



AEROSPACE MATERIAL SPECIFICATION	AMS6375™	REV. D
	Issued 1991-07 Reaffirmed 2010-10 Revised 2016-01 Superseding AMS6375C	
Steel, Welding Wire 0.50Cr - 0.55Ni - 0.20Mo (0.18 - 0.23C) (SAE 8620) Vacuum Melted, Environment Controlled Packaging (Composition similar to UNS G86200)		

RATIONALE

AMS6375D is a Five Year Review and update of this specification that brings requirements in line with similar weld wire compositions. Type 2 copper coated wire was removed from this document.

1. SCOPE

1.1 Form

This specification covers a low-alloy steel in the form of welding wire. Type 2 – Copper Coated Wire was removed from this document (see 8.5).

1.2 Application

This wire has been used typically as filler metal for gas-metal-arc or gas-tungsten-arc welding of steels of similar composition where the weld area is required to have strength and toughness comparable to those of the parent 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.

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

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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
AMS6350	Steel Sheet, Strip, and Plate, 0.95Cr - 0.20Mo - (0.28 - 0.33C) (SAE 4130)
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 A370	Mechanical Testing of Steel Products
ASTM D2650	Chemical Composition of Gasses by Mass Spectroscopy
ASTM E350	Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron
ASTM E1032	Radiographic Inspection of Welds

3. TECHNICAL REQUIREMENTS

3.1 Wire Composition

Wire shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E350, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element	min	max
Carbon (3.1.1.1)	0.18	0.23
Manganese	0.70	1.00
Silicon	0.15	0.35
Phosphorus	--	0.008
Sulfur	--	0.008
Phosphorus + Sulfur	--	0.012
Chromium	0.40	0.60
Nickel	0.40	0.70
Molybdenum	0.15	0.25
Copper	--	0.35
Oxygen (3.1.1.1)	--	0.010 (100 ppm)
Nitrogen (3.1.1.1)	--	0.0050 (50 ppm)
Hydrogen (3.1.1.1)	--	0.0010 (10 ppm)

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

3.1.1.1 Carbon, oxygen nitrogen and hydrogen shall be determined on each lot with carbon and hydrogen determined on finished wire. Hydrogen shall be determined in accordance with ASTM D2650.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2259. No variation over maximum is permitted for oxygen, nitrogen, and hydrogen.

3.2 Melting Practice

Steel shall be either vacuum induction melted or consumable electrode vacuum remelted.

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 Wire shall be formed from rod or bar descaled by a process that does not affect the composition of the wire. Surface irregularities inherent with a forming process that do not tear the wire surface are acceptable provided the wire conforms to the tolerances of 3.7.

3.4.2 In-process annealing between cold rolling or drawing operations shall be performed in a protective atmosphere to avoid surface oxidation and adsorption of other extraneous elements.

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 Butt welding is permissible only at diameters larger than final finished product provided both ends to be joined are alloy verified using a method or methods 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 equipment.

3.4.5 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 adsorption by the wire or deposition of substances harmful to the welding operations.

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 weldability disputes.

3.5.2 Spooled Wire

Shall conform to 3.5.2.1, 3.5.2.2 and 3.5.2.3.

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 1,270 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).

3.5.2.3 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 shall be level winding.

3.5.3 Tensile Properties

Specimens, prepared in accordance with 4.3.1 and tested in accordance with ASTM A370, shall have average tensile strength not lower than 90% of the average of the control specimens of 4.3.1; elongation of the welded specimens shall be not less than 6% in -inches (50.8 mm).

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, 0.078, 0.094, 0.125	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 Millimeters	Tolerance
		Millimeter Plus and Minus
Cut Lengths	0.76, 0.89, 1.14	0.025
Cut Lengths	1.57, 1.98, 2.39, 3.18	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