

MATERIAL SPECIFICATIONS

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

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Revised

STEEL WIRE, WELDING, CORROSION RESISTANT
12.5Cr (SAE 51410 Modified)
Special Grade

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. APPLICATION: Primarily for use as filler material for welding corrosion resistant alloys of similar composition which have requirements for control of ferrite.
3. COMPOSITION:

Carbon	0.11 - 0.15
Manganese	0.60 max
Silicon	0.50 max
Phosphorus	0.025 max
Sulfur	0.025 max
Chromium	11.50 - 12.50
Nickel	0.75 max
Molybdenum	0.20 max
Aluminum	0.05 max
Copper	0.50 max
Tin	0.05 max
Nitrogen	0.08 max

- 3.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2248.
4. CONDITION: Unless otherwise specified, cold drawn, annealed, descaled, and bright drawn. Wire shall be furnished on disposable spools for machine welding and in cut lengths for manual welding, as ordered.
 - 4.1 Drawing compounds, oxides, and dirt shall be removed.
 - 4.1.1 If pickling is necessary to remove surface contamination or scaling, only a light pickle shall be used and this shall be followed by a vacuum degassing operation.
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 Hardenability: Weld metal deposits approximately 1/4 in. in thickness deposited on AMS 5505 sheet shall be capable of attaining hardness of Rockwell C 39 - 44 or equivalent, when heated to 1700 F + 10, held at heat for 1 hr, and cooled in still air, and then tempered twice at 600 F + 10 for 2 hours. Cooling after each tempering operation shall be accomplished in still air.
 - 5.3 Spooled Wire: Shall conform to the following, unless otherwise agreed upon by purchaser and vendor.

Section 8.3 of the SAE Technical Board rules provides that: "All technical reports including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no attempt to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report, in formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

- 5.3.1 Cast: Wire shall have imparted to it a curvature such that a specimen 10 - 12 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. Straight lengths in any one package shall be from the same heat of material.
6. QUALITY: Wire shall be uniform in quality and condition, clean, sound, smooth, and free from foreign materials and from internal and external imperfections detrimental to its use for welding operations, operation of welding equipment, or properties of 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					Tolerance, Inch Plus and Minus
	Inch					
Cut Lengths	0.045,	0.062,	0.093,	0.125,	0.156	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 $\pm 1/4$ in. from the length ordered.
8. REPORTS: Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat in the shipment and a statement that the product conforms to the technical requirements of this specification. This report shall include the purchase order number, material specification number, nominal size, and quantity from each heat.
- 8.1 Unless otherwise specified, when parts made of this wire or assemblies requiring the use of this welding wire are supplied, the part or assembly manufacturer shall inspect each lot of wire to determine conformance to this specification and shall furnish with each shipment three copies of a report stating that the wire conforms to the requirements of this specification. This report shall include the purchase order number, material specification number, part or assembly number, and quantity.

9. PACKAGING AND MARKING: Packaging shall be accomplished in such a manner as to ensure that the wire, during shipment and storage, will be protected against mechanical injury, contamination, and moisture.

9.1 Cut Lengths:

9.1.1 Wire shall be furnished in standard containers of approximately 5, 10, 50 or 100 lb net weight, as specified.

9.1.2 When specified, cut lengths shall be marked, cleaned, and packaged in accordance with the latest issue of AMS 2815.

9.2 Spooled Wire:

9.2.1 Spools shall be of such material and construction as to provide adequate strength and rigidity to prevent damage or distortion in normal handling and use, and to insulate the wire from the spindle.

9.2.2 Unless otherwise specified, spool dimensions shall conform to the approximate dimensions shown in Fig. 2. Barrel diameter B shall be such as to permit proper feeding of the wire.

9.2.3 Unless otherwise specified, wire shall be furnished on spools of approximately 5, 10, or 25 lb net weight, as ordered; up to 20% of the net weight of any lot in the shipment may be on spools containing not less than 50% of the ordered spool net weight.

9.3 Both sides of each spool for spooled wire, and each bundle and container shall be permanently and legibly marked with the following information:

STEEL WIRE, WELDING, CORROSION RESISTANT
 AMS 5821
 SIZE _____
 QUANTITY _____
 HEAT NUMBER _____
 PURCHASE ORDER NUMBER _____
 MANUFACTURER'S IDENTIFICATION _____
 IDENTIFICATION METHOD (WHEN SPECIFIED) FOR CUT LENGTHS _____

10. REJECTIONS: Material not conforming to this specification or to authorized modifications will be subject to rejection.