



400 Commonwealth Drive, Warrendale, PA 15096-0001

# AEROSPACE MATERIAL SPECIFICATION



AMS 5574D

Issued NOV 1952  
Revised JAN 1993  
Reaffirmed SEP 2000

Superseding AMS 5574C

Steel, Corrosion and Heat Resistant, Seamless Tubing  
23Cr - 13.5Ni (SAE 30309S)  
Solution Heat Treated

UNS S30908

## 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 and for parts requiring oxidation resistance up to 2000 °F (1093 °C) but useful at that temperature only when stresses are low, however, usage is not limited to such applications.

## 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, Wrought 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 2632	Ultrasonic Inspection of Thin Materials, 0.5 Inch (13 mm) and Thinner
AMS 2645	Fluorescent Penetrant Inspection
AMS 2807	Identification, Carbon and Low-Alloy Steels, Corrosion and Heat Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing

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**2.2 ASTM Publications:**

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

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

**2.3 U.S. Government Publications:**

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

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 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	22.00	24.00
Nickel	12.00	15.00
Molybdenum	--	0.75
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.

**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 A 370:

TABLE 2 - Tensile Properties

Property	Value
Tensile Strength, maximum	100 ksi (689 MPa)
Elongation in 2 Inches (50.8 mm), minimum	
Strip Specimen	35%
Full Tube	40%

**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 1.30 times the original nominal OD.**3.5 Quality:****3.5.1** 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 but removal of such imperfections is not required.**3.5.2** When specified by purchaser, tubing shall be subjected to fluorescent penetrant inspection in accordance with AMS 2645, to ultrasonic inspection in accordance with AMS 2632, to electromagnetic (Eddy-Current) testing in accordance with ASTM E 426, or to any combination thereof. Standards for acceptance shall be as established by purchaser.**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 performing all required tests. 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:

4.2.1 Acceptance Tests: Tests for composition (3.1), condition (3.2), tensile properties (3.4.1), nondestructive inspection (3.5.2) when specified, and tolerances (3.6) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests: Tests for flarability (3.4.2) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

##### 4.3 Sampling and Testing:

Shall be in accordance with AMS 2371 and the following:

4.3.1 Specimens for flarability test (3.4.2) shall be full tubes or sections cut from a tube. The end of the specimen to be flared shall be cut square, with the cut end smooth and free from burrs, but not rounded.

##### 4.4 Reports:

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. This report shall include the purchase order number, heat and lot number, AMS 5574D, size, 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 tubing 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).

##### 5.2 Identification:

Shall be in accordance with AMS 2807.