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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5875B

Issued OCT 1984
Revised JAN 1993
Reaffirmed AUG 2000

Superseding AMS 5875A

Cobalt Alloy, Corrosion and Heat Resistant, Strip
20Cr - 15Ni - 40Co - 7.0Mo - 16Fe
Solution Heat Treated, Cold Rolled, and Aged

UNS S30003

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 4.000 inches (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. Alloy is nonmagnetic.

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.

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

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

2.2 ASTM Publications:

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

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

2.3 U.S. Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

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

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 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 melting 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 specified 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: Should be not lower than 46 HRC, or equivalent, determined in accordance with ASTM E 18, but strip shall not be rejected on the basis of hardness if the tensile property requirements are met (See 8.2).

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

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of strip 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 strip 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 2371.

4.4 Reports:

The vendor of strip shall furnish with each shipment a report showing the results of tests for composition of each heat and for tensile properties and hardness of each lot. This report shall include the purchase order number, heat and lot number, AMS 5875B, size, and quantity.