



AEROSPACE MATERIAL SPECIFICATION

AMS5950™**REV. E**Issued 1996-01
Revised 2025-10

Superseding AMS5950D

(R) Nickel Alloy, Corrosion- and Heat-Resistant, Sheet and Strip,
52.5Ni - 19Cr - 3.0Mo - 5.0Cb (Nb) - 0.90Ti - 0.50Al - 18Fe (Inconel® 718SPF),
Vacuum Induction and Consumable Electrode Remelted,
Solution Heat Treated, Precipitation Hardenable
(Composition similar to UNS N07719)

RATIONALE

AMS5950E is the result of a Five-Year-Review and update of the specification. The revision updates the Title to include the trade name (see 8.7), revises composition testing and reporting (see 3.1 and 3.1.1), revises condition (see 3.3), clarifies heat treatment (see 3.4), adds strain rate requirements (see 3.5.1.1.1 and 3.5.2.1.1.1), removes superficial hardness (see 3.5.1.2, 3.5.2.2, and 8.3), updates bending requirements (see 3.5.1.3), and adds cycle interruption information (see 8.8).

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant nickel alloy in the form of sheet and strip 0.080 inch (2.03 mm) and under in nominal thickness.

1.2 Application

These products have been used typically for parts requiring resistance to low-cycle fatigue, creep- and stress-rupture up to 1300 °F (704 °C), and oxidation resistance up to 1800 °F (982 °C), particularly those parts which are superplastically or otherwise formed or welded and then heat treated to develop desired 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 (U.S. and Canada only) or +1 724-776-4970 (outside U.S. and Canada), www.sae.org.

AMS2262 Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Sheet, Strip, and Plate

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2025 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, or used for text and data mining, AI training, or similar technologies, without the prior written permission of SAE.

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
<http://www.sae.org>

SAE WEB ADDRESS:

Full document details: SAE AMS5950E

For more information on this standard, visit <https://www.sae.org/standards/content/AMS5950E/>

Documents

Standard, visit Sharing Hub

AMS2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys
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
AMS2750	Pyrometry
AMS2807	Identification, Carbon and Low-Alloy Steels, Corrosion- and Heat-Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing
AS7766	Terms Used in Aerospace Metals Specifications
HS-1086	Metals and Alloys in the Unified Numbering System

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 E3	Preparation of Metallographic Specimens
ASTM E8/E8M	Tension Testing of Metallic Materials
ASTM E18	Rockwell Hardness of Metallic Materials
ASTM E21	Elevated Temperature Tension Tests 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 E290	Bend Test of Materials for Ductility

2.3 Definitions

Terms used in AMS are defined in AS7766 and as follows:

ALLOY-DEPLETED LAYER: A loss of alloying elements at the surface sufficient to effect a near-surface microstructure difference using a suitable etchant.

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	--	0.05
Manganese	--	0.35
Silicon	--	0.35
Phosphorus	--	0.015
Sulfur	--	0.002
Chromium	17.00	21.00
Nickel	50.00	55.00
Molybdenum	2.80	3.30
Columbium (Niobium)	4.75	5.25
Titanium	0.65	1.15
Aluminum	0.20	0.80
Cobalt	--	1.00
Boron	--	0.006
Copper	--	0.30
Nitrogen	--	0.01
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.

3.2 Melting Practice

Alloy shall be multiple melted using vacuum induction melting followed by consumable electrode remelting.

3.3 Condition

Sheet and strip shall be hot or cold rolled, solution heat treated, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled producing a uniform finish.

3.4 Solution Heat Treatment

The product should be heat treated as follows; pyrometry shall be in accordance with AMS2750:

3.4.1 It is recommended that the product be solution heat treated by heating in a suitable protective atmosphere, preferably in hydrogen or argon, or in a vacuum at 10^{-4} torr or less (see 8.2) to a temperature within the range 1700 to 1825 °F (927 to 996 °C), holding at the selected temperature within ± 25 °F (± 14 °C) for a time commensurate with product thickness, and cooling at a rate equivalent to an air cool or faster.

3.4.2 Continuous Heat Treatment

When continuous heat treating is used, process parameters (e.g., furnace temperature set points, heat input, travel rate, etc.) for continuous heat-treating lines shall be established by the material producer and validated by testing of product to the requirements of 3.5.