

# AERONAUTICAL MATERIAL SPECIFICATIONS

## AMS 5031

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Revised

### WELDING ELECTRODES, COATED, STEEL 0.07 - 0.15C

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Primarily for use as filler metal for metal arc welding of low carbon steels.
3. **COMPOSITION:** Electrodes shall be capable of depositing weld metal of the following composition:

Carbon	0.07 - 0.15
Manganese	0.25 - 0.60
Silicon	0.15 - 0.50
Phosphorus	0.04 max
Sulfur	0.04 max
Copper	0.15 max

- 3.1 **Weld Pads for Chemical Analysis:** The reference procedure for making pads of weld metal and removing samples for chemical analysis shall be ASTM A316-58T.
4. **TYPE:** Electrodes shall be suitable for welding in all positions using AC, or DC straight polarity (electrode negative).
5. **TECHNICAL REQUIREMENTS:**
  - 5.1 **Tensile Properties:** All-weld-metal tensile specimens, prepared in accordance with ASTM A233-58T and tested in the as-welded condition, shall conform to the following requirements.

Tensile Strength, psi	67,000 min
Yield Point, psi	55,000 min
Elongation, % in 2 in.	17 min
  - 5.2 **Weldability:** Electrodes shall demonstrate good weldability and shall flow smoothly and evenly under the conditions specified in Section 4.
  - 5.3 **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 range of current values recommended by the manufacturer.

Section 7C of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no requirement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and applying technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the reports are responsible for protecting themselves against infringement of patents."

5.4 Grip Portion and Arc End: A portion of the electrode 0.75 - 1.25 in. long at one end shall be bare to permit good electrical contact with the electrode holder. The opposite, or arc, end of the electrode 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.

5.5 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	9
5/64	9 or 12
3/32	12
1/8, 5/32, 3/16	14
7/32	14 or 18
1/4, 5/16	18

7.1 Unless otherwise specified, end grip electrodes shall be supplied.

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  $\pm 0.002$  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 3% of the minimum core-plus-one-coating dimension.

9. REPORTS:

9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report stating that the product conforms 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.