



AEROSPACE MATERIAL SPECIFICATION

AMS6270™

REV. R

Issued	1942-09
Reaffirmed	2006-02
Revised	2018-08

Superseding AMS6270Q

Steel, Bars, Forgings, and Tubing
0.50Cr - 0.55Ni - 0.20Mo (0.13 - 0.18C) (SAE 8615)
(Composition similar to UNS G86150)

RATIONALE

AMS6270R results from a Five-Year Review and update of this specification that revises composition analytical methods (3.1), grain size determination (3.3.2), adds no unauthorized exceptions (3.6) and revises classification of tests (4.2), reporting (4.4) and identification 5.2).

1. SCOPE

1.1 Form

This specification covers an 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 carburized parts which require low minimum core hardness and allow wide hardness range in sections 0.375 inch (9.52 mm) and under in nominal thickness, but usage is not limited to such applications. The core should be machinable after hardening.

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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.

AMS2251 Tolerances, Low-Alloy Steel Bars

AMS2253 Tolerances, Carbon and Alloy Steel Tubing

AMS2259 Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels

SAE Technical Standards Board 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 © 2018 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:

SAE values your input. To provide feedback on this
Technical Report, please visit
<http://standards.sae.org/AMS6270R>

AMS2301	Steel Cleanliness, 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
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 A255	Determining Hardenability of Steel
ASTM A370	Mechanical Testing of Steel Products
ASTM A751	Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
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 E381	Macroetch Testing Steel Bars, Billets, Blooms, and Forgings

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	0.13	0.18
Manganese	0.70	0.90
Silicon	0.15	0.35
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	0.40	0.60
Nickel	0.40	0.70
Molybdenum	0.15	0.25
Copper	--	0.35

3.1.1 Aluminum, vanadium and columbium are optional grain refining elements and need not be determined or reported unless used to satisfy the average grain size requirements of 3.3.2.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2259.

3.2 Condition

The product shall be supplied in the following condition unless another condition is authorized by purchaser; hardness and tensile strength shall be determined in accordance with ASTM A370.

3.2.1 Bars

3.2.1.1 Bars 0.500 Inch (12.70 mm) and Under in Nominal Diameter or Least Distance Between Parallel Sides

Cold finished having tensile strength not higher than 130 ksi (896 MPa) or equivalent hardness (see 8.2).

3.2.1.2 Bars Over 0.500 Inch (12.70 mm) in Nominal Diameter or Least Distance Between Parallel Sides

Hot finished, unless otherwise ordered, having hardness not higher than 229 HB, or equivalent (see 8.3). Bars ordered cold finished may have hardness as 248 HB, or equivalent (see 8.3).

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

3.2.2 Forgings

As ordered.

3.2.3 Mechanical Tubing

Cold finished, unless otherwise ordered, having hardness not higher than 25 HRC, or equivalent (see 8.3). Tubing ordered hot finished shall have hardness not higher than 99 HRB, or equivalent (see 8.3).

3.2.4 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 Macrostructure

Visual examination of transverse full cross-sections from bars, billets, tube rounds, and forging stock, etched in hot hydrochloric acid in accordance with ASTM E381, shall not show pipe or cracks. Porosity, segregation, inclusions, and other imperfections shall be no worse than the macrographs of ASTM E381 shown in Table 2.

Table 2 - Macrostructure limits

Cross Sectional Area Square Inches	Cross Sectional Area Square Centimeters	Macrographs
Up to 36, incl	Up to 232, incl	S2 - R1 - C2
Over 36 to 133, incl	Over 232 to 858, incl	S2 - R2 - C3
Over 133	Over 858	Note 1

NOTE 1: Limits for larger sizes shall be agreed upon by purchaser and producer. The purchaser shall have written approval of the agreement from the cognizant engineering organization.

3.3.1.1 Macrostructure examination is not required for hollow tubes that are produced directly from ingots or blooms unless specified by purchaser, in which case the purchaser shall specify standards to be used.