AEROSPACE MATERIAL SPECIFICATION

AMS5916™	REV. B

Issued 2011-05
Revised 2017-03
Reaffirmed 2022-05

Superseding AMS5916A

Alloy, Corrosion and Heat-Resistant, Sheet, Strip, and Plate
35Fe - 24Cr - 37Ni - 0.65Cb(Nb) - 0.2N
Annealed

(Composition similar to N08120)

RATIONALE

AMS5916B revises Properties (3.4.5), and Reports (4.4), and is a Five-Year Review and update of this specification.

AMS5916B has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

1.1 Form

This specification covers a corrosion and heat-resistant alloy in the form of sheet, strip, and plate 2.00 inch (50.8 mm) and under in thickness (see 8.4).

1.2 Application

These products have been used typically for parts requiring corrosion and oxidation resistance up to 1800 °F (982 °C), and relatively high strength up to 1500 °F (816 °C), 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 +1 724-776-4970 (outside USA), www.sae.org.

AMS2262 Tolerances Nickel, Nickel Alloy, and Cobalt Alloy Sheet, Strip, and Plate

AMS2269 Chemical Check Analysis Limits Nickel, Nickel Alloys, and Cobalt Alloys

AMS2371 Quality Assurance Sampling and Testing Corrosion and Heat-Resistant Steels and Alloys Wrought Products and Forging Stock

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**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS5916B/

AMS2750 Pyrometry

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

ARP1917 Clarification of Terms Used in Aerospace Metals Specifications

AS4194 Sheet and Strip Surface Finish Nomenclature

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 E8/E8M Tension Testing of Metallic Materials

ASTM E112 Determining Average Grain Size

ASTM E139 Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials

ASTM E290 Bend Testing of Material for Ductility

ASTM E354 Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

ASTM A480/A480M Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

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 E354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.02	0.10
Manganese	--	1.50
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	23.00	27.00
Nitrogen	0.15	0.30
Nickel	35.0	39.0
Columbium (Niobium)	0.40	0.90
Cobalt	--	3.0
Molybdenum	--	1.0
Tungsten	--	0.5
Aluminum	--	0.40
Titanium	--	0.20
Boron	--	0.010
Copper	--	0.50
Iron	remainder	

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Sheet and Strip

Hot or cold rolled, solution heat treated, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled having a surface finish comparable to the following commercial corrosion-resistant steel finishes as described in ASTM A480/A480M and AS4194, and 3.2.1.1 or 3.2.1.2 as applicable.

3.2.1.1 Sheet

Shall be No. 2D finish.

3.2.1.2 Strip

Shall be No. 1 strip finish.

3.2.2 Plate

Hot rolled, solution heat treated, and descaled.

3.3 Heat Treatment

The product shall be solution heat treated by heating in a suitable atmosphere within the range 2150 to 2250 °F (1177 to 1232 °C) holding at the selected temperature within ±25 °F (±14 °C) for a time commensurate with product thickness, and rapidly cooling. Pyrometry shall be in accordance with AMS2750.

3.4 Properties

The product shall conform to the following requirements:

3.4.1 Tensile Properties

Shall be shown in Table 2, determined in accordance with ASTM E8/E8M.

Table 2

Table 2A - Minimum Tensile Properties, Inch-Pound Units

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
Over 0.015 to 2.00, incl	90	40.0	30

Table 2B - Minimum Tensile Properties, SI Units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Over 0.38 to 50.8	620	275	30

3.4.2 Bending

Product 0.1874 inch (4.756 mm) and under in nominal thickness shall be tested in accordance with ASTM E290 using a specimen prepared nominally 0.75 inch (19.0 mm) in width with its axis parallel to the rolling direction, and shall withstand, without cracking, bending at room temperature through an angle of 180° around a diameter equal to the bend factor shown in Table 3 times the nominal thickness of the product. In case of dispute, results of tests using the guided bend test of ASTM E290 shall govern.

Table 3 - Bending Parameters

Nominal Thickness Inch (mm)	Bend Factor
Up to 0.050 (1.27), incl	1.0
Over 0.050 (1.27) to 0.1874 (4.760), incl	2.0

3.4.3 Stress-Rupture Properties at 1500 °F (816 °C)

A tensile specimen, maintained at 1500 °F ± 3 °F (816 °C ± 2 °C) while a load sufficient to produce an initial axial stress of 16.0 ksi (110 MPa) is applied continuously, shall not rupture in less than the time indicated in Table 4. The test shall be continued to rupture without change of load. Elongation after rupture, measured at room temperature, shall be not less than shown in Table 4. Tests shall be conducted in accordance with ASTM E139.

Table 4 - Stress Rupture Parameters

Nominal Thickness Inches (mm)	Time to Rupture Hours, Minimum	Elongation in % in 4D
Over 0.015 (0.381) to 2.00 (50.8)	24	10

3.4.3.1 The test of 3.4.3 may be conducted using a load higher than required to produce an initial axial stress of 16.0 ksi (110 MPa) but load shall not be changed while test is in progress. Time to rupture and elongation requirements shall be as shown in Table 4.

3.4.3.2 The test of 3.4.3 may be conducted on product 0.020 inch (0.51 mm) and over in nominal thickness using incremental loading. In such case, the load required to produce an initial axial stress of 16.0 ksi (110 MPa) shall be used to rupture or for 24 hours, whichever occurs first. After the 24 hours and at intervals of 8 hours minimum, thereafter, the stress shall be increased in increments of 2.0 ksi (13.8 MPa). Time to rupture and elongation requirements shall be as shown in Table 4.

3.4.4 Average Grain Size

Shall be an average grain size of ASTM No. 5 or coarser, determined in accordance with ASTM E112.

3.4.5 Mechanical property requirements for product outside of the range covered by 1.1 shall be agreed upon between purchaser and producer.

3.5 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.

3.6 Tolerances

Shall conform to AMS2262.