AEROSPACE MATERIAL SPECIFICATION

AMS6358™	REV. L
Issued 1943-10 Revised 2020-09 Superseding AMS6358K	

Steel Sheet, Strip, and Plate
0.50Cr - 0.55Ni - 0.25Mo (0.38 - 0.43C) (SAE 8740)
(Composition similar to UNS G87400)

RATIONALE

AMS6358L is a Five-Year Review and update of this specification that revises composition analytical methods (3.1), decarburization methods, and Tables (3.3.3), prohibits unauthorized exceptions (3.6), and revises reporting (4.4.2) and marking (5.1).

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

These products have been used typically for heat treated parts requiring through-hardening to minimum tensile strength of 200 ksi (1380 MPa) in section thickness up to 0.375 inch (9.50 mm) and proportionately lower strength in heavier thicknesses, 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

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

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**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS6358L/

AMS2807 Identification, Carbon and Low-Alloy Steels, Corrosion and Heat-Resistant Steels and Alloys Sheet, Strip, Plate, and Aircraft Tubing

ARP1917 Clarification of 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 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 Testing of Material for Ductility

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 other analytical methods approved by purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.38	0.43
Manganese	0.75	1.00
Silicon	0.15	0.35
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	0.40	0.60
Nickel	0.40	0.70
Molybdenum	0.20	0.30
Copper	--	0.35

3.1.1 Aluminum, vanadium, and columbium are optional grain refining elements and need not be determined or reported unless used to satisfy the average grain size requirements of 3.3.1.2.

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

Cold finished, bright or atmosphere annealed, sub-critically annealed or normalized and descaled if necessary, or hot rolled, annealed if necessary, and descaled having hardness not higher than 98 HRB, or equivalent (see 8.2).

3.2.2 Plate

Hot rolled, annealed, sub-critically annealed, or normalized if necessary, and descaled having hardness not higher than 24 HRC, or equivalent (see 8.2).

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

3.3 Properties

The product shall conform to the following requirements; hardness shall be performed in accordance with ASTM A370:

3.3.1 Average Grain Size

Average grain size shall be determined by either 3.3.1.1 or 3.3.1.2.

3.3.1.1 Shall be ASTM No. 5 or finer, determined in accordance with ASTM E112.

3.3.1.2 The product of a heat shall be considered to have an ASTM No. 5 or finer austenitic grain size if one or more of the following are determined by heat analysis (see 8.5):

3.3.1.2.1 A total aluminum content of 0.020 to 0.050%.

3.3.1.2.2 An acid soluble aluminum content of 0.015 to 0.050%.

3.3.1.2.3 A vanadium content of 0.02 to 0.08%.

3.3.1.2.4 A columbium content of 0.02 to 0.05%.

3.3.2 Response to Heat Treatment

Product 0.499 inch (12.67 mm) and under in nominal thickness shall have tensile strength not lower than 125 ksi (862 MPa) or hardness not lower than 26 HRC, or equivalent (see 8.2), after being heated to 1525 °F ± 10 °F (829 °C ± 6 °C), held at heat for 15 to 30 minutes, quenched in oil, tempered by heating to 1000 °F ± 10 °F (538 °C ± 6 °C), holding at heat for not less than 30 minutes, and cooling in air.

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 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 100X. The product shall not show a layer of complete (ferrite) or partial decarburization exceeding the limits of Table 2.

3.3.3.2 Hardness Traverse Method

The total depth of decarburization shall be determined by a traverse method using microindentation hardness testing in accordance with ASTM E384 conducted on a hardened but untempered specimen protected during heat treatment to prevent changes in surface carbon content. Tempering is generally not recommended, but if tempered, the tempering temperature shall be not higher than 300 °F (149 °C). Depth of decarburization is defined as the perpendicular distance from the surface to the depth under that surface where there is not further increase in hardness. Such measurements shall be far enough away from any adjacent surface to be uninfluenced by any decarburization on the adjacent surface. Acceptance shall be as listed in Table 2.

3.3.3.3 When determining the depth of decarburization, it is permissible to disregard local areas provided the decarburization of such areas does not exceed the above limits by more than 0.005 inch (0.13 mm) and the width is 0.065 inch (1.65 mm) or less.

3.3.3.4 In the case of dispute, the total depth of decarburization determined using the microindentation hardness traverse method shall govern.

Table 2A - Maximum total depth of decarburization, inch/pound units

Nominal Thickness Inches	Total Depth of Decarburization Inches
Up to 0.500, incl	0.015
Over 0.500 to 1.000, incl	0.025
Over 1.000	0.035

Table 2B - Maximum total depth of decarburization, SI units

Nominal Thickness Millimeters	Total Depth of Decarburization Millimeters
Up to 12.70, incl	0.38
Over 12.70 to 25.40, incl	0.64
Over 25.40	0.89

3.3.4 Bending

Product 0.749 inch (19.02 mm) and under in nominal thickness shall be tested in accordance with ASTM E290 using a sample prepared nominally 0.75 inch (19.0 mm) in width with its axis of bending parallel to the direction of rolling and shall withstand without cracking when bending at room temperature through the angle and bend radius shown in Table 3. In case of dispute, the results of tests using the guided bend test of ASTM E290 shall govern.

Table 3 - Bend requirements

Nominal Thickness Inches	Nominal Thickness Millimeters	Bend Angle Degree	Bend Radius t = product thickness
Up to 0.249, incl	Up to 6.32, incl	180	1/2t
Over 0.249 to 0.749, incl	Over 6.32 to 19.02, incl	90	1/2t

3.4 Quality

The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the product.

3.4.1 Steel shall be aircraft-quality conforming to AMS2301.

3.5 Tolerances

In accordance with AMS2252.

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.2.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for producer's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.