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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5858C

Issued OCT 1979
Revised APR 2001
Reaffirmed APR 2006

Superseding AMS 5858B

Steel, Corrosion and Heat Resistant, Sheet, Strip, and Plate
15Cr - 25.5Ni - 1.2Mo - 2.1Ti - 0.006B - 0.30V
Multiple Melted, 1800 °F (982 °C) Solution Heat Treated, Welding Grade
Precipitation Hardenable

(Composition similar to UNS S66286)

1. SCOPE:

1.1 Form:

This specification covers a corrosion and heat resistant steel in the form of sheet, strip, and plate.

1.2 Application:

These products have been used typically for parts requiring high strength up to 1300 °F (704 °C) and oxidation resistance up to 1500 °F (816 °C), particularly those parts which are welded and then heat treated to develop required properties, 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 canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

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

AMS 2242	Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate
MAM 2242	Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate
AMS 2248	Chemical Check Analysis Limits, Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.1 (Continued):

AMS 2371 Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS 2750 Pyrometry
AMS 2807 Identification, Carbon and Low-Alloy Steels, Corrosion and Heat Resistant Steels and Alloys Sheet, Strip, Plate, and Aircraft Tubing

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 Average Grain Size
ASTM E 139 Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials
ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

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 353, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	min	max
Carbon	--	0.08
Manganese	--	0.35
Silicon	--	0.30
Phosphorus	--	0.020
Sulfur	--	0.010
Chromium	13.50	16.00
Nickel	24.00	27.00
Molybdenum	1.00	1.50
Titanium	1.90	2.35
Boron	0.0030	0.010
Vanadium	0.10	0.50
Cobalt	--	1.00
Aluminum	--	0.35

3.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2248.

3.2 Melting Practice:

Steel shall be produced by multiple melting using consumable electrode practice in the remelt cycle.

3.3 Condition:

The product shall be supplied in the following condition:

3.3.1 Sheet and Strip: Hot rolled or cold rolled, solution heat treated, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled having a surface appearance comparable to 3.3.1.1 or 3.3.1.2 as applicable (See 8.2).

3.3.1.1 Sheet: No. 2D finish, except No. 2B finish may be supplied if acceptable to purchaser (See 8.5.1).

3.3.1.2 Strip: No. 1 strip finish.

3.3.2 Plate: Hot rolled, solution heat treated, and descaled.

3.4 Heat Treatment:

The product shall be solution heat treated by heating to 1800 °F ± 25 (982 °C ± 14), holding at heat for a time commensurate with section thickness, and cooling as required. Pyrometry shall be in accordance with AMS 2750.

3.5 Properties:

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

3.5.1 As Solution Heat Treated:

3.5.1.1 Tensile Properties: Shall be as specified in Table 2.

TABLE 2A - Tensile Properties, Inch/Pound Units

Nominal Thickness Inch	Tensile Strength ksi, max	Elongation in 2 Inches or 4D %, min
0.001 - 0.0015, incl	105	10
Over 0.0015 - 0.002, incl	105	12
Over 0.002 - 0.004, incl	105	20
Over 0.004	105	25

TABLE 2B - Tensile Properties, SI Units

Nominal Thickness Millimeter	Tensile Strength MPa, max	Elongation in 50.8 mm or 4D %, min
0.025 - 0.038, incl	724	10
Over 0.025 - 0.05, incl	724	12
Over 0.05 - 0.10, incl	724	20
Over 0.10	724	25

3.5.1.2 Hardness: Should be not higher than 90 HRB, or equivalent (See 8.3), for product 0.030 inch (0.76 mm) and over in nominal thickness but the product shall not be rejected on the basis of hardness if the tensile properties are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or another sample with similar nonconforming hardness.

3.5.1.3 Bending: Product 0.749 inch (19.02 mm) and under in nominal thickness shall withstand, without cracking, bending at room temperature 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 Inch	Nominal Thickness Millimeters	Angle deg, min
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

3.5.1.4 Average Grain Size: Shall be predominantly 5 or finer (See 8.4) for product up to 0.1875 inch (4.762 mm), exclusive, in nominal thickness, determined in accordance with ASTM E 112.

3.5.1.4.1 Grain size may be determined in the solution heat treated condition or after precipitation heat treatment at the option of the vendor.

3.5.2 After Precipitation Heat Treatment: Product shall have the following properties after being precipitation heat treated by heating to 1325 °F ± 15 (718 °C ± 8), holding at heat for not less than 16 hours, and cooling in air:

3.5.2.1 Tensile Properties: Shall be as shown in Table 4.

TABLE 4A - Minimum Tensile Properties, Inch/Pound Units

Nominal Thickness Inch	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
0.0010 - 0.0015, incl	125	95	4
Over 0.0015 - 0.002, incl	130	95	8
Over 0.002 - 0.004, incl	135	95	10
Over 0.004	140	95	15

TABLE 4B - Minimum Tensile Properties, SI Units

Nominal Thickness Millimeter	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
0.025 - 0.038, incl	862	655	4
Over 0.038 - 0.05, incl	896	655	8
Over 0.05 - 0.10, incl	931	655	10
Over 0.10	965	655	15

3.5.2.2 Hardness: Should be 24 to 35 HRC, or equivalent (See 8.3), but the product shall not be rejected on the basis of hardness if the tensile properties are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or another sample with similar nonconforming hardness.

3.5.2.3 Stress-Rupture Properties at 1200 °F (649 °C): A tensile specimen, maintained at 1200 °F ± 3 (649 °C ± 2) while a load sufficient to produce an initial axial stress not lower than specified in Table 5 is applied continuously, shall not rupture in less than 23 hours. The test may be discontinued after 23 hours. Tests shall be conducted in accordance with ASTM E 139.

TABLE 5 - Stress-Rupture Parameters

Nominal Thickness Inch	Nominal Thickness Millimeters	Stress, min ksi	Stress, min MPa
0.020 to 0.1875,excl	0.51 to 4.762, excl	67.5	465
0.1875 and over	4.762 and over	70.0	483

3.6 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.

3.7 Tolerances:

Shall conform to all applicable requirements of AMS 2242 or MAM 2242.

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 acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2371.

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 for tensile, hardness, bending, average grain size, and stress-rupture properties of each lot, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS 5858C, size, and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2371.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

Shall be in accordance with AMS 2807.