

AEROSPACE MATERIAL SPECIFICATION

SAE AMS5571

REV. J

Issued 1948-11
Reaffirmed 2000-10
Revised 2012-01
Superseding AMS5571H

Steel, Corrosion and Heat-Resistant, Seamless Tubing
18Cr - 10.5Ni - 0.70Cb (Nb) (347)
Solution Heat Treated

(Composition similar to UNS S34700)

RATIONALE

AMS5571J revises Tensile Properties (Table 2) to include minimum tensile strengths from ASTM A 511 and is a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers a corrosion and heat-resistant steel in the form of seamless tubing.

1.2 Application

This tubing has been used typically for parts requiring both corrosion and heat resistance, especially when such parts are welded during fabrication, but usage is not limited to such applications. Also for parts requiring oxidation resistance up to 1500 °F (816 °C), but useful at that temperature only when stresses are low.

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.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 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

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<http://www.sae.org/technical/standards/AMS5571J>**

AMS2632	Inspection, Ultrasonic, of Thin Materials, 0.50 Inch (12.7 mm) and Under in Cross-Sectional Thickness
AMS2645	Fluorescent Penetrant Inspection
AMS2807	Identification, Carbon and Low-Alloy Steels, Corrosion and Heat-Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing

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 A 262	Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
ASTM A 370	Mechanical Testing of Steel Products
ASTM E 353	Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys
ASTM E 426	Electromagnetic (Eddy-Current) Testing of Seamless and Welded Tubular Products, Austenitic Stainless Steel and Similar Alloys

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 E 353, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1--COMPOSITION

Element	min	max
Carbon	--	0.08
Manganese	--	2.00
Silicon	0.30	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	17.00	19.00
Nickel	9.00	12.00
Columbium (Niobium)	10XC	1.10
Molybdenum	--	0.75
Tantalum	--	0.05
Copper	--	0.75

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.2 Condition

Solution heat treated and descaled.

3.3 Fabrication

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

3.4 Properties

Tubing shall conform to the following requirements; tensile and flarability testing shall be performed in accordance with ASTM A 370:

3.4.1 Tensile Properties

Shall be as shown in Table 2.

TABLE 2A - TENSILE PROPERTIES, INCH/POUND UNITS

Nominal OD Inches	Wall Thickness Inches	Tensile Strength ksi, max	Tensile Strength, ksi, min ¹	Yield Strength at 0.2% Offset, min ¹	Elongation in 2 inches %, min Strip	Elongation in 2 inches %, min Full Tube
Up to 0.188, incl	Up to 0.016, incl	120	75	30		33
	Over 0.016	105				35
Over 0.188 to 0.500, incl	Up to 0.010, incl	115	75	30	30	35
	Over 0.010	105			30	35
Over 0.500	Up to 0.010, incl	120	75	30	25	30
	Over 0.010	105			30	35

1. Minimum tensile properties for tubing have been taken directly from ASTM A 511 (See 8.4).

TABLE 2B - TENSILE PROPERTIES, SI UNITS

Nominal OD mm	Wall Thickness mm	Tensile Strength MPa, max	Tensile Strength, MPa, min ¹	Yield Strength, at 0.2% Offset, min ¹	Elongation in 50.8 mm %, min Strip	Elongation in 50.8 mm %, min Full Tube
Up to 4.78, incl	Up to 0.41, incl	827	515	210	-	33
	Over 0.41	724			-	35
Over 4.78 to 12.70, incl	Up to 0.25, incl	793	515	210	30	35
	Over 0.25	724			30	35
Over 12.70	Up to 0.25, incl	827	515	210	25	30
	Over 0.25	724			30	35

1. Minimum tensile properties for tubing have been taken directly from ASTM A 511 (See 8.4).

3.4.2 Flarability

Specimens as in 4.3.1 shall withstand flaring at room temperature, without formation of cracks or other visible defects, by being forced axially with steady pressure over a hardened and polished tapered steel pin having a 74-degree included angle to produce a flare having a permanent expanded OD not less than specified in Table 3.

TABLE 3A - FLARABILITY, INCH/POUND UNITS

Nominal OD Inches	Expanded OD Inches	Nominal OD Inches	Expanded OD Inches
0.125	0.200	0.750	0.937
0.188	0.302	1.000	1.187
0.250	0.359	1.250	1.500
0.312	0.421	1.500	1.721
0.375	0.484	1.750	2.106
0.500	0.656	2.000	2.356
0.625	0.781		

TABLE 3B - FLARABILITY, SI UNITS

Nominal OD mm	Expanded OD mm	Nominal OD mm	Expanded OD mm
3.18	5.08	19.05	23.80
4.78	7.67	25.40	30.15
6.35	9.12	31.75	38.10
7.92	10.69	38.10	43.71
9.52	12.29	44.45	53.49
12.70	16.66	50.80	59.84
15.88	19.84		

3.4.2.1 Tubing with nominal OD between any two standard sizes given in 3.4.2 shall take the same percentage flare as shown for the larger of the two sizes.

3.4.2.2 Flarability requirements for tubing over 2.000 inches (50.80 mm) or under 0.125 inch (3.18 mm) in nominal OD shall be as agreed upon by purchaser and vendor.

3.4.3 Susceptibility to Intergranular Attack

Tubing, after sensitizing treatment in accordance with ASTM A 262, Practice E, shall pass the intergranular corrosion test performed in accordance with ASTM A 262, Practice E.

3.5 Quality

Tubing, as received by purchaser, shall be uniform in quality and condition and shall have a finish conforming to the best practice for high quality aircraft tubing. It shall be smooth and free from heavy scale or oxide, burrs, seams, tears, grooves, laminations, slivers, pits, and other imperfections detrimental to usage of the tubing. Surface imperfections such as handling marks, straightening marks, light mandrel and die marks, shallow pits, and scale pattern are acceptable if the imperfections are removable within the tolerances specified for wall thickness.

3.5.1 Tubing shall be free from grease or other foreign matter. Metallic flakes or particles shall not be collected by a clean white cloth drawn through the length of the bore of a sample tube. Discoloration of the cloth, without the presence of flakes or particles, is acceptable.

3.5.2 When specified by purchaser, tubing shall be subjected to fluorescent penetrant inspection in accordance with AMS2645, to ultrasonic inspection in accordance with AMS2632, to electromagnetic (Eddy-Current) testing in accordance with ASTM E 426, or to any combination thereof. Standards for acceptance shall be as agreed upon by purchaser and vendor.