



Standard Practice for Heat Treatment of Aluminum-Alloy Castings from All Processes¹

This standard is issued under the fixed designation B 917/B 917M; 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.

1. Scope *

1.1 This practice is intended, when specified by material specification or purchase order, for the use in the heat treatment of aluminum alloy castings from all casting processes.

1.1.1 The heat treatment of aluminum alloy castings used in specific aerospace applications is covered in AMS 2771² and specific AMS² material specifications.

1.1.2 The heat treatment of wrought aluminum alloys is covered in Practice B 918.

1.2 The values stated in either inch-pound units or SI units are to be regarded separately as standards. The SI units are shown in brackets or in separate tables. 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 non-conformance with the practice.

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 The following documents of the issue in effect on the date of material purchase form a part of this specification to the extent referenced herein:

2.2 ASTM Standards:

B 26/B 26M Specification for Aluminum-Alloy Sand Castings³

B 108 Specification for Aluminum-Alloy Permanent Mold Castings³

B 275 Practice for Codification of Certain Nonferrous Metals and Alloys, Cast and Wrought³

B 557 Test Methods of Tension Testing Wrought and Cast Aluminum and Magnesium-Alloy Products³

B 557M Test Methods of Tension Testing Wrought and Cast Aluminum and Magnesium-Alloy Products [Metric]³

B 618 Specification for Aluminum-Alloy Investment Castings³

B 686 Specification for Aluminum-Alloy Castings, High Strength³

B 881 Terminology Relating to Aluminum- and Magnesium-Alloy Products³

B 918 Practice for Heat Treatment of Wrought Aluminum Alloys³

G 110 Practice for Evaluating Intergranular Corrosion Resistance of Heat Treatable Aluminum Alloys by Immersion in Sodium Chloride + Hydrogen Peroxide Solution⁴

2.3 ANSI Standard:

H35.1 Alloy and Temper Designation Systems for Aluminum⁵

3. Terminology

3.1 Definitions:

3.1.1 Refer to Terminology B 881 for terminology relating to the heat treatment of castings.

4. Equipment

4.1 *Heating Media*—Aluminum castings are typically heat treated in air chamber furnaces; however lead baths, oil baths, fluidized beds, or even superheated steam may be used in specific applications. However the use of uncontrolled heating is not permitted. Whichever heating means are employed, careful evaluation is required to ensure that the casting responds properly to heat treatment and is not overheated or damaged by the heat treatment environment. Salt baths are not recommended for the commercial heat treatment of aluminum castings in volume. (**Warning:** Nitrate baths must not be used in the heat treatment of 5xx.0 series castings because of the inherent explosion hazard.)

4.2 *Air Chamber Furnaces* may be oil or gas-fired or may be electrically heated. The atmosphere in air chamber furnaces must be controlled to prevent porosity resulting from solution heat treatment. Furnace components that are significantly hotter than the metal should be suitably shielded for section thicknesses of less than 0.250 in. [6 mm] to prevent adverse radiation effects. The atmosphere in air chamber furnaces must

¹ This practice 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 Available from SAE-AEROSPACE, 400 Commonwealth Drive, Warrendale, PA 15096-0001, USA.

³ *Annual Book of ASTM Standards*, Vol 02.02.

⁴ *Annual Book of ASTM Standards*, Vol 03.02.

⁵ Available from American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036.

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

