SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS5085 REV. H

Issued 1954-05
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Superseding AMS5085G

Steel Sheet, Strip, and Plate
0.48 - 0.55C (SAE 1050)
Annealed

(Composition similar to UNS G10500)

RATIONALE

AMS5085H results from a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers a carbon steel in the form of sheet, strip, and plate.

1.2 Application

These products have been used typically for stamped or formed parts that may subsequently be heat treated, 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 724-776-4970 (outside USA), www.sae.org.

AMS2232 Tolerances, Carbon Steel, Sheet, Strip, and Plate

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

AMS2370 Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Wrought Products and Forging Stock

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

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**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS5085H

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 A 370 Mechanical Testing of Steel Products

ASTM E 112 Determining Average Grain Size

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

ASTM E 384 Knoop and Vickers Hardness of Materials

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	0.55
Manganese	0.60	0.90
Silicon	0.15	0.30
Phosphorus	--	0.030
Sulfur	--	0.035

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 not higher than 85 HRB, or equivalent (See 8.2), determined in accordance with ASTM A 370:

3.2.1 Sheet and Strip

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

3.2.2 Plate

Hot rolled, annealed if necessary, and descaled.

3.2.2.1 If allowed by the purchaser, cold rolled, annealed if necessary, and descaled as necessary, having hardness not higher than 85 HRB, or equivalent (See 8.2).

3.3 Properties

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

3.3.1 Bending

The product shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to twice the nominal thickness of the product with axis of bend parallel to the direction of rolling.

3.3.2 Decarburization

Depending on the thickness of the product, decarburization may be measured by an HR30N hardness step test method, or by the microhardness traverse method. Additionally, the metallographic method shall be used, in part (3.3.2.4.1) to inspect product 0.025 to 0.250 inch (0.64 to 6.35 mm) thick, and it may be used to inspect product with thickness 0.375 inch (9.52 mm) and over.

3.3.2.1 In the case of dispute, the microhardness method, conducted in accordance with ASTM E 384, shall govern. The allowance for decarburization shall be as specified in 3.3.2.4.1 or 3.3.2.5.1.

3.3.2.2 Specimens

Shall be full thickness of the product except that specimens from plate 0.250 inch (6.35 mm) and over in nominal thickness may be sliced approximately 0.250 inch (6.35 mm) thick cut parallel to and preserving one original surface of the plate. Recommended minimum specimen size is 1 x 4 inches (25 x 102 mm). For product 0.025 to 0.250 inch (0.64 to 6.35 mm), a full cross section metallographic sample shall be prepared to inspect for presence of complete decarburization (ferrite).

3.3.2.3 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.

3.3.2.4 Product 0.025 to 0.250 Inch (0.64 to 6.35 mm), Exclusive, in Nominal Thickness

Protective plating, if used to prevent any decarburization during hardening, shall be removed, and a portion of the specimen shall be ground with copious coolant to prevent thermal or mechanical effects to a depth of 0.050 inch (1.27 mm) or one-half thickness, whichever is less.

3.3.2.4.1 Allowance

The product shall show no layer of complete decarburization (ferrite) determined metallographically at a magnification not exceeding 100X. It shall also be free from any partial decarburization to the extent that the difference in hardness between the original surface and the surface (depth) generated by grinding as in 3.3.2.4 shall not be greater than two units on the HRA scale, or equivalent (See 8.2). Also, refer to 3.3.2.1.

3.3.2.5 Product 0.250 to 0.375 Inch (6.35 to 9.52 mm), Exclusive, in Nominal Thickness

Specimens shall be ground to remove 0.010 inch (0.25 mm) of metal to create a test reference surface, and a portion of the specimen shall be further ground to a depth of at least one-third the original thickness of the specimen.

3.3.2.5.1 Allowance

Shall be free from decarburization to the extent that the difference in hardness between the two prepared steps shall not be greater than three units in the HRA scale, or equivalent (See 8.2). Also, refer to 3.3.2.1.

3.3.2.6 Product 0.375 Inch (9.52 mm) and Over in Nominal Thickness

3.3.2.6.1 Allowance

The total depth of the decarburization, determined metallographically at a magnification not exceeding 100X, on the as supplied plate, shall not be greater than that shown in Table 2. Also, refer to 3.3.2.1. The depth of decarburization shall be that defined as the perpendicular distance from the surface to the depth under that surface where there is no further increase in hardness.

TABLE 2A - MAXIMUM DEPTH OF DECARBURIZATION, INCH/POUND UNITS

Nominal Thickness Inches	Total Depth of Decarburization 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 DEPTH OF DECARBURIZATION, SI UNITS

Nominal Thickness Millimeters	Total Depth of Decarburization Millimeter
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 Average Grain Size

Shall be ASTM No. 5 or finer, determined in accordance with ASTM E 112.

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.

3.5 Tolerances

Shall conform to all applicable requirements of AMS2232.

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 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

All technical requirements are classified as acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing

Shall be in accordance with the AMS2370.