



# AEROSPACE MATERIAL SPECIFICATION

**AMS5808™****REV. D**

Issued 1993-01  
Revised 2018-03  
Reaffirmed 2022-11

Superseding AMS5808C

Steel, Corrosion- and Heat-Resistant, Welding Wire  
19Cr - 13Ni - 2.5Mo  
High Ferrite Grade, Trace Element Controlled

## RATIONALE

AMS5808D revises chemical analysis standard (3.1), fabrication (3.3.2), winding (3.4.2.3), length (3.6.2), reports (4.4 and 4.4.1), and identification (5.3.1), and results from a Five-Year Review and update to this document.

AMS5808D has been reaffirmed to comply with the SAE Five-Year Review policy.

### 1. SCOPE

#### 1.1 Form

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

#### 1.2 Application

This wire has been used typically as filler metal for gas-metal-arc or gas-tungsten-arc welding of corrosion and heat-resistant steels and alloys, 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](http://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

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2022 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

**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](mailto:CustomerService@sae.org)  
<http://www.sae.org>

**For more information on this standard, visit**  
<https://www.sae.org/standards/content/AMS5808D/>

**SAE WEB ADDRESS:**

|         |                                                                        |
|---------|------------------------------------------------------------------------|
| 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                            |
| ARP1917 | Clarification of Terms Used in Aerospace Metals Specifications         |
| 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](http://www.astm.org).

ASTM A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

## 2.3 AWS Publications

Available from American Welding Society, 8669 NW 36 Street, #130, Miami, FL 33166-6672, Tel: 1-800-443-9353 or 305-443-9353, [www.aws.org](http://www.aws.org).

AWS Handbook, Volume 4, 7th Edition Metals and Their Weldability

## 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 E353, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

**Table 1 - Composition**

| Element    | Min   | Max               |
|------------|-------|-------------------|
| Carbon     | --    | 0.030             |
| Manganese  | 1.00  | 2.50              |
| Silicon    | 0.30  | 0.65              |
| Phosphorus | --    | 0.015             |
| Sulfur     | --    | 0.010             |
| Chromium   | 18.00 | 20.00             |
| Nickel     | 12.00 | 14.00             |
| Molybdenum | 2.00  | 3.00              |
| Copper     | --    | 0.50              |
| Boron      | --    | 0.003 (30 ppm)    |
| Aluminum   | --    | 0.10              |
| Lead       | --    | 0.0005 (5 ppm)    |
| Bismuth    | --    | 0.00003 (0.3 ppm) |
| Selenium   | --    | 0.0003 (3 ppm)    |
| Calcium    | --    | 0.0010 (10 ppm)   |
| Oxygen     | --    | 0.0025 (25 ppm)   |
| Nitrogen   | --    | 0.0060 (60 ppm)   |
| Hydrogen   | --    | 0.0010 (10 ppm)   |

3.1.1 Except for hydrogen, nitrogen, and oxygen, chemical analysis of initial ingot, bar, or rod stock before drawing is acceptable provided processes used for drawing or rolling, annealing, and cleaning are controlled to ensure continued conformance to composition requirements.

### 3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248 except that no variation over maximum is permitted for lead, bismuth, selenium, calcium, oxygen, nitrogen, and hydrogen.

### 3.1.3 Ferrite Control

Ferrite number of the wire shall not be less than 4.0 based on the calculated ferrite content from the DeLong diagram (refer to American Welding Handbook, Volume 4, 7th Edition, page 106).

## 3.2 Condition

Cold worked, bright finish, in a 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 within 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 a vacuum or protective atmosphere 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. 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 a curvature such that a specimen sufficient in length to form one loop with a nominal 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 Size and Tolerance

Wire shall be supplied in the standard sizes and to the tolerances shown in Table 2 and 3.6.2.

### 3.6.1 Diameter

Shall be as shown in Table 2.

**Table 2**

**Table 2A - Sizes and diameter tolerance, inch/pound units**

| Form        | Nominal Diameter<br>Inch                    | Tolerance<br>Inch<br>Plus/Minus |
|-------------|---------------------------------------------|---------------------------------|
| Cut Lengths | 0.030, 0.035, 0.045,                        | 0.001                           |
| Cut Lengths | 0.062, 0.078, 0.094, 0.125,<br>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 - Sizes and diameter tolerances, SI units**

| Form        | Nominal Diameter<br>Millimeters       | Tolerance<br>Millimeter<br>Plus/Minus |
|-------------|---------------------------------------|---------------------------------------|
| Cut Lengths | 0.76, 0.89, 1.14,                     | 0.025                                 |
| Cut Lengths | 1.57, 1.98, 2.39, 3.18,<br>3.96, 4.75 | 0.05                                  |
| Spools      | 0.18, 0.25, 0.38,                     | 0.013                                 |
| Spools      | 0.51, 0.76, 0.89, 1.14,               | 0.025                                 |
| 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.