SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS6467E

Issued	1959-01
Revised	1983-04
Noncurrent	1999-08
Reaf Nonc	2006-04
Cancelled	2008-08

Superseding AMS6467D

Steel Welding Electrodes, Covered 5Cr - 0.55Mo

(Composition similar to UNS S50200)

RATIONALE

AMS6467E results from a proposal to cancel this document.

CANCELLATION NOTICE

This specification has been declared “CANCELLED” by the Aerospace Materials Division, SAE, as of August 2008. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications indicating that it has been “CANCELLED”.

Cancelled specifications are available from SAE.

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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.

A similar product is covered in AWS A5.5.

1. SCOPE:

1.1 Form:

This specification covers a low-alloy steel in the form of covered welding electrodes.

1.2 Application:

Primarily for use as filler metal for metal-arc welding of low-alloy steels when the deposited weld metal is required to have heat treating characteristics similar to those of the metals joined.

1.3 Classification:

The electrodes covered by this specification are classified as follows:

Type A - DC
Type B - DC-AC

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

1.3.2 If no type is specified, Type B shall be supplied.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) 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 E350 Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

2.3 U.S. Government Publications:

Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 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 A5.5 - Low Alloy Steel Covered Arc-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 350, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	--	0.10
Manganese	--	1.00
Silicon	0.25	0.60
Phosphorus	--	0.03
Sulfur	--	0.03
Chromium	4.50	6.00
Molybdenum	0.45	0.65
Nickel	--	0.60
Copper	--	0.35

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 A5.5.

3.2 Properties:

Electrodes shall conform to the following requirements.

3.2.1 Weldability: Melted electrodes shall flow evenly and smoothly 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 range 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, 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 shown 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 Millimetres	Length Millimeters
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, unless otherwise specified:

3.5 Tolerances:

Shall be as follows; unless otherwise specified.

3.5.1 Electrodes shall not vary in length more than ±1/4 in. (±6.25 mm) from 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 Over-all 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 electrodes 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 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, 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 or 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 three copies of a report stating that the electrodes conform to the technical requirements of this specification. This report shall include the purchase order number, AMS 6467D, 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 three copies of a report stating that the electrodes conform. This report shall include the purchaser order number, AMS 6467D, assembly number, and quantity.