



# AEROSPACE MATERIAL SPECIFICATION

**AMS6278™****REV. G**

Issued 1985-10  
Reaffirmed 1995-05  
Revised 2026-07

Superseding AMS6278F

(R) Steel, Bars, Forgings, Mechanical Tubing, and Forging Stock,  
4.1Cr - 3.4Ni - 4.2Mo - 1.2V (0.11 - 0.15C) (M50 NIL),  
Premium Aircraft-Quality for Bearing Applications,  
Double Vacuum Melted  
(Composition similar to UNS K91231)

## RATIONALE

AMS6278G is the result of a Five-Year Review and update of the specification. The revision updates the Title to match the Scope and add the trade name (see 8.7), adds composition reporting information (see 3.1.1), clarifies heat-treatment requirements and adds pyrometry controls (see 3.4.4), revises decarburization test methods (see 3.4.5.5), removes distribution requirements (see 3.7 Rev. F), clarifies heat and lot requirements (see 4.2.1), updates sampling and reporting requirements based on heat and lot clarification (see 4.3.3, 4.3.3.1, 4.4.1, and 4.4.3), updates bar from plate reporting (see 4.4.2), adds guidance on bar stock ordering (see 8.5), and adds forging stock and macrostructure ordering information (see 4.4.3 and 8.8).

## 1. SCOPE

### 1.1 Form

This specification covers a premium aircraft-quality, low-alloy steel in the form of bars, forgings, mechanical tubing, and forging stock.

### 1.2 Application

These products have been used typically for critical carburized parts, such as bearings, operating under heavy loads and high speeds at moderate temperatures and subject to very rigid inspection standards, 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 © 2026 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: 1-877-606-7323 (U.S. and Canada only)  
Tel: 1-724-776-4970 (outside U.S. and Canada)  
Fax: 724-776-0790  
Email: CustomerService@sae.org  
http://www.sae.org

SAE WEB ADDRESS:

Full document details: SAE AMS6278G

For more information on this standard, visit  
<https://www.sae.org/standards/content/AMS6278G/>

Documents

Standard Sharing Hub

## 2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 1-877-606-7323 (U.S. and Canada only) or 1-724-776-4970 (outside U.S. and Canada), [www.sae.org](http://www.sae.org).

|         |                                                                                                                                            |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------|
| AMS2251 | Tolerances, Low-Alloy Steel Bars                                                                                                           |
| AMS2253 | Tolerances, Carbon and Alloy Steel Tubing                                                                                                  |
| AMS2259 | Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels                                                                        |
| AMS2300 | Steel Cleanliness, Premium Aircraft-Quality, Magnetic Particle Inspection Procedure                                                        |
| AMS2370 | Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Wrought Products and Forging Stock                                      |
| AMS2372 | Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Forgings                                                                |
| 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                                                                                              |
| 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](http://www.astm.org).

|            |                                                                                                                                                                                               |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ASTM A370  | Mechanical Testing of Steel Products                                                                                                                                                          |
| ASTM A604  | Macroetch Testing of Consumable Electrode Remelted Steel Bars and Billets                                                                                                                     |
| ASTM A751  | Chemical Analysis of Steel Products                                                                                                                                                           |
| ASTM E45   | Determining the Inclusion Content of Steel                                                                                                                                                    |
| ASTM E112  | Determining Average Grain Size                                                                                                                                                                |
| 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

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     | 0.11 | 0.15  |
| Manganese  | 0.15 | 0.35  |
| Silicon    | 0.10 | 0.25  |
| Phosphorus | --   | 0.015 |
| Sulfur     | --   | 0.010 |
| Chromium   | 4.00 | 4.25  |
| Nickel     | 3.20 | 3.60  |
| Molybdenum | 4.00 | 4.50  |
| Vanadium   | 1.13 | 1.33  |
| Cobalt     | --   | 0.25  |
| Tungsten   | --   | 0.15  |
| Copper     | --   | 0.10  |

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 AMS2259.

#### 3.2 Melting Practice

Steel shall be double vacuum melted, using vacuum induction melting followed by vacuum consumable electrode remelting (VAR).

#### 3.3 Condition

The product shall be supplied in the following condition; hardness and tensile strength shall be determined in accordance with ASTM A370:

##### 3.3.1 Bars

Bar shall not be cut from plate (see 4.4.2).

3.3.1.1 Bars 0.500 inch (12.70 mm) and under in nominal diameter or least distance between parallel sides shall be cold finished, having tensile strength not higher than 125 ksi (862 MPa) or hardness not higher than 27 HRC, or equivalent (see 8.2).

3.3.1.2 Bars over 0.500 inch (12.70 mm) in nominal diameter or least distance between parallel sides shall be hot finished and annealed, unless otherwise ordered, having hardness not higher than 255 HBW, or equivalent (see 8.2). Bars ordered cold finished may have hardness as high as 269 HBW, or equivalent (see 8.2).

##### 3.3.2 Forgings

Forgings shall be as ordered.