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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4395E

Issued JAN 1962
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Reaffirmed APR 2006

Superseding AMS 4395D

Magnesium Alloy Welding Wire
9.0Al - 2.0Zn (AZ92A)

UNS M11922

1. SCOPE:

1.1 Form:

This specification covers a magnesium alloy in the form of welding wire.

1.2 Application:

This wire has been used typically as filler metal for gas-metal-arc and gas-tungsten-arc welding of magnesium alloys with aluminum as a significant alloying element particularly those parts requiring consistently high-quality joints, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order form a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged or Flash Welded Rings
MAM 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged or Flash Welded Rings, Metric (SI) Units
AMS 2813	Packaging of Welding Wire, Standard Method
AMS 2816	Identification, Welding Wire, Tab Marking Method

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.1 (Continued):

AMS 2819	Identification, Welding Wire, Direct Color Code Method
AMS 4375	Magnesium Alloy Sheet and Plate, 3.0Al - 1.0Zn (AZ31B-0), Annealed and Recrystallized
ARP1876	Weldability Test for Weld Filler Metal Wire
ARP4926	Alloy Verification and Chemical Composition Inspection of Welding Wire

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS 2355 or MAM 2355:

TABLE 1 - Composition

Element	min	max
Aluminum	8.3	9.7
Zinc	1.7	2.3
Manganese	0.15	0.50
Beryllium	0.0002	0.0008
Silicon	--	0.05
Copper	--	0.05
Nickel	--	0.005
Iron	--	0.005
Other Impurities, total	--	0.30
Magnesium	remainder	

3.1.1 Chemical analysis of initial ingot, bar, or rod stock is acceptable provided the processes used for manufacture and cleaning are controlled to ensure conformance to composition requirements, and the facility employs procedures to ensure traceability of wire to the originally analyzed ingot.

3.2 Condition:

Wire for cut lengths shall be extruded and for spooled wire shall be extruded and sized.

3.3 Fabrication:

3.3.1 Butt welding is permissible provided both ends to be joined are identified by chemical analysis or the repair is made at the wire processing station. The butt weld shall not interfere with uniform, uninterrupted feeding of the wire in machine welding equipment.

3.3.2 Oxides, dirt, and extruding 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.

3.4 Properties:

Wire shall conform to the following requirements:

3.4.1 Weldability: Melted wire shall flow smoothly and evenly and shall produce, on panels of AMS 4375 magnesium alloy, a pool of molten metal of uniform appearance and form. Welding of parts by a qualified welding operator shall produce a weld bead of uniform appearance and form, free from oxide, excessive or unacceptable porosity, entrapped slag, and other defects. ARP1876 may be used to resolve disputes.

3.5 Quality:

Wire, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and imperfections detrimental to welding operations, operation of welding equipment, or properties of the deposited weld metal.

3.6 Sizes and Tolerances:

Wire shall be supplied in the sizes and to the tolerances shown in 3.6.1 and 3.6.2.

3.6.1 Diameter: Shall conform to the tolerances shown in Table 2.

TABLE 2A - Tolerances, Inch-Pound Units

Form	Nominal Diameter Inch	Tolerance, Inch plus	Tolerance, Inch minus
Cut Lengths	0.062 to 0.250, incl	0.007	0.007
Spools	0.040 to 0.125, incl	0.003	0.004
	Over 0.125 to 0.187, incl	0.007	0.007

TABLE 2B - Tolerances, SI Units

Form	Nominal Diameter Millimeters	Tolerance, Millimeter plus	Tolerance, Millimeter minus
Cut Lengths	1.57 to 6.25, incl	0.18	0.18
Spools	1.00 to 3.00, incl	0.076	0.10
	Over 3.00 to 4.75, incl	0.18	0.18

3.6.2 Length: Cut lengths shall be furnished in 36-inch (900-mm) lengths and shall not vary more than +0, -1/2 inch (-12 mm).

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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Composition (3.1) and sizes and tolerances (3.6) are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Weldability (3.3.1) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2355 or MAM 2355.

4.4 Reports:

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 4395E, nominal size, and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2355 or MAM 2355.

5. PREPARATION FOR DELIVERY:

5.1 Wire shall be supplied on spools in one continuous length for machine welding or in cut lengths for manual welding, as ordered.

5.2 Wire on each spool shall be of one continuous length from the same heat of alloy. Packages of cut lengths shall not contain wire from more than one heat of alloy.

5.3 Wire furnished on spools shall be closely wound in layers but adjacent turns within a layer need not necessarily be touching. Wire 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.

5.4 Wire from each spool or package of cut lengths shall be alloy verified by a method acceptable to purchaser. The alloy verification procedures of ARP4926 are recommended.

5.4.1 An 8-inch (203-mm) length of wire shall be made accessible at both ends of each spool for alloy verification.