



Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 5796A

Superseding AMS 5796

Issued 2-15-52

Revised 10-15-80

UNS R30605

ALLOY WELDING WIRE, CORROSION AND HEAT RESISTANT
52Co - 20Cr - 10Ni - 15W

1. SCOPE:

- 1.1 Form: This specification covers a corrosion and heat resistant cobalt alloy in the form of welding wire.
- 1.2 Application: Primarily for use as filler metal for gas-tungsten-arc or gas-metal-arc welding of parts fabricated from alloys of similar or dissimilar composition. For use also as stapling pins requiring high strength up to 1500°F (815°C) and oxidation resistance up to 2000°F (1095°C).

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., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2269 - Chemical Check Analysis Limits, Wrought Nickel Alloys and Cobalt Alloys
AMS 2350 - Standards and Test Methods
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products Except Forgings and Forging Stock
AMS 2813 - Packaging of Welding Wire, Standard Method
AMS 2815 - Identification, Welding Wire, Line Code System
AMS 2816 - Identification, Welding Wire, Color Code System

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

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

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

2.3.1 Federal Standards:

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

SAE Technical Board rules provide that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade or their use by governmental agencies is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

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 analytical methods approved by purchaser:

	min	max
Carbon	0.05	0.15
Manganese	1.00	2.00
Silicon	--	1.00
Phosphorus	--	0.04
Sulfur	--	0.03
Chromium	19.00	21.00
Nickel	9.00	11.00
Tungsten	14.00	16.00
Iron	--	3.00
Cobalt	remainder	

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

- 3.2 Condition: Cold drawn and bright annealed.

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

- 3.2.2 Drawing compounds, oxides, dirt, and oil 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.

- 3.2.2.1 If pickling is necessary to remove surface contamination or scaling, only a light pickle shall be used.

- 3.3 Properties: Wire shall conform to the following requirements:

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

- 3.3.2 Spooled Wire: Shall conform to 3.3.2.1 and 3.3.2.2, 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. (380 mm) and not greater than 30 in. (760 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: Wire, as received by purchaser, shall be uniform in quality and condition, 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, 0.078	0.002	0.002
Cut Lengths	0.093, 0.125, 0.156, 0.188	0.003	0.003
Spools	0.007, 0.010, 0.015, 0.020	0.0005	0.0005
Spools	0.030, 0.035, 0.045	0.001	0.002
Spools	0.062, 0.078, 0.093	0.002	0.002

TABLE I (SI)

Form	Nominal Diameter Millimetres	Tolerance, Millimetre	
		plus	minus
Cut Lengths	0.75, 1.15, 1.55, 2.00	0.05	0.05
Cut Lengths	2.35, 3.20, 4.00, 4.75	0.08	0.08
Spools	0.20, 0.25, 0.40, 0.50	0.015	0.015
Spools	0.75, 0.90, 1.15	0.03	0.05
Spools	1.55, 2.00, 2.35	0.05	0.05

- 3.5.2 Length: Cut lengths shall be furnished in 18, 27, or 36 in. (450, 675, or 900 mm) lengths, as ordered, and shall not vary more than +0, -0.5 in. (-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 performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to sample and to perform such confirmatory testing as he deems necessary to ensure 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 requirements for composition (3.1) and tolerances (3.5) are classified as acceptance tests and shall be performed on each lot.

- 4.2.2 Periodic Tests: Tests to determine conformance to requirements for weldability (3.3.1), cast (3.3.2.1), and helix (3.3.2.2) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

- 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 showing the results of tests for chemical composition of each heat and stating that the wire conforms to the other technical requirements of this specification. This report shall include the purchase order number, heat number, AMS 5796A, nominal size, and quantity from each heat.