

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 5781

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

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Revised

WELDING ELECTRODES, COATED, STEEL, CORROSION AND MODERATE HEAT RESISTANT
15.5Cr - 4.5Ni - 2.9Mo - 0.1N

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Primarily for metallic arc welding of parts fabricated from material of similar composition.
3. **COMPOSITION:** Electrodes shall be capable of depositing weld metal of the following composition:

Carbon	0.10 - 0.15
Manganese	0.50 - 1.25
Silicon	0.50 max
Phosphorus	0.04 max
Sulfur	0.03 max
Chromium	15.0 - 16.0
Nickel	4.0 - 5.0
Molybdenum	2.5 - 3.25
Nitrogen	0.07 - 0.13

- 3.1 **Weld Pads for Chemical Analysis:** The referee procedure for making pads of weld metal and removing samples for chemical analysis shall be ASTM A298-55T except that the sample shall not be removed within 1/2 in. of the base plate, unless the base plate is similar in composition to the core wire, in which case the sample may be removed from as close as 1/4 in. to the plate.

4. TYPE:

- 4.1 Coating shall be suitable for all position use with the following current:

Type	Current
A	DC
B	DC - AC

- 4.1.1 When DC is supplied, reverse polarity (electrode positive) is required.

- 4.2 Unless otherwise specified, Type A shall be supplied.

5. TECHNICAL REQUIREMENTS:

- 5.1 **Weldability:** Electrodes shall demonstrate good weldability and shall flow smoothly and evenly under the conditions specified in 4.1.
- 5.2 **Burn-Off:** The coating shall be consumed uniformly on all sides 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 coating within the ranges of current values recommended by the manufacturer.

Section 7C of the SAE Technical Board rules provides that: "All technical reports use by anyone engaged in industry or trade is entirely voluntary. There is no intent to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Proceedings users of the report are responsible for protecting themselves against liability for infringement of patents."

5.3 Grip Portion and Arc Ends: A portion of the electrode 0.75 - 1.25 in. long on end grip rods and 1.5 - 2 in. 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 coating begins shall not exceed the diameter of the bare wire, and in no case shall it exceed 1/8 inch.

5.4 Cleaning: Slag produced during welding shall be readily removable with hand tools.

6. QUALITY:

6.1 The core wire shall be uniform in quality and condition, clean, sound, and free from foreign materials and from imperfections detrimental to weld quality.

6.2 The coating shall be uniform in quality, tightly adherent, and free from abnormal scabs, blisters, pockmarks, bruises, and other surface imperfections and shall withstand normal handling without damage. It shall not be harmfully hygroscopic and shall not adversely affect weld quality.

7. STANDARD SIZES AND LENGTHS:

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

7.1 Unless otherwise specified, end grip electrodes shall be supplied in all lengths except 18 in. where center grip electrodes are required.

8. TOLERANCES:

8.1 Unless otherwise specified, electrodes shall not vary in length more than $\pm 1/8$ in. from the length ordered.

8.2 Electrode core wire shall not vary in diameter more than ± 0.003 in. from the size ordered.

8.3 Over-all diameter of the coated electrodes shall not vary more than 4% from that of the approved sample.

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

9. REPORTS:

9.1 Unless otherwise specified, the vendor of electrodes shall furnish with each shipment three copies of a report stating that the electrodes conform to the requirements of this specification. This report shall include the purchase order number, material specification number, 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.