

# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
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## AMS 5677

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Revised

WELDING ELECTRODES, COATED, ALLOY, CORROSION AND HEAT RESISTANT  
Nickel Base - 19.5Cr - 1.6(Cb+Ta)

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, but only where thicknesses of approximately 0.125 in. or less are involved.
3. COMPOSITION: Electrodes shall be capable of depositing weld metal of the following composition:

Carbon	0.15	max
Manganese	1.5	max
Silicon	0.75	max
Sulfur	0.015	max
Chromium	18.0 - 21.0	
Nickel + Cobalt	71.0	min
Cobalt, if determined	1.0	max
Columbium + Tantalum	1.0 - 2.2	
Iron	4.0	max

- 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 Coating 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.

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 agreement 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 approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

- 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 electrodes 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:

Type Designation	Nominal Diameter of Core Wire, Inch		
	Flat	Horizontal	Vertical and Overhead
A(DC)	All	All	5/64, 3/32, 1/8, 5/32
B(AC)	1/8, 5/32, 3/16	1/8, 5/32	1/8, 5/32
C(DC)	All	All	--
D(AC)	1/8, 5/32, 3/16	1/8, 5/32, 3/16	--

- 7.1 Unless otherwise specified, end grip electrodes shall be supplied in all lengths except those exceeding 14 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 0.001 in. and minus 0.003 in. from the size ordered.
  - 8.3 Over-all diameter of the coated electrodes shall not vary more than 1/4% 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.