AEROSPACE
MATERIAL SPECIFICATIONS
SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

AMS 6461B

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STEEL WIRE, WELDING
0.95Cr - 0.2V (0.28 - 0.33C) SAE 6130
Vacuum Melted

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. APPLICATION: Primarily for use as filler metal for inert gas arc welding of critical weldments of low alloy steels where the joint is capable of being heat treated to 180,000 psi tensile strength.

3. COMPOSITION:

Carbon	0.28 - 0.33
Manganese	0.70 - 0.90
Silicon	0.20 - 0.35
Phosphorus	0.008 max
Sulfur	0.008 max
Phosphorus + Sulfur	0.012 max
Chromium	0.80 - 1.10
Vanadium	0.15 - 0.25
Oxygen	0.0025 max
Hydrogen	0.0025 max
Nitrogen	0.005 max

3.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2259, paragraph titled "Low Alloy Steels".

4. CONDITION: Unless otherwise specified, wire shall be cold drawn, bright finish, as drawn temper. Wire shall be furnished on disposable spools for machine welding and in cut lengths for manual welding operations, as ordered. Surface roughness of spooled wire shall be as agreed upon by purchaser and vendor.

4.1 Drawing compounds, oxides, and dirt shall be removed.

4.2 Residual elements and dissolved gases deposited on, or absorbed by, the welding wire as a result of cleaning or drawing operations shall be removed by vacuum degassing. Annealing, if required, shall be performed in vacuum or inert gas atmosphere.

5. TECHNICAL REQUIREMENTS:

5.1 Welding: Melted wire shall flow smoothly and evenly during welding and shall be capable of producing acceptable welds.

5.2 Tensile Properties: Deposited weld metal shall be capable of meeting the following requirement:

5.2.1 A single butt joint vee groove weld shall be made between two pieces of AMS 6350 plate 1/4 in. thick, which are chamfered to a 60 deg included angle and to full depth. The weld metal shall be finished flush with the parent metal on both faces. The weld area in the location of the tensile specimen or specimens shall be free from defects detrimental to the tensile properties of the weld as revealed by radiography. After heat treating the parent metal to tensile strength not lower than 180,000 psi, a tensile test specimen machined in accordance with ASTM E8-57T, cut with the weld in the approximate center of the gage length and perpendicular to the longitudinal axis of the specimen, shall meet the following requirements:

Tensile Strength Through Weld Area	90% min of parent metal
Elongation, % in 2 in.	5 min

5.3 Spooled Wire: Shall conform to the following unless otherwise agreed upon by purchaser and vendor.

5.3.1 Cast: Wire shall have imparted to it a curvature such that a specimen 6 - 8 ft in length, when cut from the spool and suspended freely from its approximate midlength, shall form a circle not less than 20 in. and not greater than 36 in. in diameter (See Fig. 1). If the curvature of the wire results in a coil of more than 1-1/2 turns, the excess shall be clipped off and the wire resuspended from its new approximate midlength.

5.3.2 Helix: A specimen cut and suspended as in 5.3.1 and measured between adjacent turns shall show a separation not greater than 4 in. (See Fig. 1).

5.3.3 Layer Winding: Wire shall be closely wound in layers but adjacent turns within a layer need not necessarily be touching; shall be wound so as to avoid producing kinks, waves, and sharp bends; and shall be free to unwind without restriction caused by overlapping or wedging. The outside end of the spooled wire shall be so treated that it may be readily located.

5.4 Heat: Wire on each spool shall be one continuous length from the same heat of material. Cut lengths in any one package shall be from the same heat of material.

6. QUALITY: Unless otherwise specified, steel shall be vacuum induction melted. Wire shall be uniform in quality and condition, clean, sound, smooth, and free from foreign materials and from internal and external imperfections detrimental to welding operations, operation of welding equipment, or properties of the deposited weld metal.

7. SIZES AND TOLERANCES: Unless otherwise specified, wire shall be supplied in the following sizes and to the tolerances shown.

7.1 Diameter:

Form	Nominal Diameter Inch	Tolerance, Inch Plus or Minus
Cut Lengths	0.045, 0.062, 0.093, 0.125	0.003
Spools	0.030, 0.035, 0.045, 0.062, 0.093	0.001
Spools	0.007, 0.010, 0.015, 0.020	0.0005

7.2 Length: Cut lengths shall be furnished in 18, 27, or 36 in. lengths, as ordered, and shall not vary more than ± 1/4 in. from the length ordered.