

AEROSPACE MATERIAL SPECIFICATION



AMS 5845G

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Superseding AMS 5845F

Alloy, Corrosion-Resistant, Round Bars
20Cr - 35Ni - 35Co - 10Mo
Vacuum Induction Plus Consumable Electrode Vacuum Melted
Solution Heat Treated, Work Strengthened, and Aged
(Composition similar to UNS R30035)

1. SCOPE:

1.1 Form:

This specification covers a high-strength, corrosion-resistant alloy in the form of bars.

1.2 Application:

These bars have been used typically for parts requiring a combination of high strength, good tension-tension fatigue strength, toughness, ductility, and exceptionally good corrosion resistance (See 8.2), 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, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2261	Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Bars, Rods, and Wire
AMS 2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys
AMS 2371	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock

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2.1 (Continued):

AMS 2750 Pyrometry
 AMS 2806 Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat-Resistant Steels and Alloys

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 112 Determining Average Grain Size
 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	--	0.025
Manganese	--	0.15
Silicon	--	0.15
Phosphorus	--	0.015
Sulfur	--	0.010
Chromium	19.00	21.00
Nickel	33.00	37.00
Molybdenum	9.00	10.50
Titanium	--	1.00
Iron	--	1.00
Cobalt	remainder	

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

3.2 Melting Practice:

Alloy shall be multiple melted using vacuum induction melting followed by consumable electrode vacuum remelting.

3.3 Condition:

Solution heat treated, work strengthened, aged, and centerless ground.

3.4 Heat Treatment:

Bars shall be solution heat treated by heating to a temperature within the range 1900 to 1925 °F (1038 to 1052 °C), holding at the selected temperature within ± 25 °F (± 14 °C) for 4 to 8 hours, and cooling in air to room temperature. Pyrometry for solution heat treatment shall be in accordance with AMS 2750. After work strengthening, the bars shall be aged by heating to a temperature within the range 1000 to 1200 °F (538 to 649 °C), holding at the selected temperature within ± 25 °F (± 14 °C) for 4 to 4-1/2 hours, and cooling in air to room temperature.

3.5 Properties:

Bars 1-3/4 inches (44.4 mm) and under in nominal diameter shall conform to the following requirements (See 8.2):

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

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	260 ksi (1793 MPa)
Yield Strength at 0.2% Offset	230 ksi (1586 MPa)
Elongation in 4D	8%
Reduction of Area	35%

3.5.2 Hardness: Shall be not lower than 44 HRC, or equivalent (See 8.3), determined in accordance with ASTM E 18. Product shall not be rejected on the basis of hardness if the tensile properties of 3.5.1 are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or from another sample with similar nonconforming hardness.

3.5.3 Average Grain Size: Shall be ASTM No. 4 or finer, determined in accordance with ASTM E 112.

3.6 Quality:

Bars, 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 bars.

3.7 Tolerances:

Shall conform to all applicable requirements of AMS 2261.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of bars 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 bars conform 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 and the following:

In testing round bars, specimens for tensile testing (3.51) shall be of standard proportions in accordance with ASTM E 8 or ASTM E 8M with either 0.250-inch (6.35-mm) diameter at the reduced parallel gage section or smaller specimens proportional to the standard when required. Specimens shall be machined from the center of bars 0.800 inch (20.32 mm) and under in nominal diameter and from mid-radius of larger size bars.

4.4 Reports:

The vendor of the product shall furnish with each shipment a report showing the following results of tests and relevant information:

4.4.1 For each heat:

Composition.

4.4.2 For each lot:

Tensile properties
Hardness
Average grain size.

4.4.3 A statement that the product conforms to the other technical requirements.

4.4.4 Purchase order number

Heat and lot numbers
AMS 5845G
Size
Quantity.