SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5085E

Issued MAY 1954
Revised DEC 1997

Superseding AMS 5085D

Submitted for recognition as an American National Standard

Steel Sheet, Strip, and Plate
0.47 - 0.55C (SAE 1050)
Annealed

UNS G10500

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 which may subsequently be heat treated, 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 2232	Tolerances, Carbon Steel Sheet, Strip, and Plate
MAM 2232	Tolerances, Metric, Carbon Steel Sheet, Strip, and Plate
AMS 2259	Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels
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

QUESTIONS REGARDING THIS DOCUMENT: (412) 772-7154 FAX: (412) 776-0243
TO PLACE A DOCUMENT ORDER: (412) 776-4970 FAX: (412) 776-0790

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, 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

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	0.47	0.55
Manganese	0.60	0.90
Silicon	0.10	0.35
Phosphorus	--	0.040
Sulfur	--	0.050

3.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2259.

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.

3.3 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:

3.3.2.1 Product Under 0.045 Inch (1.14 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 0.045 to 0.375 Inch (1.14 to 9.52 mm), Excl, in Nominal Thickness:

3.3.2.2.1 Specimens: Hardness/metallographic 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 may 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 0.045 to 0.250 inch (1.14 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), exclusive, 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 HRA 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 0.045 to 0.250 Inch (1.14 to 6.35 mm), Exclusive, in Nominal Thickness: The product shall show no layer of complete (ferritic) 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 HRA 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 HRA scale.

3.3.2.3 Product 0.375 Inch (9.52 mm) and Over in Nominal Thickness: The total depth of 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 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 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 (See 8.4).

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 AMS 2232 or MAM 2232.

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.