SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5775D

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Superseding AMS 5775C

Welding Electrodes, Covered, Corrosion and Heat Resistant Steel 16.5Cr - 4.5Ni - 2.9Mo - 0.10N

W35010

NONCURRENT NOTICE

This specification has been declared “NONCURRENT” by the Aerospace Materials Division, SAE, as of August 1999. 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 upon request.

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1. SCOPE:

1.1 Form:

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

1.2 Application:

Primarily for shielded-metal-arc welding of parts fabricated from steels of similar composition, particularly when the weld zone is required to have strength and 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

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

1.3.2 Type “A” electrodes shall be supplied unless Type “B” is ordered.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications:

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

ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

2.2 Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094

2.2.1 Military Specifications:

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

2.3 AWS Publications:

Available from American Welding Society, Inc., P.O. Box 351040, Miami, FL 33135-1040.

AWS A5.4 - Corrosion-Resisting Chromium and Chromium-Nickel Steel 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 E 353, by spectrographic methods, or by other analytical methods acceptable to purchaser:

	min	max
Carbon	0.08	0.12
Manganese	0.50	1.25
Silicon	--	0.50
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	16.00	17.00
Nickel	4.00	5.00
Molybdenum	2.50	3.25
Nitrogen	0.07	0.13

3.1.1 Weld Pads for Chemical Analysis: The referee procedure for making pads of weld metal and removing samples for chemical analysis shall be AWS A5.4.

3.2 Properties:

Electrodes shall conform to the following requirements:

3.2.1 Weldability: Electrodes shall demonstrate good weldability and 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 inches (19.0 - 31.8 mm) long on end-grip rods and 1.5 - 2.0 inches (38 - 51 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 inch (3.2 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:

Shall be as shown in Table I.

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 Millimetres	Length Millimetres
1.6, 2.0	229 and 457
2.4	229, 305, and 457
3.2, 4.0, 4.8, 6.4	356

3.4.1 End-grip electrodes shall be supplied in all lengths except 18 inches (457 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 inch (±6.4 mm) from the length ordered.

3.5.2 Electrode core wire shall not vary in diameter more than ±0.002 inch (±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 approved sample 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 electrodes 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 electrodes conform to the requirements of this specification.

4.2 Classification of Tests:

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

4.2.2 Periodic Tests: Tests for weldability (3.2.1), burn-off (3.2.2), and cleaning (3.2.4) are 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 for all technical requirements are preproduction tests and shall be performed on the first-article shipment of electrodes to a purchaser, when a change in material or 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 electrodes shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling and Testing:

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 and/or, processing and, when requested, sample electrodes. Production electrodes incorporating the revised procedures shall not be shipped prior to receipt of reapproval.

4.5 Reports:

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-5775C, 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.

4.6 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.