

AEROSPACE MATERIAL SPECIFICATION

SAE

MAM 5822

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Submitted for recognition as an American National Standard

STEEL, CORROSION AND HEAT RESISTANT, WELDING WIRE
11.8Cr - 2.8Ni - 1.6Co - 1.8Mo - 0.32V
Vacuum Induction Melted

UNS S41780

1. SCOPE:

1.1 Form:

This specification covers a corrosion and heat resistant steel in the form of welding wire.

1.1.1 AMS 5822 is the inch/pound version of this MAM.

1.2 Application:

This product has been used typically as bare filler metal for gas-metal-arc or gas-tungsten-arc welding of steels of similar composition, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2248 Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys

AMS 2371 Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock

AMS 2813 Packaging and Marking of Packaging of Welding Wire, Standard Method

AMS 2814 Packaging of Welding Wire, Premium Quality

AMS 2816 Identification, Welding Wire, Color Code System

ARP1876 Weldability Test for Weld Filler Metal Wire

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2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 353, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	min	max
Carbon	0.10	0.15
Manganese	0.40	1.30
Silicon	---	0.40
Phosphorus	---	0.010
Sulfur	---	0.008
Chromium	11.00	12.50
Nickel	2.50	3.00
Cobalt	1.30	2.00
Molybdenum	1.50	2.00
Vanadium	0.25	0.40
Oxygen	---	0.005 (50 ppm)
Nitrogen	---	0.040 (400 ppm)
Hydrogen	---	0.001 (10 ppm)

- 3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2248. No variation over maximum is permitted for oxygen, nitrogen, and hydrogen.

3.2 Melting Practice: (R)

Steel shall be vacuum induction melted; it may be remelted using consumable electrode vacuum process, but remelting is not required.

3.3 Condition:

Cold worked, bright finish, in a temper and with a surface finish which will provide proper feeding of the wire in machine welding equipment.

- 3.3.1 Wire shall be furnished on disposable spools for machine welding or in cut lengths for manual welding, as ordered.

3.3.2 In process annealing between cold working or drawing operations shall be performed in a suitable protective atmosphere.

3.3.3 Drawing compounds, oxides, dirt, and other foreign materials shall be removed by cleaning processes which will neither result in pitting nor cause gas absorption by the wire or deposition of substances harmful to welding operations.

3.4 Properties:

Wire shall conform to the following requirements:

3.4.1 Weldability: Melted wire shall flow smoothly and evenly during welding and shall produce acceptable welds. ARP1876 may be used to resolve disputes.

3.4.2 Spooled Wire: Shall conform to 3.4.2.1 and 3.4.2.2.

3.4.2.1 Cast: Wire, wound on standard 300-mm diameter spools, shall have imparted to it a curvature such that a specimen, sufficient in length to form one loop with a 25 mm overlap, when cut from the spool and laid on a flat surface, shall form a circle 380 to 1270 mm in diameter.

3.4.2.2 Helix: The specimen on which cast was determined, when laid on a flat surface and measured between adjacent turns, shall show vertical separation not greater than 25 mm.

3.5 Quality:

Wire, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to welding operations, operation of welding equipment, or properties of the deposited weld metal.

3.6 Sizes and Tolerances:

Wire shall be supplied in the sizes and to the tolerances shown in 3.6.1 and 3.6.2.

3.6.1 Diameter:

TABLE 2 - Wire Sizes and Tolerances

Form	Nominal Diameter Millimeter	Tolerance Millimeter plus	Tolerance Millimeter minus
Cut Lengths	0.8, 1.0, 1.2, 1.6	0.05	0.05
Cut Lengths	2.4, 3.2	0.08	0.08
Spools	0.3, 0.5	0.01	0.01
Spools	0.8, 1.0, 1.2, 1.6	0.02	0.02

3.6.2 Length: Cut lengths shall be furnished in 500, 750, or 900 mm lengths, as ordered, and shall not vary more than +0, -10 mm from the length ordered.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of wire shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for composition (3.1), sizes and tolerances (3.6), and alloy verification (5.2.1) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests: Tests for weldability (3.4.1), cast (3.4.2.1), and helix (3.4.2.2) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2371 and as specified herein.

4.4 Reports:

The vendor of wire shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and stating that the wire conforms to the other technical requirements. This report shall include the purchase order number, lot number, MAM 5822, nominal size, and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2371.

5. PREPARATION FOR DELIVERY:

5.1 Heat:

Wire on each spool shall be of one continuous length from the same heat of steel.

5.1.1 Butt welding is permissible provided both ends to be joined are identified by chemical analysis, or the repair is made at the wire processing station, and the weld will not interfere with uniform, uninterrupted feeding of the wire in machine welding equipment.

5.2 Identification:

Shall be in accordance with AMS 2816 or other method specified by purchaser. Tab marking of cut lengths is permissible.