

AEROSPACE MATERIAL SPECIFICATION



AMS 5666E

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Superseding AMS 5666D

Nickel Alloy, Corrosion and Heat Resistant, Bars, Forgings, Extrusions, and Rings
62Ni - 21.5Cr - 9.0Mo - 3.65 (Cb+Ta)
Annealed

UNS N06625

1. SCOPE:

1.1 Form:

This specification covers a corrosion and heat resistant nickel alloy in the form of bars, 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 both corrosion and oxidation resistance up to 2000 °F (1093 °C) and where such parts may require welding during fabrication, 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 form 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.

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2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2261	Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Bars, Rods, and Wire
MAM 2261	Tolerances, Metric, Nickel, Nickel Alloy, and Cobalt Alloy Bars, Rods, and Wire
AMS 2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys and Cobalt 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
AMS 7490	Rings, Flash Welded, Corrosion and Heat Resistant Austenitic Steels, 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.

ASTM E 8	Tension Testing of Metallic Materials
ASTM E 8M	Tension Testing of Metallic Materials (Metric)
ASTM E 10	Brinell Hardness of Metallic Materials
ASTM E 112	Determining the Average Grain Size
ASTM E 354	Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt 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 354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	min	max
Carbon	--	0.10
Manganese	--	0.50
Silicon	--	0.50
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	20.00	23.00
Molybdenum	8.00	10.00
Columbium	3.15	4.15
Tantalum	--	0.05
Cobalt	--	1.00
Titanium	--	0.40
Aluminum	--	0.40
Iron	--	5.00
Nickel	remainder	

3.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2269.

3.2 Condition:

The product shall be supplied in the following condition:

3.2.1 Bars: Hot finished and annealed; round bars shall be ground or turned.

3.2.2 Forgings, Extrusions, and Flash Welded Rings: Annealed.

3.2.2.1 Flash welded rings shall not be supplied unless specified or permitted on purchaser's part drawing. When supplied, rings shall be manufactured in accordance with AMS 7490.

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

3.3 Properties:

The product shall conform to the following requirements:

3.3.1 Bars, Forgings, and Flash Welded Rings:

3.3.1.1 Tensile Properties: Shall be as shown in Table 2, determined in accordance with ASTM E 8 or ASTM E 8M on specimens taken from product under 4 inches (101.6 mm) in least cross-sectional dimension:

TABLE 2 - Minimum, Tensile Properties

Property	Value
Tensile Strength	120.0 ksi (827 MPa)
Yield Strength at 0.2% Offset	60.0 ksi (414 MPa)
Elongation in 4D	30%

3.3.1.2 Hardness: Shall be not higher than 287 HB, or equivalent (See 8.2), determined in accordance with ASTM E 10.

3.3.1.3 Average Grain Size: Shall be ASTM No. 5 or finer, determined in accordance with ASTM E 112, for product with a least cross-section dimension under 2-1/2 inches (63.5 mm).

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

3.4 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.

3.4.1 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 shall conform to all applicable requirements of AMS 2261 or MAM 2261.

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: Composition (3.1), tensile properties (3.3.1.1), hardness (3.3.1.2), grain size (3.3.1.3), and tolerances (3.5) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests: Grain flow of die forgings (3.4.1) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of test is specified by purchaser.