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AEROSPACE MATERIAL SPECIFICATION

SAE AMS-5046

REV
A

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Submitted for recognition as an American National Standard

SHEET, STRIP, AND PLATE, CARBON STEEL (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 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.

2.1.1 Aerospace Material Specifications:

AMS-2232 - Tolerances, Carbon Steel Sheet, Strip, and Plate

MM-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 of Carbon and Low-Alloy Steels, Wrought Products Except Forgings and Forging Stock

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2.2 ASTM Publications: Available from ASTM 1916 Race Street, Philadelphia, PA 19103-1187.

- 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

2.3 U.S. Government Publications: Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

2.3.1 Military Specifications:

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

2.3.2 Military Standards:

- ML-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- ML-STD-163 - Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, \emptyset determined by wet chemical methods in accordance with ASTM E 350, by spectrochemical methods, or by other analytical methods acceptable to purchaser:

	<u>Type 1</u>		<u>Type 2</u>	
	<u>min</u>	<u>max</u>	<u>min</u>	<u>max</u>
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: 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 ML-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 A 370:

3.3.1 Tensile Properties: Shall be as follows:

Tensile Strength, minimum	55,000 psi (379 MPa)
Yield Strength at 0.2% Offset, minimum	36,000 psi (248 MPa)
Elongation in 2 Inches (50.8 mm) or 4D, minimum	22%

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3.3.1.1 For each 2,000 psi (13.8 MPa) in excess of 55,000 psi (379 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 degrees 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 purchaser and vendor.

3.3.3 **Grain Size:** Shall be 5 or finer with occasional grains as large as 3 permissible, 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 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. 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 and the following:

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

4.3.2 When a statistical sampling plan has 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 shall state that such plan was used.

4.4 **Reports:** 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. This report shall include the purchase order number, lot number, AMS-5046A, size, and quantity.

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