Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS6467B
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UNS S50200

WELDING ELECTRODES, COVERED, STEEL
5Cr - 0.55Mo

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 Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 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, Pennsylvania 19103.

ASTM E350 - Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

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

2.3.1 Federal Standards:

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

2.4 AWS Publications: Available from American Welding Society, Inc., 2501 North West 7th Street, Miami, Florida 33125.

AWS A5.5 - Low Alloy Steel Covered Arc-Welding Electrodes

3. TECHNICAL REQUIREMENTS:

Printed in U.S.A.

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 E350, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other approved analytical methods:

	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:

3.2.1 Weldability: Melted electrodes shall flow smoothly and evenly during welding 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 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. (19.0 - 31.8 mm) long on end-grip rods and 1.5 - 2.0 in. (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, as 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. (3.2 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, 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: Shall be as shown in Table I:

TABLE I

Nominal Diameter of Core Wire Inch	Length Inches
1/16, 5/64	9
3/32	9 or 12
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
2.4	229 or 305
3.2, 4.0, 4.8, 6.4	356

3.4.1 Unless otherwise ordered, end-grip electrodes shall be supplied.

3.5 Tolerances:

3.5.1 Length: Unless otherwise specified, electrodes shall not vary in length more than ±1/4 in. (±6.4 mm) from the length ordered.

3.5.2 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 approved sample.

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 and shall be reponsible 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 perform such confirmatory testing as he deems necessary to assure 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 composition (3.1) grip-portion and arc ends (3.2.3), size (3.4), and tolerance (3.5) requirements are classified as acceptance or routine control tests.

4.2.2 Qualification Tests: Tests to determine conformance to weldability (3.2.1), burn-off (3.2.2), and cleaning (3.2.4), requirements are classified as qualification or periodic control tests.

4.3 Sampling: Shall be as agreed upon by purchaser and vendor.

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

4.4.1 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 ø 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 processing and, when requested, sample revised electrodes. No production electrodes incorporating the revised procedures shall be shipped prior to receipt of reapproval.

4.5 Reports:

4.5.1 The vendor of the 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, material specification number and its revision letter, control number, size, and quantity. Control number shall be a designation indicating batch processing and core wire heat number. When requested by the 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 to be supplied, the assembly manufacturer shall inspect each lot of electrodes to determine conformance to this specification and shall furnish with each shipment three copies of a report stating that the electrodes conform. This report shall include the purchase order number, material specification number and its revision letter, part 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 ø 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:

5.1.1.1 At least one legible imprint of the AWS classification (E502) shall be applied to the electrode covering as near as practical to the grip end of the core wire and within 2.5 in. or 64 mm of the grip end. In ø the case of center-grip electrodes, the imprint shall be applied to the electrode covering as above and upon both sides of the center grip (bare core wire) area. The prefix letter E in the electrode classification may be omitted from the imprint on the electrode covering.

5.1.1.2 The numbers of the imprinted electrode classification shall be of bold block type and of sufficient size ø and color contrast to be legible before and after normal welding applications.

5.1.2 Electrode Packages: Each package or container shall be legibly marked with the purchase order number, ø AMS 6467B, control number, size, quantity, type designation, recommended current value, and manufacturer's designation.

5.2 Packaging:

5.2.1 Packaging shall be accomplished in such a manner as to ensure that the electrodes, during shipment and storage, will be protected against mechanical injury and exposure to moisture. Such packaging shall not cause loss of moisture from the covering to the extent that use of the electrodes may be impaired.

5.2.2 The weight of the package shall be as agreed upon by purchaser and vendor.