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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5563B

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Superseding AMS 5563A

Submitted for recognition as an American National Standard

STEEL, CORROSION RESISTANT, SEAMLESS OR WELDED TUBING
19Cr - 9.5Ni (SAE 30304)
Cold Drawn, Quarter-Hard Temper

UNS S30400

1. SCOPE:

1.1 Form:

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

1.2 Application:

This tubing has been used typically in the fabrication of parts requiring good corrosion resistance, but usage is not limited to such applications. This tubing is not suitable for use in applications requiring flaring or sharp bends. Welding or other exposure over 800 ºF (427 º*C)* during fabrication may impair corrosion resistance.

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 1 or Type 2 may be supplied.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

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

AMS 2243	Tolerances, Corrosion and Heat Resistant Steel Tubing
MAM 2243	Tolerances, Metric, Corrosion and Heat Resistant Steel Tubing
AMS 2248	Chemical Check Analysis Limits, Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
AMS 2371	Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS 2634	Ultrasonic Inspection, Thin Wall Metal Tubing
AMS 2807	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, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM E 8	Tension Testing of Metallic Materials
ASTM E 8M	Tension Testing of Metallic Materials (Metric)
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
ASTM E 1417	Liquid Penetrant Examination

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-163	Steel Mill Products, Preparation for Shipment and Storage

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	--	1.00
Phosphorus	--	0.045
Sulfur	--	0.030
Chromium	18.00	20.00
Nickel	8.00	11.00
Molybdenum	--	0.75
Copper	--	0.75

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

3.2 Condition:

(R)

Cold drawn and pickled as required or passivated.

3.3 Fabrication:

(R)

Tubing shall be produced by either a seamless and drawn process or a welded and drawn process. The specified tensile properties shall be obtained by cold working and not by heat treatment (annealing). Surface finishes may be produced by pickling, bright annealing, or any method which will provide the required surface condition and which will not affect the limits for wall thickness or corrosion resistance, with the exception that centerless, ground finish is not acceptable. A light polish to improve external surface appearance may be employed.

3.3.1 Welded tubing (Type 2) shall be cold reduced after welding to remove any dimensional indication of the presence of welds.

3.4 Properties:

Tubing shall conform to the following requirements:

3.4.1 Tensile Properties: Shall be as shown in Table 2, determined in accordance with ASTM E 8 or ASTM E 8M.

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units

Nominal OD Inches	Tensile Strength ksi	Yield Strength at 2% Offset ksi	Elongation in 2 Inches Strip %	Elongation in 2 Inches Full Tube %
Up to 5/16, incl	120	75.0	10	12
Over 5/16	120	75.0	12	15

TABLE 2B - Minimum Tensile Properties, SI Units

Nominal OD Millimeters	Tensile Strength MPa	Yield Strength at 2% Offset MPa	Elongation in 50.8 mm Strip %	Elongation in 50.8 mm Full Tube %
Up to 7.9, incl	827	517	10	12
Over 7.9	827	517	12	15

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 will not be considered injurious if the imperfections are removable within the tolerances specified for wall thickness; removal of such imperfections is not required.

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

3.5.2 (R) When specified by purchaser, tubing shall be subjected to fluorescent penetrant inspection in accordance with ASTM E 1417, to ultrasonic inspection in accordance with AMS 2634, to electromagnetic (eddy-current) testing in accordance with ASTM E 426, or to any combination thereof. Tubing shall meet the requirements of 3.5 and other acceptance criteria established by the cognizant engineering organization.

3.6 Tolerances:

Shall conform to all applicable requirements of AMS 2243 or MAM 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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the tubing conforms to specified requirements.

4.2 Classification of Tests:

All technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2371 except as specified in 4.3.1 and 4.3.1.1.

4.3.1 A statistical sampling plan, acceptable to purchaser, may be used in lieu of sampling as in 4.3 and the report of 4.4 shall state that such plan was used.

4.3.1.1 For direct U.S. Military procurement, sampling shall be in accordance with MIL-STD-105, Sampling for Normal Inspection, Special Inspection Level S-4. Sample unit shall be one length of tubing.

4.4 Reports:
(R)

The vendor of tubing shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and for tensile properties of each lot and stating that the tubing conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS 5563B, size, type of tubing (Type 1 or Type 2), and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2371.

5. PREPARATION FOR DELIVERY:

5.1 Sizes:

Except when exact lengths or multiples of exact lengths are ordered, straight tubes will be acceptable in mill lengths of 6 to 20 feet (1.8 to 6.1 m) but not more than 10% of any shipment shall be supplied in lengths shorter than 10 feet (3 m).