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400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 5046

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Revised

CARBON STEEL SHEET, STRIP, AND PLATE
(SAE 1020 and 1025)
Annealed

UNS G10200
UNS G10250

1. SCOPE:

1.1 Form: This specification covers two types of carbon steel in the form of sheet, strip, and plate.

1.2 Application: Primarily for use in fabrication of fittings. These products are not suitable for deep forming or cupping operations.

1.3 Classification: The steels covered by this specification are classified as follows:

Type 1 - 0.17 to 0.23 Carbon
Type 2 - 0.22 to 0.28 Carbon

1.3.1 Unless a specific type is ordered, either type may be supplied.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

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 2350 - Standards and Test Methods
AMS 2370 - Quality Assurance Sampling of Carbon and Low-Alloy Steels, Wrought Products Except Forgings and Forging Stock

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM A370 - Mechanical Testing of Steel Products
ASTM E112 - Determining Average Grain Size
ASTM E350 - Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Specifications:

MIL-H-6875 - Heat Treatment of Steel, Process for

2.3.2 Military Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E350 or by spectrographic or other analytical methods approved by purchaser:

	Type 1		Type 2	
	min	max	min	max
Carbon	0.17	0.23	0.22	0.28
Manganese	0.30	0.60	0.30	0.60
Phosphorus	--	0.040	--	0.040
Sulfur	--	0.050	--	0.050

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

3.2 Condition: The product shall be supplied in the following condition; annealing shall be performed in accordance with MIL-H-6875 as specified for alloy 1025 for both Type 1 and Type 2.

3.2.1 Sheet and Strip: Hot or cold rolled, annealed, and cold finished.

3.2.2 Plate: Hot rolled, annealed, and descaled.

3.3 Properties: The product shall conform to the following requirements; tensile and bend tests shall be performed in accordance with ASTM A370:

3.3.1 Tensile Properties: Shall be as follows:

Tensile Strength, min	55,000 psi (380 MPa)
Yield Strength at 0.2% Offset, min	36,000 psi (250 MPa)
Elongation in 2 in. (50 mm) or 4D, min	22%

3.3.1.1 For each 2,000 psi (15 MPa) in excess of 55,000 psi (380 MPa) tensile strength, a reduction in elongation of 1% to a minimum of 10% is permissible.

3.3.2 Bending: Sheet and strip shall withstand, without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to the nominal thickness of the product with axis of bend parallel to the direction of rolling.

3.3.2.1 Bending requirements for plate shall be as agreed upon by the purchaser and the vendor.

3.3.3 Grain Size: Shall be 5 or finer with occasional grains as large as 3 permissible, determined in accordance with ASTM E112.

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 performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. 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 to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling: Shall be in accordance with AMS 2370 and the following:

4.3.1 For direct U.S. Military procurement, sampling shall be in accordance with MIL-STD-105, Sampling for Normal Inspection, Special Inspection Level S-4, with an AQL of 1.5. The sample unit shall be one length of product.

4.3.2 When a statistical sampling plan and acceptance quality level (AQL) have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3 and the report of 4.4.1 shall state that such plan was used.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and the results of tests on each lot to determine conformance to the other technical requirements of this specification. This report shall include the purchase order number, AMS 5046, lot number, size, and quantity from each heat.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 5046, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification and shall include in the report either a statement that the material conforms or copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2370.

5. PREPARATION FOR DELIVERY:

5.1 Identification: The product shall be identified as in 5.1.1, unless purchaser permits a method from 5.1.2.

5.1.1 Each sheet, strip, and plate shall be marked on one face, in the respective location indicated below, with AMS 5046, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be legible, shall be applied using a suitable marking fluid, and shall be removable in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the product or its performance and shall be sufficiently stable to withstand normal handling. The specification number, manufacturer's identification, and nominal thickness shall be continuously line marked.

5.1.1.1 Flat Strip 6 In. (150 mm) and Under in Width: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 ft (900 mm).

5.1.1.2 Flat Sheet, Flat Strip Over 6 In. (150 mm) in Width, and Plate: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3 ft (900 mm), the rows being spaced not more than 6 in. (150 mm) apart and alternately staggered.

5.1.1.3 Coiled Sheet and Strip: Shall be marked near both the outside and inside ends of the coil. The markings shall be applied as in 5.1.1 or shall appear on a durable tag or label attached to the coil and marked with the information of 5.1.1. When the product is wound on cores, the tag or label may be attached to the core.

5.1.2 When purchaser permits, each sheet, strip, and plate shall be marked near one end, coils being marked near the outside end, with AMS 5046, manufacturer's identification, and nominal thickness, using any suitable marking fluid. As an alternate method, individual pieces or bundles shall have attached a durable tag marked with the above information or shall be boxed and the box marked with the same information.

5.2 Protective Treatment: The product shall be oiled prior to shipment.

5.3 Packaging: