diameter tolerances**

Nominal Tubing Outside Diameter <sup>(1)(2)</sup>		Tolerance	
mm	inches <sup>(3)</sup>	±mm	±inches <sup>(3)</sup>
3.18	0.125	0.05	0.002
Over 3.18 to 11.10	Over 0.125 to 0.437	0.08	0.003
Over 11.10 to 19.05	Over 0.437 to 0.750	0.10	0.004
Over 19.05 to 50.80	Over 0.750 to 2.000	0.13	0.005
Over 50.80 to 63.50	Over 2.000 to 2.500	0.15	0.006
Over 63.50 to 76.20	Over 2.500 to 3.000	0.20	0.008
Over 76.20 to 88.90	Over 3.000 to 3.500	0.23	0.009

<sup>(1)</sup> Other diameter sizes may be specified by agreement between the producer and purchaser.

<sup>(2)</sup> The actual outside diameter shall be the average of the maximum and minimum outside diameters as determined at any one cross-section through the tubing. The diameter tolerances include the out-of-roundness.

<sup>(3)</sup> Inch dimensions are reference only.

**Table 2 - Tube wall thickness tolerances**

Nominal Tubing Wall Thickness <sup>(1)(2)</sup>		Tolerance	
mm	inches <sup>(3)</sup>	±mm	±inches <sup>(3)</sup>
0.64 to 0.76	0.025 to 0.030	0.08	0.0031
Over 0.76 to 0.89	Over 0.030 to 0.035	0.09	0.0035
Over 0.89 to 1.25	Over 0.035 to 0.049	0.11	0.0043
Over 1.25 to 1.65	Over 0.049 to 0.065	0.15	0.0059
Over 1.65 to 2.50	Over 0.065 to 0.098	0.20	0.0079

<sup>(1)</sup> The tolerances listed represent the maximum permissible deviation at any point.

<sup>(2)</sup> Diameters 3.18 mm up to and including 4.76 mm may have a wall tolerance of ±0.13 mm.

<sup>(3)</sup> Inch dimensions are reference only.

#### 5. MANUFACTURING STANDARDS

##### 5.1 Straightness

Tubing produced as straight lengths shall be straightened to a tolerance of 1.0 mm over a 1000 mm length. This tolerance may be waived if agreed upon between the producer and purchaser as documented in the purchase agreement. This tolerance does not apply to tubing supplied as coiled product.

##### 5.2 Tubing End Condition

The tubing shall be produced using normal mill cut-off practices, e.g., punch-cut ends, double cut ends, or rotary-cut ends. Tube end distortion must be minimized; end condition shall not affect normal re-cut processes performed by the end user, e.g., circular saws, nick and shear, laser, or punch cut processing methods. Extraordinary end cut processing requirements shall be defined by agreement between the producer and purchaser.