AEROSPACE MATERIAL SPECIFICATION

AMS6455™	REV. M
Issued 1939-12 Revised 2021-11 Superseding AMS6455L	

Steel, Sheet, Strip, and Plate
0.95Cr - 0.22V (0.48 - 0.53C) (SAE 6150)
(Composition similar to UNS G61500)

RATIONALE

AMS6455M is the result of a Five-Year Review and update of the specification. The revision prohibits unauthorized exceptions (3.6, 4.4.2, 5.1.1, 8.6), updates composition testing (3.1), clarifies conditions (3.2.1, 3.2.2, 3.2.2.1), updates decarburization (3.3.2.1, 3.3.2.2), adds condition for jominy specimens (3.3.4), adds agreement on frequency and severity (3.4.1, 8.8), revises testing frequency per AMS2301 (4.2.1, 4.4, 4.4.1), and allows prior revisions (8.7).

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 parts requiring high hardness or spring properties, 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/AMS6455M

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 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 E1077 Estimating the Depth of Decarburization of Steel Specimens

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	0.48	0.53
Manganese	0.70	0.90
Silicon	0.15	0.35
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	0.80	1.10
Vanadium	0.15	0.30
Nickel	--	0.25
Copper	--	0.35

3.1.1 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, or hot rolled, annealed, and descaled.

3.2.2 Plate

Hot rolled, annealed, sub-critically annealed, or normalized and descaled.

3.2.2.1 If allowed by purchaser, cold rolled, annealed, sub-critically annealed, or normalized and descaled.

3.3 Properties

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

3.3.1 Average Grain Size

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

3.3.2 Decarburization of Each Lot

Decarburization shall be evaluated by one of the methods of 3.3.2.1 or 3.3.2.2.

3.3.2.1 Metallographic (Microscopic) Method

A cross section taken perpendicular to the surface shall be prepared in accordance with ASTM E1077, etched, 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.

3.3.2.2 Hardness Traverse (Microindentation) Method

The total depth of decarburization shall be determined by a traverse method using microindentation hardness testing in accordance with ASTM E1077. Samples shall be hardened, but untempered and protected during heat treatment to prevent changes in surface carbon content. 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.

Table 2A - Maximum 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 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

3.3.2.3 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.

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

3.3.3 Bending of Each Lot

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 Degrees	Bend Radius t = nominal 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

3.3.4 Hardenability of Each Heat

Shall be J 6/16 inch (9.5 mm) = 53 HRC minimum and J 8/16 inch (12.7 mm) = 47 HRC minimum, determined on the standard end-quench test specimen in accordance with ASTM A255 except that the steel shall be normalized at 1700 °F ± 10 °F (927 °C ± 6 °C) and the test specimen austenitized at 1550 °F ± 10 °F (843 °C ± 6 °C). Cast specimens do not need to be normalized.

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. The frequency and severity rating for sheet and strip shall be as agreed by purchaser and producer.

3.5 Tolerances

Shall be 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.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (3.1), decarburization (3.3.2), bending (3.3.3), hardenability (3.3.4), frequency-severity cleanliness rating (3.4.1), and tolerances (3.5) are acceptance tests and shall be performed on each heat or lot as applicable. If process qualification in accordance with AMS2301 has been met, the frequency-severity cleanliness rating shall be conducted on a periodic basis as defined in AMS2301.

4.2.2 Periodic Tests

Average grain size (3.3.1) is a periodic test and shall be performed at a frequency selected by the producer unless frequency of testing is specified by purchaser.