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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5853A

Issued 1 OCT 1987
Revised 1 JAN 1993

Superseding AMS 5853

Submitted for recognition as an American National Standard

STEEL, CORROSION AND HEAT RESISTANT, BARS AND WIRE 15Cr - 25.5Ni - 1.2Mo - 2.1Ti - 0.006B - 0.30V Consumable Electrode Melted 1800 °F (982 °C) Solution Treated and Work-Strengthened 160 ksi (1103 MPa) Tensile Strength

UNS K66286

1. SCOPE:

1.1 Form:

This specification covers a corrosion and heat resistant steel in the form of work-strengthened bars and wire 1-1/4 inches (31.8 mm) and under in nominal diameter or least distance between parallel sides.

1.2 Application:

These products have been used typically for parts, such as fasteners, requiring room-temperature minimum tensile strength of 160 ksi (1103 MPa) after precipitation heat treatment for use up to 1000 °F (538 °C) and having oxidation resistance up to 1200 °F (649 °C), but 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 2241 Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
MAM 2241 Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
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 2750 Pyrometry
AMS 2806 Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat Resistant Steels and Alloys

2.2 ASTM Publications:

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

ASTM A 370 Mechanical Testing of Steel Products
ASTM E 112 Determining Average Grain Size
ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron 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:

(R)

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	--	0.025
Sulfur	--	0.025
Chromium	13.50	16.00
Nickel	24.00	27.00
Molybdenum	1.00	1.50
Titanium	1.90	2.35
Boron	0.003	0.010
Vanadium	0.10	0.50
Cobalt	--	1.00
Aluminum	--	0.35
Copper	--	0.50

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

3.2 Melting Practice:

Steel shall be produced by multiple melting using consumable electrode practice in the remelt cycle.

3.3 Condition:

Solution heat treated and suitably work-strengthened.

3.3.1 Bars shall be cold finished; straight, round bars shall be ground or turned.

3.3.2 Coiled bars and wire shall be cold-drawn.

3.4 Heat Treatment:

(R)

Bars and wire shall be solution heat treated by heating to 1800 °F ± 25 (982 °C ± 14), holding at heat for 1 to 2 hours, and quenching in oil or water and work-strengthened as required to meet the requirements of 3.5. Pyrometry shall be in accordance with AMS 2750.

3.5 Properties:

The product shall conform to the following requirements; hardness and tensile testing shall be performed in accordance with ASTM A 370:

3.5.1 As Solution Heat Treated and Work-Strengthened:

3.5.1.1 Tensile Strength: Shall be not higher than 120 ksi (827 MPa).

3.5.1.2 Grain Size: Shall be 5 or finer with occasional grains as large as 3 permissible, determined by comparison of a polished and etched specimen with the chart in ASTM E 112.

3.5.2 After Precipitation Heat Treatment: Bars and wire shall have the following properties after being precipitation heat treated by heating to a temperature within the range 1200 to 1300 °F (649 to 704 °C), holding at the selected temperature within ±25 °F (±14 °C) for not less than eight hours, and cooling in air:

3.5.2.1 Tensile Properties: Shall be as shown in Table 2.

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	160 ksi (1103 MPa)
Yield Strength at 0.2% Offset	120 ksi (827 MPa)
Elongation in 4D	12%
Reduction of Area	18%

3.5.2.2 Hardness: Should be not lower than 32 HRC, or equivalent, but the product shall not be rejected on the basis of hardness if the tensile property requirements of 3.5.2.1 are met (See 8.2).

3.6 Quality:

Bars and wire, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the bars and wire.

3.7 Tolerances:

Shall conform to all applicable requirements of AMS 2241 or MAM 2241.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:
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The vendor of bars and wire 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 bars and wire conform to the requirements of this specification.