



AEROSPACE MATERIAL SPECIFICATION

AMS5660™**REV. N**Issued 1959-06
Revised 2025-11

Superseding AMS5660M

Nickel-Iron Alloy, Corrosion- and Heat-Resistant, Bars Forgings and Forging Stock,
12.5Cr - 42.5Ni - 6.0Mo - 2.7Ti - 0.015B - 34Fe (Incoloy® 901),
Consumable Electrode Remelted or Vacuum Induction Melted,
Solution, Stabilization, and Precipitation Heat Treated
(Composition similar to UNS N09901)

RATIONALE

AMS5660N is the result of a Five-Year Review and update of the specification. The revision updates the Title to include the trade name and align with the Scope (see 8.6), revises composition testing and reporting (see 3.1 and 3.1.1), adds strain rate control and clarifies bar requirements (see 3.5.2.1 and 3.5.2.1.2), updates bar reporting requirements (see 4.4.2), adds option for additional forging stock properties (see 4.4.4 and 8.7), and updates the prohibition of exceptions requirements (see 4.4.3 and 8.5).

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant nickel-iron alloy in the form of bars and forgings 5 inches (127 mm) and under in nominal diameter or least distance between parallel sides and forging stock of any size.

1.2 Application

These products have been used typically for parts, such as turbine rotors, shafts, and blades, requiring high strength up to 1400 °F (760 °C) and oxidation resistance up to 1600 °F (871 °C), 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 (U.S. and Canada only) or +1 724-776-4970 (outside U.S. and Canada), 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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Documents

Standard, visit Sharing Hub

AMS2283	Composition Testing Methods for Nickel- and Cobalt-Based 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
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
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 E10	Brinell Hardness of Metallic Materials
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

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2283 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.10
Manganese	--	1.00
Silicon	--	0.60
Phosphorus	--	0.030
Sulfur	--	0.030
Chromium	11.00	14.00
Nickel	40.00	45.00
Molybdenum	5.00	7.00
Titanium	2.35	3.10
Boron	0.010	0.020
Cobalt	--	1.00
Aluminum	--	0.35
Copper	--	0.50
Lead	--	0.0005 (5 ppm)
Bismuth	--	0.00003 (0.3 ppm)
Selenium	--	0.0003 (3 ppm)
Iron	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; no variation over maximum 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 induction melted under vacuum. If consumable electrode remelting is not performed in vacuum, electrodes that 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

Bars shall be hot finished and solution, stabilization, and precipitation heat treated. Rounds shall be ground or turned.

3.3.1.1 Bars shall not be cut from plate (see 4.4.2).

3.3.2 Forgings

Forgings shall be solution, stabilization, and precipitation heat treated.

3.3.3 Forging Stock

Forging stock shall be as ordered by the forging manufacturer.