

# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
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## WELDING ELECTRODES, COATED, ALLOY, CORROSION AND HEAT RESISTANT Cobalt Base - 20Cr - 10Ni - 15W

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. APPLICATION: Primarily for welding corrosion and heat resistant alloys of composition similar to that of the core wire.
3. COMPOSITION: Electrodes shall be capable of depositing weld metal of the following composition:

|            |             |
|------------|-------------|
| Carbon     | 0.05 - 0.15 |
| Manganese  | 1.0 - 2.0   |
| Silicon    | 1.0 max     |
| Phosphorus | 0.04 max    |
| Sulfur     | 0.03 max    |
| Chromium   | 19.0 - 21.0 |
| Nickel     | 9.0 - 11.0  |
| Tungsten   | 14.0 - 16.0 |
| Iron       | 3.0 max     |
| Cobalt     | remainder   |

- 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 A298-48T, except that 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 sample may be removed from as close as 1/4 in. to the plate.

### 4. TYPE:

- 4.1 Coatings shall be suitable for the following usability characteristics:

| Type Designation | Weld Position                           | Current |
|------------------|-----------------------------------------|---------|
| A                | Flat, Vertical, Overhead and Horizontal | DC      |
| B                | Flat, Vertical, Overhead and Horizontal | DC - AC |
| C                | Horizontal Fillets, Flat                | DC      |
| D                | Horizontal Fillets, Flat                | DC - AC |

- 4.1.1 When DC is specified, 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.

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- 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.
- 5.3 Grip Portion and Arc Ends: A portion of the electrode 0.75 to 1.25 in. long on end grip rods and 1.5 to 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 defects 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 defects 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: The following sizes and length are standard:

| Nominal Diameter of Core Wire, Inch | Length, Inches |
|-------------------------------------|----------------|
| 1/16, 5/64, 3/32                    | 9 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 plus and minus 1/8 in. from the length ordered.
- 8.2 Electrode core wire shall not vary in diameter more than plus and minus 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 5% of the minimum core-plus-one-coating dimension.