



AEROSPACE MATERIAL SPECIFICATION

AMS5647™

REV. M

Issued	1953-12
Reaffirmed	2007-04
Revised	2022-03

Superseding AMS5647L

Steel, Corrosion-Resistant, Bars, Wire, Forgings,
Mechanical Tubing, Rings, and Forging Stock
19Cr - 9.5Ni
Solution Heat Treated
(Composition similar to UNS S30403)

RATIONALE

AMS5647M is the result of a limited scope update to add an implementation time for meeting the tensile test strain rate requirement (3.3.1.3).

1. SCOPE

1.1 Form

This specification covers a corrosion-resistant steel in the form of bars, wire, forgings, mechanical tubing, flash welded rings, and stock for forging or flash welded rings.

1.2 Application

These products have been used typically for parts requiring corrosion and heat resistance up to 800 °F (427 °C), especially when such parts are welded during fabrication, and for parts requiring oxidation resistance up to 1500 °F (816 °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 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2241	Tolerances, Corrosion- and Heat-Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
AMS2243	Tolerances, Corrosion- and Heat-Resistant Steel Tubing
AMS2248	Chemical Check Analysis Limits, Corrosion- and Heat-Resistant Steels and Alloys, Maraging and Other Highly Alloyed Steels, and Iron Alloys.

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 © 2022 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:

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS5647M/>

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
AMS7490	Rings, Flash Welded, Corrosion- and Heat-Resistant Austenitic Steels, Austenitic-Type Iron, Nickel or Cobalt Alloys, or Precipitation-Hardenable Alloys
ARP1917	Clarification of Terms Used in Aerospace Metals Specifications
AS1182	Standard Stock Removal Allowance, Aircraft-Quality and Premium Aircraft-Quality Steel Bars and Mechanical Tubing

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 A262	Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
ASTM A276	Stainless Steel Bars and Shapes
ASTM A370	Mechanical Testing of Steel Products
ASTM A473	Stainless Steel Forgings
ASTM A751	Chemical Analysis of Steel Products
ASTM E140	Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM A751 or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.030
Manganese	--	2.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	18.00	20.00
Nickel	8.00	11.00
Molybdenum	--	1.00
Copper	--	1.00

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Bars, Wire, Forgings, Mechanical Tubing, and Flash Welded Rings

Solution heat treated.

3.2.1.1 Bars and Wire

3.2.1.1.1 All hexagons, regardless of size, other bars 2.75 inches (69.8 mm) and under in nominal diameter or least distance between parallel sides, and wire shall be cold finished.

3.2.1.1.2 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 and descaled.

3.2.1.1.3 Bars shall not be cut from plate (see 4.4.1.5).

3.2.1.2 Mechanical Tubing

Shall be cold finished.

3.2.1.3 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.

3.2.2 Stock for Forging or Flash Welded Rings

As ordered by the forging or flash welded ring manufacturer.

3.3 Properties

The product shall conform to the following requirements; hardness and tensile testing shall be performed in accordance with ASTM A370.

3.3.1 Tensile Properties

3.3.1.1 Bars and Forgings Over 0.50 Inch (12.7 mm) in Nominal Diameter or Least Distance Between Parallel Sides

Shall be as shown in Table 2.

Table 2 - Minimum tensile properties

Property	Value
Tensile Strength	70 ksi (483 MPa)
Yield Strength at 0.2% Offset	25 ksi (172 MPa)
Elongation in 4D	
Hot Finished	40%
Cold Finished	30%
Reduction of Area	
Hot Finished	50%
Cold Finished	40%

NOTE: Minimum tensile properties for bars and forgings have been taken directly from ASTM A276 and ASTM A473 and are not based on AMS Statistical Guidelines.

3.3.1.2 Wire shall have tensile strength not higher than 125 ksi (862 MPa).