AEROSPACE MATERIAL SPECIFICATION

AMS5802™	REV. E

Issued 1987-10
Revised 2011-04
Stabilized 2017-06

Superseding AMS5802D

Iron-Nickel Alloy, Corrosion and Heat-Resistant, Welding Wire
41Fe - 37.5Ni - 14Co - 4.8Cb (Nb) - 1.5Ti
Vacuum Melted, Low Expansion
(Composition similar to UNS N19907)

RATIONALE

AMS5802E stabilizes this document because it contains mature technology that is not expected to change and thus no further revisions are anticipated.

STABILIZED NOTICE

AMS5802E has been declared "STABILIZED" by the AMS F Corrosion Heat Resistant Alloys Committee. This document was stabilized because this document contains mature technology that is not expected to change and thus no further revisions are anticipated. Previously this document was reaffirmed. The last technical update of this document occurred in April, 2011. Users of this document should refer to the cognizant engineering organization for disposition of any issues with reports/certifications to this specification; including exceptions listed on the certification.

NOTE: In many cases, the purchaser may represent a sub tier supplier and not the cognizant engineering organization.

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**

SAE values your input. To provide feedback on this Technical Report, please visit
http://standards.sae.org/AMS5802E

1. SCOPE

1.1 Form

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

1.2 Application

This wire has been used typically as filler metal for gas-tungsten-arc or gas-metal-arc welding of alloys of similar composition requiring joints with strength and corrosion resistance comparable to those of the base 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 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

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

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 E 354 Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

3. TECHNICAL REQUIREMENTS

3.1 Composition

Wire shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

Element	min	max
Carbon (3.1.2)	--	0.06
Manganese	--	1.00
Silicon	0.25	0.50
Sulfur	--	0.010
Phosphorus	--	0.015
Nickel	35.00	40.00
Cobalt	12.00	16.00
Columbium (Niobium)	4.30	5.20
Titanium	1.30	1.80
Chromium	--	1.00
Tantalum	--	0.05
Aluminum	--	0.20
Boron	--	0.012
Copper	--	0.50
Iron	remainder	

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.1.2 Shall be determined on finished wire.

3.1.3 Chemical analysis of initial ingot, bar, or rod stock before drawing, other than those analyses required to be done on the finished wire, is acceptable provided the processes used for drawing or rolling, annealing, and cleaning, are controlled to ensure continued conformance to chemical composition requirements.

3.2 Melting Practice

Alloy shall be multiple melted using consumable electrode practice in the remelt cycle or shall be vacuum induction melted. If consumable electrode remelting is not performed in vacuum, electrodes which have been produced by vacuum induction melting shall be used for remelting.

3.3 Condition

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

3.4 Fabrication

3.4.1 Wire shall be formed from rod or bar descaled by a process which does not affect the composition of the wire. Surface irregularities inherent with a forming process that does not tear the wire surfaces are acceptable provided the wire conforms to the tolerances of 3.7.

3.4.2 Butt welding is permissible provided both ends to be joined are alloy verified using a method capable of distinguishing the alloy from all other alloys processed in 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 In-process annealing, if required, between cold rolling or drawing operations, shall be performed in vacuum or protective atmospheres to ensure freedom from surface oxidation and absorption of other extraneous elements.

3.4.4 Residual elements, drawing compounds, oxides, dirt, oil, dissolved gasses and other foreign materials picked up during wire processing that can adversely affect the welding characteristics, the operation of the equipment, or the properties of the weld metal, shall be removed by cleaning processes that will neither result in pitting nor cause gas absorption by the wire or deposition of substances harmful to welding operations.

3.4.4.1 If pickling is necessary to remove surface contamination or scaling, only a light pickle shall be used followed by vacuum degassing.

3.5 Properties

Wire shall conform to the following requirements:

3.5.1 Weldability

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

3.5.2 Spooled Wire

Shall conform to 3.5.2.1 and 3.5.2.2.

3.5.2.1 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.

3.5.2.2 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 standard 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 TOLERANCES, INCH/POUND UNITS

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

TABLE 2B - SIZES AND TOLERANCES, SI UNITS

Form	Nominal Diameter Millimeters	Tolerance, Millimeter Plus and Minus
Cut Lengths	0.76, 0.89, 1.14	0.05
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, 1.57	0.025
Spools	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 (+0, -13 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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to specified requirements.