SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS4387 | REV. E

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Superseding AMS4387D

Magnesium Alloy Extrusions
2.3Zn - 0.62Zr (ZK21A-F)
As Extruded

(Composition similar to UNS M16210)

RATIONALE

AMS4387E has been reaffirmed to comply with the SAE five-year review policy.

NONCURRENT NOTICE

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of February, 2006. It is recommended, therefore, that this specification not be specified for new designs.

"NONCURRENT" refers to those specifications which have previously been widely used and which may be required for production or processing of existing designs in the future. The Aerospace Materials Division, however, does not recommend these specifications for future use in new designs. "NONCURRENT" specifications are available from SAE upon request.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
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SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4387E

1. SCOPE

1.1 Form:

This specification covers a magnesium alloy in the form of extruded bars, rods, wire, tubing, and shapes.

1.2 Application

Primarily for parts requiring good weldability and moderate strength and which do not require stress relief after welding.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms 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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS 2205 Tolerances, Aluminum Alloy and Magnesium Alloy Extrusions
AMS 2355 Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products
ASTM E 9 Compression Testing of Metallic Materials at Room Temperature

3. TECHNICAL REQUIREMENTS

3.1 Composition

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

TABLE 1 - COMPOSITION

Element	min	max
Zinc	2.0	2.6
Zirconium	0.45	0.8
Other Elements, each	--	0.10
Other Elements, total	--	0.30
Magnesium	remainder	

3.2 Condition

As extruded.

3.2.1 Extrusions shall be supplied with an as-extruded surface finish; light polishing to remove minor surface imperfections is permissible provided such imperfections can be removed within the dimensional tolerances of 3.5.

3.3 Properties

Extrusions shall conform to the following requirements:

3.3.1 Tensile Properties

Shall be as follows, determined in accordance with AMS 2355:

3.3.1.1 Bars, Rods, Wire, and Solid Shapes Under 5 Square Inches (32 cm^2) in Cross-Sectional Area

Shall be as shown in Table 2:

TABLE 2 - MINIMUM TENSILE PROPERTIES

Tensile Strength, minimum	38 ksi (262 MPa)
Yield Strength at 0.2% Offset, minimum	28 ksi (192 MPa)
Elongation in 4D, minimum	4%

3.3.1.2 Tubing 3.0 Inches (76 mm) and Under in Nominal OD and Hollow Shapes

Shall be as shown in Table 3:

TABLE 3 - MINIMUM TENSILE PROPERTIES

Tensile Strength, minimum	34 ksi (262 MPa)
Yield Strength at 0.2% Offset, minimum	26 ksi (192 MPa)
Elongation in 4D, minimum	4%

3.3.1.3 Tensile property requirements for bars, rods, wire, and solid shapes 5 square inches (32 cm^2) and over in cross-sectional area and for tubing over 3.0 inches (76 mm) in nominal OD shall be as agreed upon by purchaser and vendor.

3.3.2 Compressive Properties

Shall be as follows, determined in accordance with ASTM E 9 on specimens taken in the longitudinal direction from bars, rods, tubing, and shapes:

3.3.2.1 Bars, Rods, and Solid Shapes Under 5 Square Inches (32 cm^2) in Cross-Sectional Area

Compressive Yield Strength at 0.2% Offset, minimum: 20 ksi (138 MPa)

3.3.2.2 Tubing 3.0 Inches (76 mm) and Under in Nominal OD and Hollow Shapes

Compressive Yield Strength at 0.2% Offset, minimum: 14 ksi (97 MPa)

3.3.2.3 Compressive property requirements for bars, rods, and solid shapes 5 square inches (32 cm^2) and over in cross-sectional area and for tubing over 3.0 inches (76 mm) in nominal OD shall be as agreed upon by purchaser and vendor.

3.4 Quality

Extrusions, as received by purchaser, shall be uniform in quality and condition, sound, and free from segregation and foreign materials and from imperfections detrimental to usage of the extrusions.

3.5 Tolerances

Shall conform to all applicable requirements of AMS 2205.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The vendor of extrusions shall supply all samples for vendor's tests and shall be responsible for the performance of 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 extrusions conform to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (3.1), tensile properties (3.3.1), and tolerances (3.5) are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests

Compressive properties (3.3.2) are 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.

4.4 Reports

The vendor of extrusions shall furnish with each shipment a report stating that the extrusions conform to the composition and other technical requirements of this specification. This report shall include the purchase order number, AMS 4387E, size or section identification number, and quantity.

4.5 Resampling and Retesting

Shall be in accordance with AMS 2355.

5. PREPARATION FOR DELIVERY

5.1 Identification

Extrusions shall be identified as follows:

5.1.1 Each straight bar, rod, and tube 0.500 inch (12.70 mm) and over in nominal OD or least width of flat surface and each straight shape with configuration allowing access to a flat surface at least 0.500 inch (12.70 mm) wide recessed not more than 1/8 inch (3.2 mm) below the outline of the shape shall be marked in a row of characters recurring at intervals not greater than 3 feet (914 mm) with the alloy number temper, AMS 4387E, and manufacturer's identification. The inspection lot number shall be included in the row marking or shall be marked near one end. The characters shall be of such size as to be legible, shall be applied using a suitable marking fluid, and shall be sufficiently stable to withstand normal handling. The markings shall have no deleterious effect on the extrusions or their performance.

5.1.2 All straight extrusions other than those of 5.1.1 shall be securely bundled, boxed, or secured on lifts and identified by two durable tags marked with the information of 5.1.1, including the inspection lot number, and attached, not farther than 2 feet (610 mm) from each end, to the extrusions in each bundle, box, or lift.