



Designation: B271/B271M – 18

Standard Specification for Copper-Base Alloy Centrifugal Castings¹

This standard is issued under the fixed designation B271/B271M; 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 specification establishes requirements for centrifugal castings of copper-base alloys having the nominal compositions shown in [Table 1](#).

1.2 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 non-conformance with the standard.

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 The following documents in the current issue of the Book of Standards form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards:*²

[B208 Practice for Preparing Tension Test Specimens for Copper Alloy Sand, Permanent Mold, Centrifugal, and Continuous Castings](#)

[B824 Specification for General Requirements for Copper Alloy Castings](#)

[B846 Terminology for Copper and Copper Alloys](#)

[E10 Test Method for Brinell Hardness of Metallic Materials](#)

2.3 *ASME Code:*³

[Boiler and Pressure Vessel Code](#)

¹ This specification is under the jurisdiction of ASTM Committee B05 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.05 on Castings and Ingots for Remelting.

Current edition approved Oct. 1, 2018. Published October 2018. Originally approved in 1954. Last previous edition approved in 2015 as B271/B271M–15. DOI: 10.1520/B0271_B0271M–18.

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.

³ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, <http://www.asme.org>.

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

3. Terminology

3.1 Definitions of terms relating to copper alloys can be found in Terminology [B846](#).

4. Ordering Information

4.1 Orders for centrifugal castings under this specification should include the following information:

4.1.1 Specification title, number, and year of issue;

4.1.2 Quantity (length or number) of castings;

4.1.3 Copper Alloy UNS Number ([Table 1](#)) and temper (as-cast, heat-treated, and so forth);

4.1.4 Dimensions or drawing number and condition (as-cast, machined, and so forth);

4.1.5 *ASME Boiler and Pressure Vessel Code* requirements ([Section 9](#)); and

4.1.6 When castings are purchased for agencies of the U.S. Government, the Supplementary Requirements in Specification [B824](#) may be specified.

4.2 The following are optional and should be specified in the purchase order when required:

4.2.1 Pressure test or soundness requirements ([Specification B824](#)),

4.2.2 Approval of weld repair ([Section 8](#)),

4.2.3 Certification ([Specification B824](#)),

4.2.4 Foundry test report ([Specification B824](#)),

4.2.5 Witness inspection ([Specification B824](#)),

4.2.6 Product marking ([Specification B824](#)), and

4.2.7 Castings for seawater service ([Section X1.2](#)).

5. Materials and Manufacture

5.1 Castings in Copper Alloy UNS No. C95520 are used in the heat-treated condition only.

6. Chemical Composition

6.1 The centrifugal castings shall conform to the chemical requirement shown in [Table 2](#) for the Copper Alloy UNS Numbers specified in the purchase order.

6.2 These specification limits do not preclude the presence of other elements. Limits may be established and analysis required for unnamed elements agreed upon between the manufacturer or supplier and the purchaser. Copper or zinc may be given as remainder and may be taken as the difference

TABLE 3 Sum of All Named Elements Analyzed

Copper Alloy UNS No.	Copper Plus Named Elements % min	Copper Alloy UNS No.	Copper Plus Named Elements % min
C83600	99.3	C92200	99.3
C83800	99.3	C92300	99.3
C84400	99.3	C93200	99.2
C84800	99.3	C93500	99.4
C85200	99.1	C93600	99.3
C85400	98.9	C93700	99.0
C85470	99.5	C93800	98.9
C85700	98.7	C94300	99.0
C86100	99.0	C95200	99.0
C86200	99.0	C95300	99.0
C86300	99.0	C95400	99.5
C86400	99.0	C95410	99.5
C86500	99.0	C95500	99.5
C86700	99.0	C95520	99.5
C87300	99.5	C95800	99.5
C87400	99.2	C95900	99.5
C87500	99.5	C97300	99.0
C87600	99.5	C97600	99.7
C90300	99.4	C97800	99.6
C90500	99.7		

- 10.1.7 Specimen Preparation;
- 10.1.8 Test Methods;
- 10.1.9 Significance of Numerical Limits;
- 10.1.10 Inspection;
- 10.1.11 Rejection and Rehearing;
- 10.1.12 Certification;
- 10.1.13 Test Report;
- 10.1.14 Packaging and Package Marking;
- 10.1.15 Supplementary Requirements.

11. Sampling

- 11.1 Test bars shall be made in accordance with Practice **B208**.
- 11.2 At the manufacturer's option test bars may be removed from the casting instead of from a separately cast coupon.
- 11.3 Separately cast test bars representing castings in Copper Alloy UNS Nos. C95300HT, C95400HT, C95410HT, C95500HT, C95520HT, C95800 temper annealed, and C95900 annealed shall be heat treated with the castings.

12. Test Methods

12.1 Analytical chemical methods are given in Specification **B824**.

12.1.1 Test methods to be followed for the determination of elements resulting from contractual or purchase order agreement shall be as agreed upon between the manufacturer or supplier and the purchaser.

12.2 Brinell hardness readings shall be taken on the grip end of the tension test bar and shall be made in accordance with Test Method **E10**, with the exception that a 3000 kg load shall be used.

13. Product Marking

13.1 When specified in the purchase order the castings shall be marked with the alloy number.

14. Keywords

14.1 centrifugal castings; copper alloy castings; copper-base alloy castings

TABLE X1.1 Suggested Heat Treatments

Copper Alloy UNS No.	Solution Treatment (not less than 1 h followed by water quench)	Annealing Treatment (not less than 2 h followed by air cool)
C95300	1585–1635 °F [860–890 °C]	1150–1225 °F [620–660 °C]
C95400 C95410 C95500	1600–1675 °F [870–910 °C]	1150–1225 °F [620–660 °C]
C95520	(2 h followed by water quench) 1600–1700 °F [870–925 °C]	925–1000 °F [495–540 °C]

X1.2 For better corrosion resistance in seawater applications, castings in Copper Alloys UNS No. C95800 shall be given a temper anneal heat treatment at 1200 to 1300 °F [650 to 705 °C] for 6 h minimum. Cooling shall be by the fastest means possible that will not cause distortion or cracking which renders the castings unusable for the intended application.

X1.3 Castings in Copper Alloys UNS No. C95900 are normally supplied annealed between 1100 °F [595 °C] and 1300 °F [705 °C] for 4 h followed by air cooling.

SUMMARY OF CHANGES

Committee B05 has identified the location of selected changes to this standard since the last issue (B271/B271M – 15) that may impact the use of this standard. (Approved Oct. 1, 2018.)

(1) Added UNS Alloy No. C86100 to **Table 1, Table 2, Table 3,** and **Table 4.** (2) Revised **X1.2.**

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