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400 Commonwealth Drive, Warrendale, PA 15096-0001

# AEROSPACE MATERIAL SPECIFICATION

**SAE**

**AMS 5679F**

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Superseding AMS 5679E

Submitted for recognition as an American National Standard

**NICKEL ALLOY, CORROSION AND HEAT RESISTANT, WELDING WIRE**  
73Ni - 15.5Cr - 2.2Cb - 8.0Fe

**UNS N06062**

## 1. SCOPE:

### 1.1 Form:

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

### 1.2 Application:

This wire has been used typically as bare wire filler metal for gas-tungsten-arc or gas-metal-arc welding of parts fabricated from alloys of similar composition, but usage is not limited to such applications.

## 2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

### 2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2269 Chemical Check Analysis Limits, Wrought Nickel Alloys and Cobalt Alloys

AMS 2371 Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock

AMS 2813 Packaging of Welding Wire, Standard Method

AMS 2814 Packaging of Welding Wire, Premium Quality

AMS 2816 Identification, Welding Wire, Color Code System

ARP1876 Weldability Test for Weld Filler Metal Wire

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## 2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

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

## 3. TECHNICAL REQUIREMENTS:

## 3.1 Composition:

(R)

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	--	0.08
Manganese	--	1.00
Silicon	--	0.35
Sulfur	--	0.015
Chromium	14.00	17.00
Columbium	1.50	3.00
Iron	6.00	10.00
Cobalt (3.1.1)	--	1.00
Copper	--	0.50
Nickel + Cobalt	70.00	--

3.1.1 Determination not required for routine acceptance.

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

## 3.2 Condition:

(R)

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

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

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

3.2.3 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.

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**3.3 Properties:**

Wire shall conform to the following requirements:

**3.3.1 Weldability:** Melted wire shall flow smoothly and evenly during welding and (R) shall produce acceptable welds. ARP1876 may be used to resolve disputes.

**3.3.2 Spooled Wire:** Shall conform to 3.3.2.1 and 3.3.2.2.

**3.3.2.1 Cast:** Wire, wound on standard 12-inch (305-mm) diameter spools, shall (R) have imparted to it a curvature such that a specimen sufficient in length, 4 to 14 feet (1.2 to 4.3 m), to form one loop, 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.

**3.3.2.2 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 inch (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 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 Table 2 and 3.5.2.

**3.5.1 Diameter:**  
(R)

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

Form	Nominal Diameter Inch	Tolerance	
		Inch plus	Inch minus
Cut Lengths	0.030, 0.035, 0.045, 0.062, 0.078	0.002	0.002
Cut Lengths	0.094, 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, 0.094	0.002	0.002

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TABLE 2B - Wire Sizes and Tolerances, SI Units

Form	Nominal Diameter Millimeters	Tolerance Millimeter plus	Tolerance Millimeter minus
Cut Lengths	0.76, 0.89, 1.14, 1.57, 1.98	0.05	0.05
Cut Lengths	2.39, 3.18, 3.96, 4.78	0.08	0.08
Spools	0.18, 0.25, 0.38, 0.51	0.013	0.013
Spools	0.76, 0.89, 1.14	0.025	0.05
Spools	1.57, 1.98, 2.39	0.05	0.05

3.5.2 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.

#### 4. QUALITY ASSURANCE PROVISIONS:

##### 4.1 Responsibility for Inspection:

(R)

The vendor of the wire shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to the requirements of this specification.

##### 4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for composition (3.1), sizes and tolerances (3.5), (R) and alloy verification (5.2.1) are acceptance tests and shall be performed on each heat or lot as applicable.

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

##### 4.3 Sampling and Testing:

(R)

Shall be in accordance with AMS 2371 and as specified herein.

##### 4.4 Reports:

The vendor of wire shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and stating that the wire conforms to the other technical requirements. This report shall include the purchase order number, heat and lot number, AMS 5679F, nominal size, and quantity.

##### 4.5 Resampling and Retesting:

Shall be in accordance with AMS 2371.