SAE International™

SURFACE VEHICLE RECOMMENDED PRACTICE

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

Foreword—In fluid power systems, power is transmitted and controlled through a fluid (liquid or gas) under pressure within an enclosed circuit. Metallic tube conductor assemblies must be designed to meet these requirements under varying conditions. Testing of metallic tube conductor assemblies to meet performance requirements provides users a basis of assurance for determining design application and for checking compliance with their stated requirements. This standard also provides a means to evaluate functional requirements of new metallic tube conductor materials and end configuration manufacturing processes. This standard is primarily intended for mobile/stationary industrial equipment applications. Aircraft, Automotive and Aerospace applications were not considered during the preparation of this document.

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1. Scope—This SAE standard specifies uniform methods for various types of tests to evaluate functional performance requirements for metallic tube conductor assemblies for hydraulic fluid power applications made from both standard and non-standard metallic tubing and components. See the appropriate listed SAE or ISO tubing and connector standard for chemical, mechanical and dimensional requirements for standard tubing, end components and tube end joint configurations for the standard tube assemblies being tested. See SAE J1065 and ISO 10763 for listed nominal reference working pressures and/or reference formula that may be used to calculate reference working pressures for standard and non-standard metallic tube conductors.

1.1 Application—This standard is to be used to qualify metallic hydraulic tube assemblies manufactured with various standard and non-standard tubing materials, tube end components and tube end joining processes, primarily intended for mobile/stationary industrial equipment applications. Aircraft, Automotive and Aerospace applications were not considered during the preparation of this document.

2. References

2.1 Applicable Publications—The following standards contain provisions which, through reference in this text, constitute provisions of this document. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent edition of the standards indicated as follows. Members of IEC and ISO maintain registers of currently valid International Standards.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J514—Hydraulic Tube Fittings
SAE J518—Hydraulic Flanged Tube, Pipe and Hose Connections; 4-Bolt Type
SAE J533—Flares for Tubes
SAE J1065—Nominal Reference Working Pressures for Hydraulic Steel Tubing
SAE J1453—Fitting- O-Ring Face Seal

2.1.2 ISO PUBLICATIONS—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 6162—Hydraulic Fluid Power - Flange connectors with split or one-piece flange clamps and metric or inch screws
ISO 8434-1—Metallic tube connections for fluid power and general use - Part 1: 24 degree compression connectors
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 8434-4—Metallic tube connections for fluid power and general use - Part 4: 24 degree cone connectors with o-ring weld-on nipples

ISO 8434-5—Metallic tube connections for fluid power and general use - Part 5: method of testing threaded hydraulic connections
ISO 8434-6—Metallic tube connections for fluid power and general use - Part 6: 60 degree cone connectors and weld-on nipples
ISO 10763—Hydraulic fluid power - Plain-end, seamless and welded steel tubes - dimensions and nominal working pressures

2.2 Related Publications—The following publications are for information purposes only and are not a required part of this document.

2.2.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J343—Tests and Test Procedures for SAE 100R Series Hydraulic Hose and Hose Assemblies
SAE J356—Welded Flash Controlled Low Carbon Steel Tubing Normalized for Bending, Double Flaring, and Beading
SAE J515—Specifications for Hydraulic O-Ring Materials, Properties and Size for Metric and Inch Stud Ends, Face Seal Connections and Four-Screw Flange Connections
SAE J524—Seamless Low Carbon Steel Tubing Annealed for Bending and Flaring
SAE J525—Welded and Cold Drawn Low Carbon Steel Tubing Annealed for Bending and Flaring
SAE J526—Welded Low Carbon Steel Tubing
SAE J527—Brazed Double Wall Low Carbon Steel Tubing
SAE J1615—Thread Sealants
SAE J1644—Metallic Tube Connections for Fluid Power and General Use - Test Methods for Threaded Hydraulic Fluid Power Connectors
SAE J1677—Tests and Procedures for Low Carbon Steel and Copper-Nickel Tubing
SAE J1926/1—Part 1, Inch Ports and Stud End Connections for Fluid Power and General Use, Threaded Port with O-Ring seal in Truncated Housing
SAE J1926/2—Part 2, Connections for General use and Fluid Power-Ports and Stud Ends with ISO 725 Threads and O-Ring Sealing, Heavy-Duty (S Series) Stud Ends
SAE J1926/3—Part 3, Connections for General use and Fluid Power-Ports and Stud Ends with ISO 725 Threads and O-Ring Sealing, Light-Duty (L Series) Stud Ends
SAE J2244/1—Part 1, Connections for Fluid Power and General Use - Ports and Stud Ends with ISO 261 Threads and O-Ring Sealing, Port with O-Ring Seal in Truncated Housing
SAE J2244/2—Part 2, Connections for Fluid Power and General Use - Ports and Stud ends with ISO 261 Threads and O-Ring Sealing, Heavy-Duty (S Series) Stud Ends - Dimensions, Design, Test Methods, and Requirements
SAE J2244/3—Part 3, Connections for Fluid Power and General Use - Ports and Stud Ends with ISO 261 Threads and O-Ring Sealing, Light-Duty (L Series) Stud End - Dimensions, Design, Test Methods, and Requirement
SAE J2244/4—Part 4, Connections for Fluid Power and General Use - Ports and Stud Ends With ISO 261 Threads and O-Ring Sealing, Heavy-Duty (S Series) External Hex Port Plugs--Dimensions, Design, Test Methods, and Requirements
SAE J2435—Welded Flash Controlled, SAE 1021 Carbon Steel Tubing, Normalized for Bending, Flaring, and Beading
SAE J2467—Welded and Cold Drawn, SAE 1021 Carbon Steel Tubing Normalized for Bending, Flaring and Beading
SAE J2551—Recommended Practices For Hydraulic Tube Assemblies
SAE J2613—Welded Flash Controlled High Strength Low Alloy Steel Hydraulic Tubing, Sub-Critically Annealed for Bending, Flaring & Beading
SAE J2614—Welded and Cold Drawn High Strength Low Alloy Steel Hydraulic Tubing, Sub-Critically Annealed for Bending & Flaring