SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS4674 | REV. G

Issued 1940-05
Revised 2006-09
Reaffirmed 2012-02

Superseding AMS4674F

Nickel - Copper Alloy, Corrosion-Resistant, Bars and Forgings
67Ni - 30Cu - 0.04S
Free Machining

(Composition similar to UNS N04405)

RATIONALE

AMS4674G has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

This specification covers a corrosion-resistant nickel-copper alloy in the form of bars, forgings, and forging stock.

1.2 Application

These products have been used typically for fittings, such as cones, nipples, and unions, in fluid line assemblies using AMS 4574 or AMS 4575 tubing, but usage is not limited to such applications. These products can be machined more readily than AMS 4675.

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 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.

AMS 2261	Tolerances, 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 Alloy
AMS 2808	Identification, Forgings

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4674G

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	Tension Testing of Metallic Materials
ASTM E 8M	Tension Testing of Metallic Materials (Metric)
ASTM E 18	Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E 76	Chemical Analysis of Nickel-Copper 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 76, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

Element	min	max
Carbon	--	0.30
Manganese	--	2.00
Silicon	--	0.50
Sulfur	0.025	0.06
Copper	28.00	34.00
Iron	--	2.50
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

Cold finished.

3.2.2 Forgings

As forged.

3.2.3 Forging Stock

As ordered by the forging manufacturer.

3.3 Properties

The product shall conform to the following requirements:

3.3.1 Bars

3.3.1.1 Tensile Properties

Shall be as follows, determined in accordance with ASTM E 8M:

3.3.1.1.1 Round Bars

Shall be as shown in Table 2.

TABLE 2A - TENSILE PROPERTIES, INCH/POUND UNITS

Nominal Diameter Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi, min	Elongation in 2 inches or 4D %, min
Up to 0.50, excl	85 to 110	50	8
0.50 to 1.00, incl	85 to 110	50	15
Over 1.00 to 3.00, incl	85.0 min	50	15

TABLE 2B - TENSILE PROPERTIES, SI UNITS

Nominal Diameter Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa, min	Elongation in 50.8 mm or 4D %, min
Up to 12.7, excl	586 to 758	345	8
12.7 to 25.4, incl	586 to 758	345	15
Over 25.4 to 76.2, incl	586 min	345	15

3.3.1.1.2 Hexagons, Squares, and Rectangles

Shall be as shown in Table 3.

TABLE 3A - MINIMUM TENSILE PROPERTIES, INCH/POUND UNITS

Nominal Distance Between Parallel Sides Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
Up to 0.50, excl	85	50	10
0.50 to 2.00, incl	85	50	15

TABLE 3B - MINIMUM TENSILE PROPERTIES, SI UNITS

Nominal Distance Between Parallel Sides Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 12.7, excl	586	345	10
12.7 to 50.8, incl	586	345	15

3.3.1.2 Hardness

Shall be not lower than as shown in Table 4, or equivalent (See 8.3), determined in accordance with ASTM E 18. Product shall not be rejected on the basis of hardness if the tensile properties of Table 3 are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or from another sample with similar nonconforming hardness.

TABLE 4 - MINIMUM HARDNESS

Shapes	Hardness, HRB
Rounds	84
Hexagons, Squares, Rectangles	80

3.3.2 Forgings

Shall have hardness of 78 to 96 HRB, or equivalent (See 8.3), determined in accordance with ASTM E 18.

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.

3.5 Tolerances

3.5.1 Bars

Shall be in accordance with AMS 2261.

3.5.2 Forging Stock

Shall be as agreed upon by purchaser and vendor.

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 the specified requirements.

4.2 Classification of Tests

All technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing

Shall be as follows:

4.3.1 Bars and Forging Stock

In accordance with AMS 2371.

4.3.2 Forgings

In accordance with AMS 2374.