



AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N. Y. 10001

AMS 5627B

Superseding AMS 5627A

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STEEL BARS, FORGINGS, TUBING, AND RINGS, CORROSION AND MODERATE HEAT RESISTANT
17Cr (SAE 51430)
Annealed

1. SCOPE:

- 1.1 Form: This specification covers a corrosion and moderate heat resistant steel in the form of bars, wire, forgings, mechanical tubing, flash welded rings, and stock for forging or flash welded rings.
- 1.2 Application: Primarily for parts and assemblies, such as turbine air seals, requiring oxidation resistance but not high strength at temperatures up to 1600° F (871° C).

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 Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, New York, 10001.

2.1.1 Aerospace Material Specifications:

AMS 2241 - Tolerances, Corrosion and Heat Resistant Steel Bars and Wire and Titanium and Titanium-Alloy Bars and Wire
AMS 2243 - Tolerances, Corrosion and Heat Resistant Steel Tubing
AMS 2248 - Chemical Check Analysis Limits, Wrought Heat and Corrosion Resistant Steels and Alloys
AMS 2350 - Standards and Test Methods
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Alloys, Wrought Product Except Forgings
AMS 2808 - Identification, Forgings
AMS 7493 - Rings, Flash Welded, Non-Austenitic Corrosion Resistant Steels

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

ASTM A370 - Mechanical Testing of Steel Products
ASTM E112 - Estimating Average Grain Size of Metals
ASTM E353 - Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

- 2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

2.3.1 Federal Standards:

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

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 approved analytical methods:

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	min	max
Carbon	--	0.12
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	16.00 - 18.00	
Nickel	--	0.75
Molybdenum	--	0.50
Copper	--	0.50

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

3.2 Condition: The product shall be supplied in the following condition; hardness and tensile strength shall be determined in accordance with ASTM A370:

3.2.1 Bars: Annealed having hardness not higher than 202 HB or equivalent.

3.2.1.1 All hexagons and other bars 0.500 - 2.750 in. (12.70 - 69.85 mm), incl, in diameter or distance between parallel sides shall be cold finished.

3.2.2 Wire: Cold drawn and annealed having tensile strength not higher than 100,000 psi (690 MPa) or equivalent hardness.

3.2.3 Forgings and Flash Welded Rings: Annealed having hardness not higher than 183 HB or equivalent.

3.2.3.1 Flash welded rings shall not be supplied unless specified or permitted on purchaser's part drawing. When supplied, they shall be manufactured in accordance with AMS 7493.

3.2.4 Mechanical Tubing: Annealed and cold finished having hardness not higher than 202 HB or equivalent.

3.2.5 Stock for Forging or Flash Welded Rings: As ordered by the forging or flash welded ring manufacturer.

3.3 Properties:

3.3.1 Grain Size: Bars, wire, forgings, tubing, and flash welded rings shall have grain size not larger than 0, determined by comparison of a polished and etched specimen with the chart in ASTM E112.

3.4 Quality: The product shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

3.5 Sizes: Except when exact lengths or multiples of exact lengths are ordered, bars, straight wire, and tubing will be acceptable in mill lengths of 6 - 20 ft (1.8 - 6.1 m) but not more than 10% of any shipment shall be supplied in lengths shorter than 10 ft (3 m).

3.6 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of the following:

3.6.1 Bars and Wire: AMS 2241.

3.6.2 Mechanical Tubing: AMS 2243.

4. QUALITY ASSURANCE PROVISIONS:

- 4.1 Responsibility for Inspection: The vendor of the product shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory tests as he deems necessary to assure that the product conforms to the requirements of this specification.
- 4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance or routine control tests.
- 4.3 Sampling: Shall be in accordance with the following:
- 4.3.1 Bars, Wire, Tubing, Flash Welded Rings, and Stock for Flash Welded Rings: AMS 2371.
- 4.3.1.1 Specimens for grain size shall be cut from parent metal of flash welded rings not including the weld heat affected zone.
- 4.3.2 Forgings and Forging Stock: As agreed upon by purchaser and vendor.
- 4.4 Reports:
- 4.4.1 The vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition and grain size of each heat in the shipment. This report shall include the purchase order number, material specification number and its revision letter, heat number, size, and quantity from each heat. If forgings are supplied, the part number and the size and melt source of stock used to make the forgings shall also be included.
- 4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.
- 4.5 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

- 5.1 Identification: The product shall be identified as follows:
- 5.1.1 Bars, Wire, and Tubing:
- 5.1.1.1 Each straight bar, wire, and tube 0.500 in. (12.70 mm) and over in OD or least width of flat surface shall be marked in a row of characters recurring at intervals not greater than 3 ft (914 mm) with AMS 5627B, heat number, and manufacturer's identification. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be capable of being removed in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the material or its performance and shall be sufficiently stable to withstand normal handling.
- 5.1.1.2 Straight bars, wire, and tubes less than 0.500 in. (12.70 mm) in OD or least width of flat surface shall be securely bundled and identified by a metal or plastic tag embossed with the purchase order number, AMS 5627B, heat number, nominal size, and manufacturer's identification and attached to each bundle or shall be boxed and the box marked with the same information.