



AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N. Y. 1000

AMS 4956

Issued 5-1-69
Revised

TITANIUM ALLOY WIRE, WELDING 6Al - 4V - Extra Low Interstitial Environment Controlled

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. APPLICATION: Primarily for premium quality gas tungsten-arc welding of base metal of similar composition intended for cryogenic or elevated temperature applications. This wire is used for joints requiring sufficiently high reliability that it may be used with equipment providing continuous inert gas shielding of the wire as it passes from the dispenser to the welding arc.

3. COMPOSITION:

	min	max	Target Maxima
Aluminum	5.50	6.75	
Vanadium	3.50	4.50	
Iron	--	0.15	
Manganese	--	0.10	
Oxygen	--	0.08	0.05
Carbon	--	0.03	0.01
Nitrogen	--	0.012 (120 ppm)	50 ppm
Hydrogen	--	0.005 (50 ppm)	10 ppm
Other elements, each	--	0.03 (1)	
Other elements, total	--	0.10 (1)	
Titanium	remainder		

(1) Determination not required for routine acceptance.

- 3.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2249.
4. CONDITION: Unless otherwise specified, wire shall be formed from bar descaled by a process which does not affect the composition of the material. Surface irregularities inherent with a forming process which does not tear the wire surface are acceptable provided the wire conforms to the tolerances of Section 7 and the irregularities are free from contaminants. Wire shall be furnished on disposable spools for machine welding or in cut lengths for manual welding, as ordered.
 - 4.1 Annealing: Unless otherwise specified, wire shall be furnished in the vacuum annealed condition.
 - 4.2 Drawing compounds, oxides, and dirt shall be removed from the surface of the wire.
5. TECHNICAL REQUIREMENTS:
 - 5.1 Welding:
 - 5.1.1 Melted wire shall flow smoothly and evenly during welding and shall be capable of producing acceptable welds by a method agreed upon by purchaser and vendor.
 - 5.2 Spooled Wire: Shall conform to the following unless otherwise agreed upon by purchaser and vendor.

SAE Technical Board rules provide that: "All technical reports, including standards approved by the Board, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement 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 infringement of patents."

- 5.2.1 Cast: Wire shall have imparted to it a curvature such that a specimen sufficient in length to form one loop, when cut from the spool and laid on a flat surface, shall form a circle not less than 15 in. and not greater than 30 in. in diameter.
- 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.
- 5.2.3 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.
- 5.3 Heat: Wire on each spool shall be of 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, material shall be produced by multiple melting using consumable electrode practice; at least one of the melting cycles shall be under vacuum. The product shall be uniform in quality and condition, clean, sound, 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:

Nominal Diameter Inch	Tolerance, Inch plus and minus
0.030, 0.045, 0.062, 0.093, 0.125	0.003

- 7.2 Lengths: Cut lengths shall be furnished in 18, 27, or 36 in. lengths, as ordered, and shall not vary more than +0, -1/2 in. from the length ordered.

8. REPORTS:

- 8.1 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.
- 8.2 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. IDENTIFICATION: Unless otherwise specified, identification shall appear on unit containers in accordance with the applicable requirements of the latest issue of AMS 2815.
10. PACKAGING: Unless otherwise specified, after final processing wire shall be packaged in a hermetically sealed container filled with inert gas under slight positive pressure which will provide continuous inert gas coverage during storage until container is opened.
11. APPROVAL:
- 11.1 To assure adequate performance characteristics, wire samples shall be approved by purchaser, unless such approval be waived.