SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS5875 | REV. C

Issued 1984-10
Revised 2002-01
Reaffirmed 2012-12

Superseding AMS5875B

Cobalt Alloy, Corrosion and Heat-Resistant, Strip
20Cr - 15Ni - 40Co - 7.0Mo - 16Fe
Solution Heat Treated, Cold Rolled, and Aged
Vacuum Induction Plus Vacuum Consumable Electrode Melted
(Composition similar to UNS S30003)

RATIONALE

AMS5875C 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 cobalt alloy in the form of strip 0.100 inch (2.54 mm) and under in specified thickness and 4.000inches (101.60 mm) and under in specified width.

1.2 Application:

This strip has been used typically for springs requiring a combination of high strength up to 800 °F (427 °C), excellent corrosion resistance, and good fatigue properties, but usage is not limited to such applications. The alloy is nonmagnetic.

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 or www.sae.org.

AMS 2269 Chemical Check Analysis Limits, Nickel, Nickel Alloys and Cobalt Alloys

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

2.1 (Continued):

AMS 2371 Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, 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

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM E 8 Tension Testing of Metallic Materials

ASTM E 8M Tension Testing of Metallic Materials (Metric)

ASTM E 18 Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

ASTM E 354 Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel and Cobalt 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 354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	min	max
Carbon	--	0.15
Manganese	1.5	2.5
Silicon	--	1.20
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	19.0	21.0
Nickel	14.0	16.0
Cobalt	39.0	41.0
Molybdenum	6.0	8.0
Beryllium	--	0.10
Other Elements, total	--	1.00
Iron	remainder	

3.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2269.

3.2 Melting Practice:

Alloy shall be produced by multiple melting using vacuum induction followed by vacuum consumable electrode or electroslag remelt practices.

3.3 Condition:

Solution heat treated, cold rolled, and aged.

3.4 Heat Treatment:

Strip shall be solution heat treated by heating to 2150 °F ± 25 (1177 °C ±14), holding at heat for a time commensurate with section thickness, and cooling as required. After cold rolling, the strip shall be aged by heating to a temperature within the range 850 to 950 °F (454 to 510 °C), holding at the selected temperature within ±25 °F (±14 °C) for 5 to 5-1/2 hours, and cooling in air to room temperature.

3.5 Properties:

Strip shall conform to the following requirements:

3.5.1 Tensile Properties: Shall be as shown in Table 2, determined in accordance with ASTM E 8 or ASTM E 8M.

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units

Specified Thickness Inch			Tensile Strength ksi	Yield Strength at 0.2% Offset, ksi	Elongation in 2 Inches %
Up	to 0.0043,	incl	325	250	-
Over 0.0043	to 0.01875,	incl	315	225	-
Over 0.01875	to 0.025,	incl	300	225	1
Over 0.025	to 0.047,	incl	275	225	1
Over 0.047	to 0.075,	incl	225	160	3
Over 0.075	to 0.100,	incl	170	100	17

TABLE 2B - Minimum Tensile Properties, SI Units

Specified Thickness Millimeters			Tensile Strength MPa	Yield Strength at 0.2% Offset, MPa	Elongation in 50.8 mm %
Up	to 0.109,	incl	2241	1724	-
Over 0.109	to 0.4762,	incl	2172	1551	-
Over 0.4762	to 0.64,	incl	2068	1551	1
Over 0.64	to 1.19,	incl	1896	1551	1
Over 1.19	to 1.90,	incl	1551	1103	3
Over 1.90	to 2.54,	incl	1172	689	17

3.5.2 Elongation requirements do not apply to strip 0.01875 inch (0.4762 mm) and under in specified thickness.

3.5.3 Hardness: Shall be not lower than 46 HRC, or equivalent (See 8.2), determined in accordance with ASTM E 18, but strip shall not be rejected on the basis of hardness if the tensile property requirements are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or from another sample with similar nonconforming hardness.

3.6 Quality:

Strip, 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 strip.

3.7 Tolerances:

Width and thickness tolerances shall be in accordance with Table 3 and Table 4, respectively.

3.7.1 Width:

TABLE 3A - Width Tolerances, Inch/Pound Units

Specified Width Inches	Tolerance, Inch plus and minus
Up to 0.3755, incl	0.0030
Over 0.3755 to 0.4999, incl	0.0040
Over 0.4999 to 4.0000, incl	0.0050

TABLE 3B - Width Tolerances, SI Units

Specified Width Millimeters	Tolerance, Millimeter plus and minus
Up to 9.538, incl	0.076
Over 9.538 to 12.697, incl	0.102
Over 12.697 to 101.600, incl	0.127

3.7.2 Thickness:

TABLE 4A - Thickness Tolerances, Inch/Pound Units

Specified Thickness Inch	Tolerance, Inch plus and minus
0.001 to 0.002, incl	0.00015
Over 0.002 to 0.004, incl	0.0002
Over 0.004 to 0.006, incl	0.0003
Over 0.006 to 0.009, incl	0.0004
Over 0.009 to 0.012, incl	0.0005
Over 0.012 to 0.015, incl	0.00065
Over 0.015 to 0.020, incl	0.00075
Over 0.020 to 0.025, incl	0.0010
Over 0.025 to 0.030, incl	0.00125
Over 0.030 to 0.050, incl	0.0015
Over 0.050 to 0.070, incl	0.00175
Over 0.070 to 0.100, incl	0.002

TABLE 4B - Thickness Tolerances, SI Units

Specified Thickness Millimeters	Tolerance, Millimeter plus and minus
0.02 to 0.05, incl	0.0038
Over 0.05 to 0.10, incl	0.005
Over 0.10 to 0.15, incl	0.008
Over 0.15 to 0.23, incl	0.010
Over 0.23 to 0.30, incl	0.013
Over 0.30 to 0.38, incl	0.0165
Over 0.38 to 0.51, incl	0.0190
Over 0.51 to 0.64, incl	0.025
Over 0.64 to 0.76, incl	0.0318
Over 0.76 to 1.27, incl	0.038
Over 1.27 to 1.78, incl	0.0444
Over 1.78 to 2.54, incl	0.051