**Designation: ~~B92/B92M – 11~~ B92/B92M – 17**

# Standard Specification for Unalloyed Magnesium Ingot and Stick For Remelting[1]

This standard is issued under the fixed designation B92/B92M; 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 in the form of ingot and stick for remelting: 9980A is available in ingot and stick form, and 9980B, 9990A, 9995A, and 9998A are generally available only in ingot form.

1.2 The values stated in SI units are to be regarded as a separate standard. The values stated in each system are not exact equivalents, therefore each system must be used independently of the other.

1.3 *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 *ASTM Standards:*[2]

B951 Practice for Codification of Unalloyed Magnesium and Magnesium-Alloys, Cast and Wrought

B953 Practice for Sampling Magnesium and Magnesium Alloys for Spectrochemical Analysis

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

~~E35 Test Methods for Chemical Analysis of Magnesium and Magnesium Alloys (Withdrawn 2008)~~[3]

E88 Practice for Sampling Nonferrous Metals and Alloys in Cast Form for Determination of Chemical Composition

## 3. Terminology

3.1 *Definitions:*

3.1.1 *ingot*—a cast form suitable for remelting.

3.1.2 *stick*—an extruded form substantially uniform in cross section cut to desired length or weight.

## 4. Ordering Information

4.1 Orders for ingot and stick under this specification shall include the following information:

4.1.1 ~~Grade~~ Grade, in accordance with the requirements of Practice B951 (Section 6 and Table 1),

4.1.2 Quantity, in pieces or pounds [kilograms], and

4.1.3 Form; by agreement between the purchaser and the manufacturer the approximate form and weight of each piece or ingot may be specified.

4.1.4 For inch-pound orders specify B92, for metric orders specify B92M. Do not mix units.

## 5. Materials and Manufacture

5.1 No scrap shall be used in the production of magnesium ingot and stick, except such as shall accumulate at the manufacturer's plants from material of similar composition and of his own manufacture.

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[1] This specification is under the jurisdiction of the 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.

***A Summary of Changes section appears at the end of this standard**

**TABLE 1 Chemical Requirements**

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, 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 to the nearest unit in the last right-hand place of figures used in expressing the specified limit (see Practice E29.

| Designation | Chemical Composition, % max unless shown as a range or as a min | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Practice | UNS | Magnesium | Aluminum | Copper | Iron | Lead | Manganese | Nickel | Silicon | Sodium | Tin | Titanium | Other Elements Eeach[A,B] |
| 9980A | M19980 | 99.80 min | ... | 0.02 | ... | 0.01 | 0.10 | 0.001 | ... | 0.006 | 0.01 | ... | 0.05 |
| 9980B | M19991 | 99.80 min | ... | 0.02 | ... | 0.01 | 0.10 | 0.005 | ... | ... | 0.01 | ... | 0.05 |
| 9990A[C] | M19990 | 99.90 min | 0.003 | ... | 0.04 | ... | 0.004 | 0.001 | 0.005 | ... | ... | ... | 0.01 |
| 9995A[C] | M19995 | 99.95 min | 0.01 | ... | 0.003 | ... | 0.004 | 0.001 | 0.005 | ... | ... | 0.01 | 0.005 |
| 9998A[C] | M19998 | 99.98 min | 0.004 | 0.0005 | 0.002 | 0.001 | 0.002 | 0.0005 | 0.003 | ... | ... | 0.001 | 0.005 |

**TABLE 1 Chemical Requirements**

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, 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 to the nearest unit in the last right-hand place of figures used in expressing the specified limit (see Practice E29.

| Designation | Chemical Composition, % max unless shown as a range or as a min | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Practice | UNS | Magnesium | Aluminum | Copper | Iron | Lead | Manganese | Nickel | Silicon | Sodium | Tin | Titanium | Other Elements Each[A,B] |
| 9980A | M19980 | 99.80 min | ... | 0.02 | ... | 0.01 | 0.10 | 0.001 | ... | 0.006 | 0.01 | ... | 0.05 |
| 9980B | M19991 | 99.80 min | ... | 0.02 | ... | 0.01 | 0.10 | 0.005 | ... | ... | 0.01 | ... | 0.05 |
| 9990A[C] | M19990 | 99.90 min | 0.003 | ... | 0.04 | ... | 0.004 | 0.001 | 0.005 | ... | ... | ... | 0.01 |
| 9995A[C] | M19995 | 99.95 min | 0.01 | ... | 0.003 | ... | 0.004 | 0.001 | 0.005 | ... | ... | 0.01 | 0.005 |
| 9998A[C] | M19998 | 99.98 min | 0.004 | 0.0005 | 0.002 | 0.001 | 0.002 | 0.0005 | 0.003 | ... | ... | 0.001 | 0.005 |

[A] For specific applications, other minor impurities may be required to be controlled to limiting maxima by agreement between the purchaser and the seller.
[B] Includes elements for which no specific limit is shown.
[C] For nuclear applications, the cadmium and boron (high-capture cross-section elements) shall be specified as follows:

| | |
|---|---|
| Cadmium, max, % | 0.0001 or 0.00005 |
| Boron, max, % | 0.00007 or 0.00003 |



## 6. Chemical Composition

6.1 *Limits*—The material shall conform to the requirements as to chemical composition prescribed in Table 1.

6.2 *Sampling:*

6.2.1 Sufficient samples shall be taken by the manufacturer to assure conformance to the chemical composition requirements of the alloy. Samples ~~may~~shall be taken from the molten metal in accordance with the requirements of Practice B953 when the ingot is poured or from the ingot. Samples shall be representative of the material.

6.2.2 In case of dispute, the sampling for chemical analysis shall be according to the requirements of Practice E88. If the ingots are shipped in carload lots of the same alloy, not less than four ingots shall be taken at random from the carload for sampling. If the shipment is in less than carload lots, one ingot shall be taken for sampling for each 10 000 lb [4500 kg] or fraction thereof.

6.3 *Methods of Analysis*—Any suitable method of chemical analysis may be used. In case of dispute, the analysis shall be made by methods given in Test ~~Methods~~Method ~~E35~~B954, or any other standard methods of analysis approved by ASTM unless some other method is agreed upon by the purchaser and vendor.

## 7. General Quality

7.1 Magnesium ingot and stick shall have a clean surface and shall be commercially free from dirt, slag, or other foreign material.

## 8. Rejection

8.1 Material that does not conform to the requirements of this specification may be rejected, and if rejected the conditions of replacement shall be as agreed upon between the purchaser and the seller. The seller's responsibility shall be limited to a period of six months from shipping date unless other agreement is made by the purchaser and seller.