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400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 5761A

Issued 5-1-69
Revised 10-1-86

Superseding AMS 5761

STEEL BARS, FORGINGS, AND RINGS, CORROSION RESISTANT 15Cr - 20Co - 2.8Mo Solution Heat Treated

UNS S65150

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of April 11, 1986. It is recommended that this specification not be specified for new designs.

This cover sheet should be attached to the "A" revision of the subject specification.

This specification is under the jurisdiction of AMS Committee "F".

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

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UNS K65150

STEEL BARS, FORGINGS, AND RINGS, CORROSION RESISTANT
15Cr - 20Co - 2.8Mo
Solution Heat Treated

1. SCOPE:

1.1 Form: This specification covers a corrosion-resistant steel in the form of bars, forgings, flash welded rings, and stock for forging or flash welded rings.

1.2 Application: Primarily for parts requiring corrosion resistance and high strength up to 1000°F (540°C) after precipitation heat treatment.

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., 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
AMS 2248 - Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and 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
AMS 2374 - Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Forgings and Forging Stock
AMS 2375 - Control of Forgings Requiring First Article Approval
AMS 2806 - Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Heat and Corrosion Resistant Steels and Alloys
AMS 2808 - Identification, Forgings
AMS 7490 - Rings, Flash Welded, Corrosion and Heat Resistant Austenitic Steels and Austenitic-Type 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 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 Federal Standards:

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

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, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	--	0.03
Manganese	--	0.10
Silicon	--	0.10
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	14.50	16.00
Cobalt	19.00	21.00
Molybdenum	2.50	3.00
Nickel	--	0.20

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:

3.2.1 Bars, Forgings, and Flash Welded Rings: Solution heat treated and descaled.

3.2.1.1 Bars shall be hot finished; round bars shall be ground or turned.

3.2.1.2 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 7490.

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

3.3 Solution Heat Treatment: Bars, forgings, and flash welded rings shall be solution heat treated by heating to 1700°F ± 25 (925°C ± 15), holding at heat for 30 min. ± 5, and rapidly quenching in oil or water.

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

3.4.1 Bars, Forgings, and Flash Welded Rings:

3.4.1.1 As Solution Heat Treated:

3.4.1.1.1 Hardness: Shall be not higher than 35 HRC or equivalent.

3.4.1.2 After Precipitation Heat Treatment: The product shall have the following properties after being precipitation heat treated by heating to 1025°F ± 15 (550°C ± 8), holding at heat for 4 hr ± 0.25, and cooling in air. Properties after precipitation heat treatment at temperatures other than 1025°F ± 15 (550°C ± 8) shall be as agreed upon by purchaser and vendor.

3.4.1.2.1 Tensile Properties:

Tensile Strength, min	225,000 psi (1551 MPa)
Yield Strength at 0.2% Offset, min	200,000 psi (1379 MPa)
Elongation in 4D, min	10%
Reduction of Area, min	50%

3.4.1.2.2 Hardness: Should be 46 - 50 HRC or equivalent but the product shall not be rejected on the basis of hardness if the tensile property requirements of 3.4.1.2.1 are met.

3.4.2 Forging Stock: When a sample of stock is forged to a test coupon and heat treated as in 3.3 and 3.4.1.2, specimens taken from the heat treated coupon shall conform to the requirements of 3.4.1.2.1 and 3.4.1.2.2. If specimens taken from the stock after heat treatment as in 3.3 and 3.4.1.2 conform to the requirements of 3.4.1.2.1 and 3.4.1.2.2, the tests shall be accepted as equivalent to tests of a forged coupon.

3.4.3 Stock for Flash Welded Rings: A sample of stock heat treated as in 3.3 and 3.4.1.2 shall conform to the requirements of 3.4.1.2.1 and 3.4.1.2.2.

3.5 Quality: The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to usage of the product.

3.5.1 Forgings shall have substantially uniform macrostructure and grain flow. Standards for acceptance shall be as agreed upon by purchaser and vendor.

3.6 Sizes: Except when exact lengths or multiples of exact lengths are ordered, straight 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).

3.7 Tolerances: Unless otherwise specified, tolerances for bars shall conform to all applicable requirements of AMS 2241.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product 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 4.5. Purchaser reserves the right to sample and to perform such confirmatory testing as he deems necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to the following requirements are classified as acceptance tests and shall be performed on each heat or lot as applicable:

4.2.1.1 Composition (3.1) of each heat.

4.2.1.2 Hardness (3.4.1.1.1) of each lot of bars, forgings, and flash welded rings as solution heat treated.

4.2.1.3 Tensile properties (3.4.1.2.1) and hardness (3.4.1.2.2) of each lot of bars, forgings, and flash welded rings after precipitation heat treatment.

4.2.1.4 Tolerances (3.7) of bars.