



AEROSPACE MATERIAL SPECIFICATION

AMS6523™**REV. J**Issued 1970-11
Revised 2022-11

Superseding AMS6523H

Steel, Sheet, Strip, and Plate
0.75Cr - 9.0Ni - 4.5Co - 1.0Mo - 0.09V (0.17 - 0.23C)
Vacuum Consumable Electrode Melted, Annealed
(Composition similar to UNS K91472)

RATIONALE

AMS6523J is the result of a Five-Year Review and update of this specification. The revision prohibits unauthorized exceptions (3.8, 4.4.1, 5.1.1, 8.7), updates composition testing and reporting (3.1, 3.1.1), includes continuous heat treatment (3.4.1.1), incorporates updates to decarburization test methods (3.5.4), updates response to heat treatment requirements (3.5.5), adds strain rate (3.5.5.2), incorporates grain size options (4.2.1, 4.2.2, 4.4, 8.7), addresses cleanliness (4.4, 8.8), and allows prior revisions (8.6).

1. SCOPE

1.1 Form

This specification covers a premium aircraft-quality, low-alloy steel in the form of sheet, strip, and plate.

1.2 Application

These products have been used typically for parts requiring through-hardening to high strength and toughness levels and where such parts may require welding during fabrication, but usage is not limited to such applications.

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.

AMS2252 Tolerances, Low-Alloy Steel Sheet, Strip, and Plate

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

AMS2300 Steel Cleanliness, Premium Aircraft-Quality Magnetic Particle Inspection Procedure

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Documents

Document Sharing Hub

AMS2370	Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel, Wrought Products and Forging Stock
AMS2750	Pyrometry
AMS2807	Identification, Carbon and Low-Alloy Steels, Corrosion and Heat-Resistant Steels and Alloys Sheet, Strip, Plate, and Aircraft 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 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
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

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	0.17	0.23
Manganese	0.20	0.40
Silicon	--	0.20
Phosphorus	--	0.010
Sulfur	--	0.010
Chromium	0.65	0.85
Nickel	8.50	9.50
Cobalt	4.25	4.75
Molybdenum	0.90	1.10
Vanadium	0.06	0.12
Copper	--	0.35

3.1.1 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 multiple melted using vacuum consumable electrode practice in the remelt cycle.

3.3 Condition

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

3.3.1 Sheet and Strip

Cold finished, bright or atmosphere annealed, and descaled if necessary; or hot rolled, annealed, and descaled having hardness not higher than 36 HRC, or equivalent (see 8.2).

3.3.2 Plate

Hot rolled, annealed, and descaled having hardness not higher than 36 HRC, or equivalent (see 8.2).

3.3.2.1 If allowed by the purchaser, cold rolled, annealed, and descaled having hardness not higher than 36 HRC, or equivalent (see 8.2).

3.3.3 When normalized and tempered product is ordered, hardness shall be not higher than 40 HRC, or equivalent (see 8.2).

3.4 Heat Treatment

Shall be as follows; pyrometry shall be in accordance with AMS2750:

3.4.1 Annealing

Product shall be annealed by heating to 1250 °F ± 25 °F (677 °C ± 14 °C), holding at heat for 4 hours ± 0.25 hour, air cooling to room temperature, reheating to 1150 °F ± 25 °F (621 °C ± 14 °C), holding at heat for 8 hours ± 0.25 hour, and cooling in air to room temperature.

3.4.1.1 Continuous Heat Treatment

When continuous heat treating is used process parameters (e.g., furnace temperature set points, heat input, travel rate, etc.) for continuous heat treating lines shall be established by the material producer and validated by testing of product to the requirements of 3.3 and 3.5.

3.4.2 Normalizing

When specified by purchaser, product shall be normalized prior to annealing by heating to 1650 °F ± 25 °F (899 °C ± 14 °C), holding at heat for not less than 1 h/in (25 mm) of maximum thickness, but not less than 1 hour, and cooling in air to room temperature.