SAE The Engineering Society For Advancing Mobility Land Sea Air and Space

400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 5853

Issued 10-1-87

STEEL BARS, CORROSION AND HEAT RESISTANT
15Cr - 25.5Ni - 1.2Mo - 2.1Ti - 0.006B - 0.30V
1800°F (980°C) Solution Treated and Work-Strengthened
160,000 psi (1105 MPa) Tensile Strength, Consumable Electrode Melted
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 in. (30 mm) and under in nominal diameter or least distance between parallel sides.

1.2 Application: Primarily for parts, such as fasteners, requiring room-temperature minimum tensile strength of 160,000 psi (1105 MPa) after precipitation heat treatment for use up to 1000°F (540°C) and having oxidation resistance up to 1200°F (650°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 shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

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 2350 - Standards and Test Methods
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products Except Forgings and Forging Stock

SAENORM.COM : Click to view the full PDF of ams5853

REAFFIRMED 1991

SAE Technical Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

AMS documents are protected under United States and international copyright laws. Reproduction of these documents by any means is strictly prohibited without the written consent of the publisher.

Copyright 1987 Society of Automotive Engineers, Inc.

Printed in U.S.A.

2.1.1 Aerospace Material Specifications: (Continued)

AMS 2806 - Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Heat and Corrosion Resistant Steels and Alloys

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

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

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Specifications:

MIL-H-6875 - Heat Treatment of Steel, Process for

2.3.2 Military Standards:

MIL-STD-163 - Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E353 or by spectrochemical or other analytical methods approved by purchaser:

	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
Aluminum	--	0.35
Copper	--	0.50

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

SAENORM.COM : Click to view the full PDF of ams5853

3.2 Condition: Solution heat treated and suitably work-strengthened.

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

3.2.2 Coiled bars and wire shall be cold-drawn.

3.3 Heat Treatment: Bars shall be solution heat treated by heating to 1800°F ± 25 (980°C ± 15), holding at heat for 1 - 2 hr, and quenching in oil or water and work-strengthened as required to meet the requirements of 3.4. Furnace surveys and calibration of temperature controllers and recorders shall be in accordance with MIL-H-6875.

3.4 Properties: The product shall conform to the following requirements; hardness and tensile testing shall be performed in accordance with ASTM A370:

3.4.1 As Solution Heat Treated and Work-Strengthened:

3.4.1.1 Tensile Strength: Shall be not higher than 120,000 psi (825 MPa).

3.4.1.2 Grain Size: Shall be predominantly 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 E112.

3.4.2 After Precipitation Heat Treatment: Bars shall have the following properties after being precipitation heat treated by heating to a temperature within the range 1200° - 1300°F (650° - 705°C), holding at the selected temperature within ±25°F (±15°C) for not less than 8 hr, and cooling in air:

3.4.2.1 Tensile Properties: Shall be as follows:

Tensile Strength, min	160,000 psi (1105 MPa)
Yield Strength at 0.2% Offset, min	120,000 psi (825 MPa)
Elongation in 4D, min	12%
Reduction of Area, min	18%

3.4.2.2 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 3.4.2.1 are met.

3.5 Quality:

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

3.5.2 Bars, 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.

SAENORM.COM : Click to view the full PDF of ams5853

3.6 Sizes: Except when exact lengths or multiples of exact lengths are ordered, straight bars and wire will be acceptable in mill lengths of 6 - 20 ft (2 - 6 m) but not more than 10% of any shipment shall be supplied in lengths shorter than 10 ft (3 m).

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

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of bars shall supply all samples for vendor's tests 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 sample and to perform any confirmatory testing deemed necessary to ensure that the bars conform 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 tests and shall be performed on each heat or lot as applicable.

4.3 Sampling: Shall be in accordance with AMS 2371.

4.4 Reports:

4.4.1 The vendor of bars shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and for tensile properties and grain size of each lot as solution heat treated and work strengthened and for tensile properties and hardness of each lot after precipitation heat treatment. This report shall include the purchase order number, heat number, AMS 5853, precipitation heat treatment temperature used to obtain reported properties, size, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 5853, contractor or other direct supplier of bars, part number, and quantity. When bars for making parts are produced or purchased by the parts vendor, that vendor shall inspect each lot of bars to determine conformance to the requirements of this specification and shall include in the report either a statement that the bars conform or copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2371.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Shall be in accordance with AMS 2806.

SAENORM.COM : Click to view the full PDF of ams5853