Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4189

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Revised

ALUMINUM ALLOY WELDING WIRE
4.1Si - 0.2Mg (X4643)

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 and/or precipitation heat treatment.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2355 - Quality Assurance Sampling and Testing of Aluminum-Base and Magnesium-Base Alloys, Wrought Products (Except Forgings and Forging Stock) and Flash Welded Rings
AMS 2813 - Packaging of Welding Wire, Standard Method
AMS 2815 - Identification, Welding Wire, Line Code System

2.2 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.2.1 Military Specifications:

MIL-W-10430 - Welding Rods and Electrodes; Preparation for Delivery of

3. TECHNICAL REQUIREMENTS:

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

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3.2 Condition: As drawn, in a temper which will provide proper feeding of the wire in machine-welding equipment. Wire shall be furnished on disposable spools for machine welding and in cut lengths for manual welding operations, as ordered.

3.2.1 Oxides, dirt, and drawing compounds shall be removed by 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:

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 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.

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, 0.093, 0.125	0.003	0.003
Spools	0.030, 0.035, 0.047	0.001	0.002
Spools	0.062, 0.093	0.001	0.002

TABLE I (SI)

Form	Nominal Diameter Millimetres	Tolerance, Millimetres plus	Tolerance, Millimetres minus
Cut Lengths	1.19, 1.57, 2.36, 3.18	0.08	0.08
Spools	0.76, 0.89, 1.19	0.03	0.05
Spools	1.57, 2.36	0.05	0.05

3.5.2 Length: Cut lengths shall be furnished in 36-in. (914 mm) lengths unless 27-in. (686 mm) or 18-in. (457 mm) lengths are ordered, and shall not vary more than +0, -1/2 in. (-12.7 mm) from the length ordered.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of wire shall supply all samples 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 perform such confirmatory testing as he deems 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 composition (3.3.1) and tolerance (3.5) requirements are classified as acceptance or routine control tests.

4.2.2 Qualification Tests: Tests to determine conformance to weldability (3.3.1) requirements are classified as qualification or periodic control tests.

4.3 Sampling: Shall be in accordance with AMS 2355.