



AEROSPACE MATERIAL SPECIFICATION

AMS5578™**REV. H**

Issued	1969-11
Reaffirmed	2014-12
Revised	2023-08

Superseding AMS5578G

(R) Steel, Corrosion- and Heat-Resistant, Welded Tubing
12Cr - 8.5Ni - 0.30Cb - 1.1Ti - 2.0Cu
Vacuum Induction Plus Consumable Electrode Vacuum Melted
Solution Heat Treated, Precipitation Hardenable
(Composition similar to UNS S45500)

RATIONALE

AMS5578H is the result of a Five-Year Review and update of this specification. The revision prohibits unauthorized exceptions (see 3.9, 4.4.5, 5.2.1, and 8.5), updates composition testing and reporting (see 3.1 and 3.1.1), revises condition and fabrication requirements (see 3.3 and 3.4) updates tensile testing (see 3.6.1), revises inspection (see 3.7), adds NDT acceptance testing (see 4.2.1 and 4.4), clarifies tolerances and identification (see 3.8 and 5.2), adds country of origin requirement (see 4.4), adds definition of new term (see 2.3), and allows prior revisions (see 8.4).

1. SCOPE

1.1 Form

This specification covers a premium-quality corrosion- and heat-resistant steel in the form of welded and drawn tubing.

1.2 Application

This tubing has been used typically for parts requiring corrosion resistance and high strength up to 800 °F (427 °C) after precipitation heat treatment, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause this tubing to become susceptible to stress-corrosion cracking after precipitation heat treatment; ARP1110 recommends practices to minimize such conditions.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms 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.

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Documents
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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
AMS2300	Steel Cleanliness, Premium Aircraft-Quality, Magnetic Particle Inspection Procedure
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
AMS2750	Pyrometry
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
ARP1110	Minimizing Stress Corrosion Cracking in Wrought Forms of Steels, and Corrosion Resistant Steels and Alloys
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 A370	Mechanical Testing of Steel Products
ASTM A751	Chemical Analysis of Steel ProductsASTM A1016/1016MGeneral Requirements for, Ferritic Alloy, Austenitic Alloy, Steel and Stainless Steel Tubes
ASTM E140	Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness
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 Definitions

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

BORE CONDITIONING: Any mechanical method that is used in the bore of tubing to improve the final surface appearance, with no resultant change in tubing size beyond the allowable tolerances.

SOLUTION HEAT TREATMENT: 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 by wet chemical methods in accordance with ASTM A751 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.005
Manganese	--	0.50
Silicon	--	0.50
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	11.00	12.50
Nickel	7.50	9.50
Columbium	0.10	0.50
Titanium	0.80	1.40
Copper	1.50	2.50
Molybdenum	--	0.50

3.1.1 The 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 Melting Practice

Steel shall be multiple melted using vacuum induction melting followed by consumable electrode vacuum remelting.

3.3 Condition

Solution heat treated. Solution heat treatment shall be performed in an atmosphere yielding a bright finish. Alternately, product shall be passivated in accordance with AMS2700 to produce a uniform finish. It is permissible to pickle prior to passivation. Passivation shall be performed after final finishing (see 3.4.2). Tubing shall have been cold worked sufficiently to ensure proper weld reinforcement height and roundness in the weld reinforcement area.

3.4 Fabrication

Tubing shall be produced by a welded and drawn process. Any finishing operation applied to remove objectionable pits and surface blemishes shall be performed prior to final solution heat treatment. A light polish to improve external surface appearance may be employed after solution heat treatment.