# AEROSPACE MATERIAL SPECIFICATION

| AMS5824™ | REV. G |
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Issued 1969-11
Reaffirmed 2011-10
Revised 2022-10

Superseding AMS5824F

# Steel, Corrosion-Resistant, Welding Wire 17Cr - 7.1Ni - 1.0Al (Composition similar to UNS S17780)

RATIONALE

AMS5824G is the result of a Five-Year Review and update of the specification. The revision updates reporting and composition test methods (3.1, 3.1.1), updates requirements for spooled wire (3.4.2), prohibits unauthorized exceptions (3.7, 4.4.1, 5.3.1, 8.4), requires reporting of country of origin (4.4), removes reference to pickling (3.3.4), and allows prior revisions (8.3).



## 1. SCOPE

### 1.1 Form

This specification covers a corrosion-resistant steel 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 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)
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**SAE WEB ADDRESS:** http://www.sae.org

**For more information on this standard, visit**
https://www.sae.org/standards/content/AMS5824G/

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

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Wire Composition

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

***Table 1 - Composition***

| Element | Min | Max |
|---|---|---|
| Carbon (3.1.3) | -- | 0.09 |
| Manganese | -- | 1.00 |
| Silicon | -- | 0.50 |
| Phosphorus | -- | 0.025 |
| Sulfur | -- | 0.025 |
| Chromium | 16.00 | 17.25 |
| Nickel | 6.50 | 7.75 |
| Aluminum | 0.75 | 1.25 |



3.1.1 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.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.1.3 Shall be determined on finished wire.

3.1.4 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 Condition

Cold drawn, bright finish, in an as-drawn temper, and with a surface finish which will provide proper feeding of the wire in machine welding equipment.

3.3 Fabrication

3.3.1 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 3.6.

3.3.2 Butt welding is permissible only at diameters larger than final finished product size 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.

3.3.3 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.

3.3.4 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 Properties

Wire shall conform to the following requirements.

3.4.1 Weldability

Melted wire shall flow smoothly and evenly during welding and shall produce acceptable welds, determined by a procedure acceptable to purchaser. ARP1876 may be used to resolve disputes.

3.4.2 Spooled Wire

Shall conform to 3.4.2.1,3.4.2.2, and 3.4.2.3.

3.4.2.1 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.

3.4.2.2 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).

3.4.2.3 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 on spools shall be level winding.

3.5 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.

3.6 Sizes and Tolerances

Wire shall be supplied in the sizes and to the tolerances shown in 3.6.1 and 3.6.2.

3.6.1 Diameter

Shall be as shown in Table 2.

***Table 2A - Standard diameters and tolerances, inch/pound units***

| Form | Nominal Diameter Inches | Tolerance, Inches 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 2B - Standard diameters and 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 | 0.25 |
| Spools | 1.57, 1.98, 2.39 | 0.05 |

3.6.2 Length

Cut lengths shall be furnished in 18, 27, or 36 inch (457, 686, or 914 mm) lengths, or other lengths when specified by purchaser, and shall not vary more than +0, -0.5 inch (+0, -13 mm) from the length ordered.

3.7 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 producer'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.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (3.1), tolerances (3.6), 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

Weldability (3.4.1), cast (3.4.2.1), and helix (3.4.2.2) are periodic tests and shall be performed at a frequency selected by the producer unless frequency of testing is specified by purchaser.