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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5641F

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Superseding ASM 5641E

Steel, Corrosion Resistant, Bars, Wire, and Forgings 18.5Cr - 10Ni - 0.22Se (SAE 30303Se) Free-Machining; Swaging or Upsetting Solution Heat Treated

UNS S30323

1. SCOPE:

1.1 Form:

This specification covers a free-machining, corrosion-resistant steel in the form of bars, wire, forgings, and forging stock.

1.2 Application:

These products have been used typically for parts which may be swaged or hot upset during fabrication and on which the amount of machining warrants use of a free-machining grade of steel, but usage is not limited to such applications. Corrosion resistance is similar to that of the standard 18-8 type steel.

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.

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 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 2374	Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steel and Alloy Forgings
AMS 2806	Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat Resistant Steels and Alloys
AMS 2808	Identification, Forgings

2.2 ASTM Publications:

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

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

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:

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	--	0.12
Manganese	--	2.00
Silicon	--	0.70
Phosphorus	0.11	0.17
Sulfur	--	0.040
Chromium	17.00	20.00
Nickel	8.00	12.00
Selenium	0.15	0.30
Molybdenum	--	0.75
Copper	--	0.75

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, Wire, and Forgings: Solution heat treated free from continuous carbide network.

3.2.1.1 All hexagons, other bars 2.75 inches (69.8 mm) and under in nominal diameter or distance between parallel sides, and wire shall be cold finished.

3.2.1.2 Bars, other than hexagons, over 2.75 inches (69.8 mm) in nominal diameter or distance between parallel sides shall be hot finished.

3.2.2 Forging Stock: As ordered by the forging manufacturer.

3.3 Properties:

Bars, wire, and forgings shall conform to the following requirements; hardness and tensile testing shall be performed in accordance with ASTM A 370. Properties of forging stock shall be as agreed upon by purchaser and vendor.

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

TABLE 2 - Tensile Properties

Property	Value
Tensile Strength	75.0 to 115 ksi (517 to 793 MPa)
Elongation in 4D, minimum	35%

3.3.1.1 Elongation requirements apply only to bars and wire 0.125 inch (3.18 mm) and over in nominal diameter or distance between parallel sides.

3.3.2 Hardness:

3.3.2.1 Bars: Shall be as shown in Table 3, or equivalent, determined at approximate mid-radius or quarter thickness (See 8.2).

TABLE 3 - Hardness of Bars

Nominal Diameter or Distance Between Parallel Sides Inches	Nominal Diameter or Distance Between Parallel Sides Millimeters	Brinell Hardness min	Brinell Hardness max
Up to 2.00, incl	Up to 50.8, incl	140	255
Over 2.00	Over 50.8	--	255

3.3.2.2 Forgings: Shall be not higher than 187 HB, or equivalent.

3.4 Quality:

The product, as received by purchaser, shall be uniform in quality and condition, sound, and, consistent with the type of steel involved, free from foreign materials and from imperfections detrimental to usage of the product.

3.4.1 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 grain flow.

3.5 Tolerances:

Bars and wire shall conform to all applicable requirements of AMS 2241 or MAM 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. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

Tests for all technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing:

Shall be in accordance with the following:

4.3.1 Bars, Wire, and Forging Stock: AMS 2371.

4.3.2 Forgings: AMS 2374.

4.4 Reports:

4.4.1 The vendor of bars, wire, and forgings shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and for tensile properties and hardness of each lot. This report shall include the purchase order number, heat and lot number, AMS 5641F, size, and quantity. If forgings are supplied, the part number and the size and melt source of stock used to make the forgings shall also be included.

4.4.2 The vendor of forging stock shall furnish with each shipment a report showing the results of tests for chemical composition of each heat. This report shall include the purchase order number, heat number, AMS 5641F, size, and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with the following:

4.5.1 Bars, Wire, and Forging Stock: AMS 2371.

4.5.2 Forgings: AMS 2374.