



SURFACE VEHICLE STANDARD

J2614™**JAN2018**Issued 2003-01
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Superseding J2614 SEP2009

(R) Welded and Cold-Drawn, High Strength (500 MPa Tensile Strength)
Hydraulic Tubing, for Bending, Flaring, Cold Forming, Welding and Brazing

RATIONALE

This SAE standard has been revised as part of a Five-Year Review to reflect changes in available steels and newly developed processes used to produce this product. Document changes include revisions to the Scope, Applicable and Related Publications list, Section 8.8 Pressure Proof Test information and the addition of SAE J2614 Type-A material. Verbiage has been updated throughout the standard to align the document with other recently revised tube standards.

1. SCOPE

This specification covers sub-critically annealed or normalized electric resistance welded and cold-drawn single-wall high strength steel tubing intended for use in hydraulic pressure lines and in other applications requiring tubing of a quality suitable for bending, flaring, cold forming, welding and brazing. Nominal reference working pressures for this tubing are listed in ISO 10763 for metric tubing and SAE J1065 for inch tubing.

This specification also covers SAE J2614 Type-A tubing. The mechanical properties and performance requirements of standard SAE J2614 and SAE J2614 Type-A are the same. The designated differences of Type-A tubing do not imply that Type-A tubing is in anyway inferior to standard SAE J2614. The Type-A designation is meant to address unique manufacturing differences between sub-critically annealed and normalized tubing.

CAUTION: Sub-critically annealed steels are often produced using anneal temperatures below the Lower Critical Temperature (AC1) of the given steel to achieve the desired strength levels. Welding, brazing, or other processing methods that subject the tube material or assembly to temperatures near or above AC1 might initiate isothermal transformation of the tube microstructure and compromise the strength of the tube in the heat affected zone by further annealing the tube. Therefore, ISO 10763 and SAE J1065 nominal reference working pressures might not be applicable. It is recommended that the user and the fabricator validate and agree that the tube assembly design and pressure ratings are not compromised beyond system design by these processes. Performance testing as described in SAE J2551-2 will facilitate appropriate test recommendations.

Tube assembly configurations made to specific geometry and components requiring thermal attachment methods in association with the sub-critically annealed material, may require qualification testing in accordance with ISO 19879. The use of Type-A material avoids this systemic testing as thermal processes will not compromise the structural integrity of the Type-A tube material.

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Documents
Document Sharing Hub

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

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to extent specified herein. Unless other specified, the latest issue of the 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.

SAE J409	Product Analysis - Permissible Variations from Specified Chemical Analysis of a Heat or Cast of Steel
SAE J533	Flares for Tubing
SAE J1065	Nominal Reference Working Pressures for Steel Hydraulic Tubing
SAE J1677	Tests and Procedures for Carbon Steel and Low Alloy Steel Tubing
SAE J2551-2	Recommended Practices for Fluid Conductor Carbon, Alloy and High Strength Low Alloy Sheet Steel Tubing Applications-Part 2: General Specifications and Performance Requirements

2.1.2 ISO Publications

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

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 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.

SAE J514	Hydraulic Tube Fittings
SAE J518-1	Hydraulic Flanged Tube, Pipe, and Hose Connections, 4-Screw Flange Connection Part 1: 3.5 MPa to 35 MPa (Code 61)

SAE J518-2	Hydraulic flanged Tube, Pipe, and Hose Connections, 4-Screw Flange Connection Part 2: 42 MPa (Code 62)
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 J2551-3	Recommended Practices for Fluid Conductor Carbon, Alloy and High Strength Low Alloy Steel Tubing Applications-Part 3: Procurement
SAE J2613	Welded Flash Controlled, High Strength (500 MPa Tensile Strength) Hydraulic Tubing for Bending, Double Flaring, Cold Forming, Welding, and Brazing

2.2.2 ISO Publications

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

ISO 3304	Plain end seamless precision steel tubes - Technical conditions for delivery
ISO 3305	Plain end welded precision steel tubes - Technical conditions for delivery
ISO 4200	Plain end steel tubes, welded and seamless - General tables of dimensions and masses per unit length
ISO 4397	Fluid power connectors and associated components - Nominal outside diameters of tubes and nominal hose sizes
ISO 4399	Fluid power systems and components - Connectors and associated components - Nominal pressures
ISO 5598	Fluid power systems and components - Vocabulary
ISO 6162-1	Hydraulic fluid power – Flange connections with split or one-piece flange clamps and metric or inch screws – Part 1: Flange Connectors, ports and mounting surfaces for use at pressures of 3.5 MPa (35 bar) to 35 MPa (350 bar), DN 13 to DN 127
ISO 6162-2	Hydraulic fluid power – Flange connections with split or one-piece flange clamps and metric or inch screws – Part 2: Flange connectors, ports and mounting surfaces for use at a pressure of 42 MPa (420 bar), DN 13 to DN 76
ISO 6164	Hydraulic fluid power - Four-screw, one-piece square-flange connections for use at pressures of 25 MPa and 40 MPa (250 bar and 400 bar)
ISO 6605	Hydraulic fluid power – Test methods for hoses and hose assemblies
ISO 8434-2	Metallic tube connections for fluid power and general use – Part 2: 37 degree-flared connectors
ISO 8434-3	Metallic tube connections for fluid power and general use – Part 3: O-ring face seal connectors
ISO 10583	Aerospace fluid systems - Test methods for tube/fitting assemblies