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# AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard



**AMS 6455G**

Issued DEC 1939  
Revised OCT 1993  
Reaffirmed JAN 1999

Superseding AMS 6455F

Steel, Sheet, Strip, and Plate  
0.95Cr - 0.22V (0.48 - 0.53C) (SAE 6150)

UNS G61500

## FOREWORD

Changes in this Reaffirm are format/editorial only.

### 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 following publications form a part of this specification 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.

#### 2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

|          |   |
|----------|---|
| AMS 2252 | Tolerances, Low-Alloy Steel Sheet, Strip, and Plate   |
| MAM 2252 | Tolerances, Metric, Low-Alloy Steel Sheet, Strip, and Plate   |
| AMS 2259 | Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels   |
| AMS 2301 | Aircraft Quality Steel Cleanliness, Magnetic Particle Inspection Procedure  |
| AMS 2370 | Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Wrought Products and Forging Stock                                 |
| AMS 2807 | Identification, Carbon and Low-Alloy Steels, Corrosion and Heat Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing |

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## 2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor, West Conshohocken, PA 19428-2959.

ASTM A 370 Mechanical Testing of Steel Products

ASTM E 112 Determining the Average Grain Size

ASTM E 350 Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

## 2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage

## 3. TECHNICAL REQUIREMENTS:

### 3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 350, by spectrochemical methods, 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 AMS 2259.

### 3.2 Condition:

Cold rolled and bright annealed or hot rolled, annealed if necessary, and descaled.

### 3.3 Properties:

The product shall conform to the following requirements; hardness and bend testing shall be performed in accordance with ASTM A 370:

3.3.1 Grain Size: Shall be ASTM No. 5 or finer, determined in accordance with ASTM E 112 (see 8.2).

#### 3.3.2 Decarburization:

3.3.2.1 Product Under 0.025 Inch (0.64 mm) in Nominal Thickness: The method of test and the allowance shall be as agreed upon by purchaser and vendor.

3.3.2.2 Product 0.025 to 0.375 Inch (0.64 to 9.52 mm), Excl, in Nominal Thickness:

3.3.2.2.1 Specimens: Shall be the full thickness of the product except that specimens from plate 0.250 inch (6.35 mm) and over in nominal thickness shall be slices approximately 0.250 inch (6.35 mm) thick cut parallel to and preserving one original surface of the plate. Recommended specimen size is 1 x 4 inches (25 x 102 mm).

3.3.2.2.2 Procedure: Specimens shall be hardened by austenitizing and quenching; preferably they shall not be tempered but, if tempered, the tempering temperature shall be not higher than 300 °F (149 °C). During heat treatment, specimens shall be protected by suitable atmosphere or medium or by suitable plating to prevent carburization or further decarburization. Protective plating, if used, shall then be removed from specimens of product 0.025 to 0.250 inch (0.64 to 6.35 mm), exclusive, in nominal thickness and a portion of the specimen shall be ground to a depth of 0.050 inch (1.27 mm) or one-half thickness, whichever is less. Specimens from product 0.250 to 0.375 inch (6.35 to 9.52 mm) excl, in nominal thickness shall be ground to remove 0.020 inch (0.51 mm) of metal from the original surface of the plate and a portion of the specimen shall be further ground to a depth of at least one-third the original thickness of the specimen. At least three Rockwell hardness readings shall be taken on each prepared step and each group of readings averaged.

3.3.2.2.3 Allowance:

3.3.2.2.3.1 Product 0.025 to 0.250 Inch (0.64 to 6.35 mm), Exclusive, in Nominal Thickness: The product shall show no layer of complete decarburization, determined microscopically at a magnification not exceeding 100X. It shall also be free from partial decarburization to the extent that the difference in hardness between the original surface and the portion ground as in 3.3.2.2.2 shall be not greater than two units on the Rockwell "A" scale.

3.3.2.2.3.2 Product 0.250 to 0.375 Inch (6.35 to 9.52 mm), Exclusive, in Nominal Thickness: Shall be free from decarburization to the extent that the difference in hardness between the two prepared steps shall be not greater than three units on the Rockwell "A" scale.

- 3.3.2.3 Product 0.375 Inch (9.52 mm) and Over in Nominal Thickness: The total decarburization, determined microscopically at a magnification not exceeding 100X on the as-supplied plate, shall be not greater than shown in Table 2.

TABLE 2A - Maximum Decarburization, Inch/Pound Units

| Nominal Thickness<br>Inches | Depth of Decarburization<br>Inch |
|-----------------------------|----------------------------------|
| 0.375 to 0.500, incl        | 0.015                            |
| Over 0.500 to 1.000, incl   | 0.025                            |
| Over 1.000 to 2.000, incl   | 0.035                            |

TABLE 2B - Maximum Decarburization, SI Units

| Nominal Thickness<br>mm   | Depth of Decarburization<br>mm |
|---------------------------|--------------------------------|
| 9.52 to 12.70, incl       | 0.38                           |
| Over 12.70 to 25.40, incl | 0.64                           |
| Over 25.40 to 50.80, incl | 0.89                           |

- 3.3.3 Bending: The product shall withstand, without cracking, free bending through the angle indicated in Table 3 around a diameter equal to the nominal thickness of the product with axis of bend parallel to the direction of rolling.

TABLE 3 - Bending Parameters

| Nominal Thickness<br>Inches | Nominal Thickness<br>mm  | Bend Angle<br>Degrees |
|-----------------------------|--------------------------|-----------------------|
| Up to 0.249, incl           | Up to 6.32, incl         | 180                   |
| Over 0.249 to 0.749, incl   | Over 6.32 to 19.02, incl | 90                    |

#### 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 AMS 2301.

### 3.5 Tolerances:

Shall conform to all applicable requirements of AMS 2252 or MAM 2252.

## 4. QUALITY ASSURANCE PROVISIONS:

### 4.1 Responsibility for Inspection:

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

### 4.2 Classification of Tests:

Tests for all technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

### 4.3 Sampling and Testing:

Shall be in accordance with AMS 2370.

### 4.4 Reports:

The vendor of the product shall furnish with each shipment a report showing the results of tests for chemical composition, grain size, and frequency-severity cleanliness rating of each heat and stating that the product conforms to the decarburization and bending requirements. This report shall include the purchase order number, heat and lot number, AMS 6455G, size, and quantity.

### 4.5 Resampling and Retesting:

Shall be in accordance with AMS 2370.

## 5. PREPARATION FOR DELIVERY:

### 5.1 Identification:

Shall be in accordance with AMS 2807.

### 5.2 Protective Treatment:

The product shall be oiled prior to shipment.