



AEROSPACE MATERIAL SPECIFICATION

AMS5715

REV. F

Issued 1972-05
Revised 2009-03
Reaffirmed 2014-06

Superseding AMS5715E

Nickel Alloy, Corrosion and Heat-Resistant, Bars, forgings, and Rings
60.5Ni - 23Cr - 14Fe - 1.4Al
Annealed

(Composition similar to UNS N06601)

RATIONALE

This document has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

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

1.2 Application

These products have been used typically for parts requiring corrosion and oxidation resistance up to 2200 °F (1204 °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 forms a part of this specification to the extent supplied 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 International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2261	Tolerances Nickel, Nickel Alloy, and Cobalt Alloy Bars, Rods, and Wire
AMS2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys
AMS2371	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS2374	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steel and Alloy forgings
AMS2806	Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat-Resistant Steels and Alloys
AMS2808	Identification, forgings
AMS7490	Rings, Flash Welded, Corrosion and Heat-Resistant Austenitic Steels, Austenitic-Type Iron, Nickel, or Cobalt Alloys, or Precipitation-Hardenable Alloys

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2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM E 8/E 8M Tension Testing of Metallic Materials

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	-	1.00
Silicon	-	0.50
Sulfur	-	0.015
Chromium	21.00	25.00
Nickel	58.00	63.00
Aluminum	1.00	1.70
Titanium	-	0.60
Boron	-	0.006
Copper		1.00
Iron	remainder	

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

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 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 AMS7490.

3.2.3 Stock for Forging or Flash Welded Rings

As ordered by the forging 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

Tensile properties of bars, forgings, and flash welded rings 4.00 inches (101.6 mm) and under in least nominal cross section shall be shown in Table 2, determined in accordance with ASTM E 8/E 8M.

TABLE 2 - MINIMUM TENSILE PROPERTIES

Property	Value
Tensile Strength	80 ksi (552 MPa)
Yield Strength at 0.2% Offset	30.0 ksi (207 MPa)
Elongation in 4D	35%

3.3.2 Forging Stock

When a sample of stock is forged to a test coupon and annealed, specimens taken from the heat treated coupon shall conform to the requirements of 3.3.1. If specimens taken from the stock after annealing conform to the requirements of 3.3.1, the tests shall be accepted as equivalent to tests of a forged coupon.

3.3.3 Stock for Flash Welded Rings

Specimens taken from the stock after annealing shall conform to the requirements of 3.3.1.

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 reentrant grain flow.

3.5 Tolerances

Bars shall conform to all applicable requirements of AMS2261.

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), and tolerances (3.5) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests

Tests of forging stock (3.3.2) and of stock for flash welded rings (3.3.3) to demonstrate ability to develop required properties and grain flow of die forgings 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, Flash Welded Rings, and Stock for Forging or Flash Welded Rings

In accordance with AMS2371.

4.3.2 forgings

In accordance with AMS2374.

4.4 Reports

The vendor of the product shall furnish with each shipment a report showing the results of tests for composition of each heat and for tensile properties of each lot, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS5715F, annealing temperature used, product form, size, and quantity. If forgings are supplied, the size and melt source of stock used to make the forging shall also be included.

4.5 Resampling and Retesting

Shall be as follows:

4.5.1 Bars, Flash Welded Rings, and Stock for Forging or Flash Welded Rings

In accordance with AMS2371.

4.5.2 forgings

In accordance with AMS2374.

5. PREPARATION FOR DELIVERY

5.1 Sizes

Except when exact lengths or multiples of exact lengths are ordered, straight bars will be acceptable in mill lengths of 6 to 24 feet (1.8 to 7.3 m) but not more than 25% of any shipment shall be supplied in lengths of 6 to 9 feet (1.8 to 2.7 m) except that for bars weighing over 25 pounds per foot (37 kg/m), short lengths down to 2 feet (610 mm) may be supplied.

5.2 Identification

Shall be as follows:

5.2.1 Bars

In accordance with AMS2806.

5.2.2 forgings

In accordance with AMS2808.