AEROSPACE MATERIAL SPECIFICATION

AMS6490™ REV. J

Issued 1963-07
Revised 2018-11

Superseding AMS6490H

Steel Bars, Forgings, and Tubing
4.0Cr - 4.2Mo - 1.0V (0.77 - 0.85C) (M-50)
Premium Aircraft-Quality for Bearing Applications
Consumable Electrode Vacuum Melted
(Composition similar to UNS T11350)

RATIONALE

AMS6490J results from a Five-Year Review and update of this specification that revises composition analytical methods (3.1), adds tubing macroetch allowance (3.4.1.1), revises decarburization testing (3.4.5) and quality (3.5.2), prohibits unauthorized exceptions (3.7), and revises reporting (4.5) and identification (5.2.1).

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 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.

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
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://standards.sae.org/AMS6490J

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

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

AMS2375 Control of Forgings Requiring First Article Approval

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 A370 Mechanical Testing of Steel Products

ASTM A604 Macroetch Testing of Consumable Electrode Remelted Steel Bars and Billets

ASTM A751 Standard Test Methods, Practices, and Terminology for 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 E384 Microindentation Hardness of Materials

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	0.77	0.85
Manganese	--	0.35
Silicon	--	0.25
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	3.75	4.25
Molybdenum	4.00	4.50
Vanadium	0.90	1.10
Nickel	--	0.15
Cobalt	--	0.25
Tungsten	--	0.25
Copper	--	0.10

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2259.

3.2 Melting Practice

Steel shall be multiple melted using consumable electrode vacuum process in the remelt cycle.

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 (also see 4.5.2).

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

Cold finished and spheroidized annealed, having tensile strength not higher than 120.0 ksi (825 MPa), or equivalent hardness (see 8.2).

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

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

3.3.2 Forgings

As ordered.

3.3.3 Mechanical Tubing

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

3.3.4 Forging Stock

As ordered by the forging manufacturer.