



AEROSPACE MATERIAL SPECIFICATION

AMS5702™**REV. F**

Issued 1971-11
Reaffirmed 2012-04
Revised 2023-12

Superseding AMS5702E

(R) Nickel Alloy, Corrosion- and Heat-Resistant, Bars, Forgings, Rings
and Stock for Forging
41.5Ni - 16Cr - 37Fe - 2.9Cb (Nb) - 1.8Ti
Consumable Electrode Remelted or Vacuum Induction Melted
1750 °F (954 °C) Solution Heat Treated
(Composition similar to UNS N09706)

RATIONALE

AMS5702F is the result of a Five-Year Review and update of the specification. The revision updates the Title to match the Scope, clarifies the maximum cross section covered by the specification (see 1.1), updates the testing and reporting of composition (see 3.1 and 3.1.1), adds alternate product finishes (see 3.3.1.1.1), prohibits bar cut from plate (see 3.3.1.1.2 and 4.4.4), adds pyrometry control (see 3.4 and 3.5.1.2), removes reference to ASTM E140 conversions and provides appropriate conversion tests and values (see 3.5.1.1.1 and 3.5.1.2.2), updates grain size referee method, includes forgings in grain size limit and adds maximum cross-sectional area (see 3.5.1.1.2), heat treatment paragraph replaced by table (see 3.5.1.2), adds strain rate control to tensile testing (see 3.5.1.2.1.1), adds allowance for nonconforming hardness (see 3.5.1.2.2), and prohibits unauthorized exceptions (see 1.1, 3.8, and 8.5).

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant nickel alloy in the form of bars, forgings, and flash-welded rings up to 4.00 inches (101.6 mm), inclusive, in nominal thickness or distance between parallel sides and having a maximum cross-sectional area of less than 12.6 square inches (81 cm²). Stock for forging or flash-welded rings may be of any size and condition as ordered.

1.2 Applications

These products have been used typically for parts requiring a combination of resistance to creep and stress-rupture up to 1300 °F (704 °C), oxidation resistance up to 1800 °F (982 °C), and good machinability, particularly parts which are welded and then precipitation 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.

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 © 2023 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, 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 AMS5702F

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS5702F>

Documents

Document Sharing Hub

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
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
AMS7490	Rings, Flash Welded, Corrosion and Heat-Resistant Austenitic Steels, Austenitic-Type Iron, Nickel or Cobalt Alloys, or Precipitation-Hardenable Alloys
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 E18	Rockwell Hardness of Metallic Materials
ASTM E112	Determining Average Grain Size
ASTM E139	Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials
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

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	--	0.06
Manganese	--	0.35
Silicon	--	0.35
Phosphorus	--	0.020
Sulfur	--	0.015
Chromium	14.50	17.50
Nickel	39.00	44.00
Columbium (Niobium)	2.50	3.30
Titanium	1.50	2.00
Tantalum	--	0.05
Aluminum	--	0.40
Boron	--	0.006
Copper	--	0.30
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 produced by multiple melting 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 which have been produced by vacuum induction melting shall be used.

3.3 Condition

The product shall be supplied in the following condition:

3.3.1 Bars, Forgings, and Flash-Welded Rings

Solution heat treated and descaled.

3.3.1.1 Bars shall be hot finished; round bars shall be turned or ground.

3.3.1.1.1 Bars, other than hexagons, over 2.75 inches (69.8 mm) in nominal diameter or least distance between parallel sides shall be hot finished or cold finished.

3.3.1.1.2 Bars shall not be cut from plate (see 4.4.4).

3.3.1.2 Flash-welded rings shall not be supplied unless specified or permitted on the purchaser's part drawing. When supplied, rings shall be manufactured in accordance with AMS7490.