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400 COMMONWEALTH DRIVE WARRENDALE PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 5573G
Superseding AMS 5573F

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UNS S31600

STEEL TUBING, SEAMLESS, CORROSION AND HEAT RESISTANT
17Cr - 12.5Ni - 2.5Mo (SAE 30316)
Solution Heat Treated

1. SCOPE:

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

1.2 Application: Primarily for parts requiring both corrosion and heat resistance up to 1600°F (870°C). At elevated temperatures, strength of this steel is slightly higher than, and oxidation resistance similar to, that of 18-8 types.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2243 - Tolerances, Corrosion and Heat Resistant Steel Tubing
AMS 2248 - Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
AMS 2350 - Standards and Test Methods
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products Except Forgings and Forging Stock

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM A370 - Mechanical Testing of Steel Products
ASTM E353 - Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

MIL-STD-163 - Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E353, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	--	0.08
Manganese	1.25	2.00
Silicon	--	1.00
Phosphorus	--	0.04
Sulfur	--	0.03
Chromium	16.00	18.00
Nickel	10.00	14.00
Molybdenum	2.00	3.00
Copper	--	0.75

3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2248.

3.2 Condition: Solution heat treated free from continuous carbide network 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. Passivation treatment shall follow any polishing treatment.

3.4 Properties: The product shall conform to the following requirements; tensile testing shall be performed in accordance with ASTM A370:

3.4.1 Tensile Properties: Shall be as specified in Table I.

TABLE I

Nominal OD Inches	Nominal Wall Thickness Inch	Tensile Strength psi, max	Elongation % in 2 in., min	
			Strip	Full Tube
Up to 0.188, incl	Up to 0.016, incl	115,000	--	35
	Over 0.016	100,000	--	40
Over 0.188 to 0.500, incl	Up to 0.010, incl	110,000	32	37
	Over 0.010	100,000	35	40
Over 0.500	Up to 0.010, incl	100,000	27	32
	Over 0.010	100,000	30	35

TABLE I (SI)

Nominal OD Millimetres	Nominal Wall Thickness Millimetres	Tensile Strength MPa, max	Elongation % in 50 mm, min	
			Strip	Full Tube
Up to 4.70, incl	Up to 0.40, incl	795	--	35
	Over 0.40	690	--	40
Over 4.70 to 12.50, incl	Up to 0.25, incl	760	32	37
	Over 0.25	690	35	40
Over 12.50	Up to 0.25, incl	690	27	32
	Over 0.25	690	30	35

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 deg included angle to produce a flare having a permanent expanded OD not less than specified in Table II.

TABLE II

Nominal OD Inches	Expanded OD Inches	Nominal OD Inches	Expanded OD Inches
0.125	0.200	0.750	0.937
0.188	0.290	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 II (SI)

Nominal OD Millimetres	Expanded OD Millimetres	Nominal OD Millimetres	Expanded OD Millimetres
3.18	5.08	19.05	23.80
4.78	7.37	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 that for the larger of the two sizes.

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

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 Ø imperfections detrimental to usage of the tubing. Surface imperfections such as handling marks, light mandrel and die marks, shallow pits, and scale pattern will not be considered injurious if the imperfections are removable within the tolerances specified for wall thickness but the removal of such imperfections is not required.

3.6 Sizes: Except when exact lengths or multiples of exact lengths are ordered, straight tubing will be acceptable in mill lengths of 6 - 20 ft (2 - 6 m) but not more than 10% of any shipment shall be supplied in lengths shorter than 10 ft (3 m).

3.7 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2243.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of tubing shall supply all samples for vendor's tests and shall be responsible for performing all Ø required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the tubing conforms to the requirements of this specification.

4.2 Classification of Tests: