



Designation: B107/B107M – 13 (Reapproved 2021)

Standard Specification for Magnesium-Alloy Extruded Bars, Rods, Profiles, Tubes, and Wire¹

This standard is issued under the fixed designation B107/B107M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification covers magnesium-alloy extruded bars, rods, profiles, tubes, and wire of the composition given in [Table 1](#).

1.2 The values stated in either inch-pound or SI units are to be regarded separately as standards. The SI units are shown in brackets or in separate tables or columns. The values stated in each system are not exact equivalents; therefore, each system must be used independent of the other. Combining values from the two systems may result in nonconformance with the specification.

1.3 Unless the order specifies the “M” specification designation, the material shall be furnished to the inch-pound units.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 The following documents of the issue in effect on date of order acceptance form a part of this specification to the extent referenced herein.

2.2 *ASTM Standards:*²

[B117 Practice for Operating Salt Spray \(Fog\) Apparatus](#)
[B296 Practice for Temper Designations of Magnesium Alloys, Cast and Wrought](#)
[B557 Test Methods for Tension Testing Wrought and Cast](#)

¹ This specification is under the jurisdiction of ASTM Committee B07 on Light Metals and Alloys and is the direct responsibility of Subcommittee B07.04 on Magnesium Alloy Cast and Wrought Products.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[Aluminum- and Magnesium-Alloy Products](#)
[B557M Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products \(Metric\)](#)
[B660 Practices for Packaging/Packing of Aluminum and Magnesium Products](#)
[B951 Practice for Codification of Unalloyed Magnesium and Magnesium-Alloys, Cast and Wrought](#)
[B954 Test Method for Analysis of Magnesium and Magnesium Alloys by Atomic Emission Spectrometry](#)
[E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)
[E55 Practice for Sampling Wrought Nonferrous Metals and Alloys for Determination of Chemical Composition](#)
[E527 Practice for Numbering Metals and Alloys in the Unified Numbering System \(UNS\)](#)

3. Terminology

3.1 *Definitions:*

3.1.1 *extruded bar, n*—a solid extrusion, long in relation to its cross-sectional dimensions, having a symmetrical cross section that is square or rectangular with sharp or rounded corners or edges, or is a regular hexagon or octagon, and whose width or greatest distance between parallel faces is over 0.375 in. [10 mm].

3.1.2 *extruded profile, n*—a hollow or solid extrusion, long in relation to its cross-sectional dimensions, whose cross section is other than that of wire, rod, bar, or tube.

3.1.3 *extruded rod, n*—a solid round extrusion, long in relation to its diameter, whose diameter is over 0.375 in. [10 mm].

3.1.4 *extruded tube, n*—a hollow extrusion, long in relation to its cross-sectional dimensions, which is symmetrical and is round, square, rectangular, hexagonal, octagonal, or elliptical with sharp or rounded corners, and has a uniform wall thickness except as affected by corner radii.

3.1.5 *producer, n*—the primary manufacturer of a material.

3.1.6 *supplier, n*—includes only the category of jobbers and distributors as distinct from producer.

3.1.7 *wire, n*—a solid section long in relation to its cross-sectional dimensions, having a cross section that is round,

TABLE 1 Chemical Requirements^A

NOTE 1—Analysis shall regularly be made only for the elements specifically mentioned in this table. If, however, the presence of other elements is suspected or indicated in the course of routine analysis to be in amounts greater than the specified limits, further analysis shall be made to determine that the total of these other elements is not in excess of the limits specified in the last column of the table.

NOTE 2—The following applies to all specified limits in this table: For purposes of acceptance and rejection, an observed value or a calculated value obtained from analysis should be rounded-off to the nearest unit in the last right-hand place of figures used in expressing the specified limit.

Alloy ^B		Composition, %															
UNS No.	ASTM No.	Magne- sium	Alumi- num	Cal- cium	Cop- per	Iron	Lithium	Man- gane- se	Neo- dymium	Nickel	Rare Earths	Sili- con	Yttrium	Zirco- nium, min	Zinc	Other Impurities, each	Total Other ^C Impurities
M11311	AZ31B	remain- der	2.5–3.5	0.04	0.05	0.005		0.20–1.0		0.005		0.10		...	0.6–1.4		0.30
M11312	AZ31C	remain- der	2.4–3.6	...	0.10	...		0.15–1.0 ^D		0.03		0.10		...	0.50–1.5		0.30
M11610	AZ61A	remain- der	5.8–7.2	...	0.05	0.005		0.15–0.5		0.005		0.10		...	0.40–1.5		0.30
M11800	AZ80A	remain- der	7.8–9.2	...	0.05	0.005		0.12–0.5		0.005		0.10		...	0.20–0.8		0.30
M15100	M1A	remain- der	...	0.30	0.05	...		1.2–2.0		0.01		0.10		...	...		0.30
M18432	WE43B	remain- der	...	...	0.02	0.010	0.2	0.03	2.0–2.5	0.005	1.9 ^E	...	3.7–4.3	0.40–1.0	^F	0.01	...
M18434	WE43C	remain- der	...	...	0.02	0.005		0.03	2.0–2.5	0.0020	0.3–1.0 ^G		3.7–4.3	0.2–1.0	0.06	0.01	...
M18410	WE54A	remain- der	...	...	0.03	...	0.2	0.03	1.5–2.0	0.005	2.0 ^E	0.01	4.75–5.5	0.40–1.0	0.20	0.2	...
M16400	ZK40A	remain- der	...	...	...	...		...		...		...		0.45	3.5–4.5		0.30
M16600	ZK60A	remain- der	...	...	...	...		...		...		...		0.45	4.8–6.2		0.30

^A Limits are in weight percent maximum unless shown as a range or otherwise stated.

^B These alloy designations were established in accordance with Practice B951 (see also Practice E527).

^C Includes listed elements for which no specific limit is shown.

^D Manganese minimum limit need not be met if iron is 0.005 %, or less.

^E Other Rare Earths shall be principally heavy rare earths, for example, Gadolinium, Dysprosium, Erbium, and Ytterbium. Other Rare Earths are derived from the Yttrium, typically 80 % Yttrium 20 % heavy rare earths.

^F Zinc + Silver content shall not exceed 0.20 % in WE43B.

^G Other Rare Earths are heavy rare earths, such as Gadolinium, Dysprosium, Erbium, Samarium, and Ytterbium. The total of Gadolinium + Dysprosium + Erbium shall be 0.3 to 1.0 %. Samarium shall not exceed 0.04 % and Ytterbium shall not exceed 0.02 %

hexagonal, or octagonal, and whose diameter, width, or greatest distance between parallel faces is up through 0.375 in. [10 mm], or having a symmetrical cross section that is square or rectangular (excluding flattened wire) with sharp or rounded corners or edges.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *capable of, adj*—means that the test need not be performed by the producer of the material. However, should subsequent testing by the purchaser establish that the material does not meet these requirements, the material shall be subject to rejection.

4. Ordering Information

4.1 Orders for material to this specification shall include the following information:

- 4.1.1 This specification number,
- 4.1.2 Quantity in pieces or pounds [kilograms],
- 4.1.3 Alloy (Section 6),
- 4.1.4 Temper (Section 7),
- 4.1.5 Nominal cross-sectional dimensions as follows:
 - 4.1.5.1 For rod and round wire—diameter,
 - 4.1.5.2 For square corner bars and wire—depth and width,
 - 4.1.5.3 For sharp cornered hexagonal or octagonal bars and wire—distance across flats,

4.1.5.4 For round tube—outside or inside diameter and wall thickness,

4.1.5.5 For square or sharp cornered other than round tube—distance across flats and wall thickness,

4.1.5.6 For round cornered bars and wire; profiles; tube other than round, square, rectangular, hexagonal or octagonal with sharp corners—drawing required,

4.1.6 Length,

4.1.7 Surface finish (see 10.2),

4.1.8 Whether inspection or witness of inspection and tests by the purchaser's representative is required prior to material shipment (Section 11),

4.1.9 Whether certification is required (Section 13),

4.1.10 Whether marking for identification is required (Section 14 and Practice B660).

4.1.11 Whether special packaging is required for shipment (Section 15).

5. Quality Assurance

5.1 *Responsibility for Inspection*—Unless otherwise specified in the contract or purchase order, the producer or supplier is responsible for the performance of all inspection and test requirements specified herein. Except as otherwise specified in the contract or order, the producer or supplier may use his own