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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5740D

Issued	MAY 1968
Revised	APR 1989
Noncurrent	AUG 1991
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Superseding	AMS 5740C

Steel, Corrosion and Moderate Heat Resistant, Bars, Forgings, and Rings
14.5Cr - 6.5Ni - 0.72Ti
Solution Heat Treated and Maraged, 155,000 psi (1070 MPa) Tensile Strength

UNS S36200

NONCURRENT NOTICE

This specification has been declared “NONCURRENT” by the Aerospace Materials Division, SAE, as of August, 1991. It is recommended, therefore, that this specification not be specified for new designs.

“NONCURRENT” refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these “NONCURRENT” specifications is available from SAE.

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1. SCOPE:

1.1 Form:

This specification covers a corrosion and moderate heat resistant steel in the form of bars, wire, 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 600°F (315°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
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 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 spectrographic or other analytical methods approved by purchaser:

	min	max
Carbon	--	0.05
Manganese	--	0.50
Silicon	--	0.30
Phosphorus	--	0.03
Sulfur	--	0.03
Chromium	14.00	15.00
Nickel	6.00	7.00
Titanium	0.55	0.90

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:

3.2.1.1 Rounds: Hot finished, solution heat treated, maraged, and centerless ground.

3.2.1.2 Squares, Flats, and Hexagons: Solution heat treated, maraged, and cold drawn.

3.2.2 Wire: Cold-drawn, solution heat treated, and maraged.

3.2.3 Forgings and Flash Welded Rings: Solution heat treated and maraged.

3.2.3.1 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.

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

3.3 Heat Treatment:

Bars, wire, forgings, and flash welded rings shall be solution heat treated by heating to 1500°F ± 25 (815°C ±15), holding at heat for not less than 1 hr, and cooling as required and maraged by heating to 1000°F ± 25 (540°C ± 15), holding at heat for not less than 2 hr, and cooling in air.

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 Bar, Wire, Forgings, and Flash Welded Rings:

3.4.1.1 Tensile Properties (Parallel to Grain Flow): Shall be as follows for product up to 3.0 in. (75 mm), excl, in nominal diameter or distance between parallel sides:

Tensile Strength, max	155,000 psi (1070 MPa)
Yield Strength at 0.2% Offset, min	145,000 psi (1000 MPa)
Elongation in 4D, min	12%
Reduction of Area, min	45%

3.4.1.1.1 Tensile property requirements for product 3.0 in. (75 mm) and over in nominal diameter or distance between parallel sides and for specimen orientation other than parallel to grain flow shall be as agreed upon by purchaser and vendor.

3.4.1.2 Hardness: Should be 302 - 352 HB, or equivalent, but the product shall not be rejected on the basis of hardness if the tensile property requirements 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, specimens taken from the heat treated coupon shall conform to the requirements of 3.4.1.1 and 3.4.1.2. If specimens taken from the stock after heat treatment as in 3.3 conform to the requirements of 3.4.1.1 and 3.4.1.2, 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 shall conform to the requirements of 3.4.1.1 and 3.4.1.2.

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 Forgings shall have substantially uniform macrostructure; standards for acceptance shall be as agreed upon by purchaser and vendor.

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

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:

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. Results of such tests shall be reported to the purchaser as required by 4.5. 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:

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 Tensile properties (3.4.1.1) and hardness (3.4.1.2) of each lot of bars, wire, forgings, and flash welded rings.

4.2.1.3 Tolerances (3.7) of bars and wire.

4.2.2 Periodic Tests: Tests of forging stock (3.4.2) and of stock for flash welded rings (3.4.3) to demonstrate ability to develop required properties are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.2.3 Preproduction Tests: Tests of forgings to determine conformance to all applicable technical requirements of this specification when AMS 2375 is specified are classified as preproduction tests and shall be performed prior to or on the first-article shipment of a forging to a purchaser, when a change in material, processing, or both requires reapproval as in 4.4, and when purchaser deems confirmatory testing to be required.

4.2.3.1 For direct U.S. Military procurement of forgings, substantiating test data and, when requested, preproduction forgings shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling:

Shall be in accordance with the following:

4.3.1 Bars, Wire, Flash Welded Rings, and Stock for Flash Welded Rings: AMS 2371.

4.3.2 Forgings and Forging Stock: AMS 2374.

4.4 Approval:

When specified, approval and control of forgings shall be in accordance with AMS 2375.

4.5 Reports:

4.5.1 The vendor of bars, wire, forgings, and flash welded rings shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and the results of tests on each lot to determine conformance to the other acceptance test requirements of this specification. This report shall include the purchase order number, heat number, AMS 5740D, 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.

4.5.2 The vendor of stock for forging or flash welded rings 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 5740D, size, and quantity.

4.5.3 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 5740D, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification and shall include in the report either a statement that the material conforms or copies of laboratory reports showing the results of tests to determine conformance.