

**AEROSPACE
MATERIAL
SPECIFICATION**

Submitted for recognition as an American National Standard

AMS 5677B

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Superseding AMS 5677A

**ALLOY WELDING ELECTRODES, COVERED, CORROSION AND HEAT RESISTANT
75Ni - 19.5Cr - 1.6 (Cb + Ta)**

UNS N06003

1. SCOPE:

1.1 Form: This specification covers a corrosion and heat resistant nickel alloy in the form of covered welding electrodes.

1.2 Application: Primarily for shielded-metal-arc welding of parts fabricated from material 1/8 in. (3 mm) and under in nominal thickness of similar or dissimilar composition, particularly when the weld zone is required to have corrosion and heat resistance comparable to that of the parent metal.

1.3 Classification: Electrodes covered by this specification are classified as follows and shall be suitable for the following usability characteristics:

Type Designation	AWS Designation	Weld Position	Current
A	-15	Flat, Vertical, Overhead, and Horizontal	DC
B	-16	Flat, Vertical, Overhead, and Horizontal	DC-AC
C	-15	Horizontal Fillets, Flat	DC
D	-16	Horizontal Fillets, Flat	DC-AC

1.3.1 When DC is specified, reverse polarity (electrode positive) is required.

1.3.2 Type "A" electrodes shall be supplied unless another type is ordered.

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2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E354 - Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Specifications:

MIL-W-10430 - Welding Rods and Electrodes; Preparation for Delivery of

2.4 AWS Publications: Available from American Welding Society, Inc., P.O. Box 351040, Miami, FL 33135.

AWS A5.11 - Nickel and Nickel Alloy Covered Welding Electrodes

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Weld metal deposited from electrodes shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E354 or by spectrographic or other analytical methods approved by purchaser:

	min	max
Carbon	--	0.15
Manganese	--	1.5
Silicon	--	0.75
Sulfur	--	0.015
Chromium	18.0 -	21.0
Nickel + Cobalt	71.0	--
Columbium + Tantalum	1.0 -	2.2
Cobalt (3.1.1)	--	1.0
Iron	--	4.0

3.1.1 Determination not required for routine acceptance.

3.1.2 Weld Pads for Chemical Analysis: The referee procedure for making pads of weld metal and removing samples for chemical analysis shall be AWS A5.11.

3.2 Properties: Electrodes shall conform to the following requirements:

- 3.2.1 Weldability: Electrodes shall demonstrate good weldability, shall flow smoothly and evenly when used under the conditions specified in 1.3, and shall produce acceptable welds, determined by a procedure agreed upon by purchaser and vendor.
- 3.2.2 Burn-Off: The covering shall be consumed uniformly all around and shall not burn back from the core wire under proper welding conditions. Heating of the electrode during welding shall not cause injurious blistering of the covering within the ranges of current values recommended by the manufacturer.
- 3.2.3 Grip Portion and Arc Ends: A portion of the electrode 0.75 - 1.25 in. (20 - 30 mm) long on end-grip rods and 1.5 - 2.0 in. (40 - 50 mm) long on center-grip rods shall be bare to permit good electrical contact with the electrode holder. The arc end of the electrodes shall be sufficiently bare to permit easy striking of the arc but the length of this bare section, measured from the end of the electrode to the point where the full cross-section of the covering begins, shall not exceed the diameter of the bare wire, and in no case shall it exceed 1/8 in. (3 mm).
- 3.2.4 Cleaning: Slag produced during welding shall be readily removable with hand tools.

3.3 Quality:

- 3.3.1 Core Wire: Shall be uniform in quality and condition, cylindrical, sound, and free from foreign materials and from imperfections detrimental to weld quality.
- 3.3.2 Covering: Shall be uniform in quality, tightly adherent, and free from abnormal scabs, blisters, pockmarks, bruises, and other surface defects and shall withstand normal handling without damage. It shall not be harmfully hygroscopic and shall not adversely affect weld quality.

3.4 Standard Sizes and Lengths: The sizes and lengths in Table I are standard.

TABLE I

Nominal Diameter of Core Wire Inch	Length Inches
1/16, 5/64	9 and 18
3/32	9, 12, and 18
1/8, 5/32, 3/16, 1/4	14