



Designation: B26/B26M – 18^{ε1}

Standard Specification for Aluminum-Alloy Sand Castings¹

This standard is issued under the fixed designation B26/B26M; 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 NOTE—Revised Footnote B of Table 4 editorially in August 2018.

1. Scope*

1.1 This specification² covers aluminum-alloy sand castings designated as shown in Table 1.

1.2 This specification is for aluminum-alloy sand castings used in general purpose applications. It may not address the mechanical properties, integrity testing, and verification required for highly loaded or safety critical applications.

1.3 Alloy and temper designations are in accordance with ANSI H35.1/H35.1M.

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

1.5 For acceptance criteria for inclusion of new aluminum and aluminum alloys and their properties in this specification, see [Annex A1](#) and [Annex A2](#).

1.6 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.8 *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 Recom-*

mendations 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 material purchase form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards*:³

[B179 Specification for Aluminum Alloys in Ingot and Molten Forms for Castings from All Casting Processes](#)

[B275 Practice for Codification of Certain Zinc, Tin and Lead Die Castings](#)

[B557 Test Methods for Tension Testing Wrought and Cast 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](#)

[B666/B666M Practice for Identification Marking of Aluminum and Magnesium Products](#)

[B881 Terminology Relating to Aluminum- and Magnesium-Alloy Products](#)

[B917/B917M Practice for Heat Treatment of Aluminum-Alloy Castings from All Processes](#)

[B985 Practice for Sampling Aluminum Ingots, Billets, Castings and Finished or Semi-Finished Wrought Aluminum Products for Compositional Analysis](#)

[D3951 Practice for Commercial Packaging](#)

[E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)

[E34 Test Methods for Chemical Analysis of Aluminum and Aluminum-Base Alloys \(Withdrawn 2017\)](#)⁴

[E94/E94M Guide for Radiographic Examination Using Industrial Radiographic Film](#)

¹ This specification is under the jurisdiction of ASTM Committee B07 on Light Metals and Alloys and is the direct responsibility of Subcommittee B07.01 on Aluminum Alloy Ingots and Castings.

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² For ASME Boiler and Pressure Vessel Code applications see related Specification SB-26/SB-26M in Section II of that Code.

³ 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.

⁴ The last approved version of this historical standard is referenced on www.astm.org.

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

- [E155 Reference Radiographs for Inspection of Aluminum and Magnesium Castings](#)
- [E165/E165M Practice for Liquid Penetrant Examination for General Industry](#)
- [E607 Test Method for Atomic Emission Spectrometric Analysis Aluminum Alloys by the Point to Plane Technique Nitrogen Atmosphere \(Withdrawn 2011\)⁴](#)
- [E716 Practices for Sampling and Sample Preparation of Aluminum and Aluminum Alloys for Determination of Chemical Composition by Spark Atomic Emission Spectrometry](#)
- [E1251 Test Method for Analysis of Aluminum and Aluminum Alloys by Spark Atomic Emission Spectrometry](#)
- [E2422 Digital Reference Images for Inspection of Aluminum Castings](#)
- [IEEE/ASTM SI 10 Standard for Use of the International System of Units \(SI\): The Modern Metric System](#)
- 2.3 *AMS Standard*.⁵
- [AMS 2771 Heat Treatment of Aluminum Alloy Castings](#)
- 2.4 *American National Standards*.⁶
- [H35.1/H35.1\(M\) Alloy and Temper Designation System for Aluminum](#)
- 2.5 *Military Standards*.⁷
- [MIL-STD-129 Marking for Shipment and Storage](#)
- [MIL-STD-276 Impregnation of Porous Nonferrous Metal Castings](#)
- [NAVSEA Technical Publication S9074-AR-GIB-010/278](#)
- 2.6 *Federal Standard*.⁷
- [Fed. Std. No. 123 Marking for Shipment \(Civil Agencies\)](#)
- 2.7 *Aluminum Association Standard*.⁶
- [Designations and Chemical Composition Limits for Aluminum Alloys in the Form of Castings and Ingot \(The Pink Sheets\)](#)
- 2.8 *Other Standards*.⁸
- [EN 14242 Aluminum and Aluminum Alloys—Chemical Analysis—Inductively Coupled Plasma Optical Emission Spectral Analysis](#)

3. Terminology

3.1 Definitions:

3.1.1 Refer to Terminology [B881](#) for definitions of product terms used in this specification.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *sand casting, n*—a metal object produced by pouring molten metal into a sand mold and allowing it to solidify.

4. Ordering Information

4.1 Orders for material under this specification shall include the following information ([1.4](#) and [1.5](#)):

⁵ Available from Society of Automotive Engineers (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, <http://www.sae.org>.

⁶ Available from Aluminum Association, Inc., 1400 Crystal Drive Suite 430 Arlington, VA 22202 <http://www.aluminum.org>.

⁷ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, <http://www.dodssp.daps.mil>.

⁸ Available from European Committee for Standardization (CEN), 36 rue de Stassart, B-1050, Brussels, Belgium, <http://www.cenorm.be>.

4.1.1 This specification designation (which includes the number, year, and revision letter, if applicable),

NOTE 1—For inch-pound application, specify Specification B26 and for metric application specify Specification B26M. Do not mix units.

4.1.2 The quantity in either pieces or pounds [kilograms],

4.1.3 Alloy (Section [7](#) and [Table 1](#)),

4.1.4 Temper (Section [10](#) and [Table 2](#)), and

4.1.5 Applicable drawing or part number,

4.2 Additionally, orders for material to this specification shall include the following information when required by the purchaser:

4.2.1 Whether chemical analysis and tensile property reports are required ([Table 1](#) and [Table 2](#)),

4.2.2 Whether castings or test bars, or both, may be artificially aged for Alloys 705.0-T5, 707.0-T5, 712.0-T5, and 713.0-T5 ([10.2](#)) and whether yield strength tests are required for these alloys;

4.2.3 Whether test specimens cut from castings are required in addition to, or instead of, separately cast specimens (Sections [10](#) and [13](#));

4.2.4 Whether heat treatment is to be performed in accordance with AMS 2771 (see Section [15](#)),

4.2.5 Whether repairs are permissible ([16.1](#)),

4.2.6 Whether inspection is required at the producer's works (Section [18](#));

4.2.7 Whether certification is required ([21.1](#));

4.2.8 Whether surface requirements shall be checked against observational standards where such standards are established ([19.1](#));

4.2.9 Whether liquid penetrant inspection is required ([19.2](#));

4.2.10 Whether radiographic inspection is required and, if so, the radiographic grade of casting required ([19.3](#), [Table 3](#));

4.2.11 Whether foundry control is required (Section [9](#)); and

4.2.12 Whether Practice [B660](#) applies and, if so, the levels of preservation, packaging, and packing required ([24.4](#)).

5. Quality Assurance

5.1 Unless otherwise specified in the contract or purchase order, the producer shall be responsible for the performance of all inspections and test requirements specified herein. Unless disapproved by the purchaser, the producer may use his own or any other suitable facilities for the performance of the inspection and test requirements specified herein. The purchaser shall have the right to perform any of the inspections and tests set forth in this specification where such inspections are deemed necessary to confirm that the material conforms to prescribed requirements.

6. Manufacture

6.1 The responsibility of furnishing castings that can be laid out and machined to the finished dimensions within the permissible variations specified, as shown on the blueprints or drawings, shall rest with the producer, except where pattern equipment is furnished by the purchaser.

7. Chemical Composition

7.1 The Product shall conform to the chemical composition limits prescribed in [Table 1](#). Conformance shall be determined



TABLE 1 Chemical Composition Limits^{A,B,C,D}

Desig. ^J	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	Be	Pb	Sn	Zr	-	FNs	OTHERS ^F	
																	Each	Total ^F
201.0	0.10	0.15	4.0-5.2	0.20-0.50	0.15-0.55	...	...	...	0.15-0.35	0.40-1.0	...	...	...	...	...	...	0.05	0.10
204.0	0.20	0.35	4.2-5.0	0.10	0.15-0.35	...	0.05	0.10	0.15-0.30	...	...	...	0.05	...	...	...	0.05	0.15
242.0	0.7	1.0	3.5-4.5	0.35	1.2-1.8	0.25	1.7-2.3	0.35	0.25	...	...	...	...	...	...	...	0.05	0.15
A242.0	0.6	0.8	3.7-4.5	0.10	1.2-1.7	0.15-0.25	1.8-2.3	0.10	0.07-0.20	...	...	...	...	...	...	...	0.05	0.15
295.0	0.7-1.5	1.0	4.0-5.0	0.35	0.03	...	...	0.35	0.25	...	...	...	...	...	...	...	0.05	0.15
319.0	5.5-6.5	1.0	3.0-4.0	0.50	0.10	...	0.35	1.0	0.25	...	...	...	...	...	...	...	...	0.50
328.0	7.5-8.5	1.0	1.0-2.0	0.20-0.6	0.20-0.6	0.35	0.25	1.5	0.25	...	...	...	...	...	...	...	...	0.50
355.0	4.5-5.5	0.6 ^G	1.0-1.5	0.50 ^G	0.40-0.6	0.25	...	0.35	0.25	...	...	...	...	...	...	...	0.05	0.15
C355.0	4.5-5.5	0.20	1.0-1.5	0.10	0.40-0.6	...	...	0.10	0.20	...	...	...	...	...	...	...	0.05	0.15
356.0	6.5-7.5	0.6 ^G	0.25	0.35 ^G	0.20-0.45	...	...	0.35	0.25	...	...	...	...	...	...	...	0.05	0.15
A356.0	6.5-7.5	0.20	0.20	0.10	0.25-0.45	...	...	0.10	0.20	...	...	...	...	...	...	...	0.05	0.15
443.0	4.5-6.0	0.8	0.6	0.50	0.05	0.25	...	0.50	0.25	...	...	...	...	...	...	...	...	0.35
B443.0	4.5-6.0	0.8	0.15	0.35	0.05	...	...	0.35	0.25	...	...	...	...	...	...	...	0.05	0.15
512.0	1.4-2.2	0.6	0.35	0.8	3.5-4.5	0.25	...	0.35	0.25	...	...	...	...	...	...	...	0.05	0.15
514.0	0.35	0.50	0.15	0.35	3.5-4.5	...	...	0.15	0.25	...	...	...	...	...	...	...	0.05	0.15
520.0	0.25	0.30	0.25	0.15	9.5-10.6	...	...	0.15	0.25	...	...	...	...	...	...	...	0.05	0.15
535.0	0.15	0.15	0.05	0.10-0.25	6.2-7.5	...	...	...	0.10-0.25	0.003-0.007	...	...	...	0.005B	...	...	0.05	0.15
705.0	0.20	0.8	0.20	0.40-0.6	1.4-1.8	0.20-0.40	...	2.7-3.3	0.25	...	...	...	...	...	...	...	0.05	0.15
707.0	0.20	0.8	0.20	0.40-0.6	1.8-2.4	0.20-0.40	...	4.0-4.5	0.25	...	...	...	...	...	...	...	0.05	0.15
710.0 ^I	0.15	0.50	0.35-0.6	0.05	0.6-0.8	...	...	6.0-7.0	0.25	...	...	...	...	...	...	...	0.05	0.15
712.0 ^I	0.30	0.50	0.25	0.10	0.50-0.65 ^H	0.40-0.6	...	5.0-6.5	0.15-0.25	...	...	...	...	...	...	...	0.05	0.15
713.0	0.25	1.1	0.40-1.0	0.6	0.20-0.50	0.35	0.15	7.0-8.0	0.25	...	...	...	...	...	...	...	0.05	0.20
771.0	0.15	0.15	0.10	0.10	0.8-1.0	0.06-0.20	...	6.5-7.5	0.10-0.20	...	...	...	...	...	...	...	0.10	0.25
850.0	0.7	0.7	0.7-1.3	0.10	0.10	...	...	...	0.20	...	...	...	5.5-7.0	...	...	...	0.05	0.15
851.0 ^I	2.0-3.0	0.7	0.7-1.3	0.10	0.10	...	0.30-0.7	...	0.20	...	...	...	5.5-7.0	...	...	...	...	0.30
852.0 ^I	0.40	0.7	1.7-2.3	0.10	0.6-0.9	...	0.9-1.5	...	0.20	...	...	...	5.5-7.0	...	...	...	...	0.30

^A When single units are shown, they indicate the maximum amounts permitted.

^B Analysis shall be made for the elements for which limits are shown in this table.

^C The following applies to all specified limits in this table: For purposes of determining conformance to these limits, an observed value or a calculated value obtained from analysis shall be rounded to the nearest unit in the last right-hand place of figures used in expressing the specified limit in accordance with the rounding-off method of Practice E29.

^D In case of discrepancy between the values listed in Table 1 and those listed in the "Designations and Composition Limits for Aluminum Alloys in the Form of Castings and Ingots (known as the 'Pink Sheets')", the composition limits registered with the Aluminum Association and published in the "Pink Sheets" shall be considered the controlling composition.

^E "Others" includes listed elements for which no specific limit is shown as well as unlisted metallic elements. The producer may analyze samples for trace elements not specified in the specification. However, such analysis is not required and may not cover all metallic "Others" elements. Should any analysis by the producer or the purchaser establish that an "Others" element exceeds the limit of "Each" or that the aggregate of several "Others" elements exceeds the limit of "Total," the material shall be considered nonconforming.

^F Other Elements—Total shall be the sum of unspecified metallic elements 0.010 % or more, rounded to the second decimal before determining the sum.

^G If iron exceeds 0.45, manganese content shall not be less than one-half iron content.

^H The Aluminum Association ruling on the number of decimal places to which Mg percent is expressed is exempted for some long standing alloys. See A2.2.6.

^I 710.0 formerly A712.0, 712.0 formerly D712.0, 851.0 formerly A850.0, 852.0 formerly B850.0.

^J For a cross reference of current and former alloy designations see the Aluminum Association's "Designations and Composition Limits for Aluminum Alloys in the Form of Castings and Ingots (known as the 'Pink Sheets').".