SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS6468 | REV. E

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Superseding AMS6468D

Steel, Welding Wire
1.0Cr - 10Ni - 3.8Co - 0.45Mo - 0.08V (0.14 - 0.17C)
Vacuum Melted, Environment Controlled Packaging
(Composition Similar to UNS K91461)

RATIONALE

AMS6468E results from a Five Year Review and update of this document.

1. SCOPE

1.1 Form

This specification covers an alloy steel in the form of welding wire.

1.2 Application

This wire has been used typically as filler metal for gas-tungsten-arc and gas-metal-arc welding of low-alloy steels having similar composition and requiring a combination of high strength and high notch toughness without the need for post-weld heat treatment, 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 724-776-4970 (outside USA), www.sae.org.

AMS2259 Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels

AMS2300 Steel Cleanliness, Premium Aircraft-Quality, Magnetic Particle Inspection Procedure

AMS2370 Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Wrought Products and Forging Stock

AMS2813 Packaging and Marking of Packages of Welding Wire, Standard Method

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
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS6468E

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

AMS6523 Steel, Sheet, Strip, and Plate, 0.75Cr - 9.0Ni - 4.5Co - 1.0Mo - 0.09V (0.17 - 0.23C), Vacuum Consumable Electrode Melted, Annealed

ARP1876 Weldability Test for Weld Filler Metal Wire

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.

ASTM D 2650 Chemical Composition of Gasses by Mass Spectrometry

ASTM E 350 Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

ASTM E 1032 Radiographic Examination of Weldments

ASTM E 1820 Measurement of Fracture Toughness

3. TECHNICAL REQUIREMENTS

3.1 Wire Composition

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 350, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 – COMPOSITION

Element	min	max
Carbon (3.1.1.1)	0.14	0.17
Manganese	0.40	0.55
Silicon	0.15	0.25
Phosphorus	--	0.006
Sulfur	--	0.005
Chromium	0.90	1.05
Nickel	9.75	10.25
Cobalt	3.50	4.00
Molybdenum	0.40	0.50
Vanadium	0.06	0.10
Copper	--	0.10
Oxygen (3.1.1.1)	--	0.0025 (25 ppm)
Nitrogen (3.1.1.1)	--	0.0050 (50 ppm)
Hydrogen (3.1.1.1)	--	0.0005 (5 ppm)

3.1.1 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 requirements.

3.1.1.1 Carbon, oxygen, nitrogen, and hydrogen shall also be determined periodically on finished wire (See 4.2.2).

3.1.1.2 The hydrogen content of the wire shall be determined at final diameter in accordance with ASTM D 2650.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2259.

3.2 Melting Practice

Steel shall be vacuum induction melted; it may be re-melted using consumable electrode vacuum practice (VAR) in the remelt cycle, but remelting is not required.

3.2.1 Steel shall be premium aircraft-quality conforming to AMS2300.

3.3 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.

3.4 Fabrication

3.4.1 In-process annealing, if required between cold rolling or drawing operations, shall be performed in vacuum or protective atmosphere to avoid surface oxidation and adsorption of other extraneous elements.

3.4.2 Butt welding is permissible provided both ends to be joined are either alloy verified using a method or methods 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 equipment.

3.4.3 Drawing compounds, oxides, dirt, oil, and other foreign materials 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.

3.4.4 Residual elements and dissolved gasses picked up during wire processing that can adversely affect the welding characteristics, the operation of the equipment, or the properties of weld metal shall be removed.

3.5 Properties

Wire shall conform to the following requirements:

3.5.1 Weldability

Melted wire shall flow smoothly and evenly during welding and shall produce acceptable welds. ARP1876 may be used to resolve disputes.

3.5.2 Spooled Wire

Shall conform to 3.5.2.1 and 3.5.2.2.

3.5.2.1 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.

3.5.2.2 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).

3.5.3 Fracture Toughness

When specified by purchaser, test specimens prepared as in 4.3.1 shall be fracture toughness tested in accordance with ASTM E 1820. Standards for acceptance for fracture toughness, when specified, shall be as agreed upon by purchaser and vendor.

3.6 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.

3.7 Sizes and Tolerances

Wire shall be supplied in the sizes and to the tolerances shown in 3.7.1 and 3.7.2.

3.7.1 Diameter

Shall be as shown in Table 2.

TABLE 2A - SIZES AND DIAMETER TOLERANCES, INCH/POUND UNITS

Form	Nominal Diameter Inch	Tolerance Inch Plus and Minus
Cut Lengths	0.030, 0.035, 0.045	0.001
Cut Lengths	0.062, 0.094, 0.125	0.002
Spools	0.020, 0.025	0.0005
Spools	0.030, 0.035, 0.045	0.001
Spools	0.062, 0.094	0.002

TABLE 2B - SIZES AND DIAMETER TOLERANCES, SI UNITS

Form	Nominal Diameter Millimeters	Tolerance Millimeter Plus and Minus
Cut Lengths	0.76, 0.089, 1.14	0.025
Cut Lengths	1.57, 2.39, 3.18	0.05
Spools	0.51, 0.64	0.013
Spools	0.76, 0.89, 1.14	0.025
Spools	1.57, 2.39	0.05

3.7.2 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 (+0, -13 mm) from the length ordered.