



AEROSPACE MATERIAL SPECIFICATION

AMS6425™**REV. G**

Issued 1989-07
Reaffirmed 2006-07
Revised 2026-06

Superseding AMS6425F

(R) Steel, Bars, Forgings, Mechanical Tubing, and Forging Stock,
1.4Mn - 1.5Si - 0.30Cr - 1.8Ni - 0.40Mo (0.23 - 0.28C) (HY-TUF),
Premium Aircraft-Quality,
Consumable Electrode Vacuum Melted
(Composition similar to UNS K32550)

RATIONALE

AMS6425G 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 material quality and trade name (see 8.7), adds composition reporting (see 3.1.1), updates macrostructure (see 3.4.1 and 8.10), revises decarburization testing (see 3.4.3.5), adds pyrometry (see 3.4.4), updates tensile test requirements (see 3.4.4.3), adds invalidity requirements for fracture toughness testing (see 3.4.4.5.2.1), directs MMPDS participation (see 3.7 and 8.9), clarifies bar reporting (see 4.4.2), notes stock removal (see 8.6), and adds exception requirements (1.1, 3.4.4.4, 4.4.4, and 8.5).

1. SCOPE

1.1 Form

This specification covers a premium aircraft-quality, low-alloy steel in the form of bars, forgings, and mechanical tubing 225 square inches (1452 cm²) and under in cross-sectional area and forging stock of any size.

1.2 Application

These products have been used typically for parts requiring a through-hardening steel capable of developing a combination of high tensile strength, ductility, and fracture toughness, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking after heat treatment; ARP1110 recommends practices to minimize such conditions.

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.

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Documents

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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.

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
AMS2310	Qualification Sampling and Testing of Steels for Transverse Tensile Properties
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
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
ARP1110	Minimizing Stress Corrosion Cracking in Wrought Forms of Steels and Corrosion-Resistant Steels and Alloys
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.

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 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 E399	Plane-Strain Fracture Toughness of Metallic Materials
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	0.23	0.28
Manganese	1.20	1.50
Silicon	1.30	1.70
Phosphorus	--	0.010
Sulfur	--	0.010
Chromium	0.20	0.40
Nickel	1.65	2.00
Molybdenum	0.35	0.45
Copper	--	0.35

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, except that check analysis limits for carbon shall apply to over maximum only.

3.2 Melting Practice

Steel shall be multiple melted using consumable electrode vacuum practice in the remelt cycles.

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.

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 145 ksi (1000 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 shall be hot finished, unless otherwise ordered, annealed or normalized, and tempered if necessary having hardness not higher than 293 HBW, or equivalent (see 8.3). Bars ordered cold finished may have hardness as high as 311 HBW, or equivalent.

3.3.2 Forgings

Forgings shall be normalized and tempered having hardness not higher than 311 HBW, or equivalent (see 8.3).

3.3.3 Mechanical Tubing

Mechanical tubing shall be cold finished, unless otherwise ordered, having hardness not higher than 32 HRC, or equivalent (see 8.3). Tubing ordered hot finished and annealed shall have hardness not higher than 31 HRC, or equivalent.