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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5825E

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Superseding AMS 5825D

Submitted for recognition as an American National Standard

STEEL, CORROSION RESISTANT, WELDING WIRE
16.4Cr - 4.8Ni - 0.22Cb - 3.6Cu

UNS S17480

1. SCOPE:

1.1 Form:

This specification covers a corrosion-resistant steel in the form of welding wire.

1.2 Application:

This wire has been used typically as bare wire filler metal for gas-tungsten-arc or gas-metal-arc welding of precipitation-hardening, corrosion-resistant steels having composition similar to that of this wire, but usage is not limited to such applications.

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 2248 Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
AMS 2371 Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS 2813 Packaging of Welding Wire, Standard Method
AMS 2814 Packaging of Welding Wire, Premium Quality
AMS 2816 Identification, Welding Wire, Color Code System
AMS 5643 Steel Bars, Forgings, Tubing, and Rings, Corrosion Resistant, 16Cr - 4.0Ni - 0.30(Cb+Ta) - 4.0Cu, Solution Heat Treated
ARP1876 Weldability Test for Weld Filler Metal Wire

2.2 ASTM Publications:

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

ASTM E 18 Rockwell Hardness and Rockwell Superficial Hardness 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:
(R)

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	--	0.05
Manganese	0.25	0.75
Silicon	--	0.75
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	16.00	16.75
Nickel	4.50	5.00
Columbium	0.15	0.30
Copper	3.25	4.00
Molybdenum	--	0.75

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

3.2 Condition:
(R)

Cold worked, bright finished, in an as-drawn temper, and with a surface finish which will provide proper feeding of the wire in machine welding equipment.

3.2.1 Wire shall be furnished on disposable spools for machine welding or in cut lengths for manual welding, as ordered.

3.2.2 Drawing compounds, oxides, dirt, and oil shall be removed by cleaning processes which will neither result in pitting nor cause gas absorption by the wire or deposition of substances harmful to welding operations.

3.2.3 In-process annealing between cold working or drawing operations shall be performed in a suitable protective atmosphere.

3.3 Properties:

Wire shall conform to the following requirements:

3.3.1 (R) Weldability: Melted wire shall flow smoothly and evenly during welding and shall produce acceptable welds. ARP1876 may be used to resolve disputes.

3.3.2 Response to Heat Treatment: Weld metal, approximately 1/4 inch (6.4 mm) in thickness, deposited on AMS 5643 steel shall attain hardness not lower than 38 HRC, or equivalent, determined in accordance with ASTM E 18, after being solution heat treated by heating to 1900 °F ± 25 (1038 °C ± 14), holding at heat for not less than 30 minutes, and cooling to below 60 °F (16 °C) and precipitation heat treated by heating to 900 °F ± 10 (482 °C ± 6), holding at heat for 60 minutes ± 5, and cooling in air.

3.3.3 Spooled Wire: Shall conform to 3.3.3.1 and 3.3.3.2.

3.3.3.1 (R) Cast: Wire, wound on standard 12-inch (305-mm) diameter spools, shall have imparted to it a curvature such that a specimen sufficient in length, 4 to 14 feet (1.2 to 4.3 m), to form one loop, when cut from the spool and laid on a flat surface, shall form a circle 15 to 50 inches (381 to 1270 mm) in diameter.

3.3.3.2 Helix: The specimen on which cast was determined, when laid on a flat surface and measured between adjacent turns, shall show a vertical separation not greater than 1 inch (25 mm).

3.4 Quality:

Wire, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to welding operations, operation of welding equipment, or properties of the deposited weld metal.

3.5 Sizes and Tolerances:

Wire shall be supplied in the sizes and to the tolerances shown in Table 2 and 3.5.2.

3.5.1 Diameter:
(R)

TABLE 2A - Standard Diameters and Tolerances, Inch/Pound Units

Form	Nominal Diameter Inch	Tolerance Inch Plus	Tolerance Inch Minus
Cut Lengths	0.030, 0.035, 0.045, 0.062, 0.078	0.002	0.002
Cut Lengths	0.094, 0.125, 0.156, 0.188	0.003	0.003
Spools	0.007, 0.010, 0.015. 0.020	0.0005	0.0005
Spools	0.030, 0.035, 0.045	0.001	0.002
Spools	0.062, 0.078, 0.094	0.002	0.002

TABLE 2B - Standard Diameters and Tolerances, SI Units

Form	Nominal Diameter Millimeters	Tolerance Millimeter Plus	Tolerance Millimeter Minus
Cut Lengths	0.76, 0.89, 1.14, 1.57, 1.98	0.05	0.05
Cut Lengths	2.39, 3.18, 3.96, 4.78	0.08	0.08
Spools	0.18, 0.25, 0.38, 0.51	0.013	0.013
Spools	0.77, 0.89, 1.14	0.025	0.05
Spools	1.57, 1.98, 2.39	0.05	0.05

3.5.2 Length: Cut lengths shall be furnished in 18, 27, or 36 inch (457, 686, or 914 mm) lengths, as ordered, and shall not vary more than +0, -0.5 inch (-13 mm) from the length ordered.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:
(R)

The vendor of wire 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 wire conforms to the requirements of this specification.