SURFACE VEHICLE STANDARD

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Superseding J356 DEC2013

(R) Welded, Flash-Controlled, Low-Carbon Steel Tubing Normalized for Bending, Double Flaring, Beading, Forming, and Brazing

RATIONALE

This SAE Standard has been revised as part of a Five-Year Review. Document changes include: revisions to the scope, applicable documents, and related publications lists; new and revised verbiage in Section 4; new verbiage in 5.2; clarified 5.3 requirement; and revised or added notes to 8.8 and 8.9. Verbiage has been updated throughout the standard to align the document with other recently revised bulk tube standards.

1. SCOPE

This SAE Standard covers normalized electric-resistance welded flash-controlled single-wall, low-carbon steel pressure tubing intended for use as pressure lines and in other applications requiring tubing of a quality suitable for bending, double 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 caused by the Inside Diameter (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 purchaser.

This specification also covers SAE J356 Type-A tubing. The mechanical properties and performance requirements of SAE J356 and SAE J356 Type-A are the same. The SAE J356 or SAE J356 Type-A designation define unique manufacturing differences between coiled and straight material. Nominal reference working pressures for this tubing are listed in ISO 10763 for metric tubing, and SAE J1065 for inch tubing. SAE J356 is produced in straight lengths that undergo a secondary heat treat operation. SAE J356 Type-A tubing is heat treated in-line to relieve stresses, and is produced in coil form.

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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http://standards.sae.org/J356_201905

2. REFERENCES

2.1 Applicable Documents

The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE documents 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.

SAE J409	Product Analysis - Permissible Variations from Specified Chemical Analysis of a Heat or Cast of Steel
SAE J514	Hydraulic Tube Fittings
SAE J533	Flares for Tubing
SAE J1065	Nominal Reference Working Pressures for Steel Hydraulic Tubing
SAE J1677	Tests and Procedures for Carbon Steel and High Strength Low Alloy Steel Tubing

2.1.2 ISO Publications

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

ISO 10763	Plain-End, Seamless and Welded Steel Tubes - Dimensions and Nominal Working Pressures

2.2 Related Publications

The following documents 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 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

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° Flare Fittings

ISO 8434-3 Metallic Tube Connections for Fluid Power and General Use - Part 3: ORFS Fittings

ISO 10583 Aerospace 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

2.2.3 EN Publications

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

EN 10305-3 Steel Tubes for Precision Applications - Technical Delivery Conditions - Part 3: Welded Cold Sized Steel Tubes

2.2.4 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 A513/A513M-15 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 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 Outside Diameter (OD) flash shall be removed to provide a smooth surface. The Inside Diameter (ID) flash shall be of uniform contour, free from saw-tooth peaks, and controlled in height by seam-welding techniques or by cutting, but not by hammering or rolling. The inside flash height shall conform to the dimensional characteristics listed in Table 1.

3.1 The tubing shall be normalized via an atmospherically controlled method to produce a finished product which will meet all requirements of this document.

3.2 Type-A tubing shall be heat treated to relieve stresses via an atmospherically controlled method to produce a finished product which will meet all requirements of this document.