SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5779D

Issued	JAN 1958
Revised	JUL 1986
Noncurrent	MAY 1996
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Revised	JAN 2003

Superseding AMS 5779C

Alloy Welding Electrodes, Covered, Corrosion and Heat Resistant
75Ni - 15Cr - 1.5 (Cb+Ta) - 1.9Ti - 0.55Al - 5.5Fe

(Composition similar to UNS N07750)

NOTE

Revision C, also a Noncurrency Notice, was published in May 1996. Unfortunately, a wrong specification was attached to that notice; such was labeled AMS 5779C, but the entire text was AMS 5775C. This AMS 5779D is being published to correct the clerical error.

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NONCURRENT NOTICE

This specification has been declared “NONCURRENT” by the Aerospace Materials Division, SAE, as of May 1996. It is recommended, therefore, that this specification not be specified for new designs.

“NONCURRENT” refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these “NONCURRENT” specifications is available from SAE.

1. SCOPE:

1.1 Form:

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

1.2 Application:

Primarily for shielded-metal-arc welding of parts fabricated from alloys 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:

Coverings shall be suitable for welding in all positions using DC reverse polarity (electrode positive).

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	--	0.25
Manganese	--	1.0
Silicon	--	1.0
Sulfur	--	0.015
Chromium	12.5	17.0
Nickel + Cobalt	66.0	--
Columbium + Tantalum	4 x Si	--
Titanium	1.0	2.75
Aluminum	0.10	1.0
Cobalt (3.1.1)	--	1.0
Iron	--	11.0
Copper	--	0.50

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 flow smoothly and evenly under the conditions shown 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 (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, clean, 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

TABLE I (SI)

Nominal Diameter of Core Wire Millimeters	Length Millimetres
1.5, 2.0	225 and 450
2.5	225, 300, and 450
3.0, 4.0, 5.0, 6.5	350

3.4.1 End-grip electrodes shall be supplied in all lengths except 18 in. (450 mm) where center grip electrodes are required.

3.5 Tolerances:

Shall be as follows:

3.5.1 Electrodes shall not vary in length more than ±1/4 in. (±6 mm) from the length ordered.

3.5.2 Electrode core wire shall not vary in diameter more than ±0.002 in. (±0.05 mm) from the size ordered.

3.5.3 Overall diameter of the covered electrodes shall not vary more than 4% from that of the sample approved as in 4.4.1.

3.5.4 Covering shall be concentric with the core wire to the extent that the maximum core-plus-one-covering dimension shall not exceed the minimum core-plus-one-covering dimension by more than 5% of the minimum core-plus-one-covering dimension.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of the product shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the electrodes conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1), grip portion and arc ends (3.2.3), sizes (3.4), and tolerances (3.5) are classified as acceptance tests and shall be performed to represent each control number of electrodes.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for weldability (3.2.1), burn-off (3.2.2), and cleaning (3.2.4) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.2.3 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed prior to or on the first-article shipment of electrodes to a purchaser, when a change in material, processing, or both requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.3.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling:

Shall be as agreed upon by purchaser and vendor; a control number shall be a designation indicating batch processing and core wire heat number.

4.4 Approval:

4.4.1 Sample electrodes shall be approved by purchaser before electrodes for production use are supplied, unless such approval be waived by purchaser.

4.4.2 Vendor shall use materials, manufacturing procedures, processes, and methods of inspection on production electrodes which are essentially the same as those used on the approved sample electrodes. If necessary to make any change in covering formulation or in manufacturing procedures, processes, or methods of inspection, vendor shall submit for reapproval a statement of the proposed changes in material, processing, or both and, when requested, sample electrodes. Production electrodes incorporating the revised procedures shall not be shipped prior to receipt of reapproval.

4.5 Reports:

4.5.1 The vendor of electrodes shall furnish with each shipment a report stating that the electrodes conform to the technical requirements of this specification. This report shall include the purchase order number, AMS 5779D, control number, size, and quantity. When requested by purchaser, the vendor shall also include in the report the composition of the deposited weld metal for each heat in the shipment.

4.5.2 When assemblies requiring use of these electrodes are supplied, the assembly manufacturer shall inspect each lot of electrodes to determine conformance to the technical requirements of this specification and shall furnish with each shipment a report stating that the electrodes conform. This report shall include the purchase order number, AMS 5779D, assembly number, and quantity.

4.6 Resampling and Retesting:

If any specimen used in the above tests fails to meet the specified requirements, disposition of the electrodes may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the electrodes represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

5.1.1 Individual Electrodes: