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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4352G

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Superseding AMS 4352F

Submitted for recognition as an American National Standard

EXTRUSIONS, MAGNESIUM ALLOY 5.5Zn - 0.45Zr (ZK60A-T5) Precipitation Heat Treated

UNS M16600

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:

These extrusions have been used typically for parts requiring toughness and moderate abrasion resistance, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

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

AMS 2205 Tolerances, Aluminum Alloy and Magnesium Alloy Extrusions
MAM 2205 Tolerances, Metric, 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
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 2750 Pyrometry
AMS 2811 Identification, Aluminum and Magnesium Alloy Wrought Products

Printed in U.S.A.
91-0942/ EG

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

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:
(R)

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
Zinc	4.8	6.2
Zirconium	0.45	--
Impurities, each (3.1.1)	--	0.10
Impurities, total (3.1.1)	--	0.30
Magnesium	remainder	

3.1.1 Determination not required for routine acceptance.
(R)

3.2 Condition:

Precipitation heat treated.

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 3.6.

3.3 Heat Treatment:
(R)

Extrusions shall be precipitation heat treated by heating to 300 °F ± 15 (149 °C ± 8), holding at heat for not less than 24 hours, and cooling in air. Pyrometry shall be in accordance with AMS 2750.

3.4 Properties:

Extrusions shall conform to the requirements of 3.4.1 and 3.4.2.

3.4.1 Tensile Properties: Shall be as specified in 3.4.1.1, 3.4.1.2, 3.4.1.3, and 3.4.1.4, determined in accordance with AMS 2355 or MAM 2355:

3.4.1.1 Bars, Rods, Wire, and Solid Shapes:

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units

Nominal Cross-Sectional Area Square Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 4D %
Up to 5, excl	45.0	36.0	4
5 to 25, excl	45.0	34.0	6
25 to 40, excl	43.0	31.0	6

TABLE 2B - Minimum Tensile Properties, SI Units

Nominal Cross-Sectional Area Square Centimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 4D %
Up to 32, excl	310	248	4
32 to 161, excl	310	234	6
161 to 258, excl	296	214	6

3.4.1.2 Tubing:

TABLE 3A - Minimum Tensile Properties, Inch/Pound Units

Nominal OD Inches	Nominal Wall Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Up to 3.0, incl	0.028 to 0.250, incl	46.0	38.0	4
Over 3.0 to 8.5, incl	0.094 to 1.188, incl	44.0	33.0	4

TABLE 3B - Minimum Tensile Properties, SI Units

Nominal OD Millimeters	Nominal Wall Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 76, incl	0.71 to 6.35, incl	317	262	4
Over 76 to 216, incl	2.39 to 30.18, incl	303	228	4

3.4.1.3 Hollow Shapes:

TABLE 4 - Minimum Tensile Properties

Property	Value
Tensile Strength	46.0 ksi (317 MPa)
Yield Strength at 0.2% Offset	38.0 ksi (262 MPa)
Elongation in 2 Inches (50.8 mm) or 4D	4%

3.4.1.4 Tensile property requirements for sizes other than those shown in 3.4.1.1 and 3.4.1.2 shall be as agreed upon by purchaser and vendor.

3.4.2 Compressive Properties: Shall be as specified in 3.4.2.1, 3.4.2.3 and 3.4.2.4, determined in accordance with ASTM E 9 on specimens taken in the longitudinal direction:

3.4.2.1 Bars, Rods, and Solid Shapes:

TABLE 5A - Minimum Compressive Properties, Inch/Pound Units

Nominal Cross-Sectional Area Square Inches	Yield Strength at 0.2% Offset ksi
Up to 2, excl	30.0
2 to 3, excl	28.0
3 to 5, excl	25.0
5 to 10, excl	23.0
10 to 25, excl	22.0
25 to 40, excl	20.0

TABLE 5B - Minimum Compressive Properties, SI Units

Nominal Cross-Sectional Area Square Centimeters	Yield Strength at 0.2% Offset MPa
Up to 13, excl	207
13 to 19, excl	193
19 to 32, excl	172
32 to 64, excl	159
64 to 161, excl	152
161 to 258, excl	138

3.4.2.2 Tubing:

TABLE 6A - Minimum Compressive Properties, Inch/Pound Units

Nominal OD Inches	Nominal Wall Thickness Inches	Yield Strength at 0.2% Offset ksi
Up to 3.0, incl	0.028 to 0.250, incl	26.0
Over 3.0 to 8.5, incl	0.094 to 1.188, incl	21.0

TABLE 6B - Minimum Compressive Properties, SI Units

Nominal OD Millimeters	Nominal Wall Thickness Millimeters	Yield Strength at 0.2% Offset MPa
Up to 76, incl	0.71 to 6.35, incl	179
Over 76 to 216, incl	2.39 to 30.18, incl	145

3.4.2.3 Hollow Shapes:

TABLE 7 - Minimum Compressive Properties

Requirement	Value
Yield Strength at 0.2% Offset	26.0 ksi (179 MPa)

3.4.2.4 Compressive property requirements for sizes other than those shown in 3.4.2.1 and 3.4.2.2 shall be as agreed upon by purchaser and vendor.

3.5 Quality:

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

3.6 Tolerances:

Shall conform to all applicable requirements of AMS 2205 or MAM 2205.