



AEROSPACE MATERIAL SPECIFICATION	AMS4674™	REV. J
	Issued 1948-05 Reaffirmed 2012-02 Revised 2024-12	
Superseding AMS4674H		
Nickel - Copper Alloy, Corrosion-Resistant, Bars, Forgings and Forging Stock 67Ni - 30Cu - 0.04S Free Machining (Composition similar to UNS N04405)		

RATIONALE

AMS4674J is the result of a Five-Year Review and update of the specification. The revision updates the Title to match the Scope, revises composition testing and reporting (see 3.1 and 3.1.1), adds strain rate requirements for tensile tests (see 3.3.1.1.1), adds forging stock ordering information (see 4.4.3 and 8.6), and updates the prohibition of exceptions requirements (see 3.3.1.1.4, 8.4, and 8.6).

1. SCOPE

1.1 Form

This specification covers a corrosion-resistant nickel-copper alloy in the form of bars up to 3.00 inches (76.2 mm), inclusive, in thickness and forgings and forging stock of any size.

1.2 Application

These products have been used typically for fittings, such as cones, nipples, and unions, in fluid line assemblies using AMS4574 or AMS4575 tubing, but usage is not limited to such applications. These products can be machined more readily than AMS4675.

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 +1 724-776-4970 (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

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<https://www.sae.org/standards/content/AMS4674J/>

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
AMS4574	Nickel-Copper Alloy, Corrosion Resistant, Tubing, Seamless, 67Ni - 31Cu, Annealed
AMS4575	Nickel-Copper Alloy Tubing, Brazed, Corrosion Resistant, 67 Ni - 31Cu, Annealed
AMS4675	Nickel-Copper Alloy, Corrosion-Resistant, Bars and Forgings, 67Ni - 30Cu
AS7766	Terms Used in Aerospace Metals Specifications

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 E8/E8M	Tension Testing of Metallic Materials
ASTM E18	Rockwell Hardness of Metallic Materials
ASTM E140	Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness
ASTM E1473	Chemical Analysis of Nickel, Cobalt, and High-Temperature Alloys

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM E1473 or by other analytical methods acceptable to the 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 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.2 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

Cold finished.

3.2.1.1 Bars shall not be cut from plate (see 4.4.1).

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 E8/E8M and the following:

3.3.1.1.1 Unless otherwise specified, the strain rate shall be set at 0.005 in/in/min (0.005 mm/mm/min) and maintained within a tolerance of ± 0.002 in/in/min (± 0.002 mm/mm/min) through 0.2% offset yield strain. After the yield strain, the speed of the testing machine shall be set between 0.05 and 0.5 in/in (0.05 and 0.5 mm/mm) of the length of the reduced parallel section (or distance between the grips for specimens not having a reduced section) per minute. Alternatively, an extensometer and strain rate indicator may be used to set the strain rate between 0.05 and 0.5 in/in/min (0.05 and 0.5 mm/mm/min). The requirement for compliance becomes effective for material produced 1 year after the publication date of this specification.

3.3.1.1.2 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 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 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

3.3.1.1.3 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 mm or 4D %
Up to 12.7, excl	586	345	10
12.7 to 50.8, incl	586	345	15

3.3.1.1.4 Mechanical property requirements for product outside the thickness range of 1.1 shall be agreed upon by the purchaser and producer and reported per 4.4.

3.3.1.2 Hardness

Shall be not lower than as shown in Table 4, or equivalent (see 8.2), determined in accordance with ASTM E18. 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 8.2), determined in accordance with ASTM E18.

3.4 Quality

3.5 The product, as received by the purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the product.

3.6 Tolerances

3.6.1 Bars

Shall be in accordance with AMS2261.

3.6.2 Forging Stock

Shall be as agreed upon by the purchaser and producer.

3.7 Any exceptions shall be authorized by the purchaser and reported as in 4.4.2.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. The 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 AMS2371.

4.3.2 Forgings

In accordance with AMS2374.

4.4 Reports

The producer of product shall furnish with each shipment a report showing: the producer's name; the country where the metal was melted (e.g., final melt in the case of metal processed by multiple melting operations); the results of tests for composition of each heat; and the results of tests for tensile properties of bars and hardness of bars and forgings of each lot. The report shall state that the product conforms to the other technical requirements and shall include the purchase order number, heat and lot numbers, AMS4674J, size, and quantity.

4.4.1 Report the nominal metallurgically worked cross-sectional size and the cut size, if different (see 3.2.1.1).