



AEROSPACE MATERIAL SPECIFICATION

AMS6385™**REV. M**

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Superseding AMS6385L

Steel Sheet, Strip, and Plate, Low Alloy, Heat-Resistant
0.65Si - 1.25Cr - 0.50Mo - 0.25V (0.27 - 0.33C) [17-22A(S)]
Aircraft Quality
(Composition similar to UNS K23015)

RATIONALE

AMS6385M is the result of a Five-Year Review and update of the specification. The revision updates the Title to add the common name and material quality, adds composition reporting requirements (see 3.1.1), clarifies descaling requirements (see 3.2.2 and 3.2.2.1), standardizes bend test requirements (see 3.3.4), updates decarburization test methods (see 3.3.3), adds pyrometry (see 3.3.5), adds strain rate requirements for tensile testing (see 3.3.5.1.1.1), updates wording to acknowledge changes in AMS2301 (see 4.2.1 and 4.4.3), and updates the prohibition on exceptions requirements (see Table 2, 4.4.2, and 8.5).

1. SCOPE

1.1 Form

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

1.2 Application

This material has been used typically for parts requiring strength up to 1000 °F (538 °C), 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.

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

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

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Documents

Standard, visit Sharing Hub

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
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 A751	Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
ASTM E21	Elevated Temperature Tension Tests of Metallic Materials
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 E290	Bend Test of Materials for Ductility
ASTM E381	Macroetch Testing, Steel, Bars, Billets, Blooms, and Forgings
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 following 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	0.27	0.33
Manganese	0.45	0.65
Silicon	0.55	0.75
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	1.00	1.50
Molybdenum	0.40	0.60
Vanadium	0.20	0.30
Nickel	--	0.25
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.

3.2 Condition

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

3.2.1 Sheet and Strip

Sheet and strip shall be cold finished, bright or atmosphere annealed, subcritically annealed or normalized, and descaled if necessary, having hardness not higher than 98 HRB, or equivalent (see 8.2).

3.2.2 Plate

Plate shall be hot rolled, annealed, subcritically annealed or normalized, and descaled if necessary, having hardness not higher than 24 HRC, or equivalent (see 8.2).

3.2.2.1 If allowed by the purchaser, cold rolled, annealed, subcritically annealed or normalized, and descaled, if necessary, having hardness not higher than 24 HRC, or equivalent (see 8.2).

3.3 Properties

The product shall conform to the following requirements; hardness, tensile, and bend testing shall be performed in accordance with ASTM A370 except as specified in 3.3.5.1.2:

3.3.1 Macrostructure

Visual examination of transverse full cross sections from finished slab or billet or suitable rerolled product, etched in hot hydrochloric acid in accordance with ASTM E381, shall show no pipes 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

Section Size Square Inches	Section Size 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	(1)

(1) Limits for larger sizes shall be agreed upon by the purchaser and producer.

3.3.2 Average Grain Size

Average grain size shall be ASTM No. 5 or finer, determined in accordance with ASTM E112 (see 8.4).

3.3.3 Decarburization

Decarburization shall be evaluated by one of the methods of 3.3.3.1 or 3.3.3.2.

3.3.3.1 Metallographic (Microscopic) Method

A cross section taken perpendicular to the surface shall be prepared in accordance with ASTM E1077 and examined metallographically at a magnification not to exceed 200X. The sample shall not show a layer of complete (ferrite) or partial decarburization exceeding the limits of Table 3.