



AEROSPACE MATERIAL SPECIFICATION

AMS5706™

REV. N

Issued	1964-01
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Superseding AMS5706M

Nickel Alloy, Corrosion and Heat-Resistant, Bars, Forgings, and Rings
 57Ni - 19.5Cr - 13.5Co - 4.3Mo - 3.0Ti - 1.4Al - 0.006B - 0.05Zr
 Consumable Electrode or Vacuum Induction Melted
 1825 to 1900 °F Solution Heat Treated
 (Composition similar to UNS N07001)

RATIONALE

AMS5706N prohibits unauthorized exceptions (3.8), revises Reports (4.4) and Identification (5.2.1.1), and results from a Five-Year Review and update of this specification.

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, flash welded rings.

1.1.1 This specification covers products 3.25 inches (83 mm) and under in least nominal diameter or distance between parallel sides (see 8.6).

1.2 Application

These products have been used typically for parts, such as fasteners, flanges, and rings, requiring high strength up to 1500 °F and oxidation resistance up to 1750 °F (954 °C), particularly those parts which are formed or welded and then heat treated to develop required properties, 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 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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For more information on this standard, visit
<https://www.sae.org/standards/content/AMS5706N/>

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
AMS2750	Pyrometry
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 and Austenitic-Type Iron, Nickel or Cobalt Alloys, or Precipitation-Hardenable Alloys
ARP1917	Clarification of 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 E10	Brinell Hardness of Metallic Materials
ASTM E112	Determining Average Grain Size
ASTM E139	Conducting Creep, Creep-Rupture, and Stress-Rupture Tests 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 E292	Conducting Time-for-Rupture Notch Tension Tests of Materials
ASTM E354	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 E354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.02	0.10
Manganese	--	0.10
Silicon	--	0.15
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	18.00	21.00
Cobalt	12.00	15.00
Molybdenum	3.50	5.00
Titanium	2.75	3.25
Aluminum	1.20	1.60
Boron	0.003	0.010
Zirconium	0.02	0.08
Iron	--	2.00
Copper	--	0.10
Lead	--	0.0005 (5 ppm)
Bismuth	--	0.00003 (0.3 ppm)
Selenium	--	0.0003 (3 ppm)
Nickel	remainder	

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269; no variation is permitted for lead, bismuth, and selenium.

3.2 Melting Practice

Alloy shall be multiple melted using consumable electrode practice in the remelt cycle or shall be multiple vacuum melted. If consumable electrode remelting is not performed in vacuum, electrodes which have been produced by vacuum induction melting shall be used for remelting.

3.3 Condition

The product shall be supplied in the following condition:

3.3.1 Bars

Hot finished, solution heat treated, and descaled. Round bars shall be ground or turned.

3.3.1.1 Bars shall not be cut from plate (also see 4.4.5).

3.3.2 Forgings and Flash Welded Rings

Solution heat treated.

3.3.2.1 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.

3.3.3 Stock for Forging, Flash Welded Rings, or Heading

As ordered by the forging, flash welded ring, or heading manufacturer.

3.4 Heat Treatment

Bars, forgings, and flash welded rings shall be solution heat treated by heating to a temperature within the range 1825 to 1900 °F (996 to 1038 °C), holding at the selected temperature within ± 25 °F (± 14 °C) for a time commensurate with section thickness, and cooling at a rate equivalent to an air cool or faster; pyrometry shall be in accordance with AMS2750.