SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5764D

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Superseding AMS 5764C

Steel, Corrosion-Resistant, Bars, Wire, Forgings, Extrusions, and Rings
5.0Mn - 22Cr - 12.5Ni - 2.2Mo - 0.20Cb - 0.30N - 0.20V
Solution Heat Treated

(Composition similar to UNS S20910)

1. SCOPE:

1.1 Form:

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

1.2 Application:

These products have been used typically for parts requiring excellent corrosion resistance and high strength from -423 to +1100 °F (-253 to +593 °C) and for welded parts without subsequent heat treatment, but usage is not limited to such applications.

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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2241 Tolerances, Corrosion and Heat-Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
AMS 2248 Chemical Check Analysis Limits, 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

TO PLACE A DOCUMENT ORDER:
Tel: 877-606-7323 (inside USA and Canada)
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: custsvc@sae.org
SAE WEB ADDRESS: http://www.sae.org

2.1 (Continued):

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
AMS 7490 Rings, Flash Welded, Corrosion and Heat-Resistant Austenitic Steels and Austenitic-Type Iron, Nickel, or Cobalt Alloys, or Precipitation-Hardenable Alloys

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM A 262 Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
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	--	0.06
Manganese	4.00	6.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	20.50	23.50
Nickel	11.50	13.50
Molybdenum	1.50	3.00
Columbium	0.10	0.30
Vanadium	0.10	0.30
Nitrogen	0.20	0.40
Titanium (3.1.1)	--	0.02
Aluminum (3.1.1)	--	0.02
Zirconium (3.1.1)	--	0.02

3.1.1 Determination not required for routine acceptance.

3.1.2 Check Analysis: Composition variations shall meet the applicable 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: Solution heat treated, centerless ground or turned.

3.2.1.2 Hexagons: Solution heat treated, descaled, and cold drawn.

3.2.1.3 Squares and Flats: Hot finished and solution heat treated.

3.2.2 Wire: Solution heat treated, cold drawn, or centerless ground.

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

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 Extrusions: Solution heat treated, straightened, and descaled.

3.2.5 Stock for Forging, Extruding, or Flash Welded Rings: As ordered by the forging, extrusion, or flash welded ring manufacturer.

3.3 Heat Treatment:

Bars, wire, forgings, extrusions, and flash welded rings shall be solution heat treated by heating within the range 1925 to 1975 °F (1052 to 1079 °C), holding at heat for a time commensurate with section thickness, and cooling at a rate equivalent to a forced air cool or faster.

3.4 Properties:

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

3.4.1 Bars, Wire, Forgings, Extrusions, and Flash Welded Rings:

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

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	100 ksi (690 MPa)
Yield Strength at 0.2% Offset	55 ksi (379 MPa)
Elongation in 4D	35%
Reduction of Area	55%

3.4.1.2 Hardness: Shall be not lower than 20 HRC, or equivalent (See 8.2). Product shall not be rejected on the basis of hardness if the tensile property requirements of 3.4.1.1 are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or from another sample with similar nonconforming hardness.

3.4.1.3 Susceptibility to Intergranular Attack: Specimens from the product shall pass the copper/copper sulfate/sulfuric acid test performed in accordance with ASTM A 262, Practice E.

3.4.2 Stock for Forging, Extruding, or Flash Welded Rings: Shall have properties as agreed upon by purchaser and vendor.

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 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 reentrant grain flow.

3.6 Tolerances:

Bars and wire 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 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 requirements 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 (3.4.1.2) of each lot of bars, wire, forgings, extrusions, and flash welded rings.

4.2.1.3 Tolerances (3.6) of bars and wire.

4.2.2 Periodic Tests: Susceptibility to intergranular attack (3.4.1.3), tests of forging stock and of stock for extruding or flash welded rings (3.4.2) to demonstrate ability to develop required properties, and grain flow of die forgings (3.5.1) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 Bars, Wire, Extrusions, Flash Welded Rings, and Stock for Forging, Extruding, or Flash Welded Rings: In accordance with AMS 2371.

4.3.2 Forgings: In accordance with AMS 2374.

4.4 Reports:

The vendor of the product shall furnish with each shipment a report showing the following results of tests and relevant information:

4.4.1 For each heat:

Composition.

4.4.2 For each lot of bars, wire, forgings, extrusions, and rings:

Tensile Properties
Hardness.

4.4.3 A statement that the product conforms to the other technical requirements.

4.4.4 Purchase order number
Heat and lot numbers
AMS 5764D
Size
Quantity.

4.4.5 If forgings are supplied, the size and melt source of stock used to make the forgings