



AEROSPACE MATERIAL SPECIFICATION

AMS 5738A
Superseding AMS 5738

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

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STEEL BARS, CORROSION RESISTANT
18Cr - 9Ni (SAE 30303F)
Free Machining, High Yield Strength

1. SCOPE:

1.1 Form: This specification covers a free-machining, corrosion resistant steel in the form of cold worked bars and wire.

1.2 Application: Primarily for parts such as bolts requiring high strength, on which the amount of machining warrants use of a free machining grade of steel, requiring corrosion resistance similar to the 18-8 type of steel but not subjected to temperatures exceeding 700 F (371 C) during fabrication or in service.

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 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 Products Except Forgings

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 E353 - Chemical Analysis of Stainless, Heat Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

2.3 Government Publications: Available from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

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	0.020 -	2.00
Silicon	--	1.00
Phosphorus	--	0.17
Sulfur	--	0.10
Chromium	17.00 -	19.00
Nickel	8.00 -	10.00
Selenium	0.15	0.35
Molybdenum	--	0.75 (1)
Copper	--	0.75

(1) Substitution of zirconium in place of molybdenum is optional with the manufacturer.

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

3.2 Conditions: Solution heat treated free from continuous carbide network, and cold worked.

3.3 Properties:

3.3.1 Tensile Properties: Shall be as specified in Table I, determined in accordance with ASTM A370:

TABLE I

Nominal Diameter or Distance Between Parallel Sides Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation % in 2 in. or 4D min	Reduction of Area %, min
Up to 0.750, incl	125,000	100,000	12	35
Over 0.750 to 1.000, incl	115,000	80,000	15	35
Over 1.000 to 1.250, incl	105,000	65,000	20	35
Over 1.250 to 1.750, incl	95,000	45,000	28	35

TABLE I (SI)

Nominal Diameter or Distance Between Parallel Sides mm	Tensile Strength MN/m ² , min	Yield Strength at 0.2% Offset MN/m ² , min	Elongation % in 50.8 mm or 4D min	Reduction of Area %, min
Up to 19.05, incl	862	690	12	35
Over 19.05 to 25.40, incl	793	552	15	35
Over 25.40 to 31.75, incl	724	448	20	35
Over 31.75 to 44.45, incl	655	310	28	45

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 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 AMS 2241.

4. QUALITY ASSURANCE PROVISIONS:

- 4.1 Responsibility for Inspection: The vendor 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 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to assure that material 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 routine control tests.
- 4.3 Sampling: Shall be in accordance with AMS 2371.
- 4.4 Reports:
- 4.4.1 The vendor of the product shall furnish with each shipment three copies of a report of the results for chemical composition of each heat in the shipment and the results of tests on each size from each heat to determine conformance to the tensile property requirements. This report shall include the purchase order number, heat number, material specification number and its revision letter, size, and quantity from each heat.
- 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 testing of 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 material 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 Each straight bar 0.500 in. (12.7 mm) and over in diameter 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 5738A, 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.
- 5.1.2 Straight bars and wire less than 0.500 in. (12.7 mm) in diameter 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 5738A, 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.
- 5.2 Packaging: The product shall be prepared for shipment in accordance with commercial practice to assure carrier acceptance and safe transportation to the point of delivery. Packaging shall conform to requirements of carrier rules and regulations applicable to the mode of transportation.
6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.