



AEROSPACE MATERIAL SPECIFICATION

AMS 5829

Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N. Y. 10001

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Revised

ALLOY WIRE, WELDING, CORROSION AND HEAT RESISTANT
Nickel Base - 19.5Cr - 18Co - 2.5Ti - 1.5Al

1. SCOPE:

- 1.1 Form: This specification covers a corrosion and heat resistant nickel-base alloy in the form of welding wire.
- 1.2 Application: Primarily as filler metal for gas-metal-arc welding nickel-base alloys of similar composition requiring joints with strength and corrosion resistance comparable to those of the basis metal.
2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

- 2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, New York 10001.

2.1.1 Aerospace Material Specifications:

AMS 2269 - Chemical Check Analysis Limits, Wrought Nickel and Nickel-Base Alloys

AMS 2350 - Standards and Test Methods

AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Alloys, Wrought Products Except Forgings

AMS 2813 - Packaging, Welding Wire, Standard Method

AMS 2815 - Identification, Welding Wire, Line Code System

- 2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

ASTM E354 - Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt-Base Alloys

- 2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

3. TECHNICAL REQUIREMENTS:

- 3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E354, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other approved analytical methods:

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	min	max
Carbon	--	0.13
Manganese	--	1.00
Silicon	--	1.00
Sulfur	--	0.015
Chromium	18.00 - 21.00	
Cobalt	15.00 - 21.00	
Titanium	2.00 - 3.00	
Aluminum	1.00 - 2.00	
Iron	--	1.50
Copper	--	0.20
Zirconium	--	0.15
Boron	--	0.02
Lead	--	0.002 (20 ppm)
Silver	--	0.0005 (5 ppm)
Bismuth	--	0.0001 (1 ppm)
Nickel	remainder	

3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2269.

3.2 Condition: Cold drawn, bright finish, in a temper which will provide proper feeding of the wire in machine welding equipment. Wire shall be furnished on disposable spools for machine welding or in cut lengths for manual welding, as ordered.

3.2.1 In-process annealing between cold rolling or drawing operations shall be performed in a suitable protective atmosphere.

3.2.2 Oxides, dirt, and drawing compounds shall be removed by processes which will neither result in pitting nor cause gas absorption by the wire or deposition of substances harmful to welding operations.

3.3 Properties:

3.3.1 Weldability: Melted wire shall flow smoothly and evenly during welding and shall be capable of producing acceptable welds, determined by a procedure agreed upon by purchaser and vendor.

3.3.2 Spooled Wire: Shall conform to the following, unless otherwise agreed upon by purchaser and vendor:

3.3.2.1 Cast: Wire shall have imparted to it a curvature such that a specimen sufficient in length to form one loop, when cut from the spool and laid on a flat surface, shall form a circle not less than 15 in. (381 mm) and not greater than 30 in. (762 mm) in diameter.

3.3.2.2 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 in. (25 mm).

3.4 Quality: Material shall be melted under vacuum. Wire shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to welding operations, operation of welding equipment, or properties of the deposited weld metal.

3.5 Sizes and Tolerances: Wire shall be supplied in the sizes and to the tolerances shown in 3.5.1 and 3.5.2.

3.5.1 Diameter:TABLE I

Form	Nominal Diameter Inch	Tolerance, Inch	
		plus	minus
Cut Lengths	0.030, 0.045, 0.062, 0.093, 0.125	0.003	0.003
Spools	0.030, 0.035, 0.045	0.001	0.002
Spools	0.062, 0.093	0.002	0.002

TABLE I (SI)

Form	Nominal Diameter Millimeters	Tolerance, Millimeter	
		plus	minus
Cut Lengths	0.76, 1.14, 1.57, 2.36, 3.18	0.08	0.08
Spools	0.76, 0.89, 1.14	0.03	0.05
Spools	1.57, 2.36	0.05	0.05

3.5.2 Length: Cut lengths shall be furnished in 18, 27, or 36 in. (457, 656, or 914 mm) lengths, as ordered, and shall not vary more than +0, -1/2 in. (-12.7 mm) from the length ordered.

4. QUALITY ASSURANCE PROVISIONS:

- 4.1 Responsibility for Inspection: The vendor of wire shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to assure that the wire conforms to the requirements of this specification.
- 4.2 Classification of Tests:
- 4.2.1 Acceptance Tests: Tests to determine conformance to composition (3.1) and tolerance (3.5) requirements are classified as acceptance or routine control tests.
- 4.2.2 Qualification Tests: Tests to determine conformance to weldability (3.3.1), cast (3.3.2.1), and helix (3.3.2.2) requirements are classified as qualification or periodic control tests.
- 4.3 Sampling: Shall be in accordance with AMS 2371 and as specified herein.
- 4.4 Reports:
- 4.4.1 The vendor of wire shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat in the shipment and a statement that the wire conforms to the other technical requirements of this specification. This report shall include the purchase order number, heat number, material specification number, nominal size, and quantity from each heat.
- 4.4.2 When parts made of this wire or assemblies requiring use of this welding wire are supplied, the part or assembly manufacturer shall inspect each lot of wire to determine conformance to the requirements of this specification and shall furnish with each shipment three copies of a report stating that the wire conforms. This report shall include the purchase order number, material specification number, part or assembly number, and quantity.
- 4.5 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the wire may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the wire represented and no additional testing shall be permitted. Results of all tests shall be reported.