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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5763C

Issued DEC 1972
Revised FEB 2001
Reaffirmed APR 2006

Superseding AMS 5763B

Steel, Corrosion Resistant Bars, Forgings, Tubing, and Rings
15Cr - 6.5Ni - 0.75Mo - 0.50 (Cb + Ta) - 1.5Cu
Solution Heat Treated

UNS S45000

1. SCOPE:

1.1 Form:

This specification covers a corrosion-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:

These products have been used typically for parts requiring corrosion resistance approximating that of steels of the 18-8 types and high strength exceeding that of the 12 Cr martensitic types up to 700 °F (370 °C), but usage is not limited to such applications.

1.3 This steel can be used in the solution heat treated condition and is capable of being precipitation heat treated to tensile strengths as high as 180,000 psi (1240 MPa).

1.4 Although this steel is relatively immune to stress-corrosion cracking, reference should be made to ARP1110 for recommended practices to minimize such conditions.

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

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 2243	Tolerances, Corrosion and Heat Resistant Steel Tubing
MAM 2243	Tolerances, Metric, Corrosion and Heat Resistant Steel Tubing
AMS 2248	Chemical Check Analysis Limits, Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
AMS 2303	Aircraft Quality Steel Cleanliness, Martensitic Corrosion Resistant Steels, Magnetic Particle Inspection Procedure
MAM 2303	Aircraft Quality Steel Cleanliness, Martensitic Corrosion Resistant Steels, Magnetic Particle Inspection Procedure, Metric (SI) Measurement
AMS 2371	Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS 2374	Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloy Forgings
AMS 2750	Pyrometry
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, Austenitic-Type Iron, Nickel, or Cobalt Alloys, or Precipitation-Hardenable Alloys
ARP1110	Minimizing Stress Corrosion Cracking in Wrought Forms of Steels and Corrosion Resistant Steels and Alloys

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM A 370	Mechanical Testing of Steel Products
ASTM E 353	Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

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	--	0.05
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.030
Sulfur	--	0.030
Chromium	14.00	16.00
Nickel	6.00	7.00
Molybdenum	0.50	1.00
Columbium	8 x C	0.75
Tantalum (See 3.1.2)	--	0.05
Copper	1.25	1.75

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

3.1.2 Determination not required for routine acceptance.

3.2 Condition:

The product shall be supplied in the following condition:

3.2.1 Bars, Wire, Mechanical Tubing, Forgings, and Flash Welded Rings: Solution heat treated.

3.2.1.1 Bars:

3.2.1.1.1 Rounds: Solution heat treated and centerless ground.

3.2.1.1.2 Squares, Hexagons, and Flats: Hot finished, solution heat treated, and descaled, or solution heat treated cold drawn, and descaled.

3.2.1.2 Wire: Solution heat treated and cold drawn.

3.2.1.3 Mechanical Tubing: Cold finished and solution heat treated.

3.2.1.4 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 Heat Treatment:

Bars, wire, forgings, mechanical tubing, and flash welded rings shall be solution heat treated by heating to 1900 °F ± 25 (1040 °C ± 15), holding at heat for not less than one hour, and cooling rapidly. Pyrometry shall be in accordance with AMS 2750.

3.4 Properties:

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

3.4.1 Bars, Wire, Forgings, Mechanical Tubing, and Flash Welded Rings: Shall be as follows on product 8.0 inch (200 mm) and under in least nominal cross-sectional dimensions:

3.4.1.1 As Solution Treated:

3.4.1.1.1 Tensile Properties: Shall meet the requirements shown in Table 2 and 3.4.1.1.1.2.

3.4.1.1.1.1 Bars, Forgings, Tubing, and Flash Welded Rings:

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	125.0 ksi (860 MPa)
Yield Strength at 0.2% Offset	95.0 ksi (655 MPa)
Elongation in 4D	10%
Reduction of Area	40%

3.4.1.1.1.2 Wire: Not higher than 165.0 ksi (1135 MPa) or equivalent hardness (See 8.2).

3.4.1.1.2 Hardness: Shall be as follows:

3.4.1.1.2.1 Bars: Not higher than 311 HB, or equivalent (See 8.3), determined midway between surface and center.

3.4.1.1.2.2 Tubing, Flash Welded Rings, and Forgings: Not higher than 311 HB, or equivalent (See 8.3).

3.4.1.2 After Precipitation Heat Treatment: The product shall have the following properties after being precipitation heat treated by heating to 900 °F ± 15 (480 °C ± 8), holding at heat for not less than four hours, and cooling in air:

3.4.1.2.1 Tensile Properties: Shall be as shown in Table 3:

TABLE 3 - Minimum Tensile Properties

Property	Value
Tensile Strength	180.0 psi (1240 MPa)
Yield Strength at 0.2% Offset	170.0 psi (1170 MPa)
Elongation in 4D	10%
Reduction of Area	40%

3.4.1.2.2 Hardness: Shall be not lower than 363 HB, or equivalent (See 8.2), but the product shall not be rejected on the basis of hardness if the tensile properties of 3.4.1.2.1 are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness, or from another sample with similar nonconforming hardness.

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: Specimens taken from the stock after heat treatment 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 imperfections detrimental to usage of the product.

3.5.1 When specified, steel shall conform to AMS 2303 or MAM 2303.

3.5.2 Forgings shall have substantially uniform macrostructure. Standards for acceptance may be agreed upon by purchaser and vendor.

3.5.3 Grain flow of die forgings, except in areas which contain flash-line end grain, shall follow the general contour of the forgings, showing no evidence of re-entrant flow.

3.6 Tolerances:

Shall be as follows:

3.6.1 Bars and Wire: In accordance with AMS 2241 or MAM 2241.

3.6.2 Mechanical Tubing: In accordance with AMS 2243 or MAM 2243.

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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: The following are 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 Tensile properties (3.4.1.1) and hardness (3.4.1.1.2) of each lot of bars, wire, forgings, mechanical tubing, and flash welded rings as solution heat treated.

4.2.1.3 Macrostructure of forgings (3.5.2).

4.2.1.4 Tolerances (3.6) or bars, wire, and mechanical tubing.

4.2.2 Periodic Tests: The following are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser:

4.2.2.1 Tensile properties (3.4.1.2.1) and hardness (3.4.1.2.2) of each lot of bars, wire, forgings, mechanical tubing, and flash welded rings after precipitation heat treatment, and grain flow of die forgings (3.5.3).

4.2.2.2 Ability of forging stock (3.4.2) and stock for flash welded rings (3.4.3) to develop required properties.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 Bars, Wire, Mechanical Tubing, Flash Welded Rings, Forging Stock, and Stock for Flash Welded Rings: In accordance with AMS 2371.

4.3.2 Forgings: In accordance with AMS 2374.