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Superseding AMS 5027B

Submitted for recognition as an American National Standard

WIRE, STEEL WELDING
1.05Cr - 0.55Ni - 1.0Mo - 0.70V (0.26 - 0.32C)
Vacuum Melted, Environment-Controlled Packaging

UNS K22925

1. SCOPE:

1.1 Form:

This specification covers a low-alloy steel in the form of welding wire.

1.2 Application:

This wire has been used typically as filler metal for gas-tungsten-arc welding of heat-treatable steels of similar composition where the weld area is required to have strength comparable to that of the base metal, 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.

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2.1 SAE Publications:

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

- AMS 2259 Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels
- AMS 2370 Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Wrought Products and Forging Stock
- AMS 2813 Packaging of Welding Wire, Standard Method
- AMS 2814 Packaging of Welding Wire, Premium Quality
- AMS 2815 Identification, Welding Wire, Line Code System
- AMS 2816 Identification, Welding Wire, Color Code System
- ARP1876 Weldability Test for Weld Filler Metal Wire

2.2 ASTM Publications:

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

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

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 350, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	min	max
Carbon	0.26	0.32
Manganese	0.60	0.90
Silicon	0.10	0.30
Phosphorus	--	0.010
Sulfur	--	0.010
Chromium	0.90	1.20
Nickel	0.40	0.70
Molybdenum	0.90	1.10
Vanadium	0.05	0.10
Copper	--	0.35
Hydrogen (3.1.2)	--	0.0010 (10 ppm)
Oxygen (3.1.2)	--	0.0025 (25 ppm)
Nitrogen (3.1.2)	--	0.0050 (50 ppm)

3.1.1 Check Analysis: Composition variations shall meet the applicable
(R) requirements of AMS 2259. No variation over maximum is permissible for oxygen, nitrogen, and hydrogen.

3.1.2 Shall be determined on finished wire, but not required for cut lengths.
(R)

3.2 Melting Practice:
(R)

Steel shall be multiple melted using consumable electrode vacuum practice in the remelt cycle.

3.3 Condition:
(R)

Cold drawn, bright finish, in a temper and with a surface finish which will provide proper feeding of the wire in machine welding equipment. Wire shall be formed from bar descaled by a process which does not affect the composition of the wire. Surface irregularities inherent with a forming process which does not tear the wire surface are acceptable provided the wire conforms to the tolerances of 3.6.

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

3.3.2 In-process annealing, if required, between cold rolling or drawing
(R) operations shall be performed under vacuum or in an inert gas atmosphere.

3.3.3 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.

3.3.4 Residual elements and dissolved gases deposited on, or absorbed by, the welding wire as a result of cleaning or drawing operations shall be removed.

3.4 Properties:

Wire shall conform to the following requirements:

3.4.1 Weldability:
(R)

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

3.4.2 Spooled Wire: Shall conform to 3.4.2.1 and 3.4.2.2.

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 4 - 14 feet (1.2 - 4.3 m), to form one loop, when cut from the spool and laid on a flat surface, shall form a circle 15 - 50 inches (381 - 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 (25.4 mm).

3.5 Quality:

3.6 Sizes and Tolerances:

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

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

Form	Standard Sizes Nominal Diameter Inch	Tolerance	
		Inch plus	Inch minus
Cut Lengths	0.030, 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

TABLE 2B - Sizes and Tolerances, SI Units

Form	Standard Sizes Nominal Diameter Inch	Tolerance	
		Millimeter plus	Millimeter minus
Cut Lengths	0.76, 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

3.6.1 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.