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

AEROSPACE MATERIAL SPECIFICATION

AMS 5717C
Superseding AMS 5717B
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ALLOY BARS, FORGINGS AND RINGS, CORROSION AND HEAT RESISTANT
45.5Ni - 25.5Cr - 3.2Co - 3.2Mo - 3.2W - 18.5Fe

1. SCOPE:

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

1.2 Application: Primarily for parts and assemblies requiring heat and oxidation resistance up to 2150° F (1177° C), particularly where such parts may require welding during fabrication.

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, Pennsylvania 15096.

2.1.1 Aerospace Material Specifications:

AMS 2241 - Tolerances, Corrosion and Heat Resistant Steel Bars and Wire and Titanium and Titanium Alloy Bars and Wire
AMS 2248 - Chemical Check Analysis Limits, Wrought Heat and Corrosion Resistant Steels and Alloys
AMS 2350 - Standards and Test Methods
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Alloys, Wrought Products Except Forgings
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, Pennsylvania 19103.

ASTM E8 - Tension Testing of Metallic Materials
ASTM E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E354 - Chemical Analysis of High Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt-Base Alloys

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

2.3.1 Federal Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E354, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other approved analytical methods:

	min	max
Carbon	--	0.08
Manganese	--	2.00
Silicon	0.75	1.50
Phosphorus	--	0.030
Sulfur	--	0.030
Chromium	24.00	27.00
Nickel	44.00	47.00
Cobalt	2.50	4.00
Molybdenum	2.50	4.00
Tungsten	2.50	4.00
Copper	--	0.50
Tin	--	0.025
Lead	--	0.025
Iron	remainder	

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.

3.2.1.1 Bars shall be hot finished except that bars under 0.250 in. (6.35 mm) in diameter or distance between parallel sides may be cold finished.

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 Heat Treatment: Bars, forgings, and flash welded rings shall be solution heat treated by heating to 2000° F ± 50 (1093.3° C ± 28), holding at heat for 10 min. per inch (25 mm) of cross-section, and either quenching in water or cooling rapidly in air.

3.4 Properties:

3.4.1 Bars, Forgings, and Flash Welded Rings: The product shall conform to the following requirements:

3.4.1.1 Tensile Properties: Shall be as follows, determined in accordance with ASTM E8:

Tensile Strength, max	120,000 psi (827 MPa)
Yield Strength at 0.2% Offset, min	35,000 psi (241 MPa)
Elongation in 2 in. (50.8 mm) or 4D, min	30%

3.4.1.2 Hardness: Should be not higher than 95 HRB or equivalent, determined in accordance with ASTM E18, but the product shall not be rejected on the basis of hardness if the tensile property requirements are met.

3.5 Quality: The product shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

3.6 Sizes: Except when exact lengths or multiples of exact lengths are ordered, 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 and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to assure that the product conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance or routine control tests.

4.3 Sampling: Shall be as follows:

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

4.3.2 Forgings and Forging Stock: As agreed upon by purchaser and vendor.

4.3.3 Tensile test specimens from flash welded rings shall be cut from parent metal not including the weld-heat-affected zone.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat in the shipment and the results of tests on each size from each heat to determine conformance to the tensile property and hardness requirements of this specification. This report shall include the purchase order number, material specification number and its revision letter, heat number, size, and quantity from each heat. 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 finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, 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 a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: Shall be as follows:

4.5.1 Bars, Flash Welded Rings, and Stock for Flash Welded Rings: In accordance with AMS 2371.

4.5.2 Forgings and Forging Stock: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented and no additional testing shall be permitted. Results of all tests shall be reported.