AEROSPACE MATERIAL SPECIFICATION

AMS5782™	REV. J

Issued 1948-11
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Revised 2024-04

Superseding AMS5782H

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

AMS5782J is the result of a Five-Year Review and update of the specification. The revision updates reporting of composition (see 3.1.2), removes requirements for alloy identification, adds country of origin to reporting (see 4.4), and updates the prohibition on exceptions (see 4.4.1, 5.3.1, and 8.4).

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.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2248 Chemical Check Analysis Limits, Corrosion- and Heat-Resistant Steels and Alloys, Maraging and Other Highly Alloyed Steels, and Iron Alloys

AMS2371 Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

For more information on this standard, visit
https://www.sae.org/standards/content/AMS5782J

AMS2813 Packaging and Marking of Packages of Welding Wire, Standard Method

AMS2814 Packaging and Marking of Packages of Welding Wire, Premium Quality

AMS2816 Identification, Welding Wire, Tab Marking Method

AMS2819 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

AS7766 Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A751 Chemical Analysis of Steel Products

ASTM E8/E8M Tension Testing of Metallic Materials

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Wire Composition

Composition shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM A751 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon (see 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 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.3 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.2 Melting Practice

Steel shall be vacuum induction melted.

3.3 Condition

Wire shall be cold worked, bright finish, in a temper and with a surface finish that 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 Wire shall be formed from rod or bar descaled by a process that does not affect the composition of the wire. Surface irregularities inherent with a forming process that do not tear the wire are acceptable provided the wire conforms to the tolerances of 3.6.

3.4.2 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 materials.

3.4.3 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.

3.4.4 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 neither result in pitting nor cause gas absorption by the wire nor deposition of 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 E8/E8M.

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

Spooled wire shall conform to 3.5.3.1, 3.5.3. 2, and 3.5.3.3.

3.5.3.1 Winding

Filler metal in coils and on spools shall be wound so that kinks, waves, sharp bends, overlapping, or wedging are not encountered, leaving the filler metal free to unwind without restriction. The outside end of the electrode (the end where welding is to begin) shall be identified so it can be located readily and shall be fastened to avoid unwinding. The winding shall be level winding.

3.5.3.2 Cast

Wire, wound on standard diameter spools as shown in Table 2, 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 (cast) within the limits shown in Table 2.

3.5.3.3 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 shown in Table 2.

Table 2A - Cast and helix requirements, inch/pound units

Spool Diameter	Cast-Diameter Inches		Helix Inches
Inches	Min	Max	Max
4	2.5	15	0.5
8	8	50	1
12	15	50	1

Table 2B - Cast and helix requirements, SI units

Spool Diameter	Cast-Diameter Millimeters		Helix Millimeters
Millimeters	Min	Max	Max
100	65	380	13
200	200	1300	25
300	380	1300	25

3.6 Quality

Wire, as received by the 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

Wire diameter shall be as shown in Table 3.

Table 3A - 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 3B - Sizes and diameter tolerances, SI units

Form	Nominal Diameter Millimeters	Tolerance Millimeters 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.

3.8 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of wire shall supply all samples for the producer's test and shall be responsible for the performance of all required tests. The purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (see 3.1), tensile properties (see 3.5.1), sizes and tolerances (see 3.7), and alloy verification (see 5.2) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests

Determination of carbon on finished wire (see 3.1.1.1), weldability (see 3.5.2), cast (see 3.5.3.2), and helix (see 3.5.3.3) are periodic tests and shall be performed at a frequency selected by the producer unless frequency of testing is specified by the purchaser.

4.3 Sampling and Testing

Sampling shall be in accordance with AMS2371 and as specified herein.