



AEROSPACE MATERIAL SPECIFICATION

AMS5896™**REV. C**

Issued 1994-06
Reaffirmed 2006-04
Revised 2022-09

Superseding AMS5896B

Steel, Corrosion- and Heat-Resistant, Seamless or Welded Hydraulic Tubing
18.5Cr - 10.5Ni - 0.55Ti (321)
Solution Heat Treated and Cold Drawn, 1/8 Hard Temper
(Composition similar to UNS S32100)

RATIONALE

AMS5896C is the result of a Five-Year Review and update of the specification. The revision highlights size limits (1.1), prohibits unauthorized exceptions (3.7, 4.4.1, 5.2.1, 8.4), updates composition testing (3.1, 3.1.1), updates condition adding AMS2700 (3.2), updates tensile testing (3.4.1.2), updates the specification for sensitization (3.4.3), updates hydrostatic testing (3.4.5), updates inspection (3.5.2, 3.5.3, 3.5.4, 4.3.4, 4.3.5), requires country of origin (4.4), clarifies tubing type (3.6, 4.2), and allows prior revisions (8.3).

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant steel in the form of two types of thin-wall, close-tolerance hydraulic tubing 0.125 to 2.00 inches (3.18 to 50.8 mm), inclusive, in nominal OD.

1.2 Application

This tubing has been used typically in high-pressure hydraulic or pneumatic systems assembled with brazed joints, but usage is not limited to such applications.

1.3 Classification

Tubing covered by this specification is classified as follows:

Type 1: Seamless and drawn

Type 2: Welded and drawn

1.3.1 Unless a specific type is ordered, either type may be supplied.

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2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order form a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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.

AMS2243	Tolerances, Corrosion- and Heat-Resistant Steel Tubing
AMS2248	Chemical Check Analysis Limits, Corrosion- and Heat-Resistant Steels and Alloys, Maraging and Other Highly Alloyed Steels, and Iron Alloys
AMS2371	Quality Assurance Sampling and Testing, Corrosion- and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS2634	Ultrasonic Inspection, Thin Wall Metal Tubing
AMS2700	Passivation of Corrosion-Resistant Steels
AMS2761	Heat Treatment of Steel Raw Materials
AMS2807	Identification, Carbon and Low-Alloy Steels, Corrosion- and Heat-Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing
AS7766	Terms Used in Aerospace Metals Specifications

2.2 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 A262	Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
ASTM A370	Mechanical Testing of Steel Products
ASTM A751	Chemical Analysis of Steel Products
ASTM A1016/A1016M	General Requirements for Ferritic Alloy Steel, Austenitic Alloy Steel, and Stainless Steel Tubes
ASTM E112	Determining Average Grain Size
ASTM E426	Electromagnetic (Eddy-Current) Examination of Seamless and Welded Tubular Products, Austenitic Stainless Steel and Similar Alloys
ASTM E1417/E1417M	Liquid Penetrant Testing

2.3 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

ASME B46.1	Surface Texture
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2.4 Definitions

Terms used in AMS are defined in AS7766 and the following:

SOLUTION HEAT TREATMENT: The heating of an alloy to a suitable temperature, holding it at that temperature long enough to cause one or more constituents to enter into a solid solution and then cooling it rapidly enough to keep these constituents in solution. AMS2761 provides guidance, but refers to this process as annealing with a quenching treatment.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM A751, or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.08
Manganese	--	2.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	17.00	20.00
Nickel	9.00	12.00
Titanium	5x(C+N)	0.75
Molybdenum	--	0.75
Copper	--	0.75
Nitrogen	--	0.10

3.1.1 Producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection, unless limits of acceptability are specified by the purchaser.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.2 Condition

Solution heat treated (see 2.4), cold drawn, pickled as required, and passivated in accordance with AMS2700. Passivation shall be performed after final finishing.

3.3 Fabrication

3.3.1 Type 1

Tubing shall be produced by a seamless process.

3.3.2 Type 2

Tubing shall be produced by the gas-metal arc, gas-tungsten arc, or plasma arc process and subsequently drawn. Tubing shall contain no more than one longitudinal weld and no circumferential welds. Tubing shall be processed to remove any dimensional indication of the presence of welds. A minimum reduction of 30% is recommended for Type 2 tubing.

3.3.3 Tensile properties shall be obtained by cold working and not by heat treatment.