



AEROSPACE MATERIAL SPECIFICATION

AMS6516™**REV. C**Issued 2011-07
Revised 2021-11

Superseding AMS6516B

Steel, Bars and Forgings and Forging Stock
1Cr - 10Ni - 7Co - 2Mo - 1.3W - 0.1V - (0.28 - 0.32C)
Vacuum Induction Melted, Vacuum Arc Remelted, Normalized and Annealed
Precipitation Hardenable
(Composition similar to UNS K91973)

RATIONALE

AMS6516C is the result of a Five-Year review and update of the specification. The revision updates the title to match the scope, updates the prohibition on substitutions (3.9, 8.6, 8.8), adopts new chemical testing standard (3.1), incorporates AS6279 as a requirement (3.8), adds additional notes on AS1182 (8.5), and allows prior revisions (8.7).

1. SCOPE

1.1 Form

This specification covers a premium aircraft-quality alloy steel in the form of bars and forgings 189 in² (1219 cm²) and under in cross-sectional area and forging stock of any size.

1.2 Application

These products have been used typically for heat treated parts requiring a combination of high strength, high toughness, and weldability, 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.

AMS2251	Tolerances, Low-Alloy Steel Bars
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

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For more information on this standard, visit
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Documents
Document Sharing Hub

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
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
AS6279	Standard Practice for Production, Distribution, and Procurement of Metal Stock

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 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 E399	Plane-Strain Fracture Toughness of Metallic 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	0.28	0.32
Manganese	--	0.1
Silicon	--	0.1
Phosphorus	--	0.008
Sulfur	--	0.006
Chromium	0.7	1.3
Nickel	9.5	10.5
Cobalt	6.6	7.4
Molybdenum	1.8	2.2
Tungsten	1.1	1.5
Titanium	--	0.045
Aluminum	--	0.01
Vanadium	0.04	0.16
Oxygen	--	0.0020 (20 ppm)
Nitrogen	--	0.0015 (15 ppm)

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2259.

3.2 Melting Practice

Steel shall be multiple melted using vacuum induction melting followed by vacuum arc remelting.

3.3 Condition

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

3.3.1 Bars

Normalized and annealed, having hardness not higher than 429 HB or equivalent (see 8.2), and ground or turned. Bar shall not be cut from plate (also see 4.4.2).

3.3.2 Forgings

Normalized and annealed, having hardness not higher than 429 HB or equivalent (see 8.2), and descaled.

3.3.3 Forging Stock

As ordered by the forging manufacturer.

3.4 Heat Treatment

Shall conform to the following:

3.4.1 Bars and Forgings

Shall be normalized by heating to 1965 °F ± 25 °F (1074 °C ± 14 °C) for a time commensurate with section thickness, 60 minutes minimum, and cooling in air to room temperature, and annealed by heating to between 1155 °F and 1255 °F (624 °C and 679 °C), holding at heat for 8 hours minimum, and air cooled. Pyrometry shall be in accordance with AMS2750.

3.4.2 Forging Stock

As ordered by the forging manufacturer.