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400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4189B
Superseding AMS 4189A

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ALUMINUM ALLOY WELDING WIRE
4.1Si - 0.2Mg (4643)

UNS A94643

1. SCOPE:

1.1 Form: This specification covers an aluminum alloy in the form of welding wire.

1.2 Application: Primarily for use as filler metal for gas-metal-arc and gas-tungsten-arc welding of heavy sections of aluminum alloys such as AMS 4117 to produce joints having inherently low dilution ratio of base-metal to weld-metal, and where the weldment may require solution or precipitation heat treatment, or both.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2355 - Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings
MAM 2355 - Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings, Metric (SI) Units
AMS 2813 - Packaging of Welding Wire, Standard Method
AMS 2815 - Identification, Welding Wire, Line Code System
AMS 2816 - Identification, Welding Wire, Color Code System

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined in accordance with AMS 2355 or MAM 2355:

	min	max
Silicon	3.6	4.6
Magnesium	0.10	0.30
Iron	--	0.8
Titanium	--	0.15
Copper	--	0.10
Zinc	--	0.10
Manganese	--	0.05
Beryllium	--	0.0008
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

3.2 Condition: As drawn, in a temper which will provide proper feeding of the wire in machine-welding equipment.

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

3.2.2 Oxides, dirt, and drawing compounds 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 Properties: Wire shall conform to the following requirements:

3.3.1 Weldability: Melted wire shall flow smoothly and evenly during welding and shall produce acceptable welds, determined by a procedure agreed upon by purchaser and vendor.

3.4 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.

3.5 Sizes and Tolerances: Wire shall be supplied in the sizes and to the tolerances shown in 3.5.1 and 3.5.2.

3.5.1 Diameter:

TABLE I

Form	Nominal Diameter Inch	Tolerance, Inch plus	Tolerance, Inch minus
Cut Lengths	0.047, 0.062, 0.078, 0.094, 0.125	0.003	0.003
Spools	0.030, 0.035, 0.047	0.001	0.002
Spools	0.062, 0.078, 0.094	0.002	0.002

TABLE I (SI)

Form	Nominal Diameter Millimetres	Tolerance, Millimetre plus	minus
Cut Lengths	1.15, 1.55, 1.95, 2.35, 3.10	0.08	0.08
Spools	0.75, 0.90, 1.15	0.02	0.05
Spools	1.55, 1.95, 2.35	0.05	0.05

3.5.2 Length: Cut lengths shall be furnished in 36-in. (900 mm) lengths unless 27-in. (675-mm) or 18-in. (450-mm) lengths are ordered, and shall not vary more than +0, -1/2 in. (-12 mm) from the length ordered.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of wire shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1) and tolerances (3.5) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for weldability (3.3.1) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling: Shall be in accordance with AMS 2355 or MAM 2355.

4.4 Reports:

4.4.1 The vendor of wire shall furnish with each shipment a report stating that the wire conforms to the chemical composition and other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 4189B, nominal size, and quantity from each lot.

4.4.2 When parts made of this wire or assemblies requiring use of this welding wire are supplied, the part or assembly manufacturer shall inspect each lot of wire to determine conformance to the requirements of this specification and shall furnish with each shipment a report stating that the wire conforms. This report shall include the purchase order number, AMS 4189B, part or assembly number, and quantity.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2355 or MAM 2355.