

ADOPTION NOTICE

SAE-AMS 5803, "Steel, Corrosion and Heat Resistant, Welding Wire 16.4Cr - 4.8Ni - 0.22 (Cb+Ta) - 3.6Cu Vacuum Melted" was adopted on 5 August 1996 for use by the Department of Defense (DoD). Proposed changes by DoD activities must be submitted to the DoD Adopting Activity: Air Force, ASC/ENSI, 2530 Loop Road West, Wright-Patterson AFB OH 45433-7101. DoD activities may obtain copies of this standard from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094. The private sector and other Government agencies may purchase copies from the Society of Automotive Engineers Inc., 400 Commonwealth Drive, Warrendale, PA 15096-0001.

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AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard



AMS 5803C

Issued OCT 1987
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Superseding AMS 58038

STEEL, CORROSION AND HEAT RESISTANT, WELDING WIRE
16.4Cr - 4.8Ni - 0.22 (Cb+Ta) - 3.6Cu
Vacuum Melted

UNS S17480

1. SCOPE:

1.1 Form:

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

1.2 Application:

This wire has been used typically as filler metal for gas-tungsten-arc or gas-metal-arc welding of steels of similar composition requiring joints with strength and corrosion resistance comparable to those of the base metal, but usage is not limited to such application.

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, 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 and Marking of Packages of Welding Wire, Standard Method
- AMS 2814 Packaging and Marking of Packages of Welding Wire, Premium Quality
- AMS 2816 Identification, Welding Wire, Tab Marking Method
- AMS 2819 Identification, Welding Wire, Direct 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

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2.1 (Continued):

- ARP1876 Weldability Test for Weld Filler Metal Wire
 ARP4926 Alloy Verification and Chemical Composition inspection of Welding Wire

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

- 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 Wire Composition:

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	--	0.50
Phosphorus	--	0.015
Sulfur	--	0.008
Chromium	16.00	16.75
Nickel	4.50	5.00
Columbium + Tantalum	0.15	0.30
Copper	3.25	4.00
Molybdenum	--	0.75
Aluminum	--	0.05
Boron (3.1.2)	--	0.0010 (10 ppm)
Tin (3.1.2)	--	0.0050 (50 ppm)
Lead (3.1.2)	--	0.0010 (10 ppm)
Oxygen (3.1.2)	--	0.0050 (50 ppm)
Nitrogen (3.1.2)	--	0.0150 (150 ppm)
Hydrogen (3.1.2)	--	0.0005 (5 ppm)

- 3.1.1 Chemical analysis of initial bar or rod stock before drawing is acceptable provided the processes used for drawing or rolling, annealing, and cleaning are controlled to ensure continued conformance to composition requirements.

- 3.1.2 Check Analysis: Composition variations shall meet the requirements of AMS 2248. No variation over maximum is permitted for boron, tin, lead, oxygen, nitrogen, and hydrogen.

3.2 Melting Practice:

Steel shall be multiple melted using consumable electrode practice in the remelt cycle or shall be vacuum induction melted.

3.3 Condition:

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

- 3.3.1 All wire shall have a smooth finish that is free from slivers, depressions, scratches, scale, (R) seams, laps, and foreign matter that would adversely affect welding characteristics, operation of the welding equipment, or properties of the weld metal.

3.4 Fabrication:

- 3.4.1 In-process annealing between cold rolling or drawing operations shall be performed in a (R) protective atmosphere to avoid surface oxidation and adsorption of other extraneous elements.

- 3.4.2 Butt welding is permissible provided both ends to be joined are alloy verified using a method or (R) methods capable of distinguishing the alloy from all other alloys processed within the facility or the repair is made at the wire processing station. The butt weld shall not interfere with uniform, uninterrupted feeding of the wire in machine welding equipment.

- 3.4.3 Drawing compounds, oxides, dirt, oil, and other foreign materials shall be removed by cleaning (R) processes which will neither result in pitting nor cause gas absorption by the wire or deposition of substances harmful to welding operations.

- 3.4.3.1 If pickling is necessary to remove surface contamination or scaling, only a light pickle shall be used followed by vacuum degassing.

3.5 Properties:

Wire shall conform to the following requirements:

- 3.5.1 Weldability: Melted wire shall flow smoothly and evenly during welding and shall produce acceptable welds. ARP1876 may be used to resolve disputes.
- 3.5.2 Response to Heat Treatment: When specified, 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.

3.5.3 Spooled Wire: Shall conform to 3.5.3.1 and 3.5.3.2.

3.5.3.1 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 to form one loop with a 1-inch (25-mm) overlap, 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.

3.5.3.2 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).

3.6 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.

3.7 Sizes and Tolerances:

Wire shall be supplied in the sizes and to the tolerances shown in 3.7.1 and 3.7.2.

3.7.1 Diameter: Shall be as shown in Table 2.

(R)

TABLE 2A - Sizes and Diameter Tolerances, Inch/Pound Units

Form	Nominal Diameter Inch	Tolerance	
		Inch Plus	Inch Minus
Cut Lengths	0.030, 0.035, 0.045, 0.062	0.002	0.002
Cut Lengths	0.094, 0.125	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, 0.094	0.002	0.002

TABLE 2B - Sizes and Diameter Tolerances, SI Units

Form	Nominal Diameter Millimeters	Tolerance	
		Millimeter Plus	Millimeter Minus
Cut Lengths	0.76, 0.89, 1.14, 1.57	0.05	0.05
Cut Lengths	2.39, 3.18	0.08	0.08
Spools	0.13, 0.18, 0.25, 0.38, 0.51	0.013	0.013
Spools	0.76, 0.89, 1.14	0.025	0.05
Spools	1.57, 2.39	0.05	0.05