SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5782F

Issued NOV 1948
Revised AUG 2002
Reaffirmed APR 2007

Superseding AMS 5782E

Steel, Corrosion and Heat-Resistant, Welding Wire 20.5Cr - 9.0Ni - 0.50Mo - 1.5W - 1.2Cb - 0.20Ti Vacuum Induction Melted

(Composition similar to UNS S63197)

RATIONALE

This document has been reaffirmed to comply with the SAE 5-year Review policy.

1. SCOPE:

1.1 Form:

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

1.2 Application:

This wire has been used typically as filler metal for gas-metal-arc or gas-tungsten-arc welding of steels of similar composition requiring joints with strength and corrosion resistance comparable to those of the basis metal, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: custsvc@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2248 Chemical Check Analysis Limits, 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 Packages of Welding Wire, Standard Method
AMS 2814 Packaging and Marking of Packages of Welding Wire, Premium Quality
AMS 2816 Identification, Welding Wire, Tab Marking Method
AMS 2819 Identification, Welding Wire, Direct Color Code System
ARP1876 Weldability Test for Weld Filler Metal Wire
ARP4926 Alloy Verification and Chemical Composition Inspection of Welding Wire

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM E 8 Tension Testing of Metallic Materials
ASTM E 8M Tension Testing of Metallic Materials (Metric)
ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

3. TECHNICAL REQUIREMENTS:

3.1 Wire 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 (3.1.1.1)	0.07	0.13
Manganese	1.00	2.00
Silicon	0.30	0.65
Phosphorus	--	0.15
Sulfur	--	0.10
Chromium	19.00	22.00
Nickel	8.00	9.50
Molybdenum	0.35	0.65
Tungsten	1.25	1.75
Columbium	1.00	1.40
Titanium	0.10	0.30
Tantalum	--	0.05
Copper	--	0.50

3.1.1 Chemical analysis of initial ingot, bar, or rod stock before drawing is acceptable provided processes used for drawing or rolling, annealing, and cleaning are conducted to ensure continued conformance to composition requirements.

3.1.1.1 Carbon shall also be determined periodically on finished wire (See 4.2.2).

3.1.2 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2248.

3.2 Melting Practice:

Steel shall be vacuum induction melted.

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 All wire shall have a smooth finish that is free from slivers, depressions, scratches, scale, seams, laps, and foreign matter that would adversely affect welding characteristics, operation of the welding equipment, or properties of the weld metal.

3.4 Fabrication:

3.4.1 In-process annealing between cold rolling or drawing operations shall be performed in vacuum or a protective atmosphere to avoid surface oxidation and absorption of other extraneous elements.

3.4.2 Butt welding is permissible provided both ends to be joined are alloy verified using a method or methods capable of distinguishing the alloy from all other alloys processed within the facility, or the repair is made at the wire processing station. The butt weld shall not interfere with uniform, uninterrupted feeding of the wire in machine welding equipment.

3.4.3 Residual elements, drawing compounds, oxides, dirt, oil, dissolved gases, and other foreign materials picked up during wire processing that can adversely affect the welding characteristics, the operation of the equipment, or properties of the weld metal, shall be removed by a cleaning process that will not result in pitting nor cause gas absorption by the wire nor deposit substances harmful to welding operations.

3.5 Properties:

Wire shall conform to the following requirements:

3.5.1 Tensile Properties: Wire, furnished on spools, shall have tensile strength of 110 to 150 ksi (758 to 1034 MPa), determined in accordance with ASTM E 8 or ASTM E 8M.

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

3.5.3 Spooled Wire: Shall conform to 3.5.3.1 and 3.5.3.2.

3.5.3.1 Cast: Wire, wound on standard 12-inch (305-mm) diameter spools, shall have imparted to it a curvature such that a specimen sufficient in length to form one loop with a 1-inch (25-mm) overlap, when cut from the spool and laid on a flat surface, shall form a circle 15 to 50 inches (381 to 1270 mm) in diameter.

3.5.3.2 Helix: The specimen on which cast was determined, when laid on a flat surface and measured between adjacent turns, shall show a vertical separation not greater than 1 inch (25 mm).

3.6 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.

3.7 Sizes and Tolerances:

Wire shall be supplied in the sizes and to the tolerances shown in 3.7.1 and 3.7.2.

3.7.1 Diameter: Shall be as shown in Table 2.

TABLE 2A - Sizes and Diameter Tolerances, Inch/Pound Units

Form	Nominal Diameter Inch	Tolerance Inch Plus and Minus
Cut Lengths	0.030, 0.035, 0.045	0.001
Cut Lengths	0.062, 0.078, 0.094, 0.125, 0.156, 0.187	0.002
Spools	0.007, 0.010, 0.015	0.0005
Spools	0.020, 0.030, 0.035, 0.045	0.001
Spools	0.062, 0.078, 0.094	0.002

TABLE 2B - Sizes and Diameter Tolerances, SI Units

Form	Nominal Diameter Millimeter	Tolerance Millimeter Plus and Minus
Cut Lengths	0.76, 0.89,1.14	0.025
Cut Lengths	1.57, 1.98, 2.39,3.18, 3.96, 4.75	0.05
Spools	0.18, 0.25, 0.38	0.013
Spools	0.51, 0.76, 0.89,1.14	0.025
Spools	1.57, 1.98, 2.39	0.05

3.7.2 Length: Cut lengths shall be furnished in 18, 27, or 36-inch (457, 686, or 914-mm) lengths, as ordered and shall not vary more than +0, -0.5 inch (-13 mm) from the length ordered.