



<b>AEROSPACE MATERIAL SPECIFICATION</b>	<b>AMS5631™</b>	<b>REV. G</b>
	Issued 1952-11 Reaffirmed 2012-04 Revised 2023-08  Superseding AMS5631F	
Steel, Corrosion-Resistant, Bars Forgings and Forging Stock 17Cr (0.60 - 0.75C) (440A) (Composition similar to UNS S44002)		

## RATIONALE

AMS5631G is the result of a Five-Year Review and update of the specification. The revision updates the title to match the scope, addresses composition reporting (see 3.1.1), reorganizes and updates response to heat treatment (see 3.3.2), and decarburization (see 3.3.1), updates quality requirements (see 3.4.1 and 8.4), prohibits unauthorized exceptions (see 3.6 and 8.5), and addresses forging properties (see 4.4.4).

### 1. SCOPE

#### 1.1 Form

This specification covers a corrosion-resistant steel in the form of bars, forgings, and forging stock.

#### 1.2 Application

These products have been used typically for parts requiring hardness up to 55 HRC and resistance to wear, corrosion, and oxidation, 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](http://www.sae.org).

- AMS2241 Tolerances, Corrosion- and Heat-Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
- AMS2248 Chemical Check Analysis Limits, Corrosion- and Heat-Resistant Steels and Alloys, Maraging and Other Highly Alloyed Steels, and Iron Alloys
- AMS2371 Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock

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](mailto:CustomerService@sae.org)  
<http://www.sae.org>

SAE WEB ADDRESS:

**For more information on this standard, visit**  
<https://www.sae.org/standards/content/AMS5631G>

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
AS1182	Standard Stock Removal Allowance, Aircraft-Quality and Premium Aircraft-Quality Steel, Bars and Mechanical Tubing
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](http://www.astm.org).

ASTM A370	Mechanical Testing of Steel Products
ASTM A751	Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
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 E1077	Estimating the Depth of Decarburization of Steel Specimens

## 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 ASTM A751 or by other analytical methods acceptable to the purchaser.

**Table 1 - Composition**

Element	Min	Max
Carbon	0.60	0.75
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	16.00	18.00
Nickel	--	0.75
Molybdenum	--	0.75
Copper	--	0.50

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 AMS2248.

## 3.2 Condition

The product shall be supplied in the following condition:

### 3.2.1 Bars

Shall have hardness not higher than 241 HBW, or equivalent (see 8.2), determined in accordance with ASTM A370.

#### 3.2.1.1 All Hexagons, and Bars 2.750 Inches (69.85 mm) and Under in Nominal Diameter or Least Distance Between Parallel Sides

Cold finished.

#### 3.2.1.2 Bars, Other Than Hexagons, Over 2.750 Inches (69.85 mm) in Nominal Diameter or Least Distance Between Parallel Sides

Hot finished and descaled, or cold finished.

#### 3.2.1.3 Bars shall not be cut from plate (see 4.4.3).

### 3.2.2 Forgings

As ordered.

### 3.2.3 Forging Stock

As ordered by the forging manufacturer.

## 3.3 Properties

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

### 3.3.1 Decarburization

#### 3.3.1.1 Bars ordered ground, turned, or polished shall be free from decarburization on the ground, turned, or polished surfaces.

#### 3.3.1.2 Allowable decarburization of bars and billets ordered for redrawing or forging or to specified microstructural requirements shall be as agreed upon by the purchaser and producer.

#### 3.3.1.3 Decarburization of bars to which 3.3.2.1 or 3.3.2.2 is not applicable shall be not greater than shown in Table 2.