Designation: B505/B505M – 23

Standard Specification for Copper Alloy Continuous Castings[1]

This standard is issued under the fixed designation B505/B505M; 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 requirements for continuously cast rod, bar, tube, and shapes produced from copper alloys with nominal compositions as listed in Table 1.[2]

1.2 Castings produced to this specification may be manufactured for and supplied from stock. In such cases the manufacturer shall maintain heat traceability to specific manufacturing date and chemical analysis.

1.3 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.

1.4 *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.*

1.5 *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:*[3]

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

E8/E8M Test Methods for Tension Testing of Metallic Materials

E10 Test Method for Brinell Hardness of Metallic Materials

E18 Test Methods for Rockwell Hardness of Metallic Materials

E255 Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition

E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

2.2 *Other Standard:*[4]

ASME Boiler and Pressure Vessel Code

3. Terminology

3.1 For definitions of terms related to copper and copper alloys, refer to Terminology B846.

4. General Requirements

4.1 The following sections of Specification B824 form a part of this specification. The definition of a casting lot as defined in Section 12, Sampling, takes precedence over Specification B824.

4.1.1 Terminology (Section 3),
4.1.2 Other Requirements (Section 7),
4.1.3 Workmanship, Finish, and Appearance (Section 9),
4.1.4 Number of Tests and Retests (Section 11),
4.1.5 Specimen Preparation (Section 12),
4.1.6 Test Methods (Section 13),
4.1.7 Significance of Numerical Limits (Section 14),
4.1.8 Inspection (Section 15),
4.1.9 Rejection and Rehearing (Section 16),
4.1.10 Certification (Section 17),
4.1.11 Test Report (Section 18),
4.1.12 Product Marking (Section 19),

[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.

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[2] The UNS system for copper and copper alloys (see Practice E527) is a simple expansion of the former standard designation system accomplished by the addition of a prefix "C" and a suffix "00." The suffix can be used to accommodate composition variations of the base alloy.

[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] 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**

TABLE 1 Nominal Composition

Copper Alloy UNS No.	Designation	Composition, %											
		Copper	Tin	Lead	Zinc	Nickel	Aluminum	Iron	Manganese	Silicon	Phosphorus	Bismuth	Sulfur
C83470	low-lead sulfur tin bronze	93	4	...	2	0.5	...	...	...	...	...	...	0.5
C83600	leaded red brass	85	5	5	5	...	...	...	...	...	...	...	...
C83800	leaded red brass	82.9	3.8	6	6.5	...	...	...	...	...	...	...	...
C84200	leaded semi-red brass	80	5	2.5	13	...	...	...	...	...	...	...	...
C84400	leaded semi-red brass	80	2.9	7	8.5	...	...	...	...	...	...	...	...
C84800	leaded semi-red brass	76	2.5	6.2	15	...	...	...	...	...	...	...	...
C85470	yellow brass	62.5	2.5	...	34.3	...	0.5	...	...	...	0.13	...	...
C85700	leaded naval brass	61	1	1.2	36	...	...	...	...	...	...	...	...
C86200	high-strength yellow brass	63	...	...	25	...	4	3	3.8	...	...	...	...
C86300	high-strength yellow brass	63	...	...	25	...	6.2	3	3.8	...	...	...	...
C86500	high-strength yellow brass	57.5	...	...	39	...	1	1.2	0.8	...	...	...	...
C87700	silicon bronze	88.5	...	...	8	...	...	...	...	3	...	...	...
C87710	silicon bronze	86	...	...	10	...	...	...	...	4	...	...	...
C87850	silicon brass	76	...	...	20.9	...	...	...	...	3	0.12	...	...
C89320	bismuth tin bronze	89	6	...	...	...	...	...	...	...	...	5.0	...
C89545	bismuth brass	69.0	...	...	29.0	0.5	1.0	...	...	...	0.08	0.55	...
C89720[A]	bismuth brass	67.4	1	...	29	...	0.5	...	...	0.5	...	1.5	...
C89838	bismuth brass	81.5	2.75	...	15.0	...	...	...	...	...	...	0.55	...
C89845	bismuth semi-red brass	85.0	4.0	...	7.5	2.0	...	...	...	...	...	1.5	...
C90300	tin bronze	87.5	8.2	...	4	...	...	...	...	...	...	...	...
C90500	tin bronze	87.5	10	...	2	...	...	...	...	...	...	...	...
C90700	tin bronze	89	11	...	...	...	...	...	...	...	...	...	...
C91000	tin bronze	85	15	...	...	...	...	...	...	...	...	...	...
C91300	tin bronze	80.5	19	...	...	...	...	...	...	...	...	...	...
C92200	leaded tin bronze	88	6	1.5	4	...	...	...	...	...	...	...	...
C92300	leaded tin bronze	87	8.2	0.6	3.8	...	...	...	...	...	...	...	...
C92500	nickel-phosphor bronze	86.5	11	1.2	...	1.2	...	...	...	...	...	...	...
C92700	leaded tin bronze	87.5	10	1.8	...	...	...	...	...	...	...	...	...
C92800	leaded tin bronze	80	16	5	...	...	...	...	...	...	...	...	...
C92900	leaded nickel-tin bronze	84	10	2.6	...	3.4	...	...	...	...	...	...	...
C93200	high-leaded tin bronze	83	6.9	7	3	...	...	...	...	...	...	...	...
C93400	high-leaded tin bronze	83.5	8	8	...	...	...	...	...	...	...	...	...
C93500	high-leaded tin bronze	84.5	5.2	9	1	...	...	...	...	...	...	...	...
C93600	high-leaded tin bronze	81	7	12	...	...	...	...	...	...	...	...	...
C93700	high-leaded tin bronze	80	10	9.5	...	...	...	...	...	...	...	...	...
C93800	high-leaded tin bronze	77	6.9	14.5	...	...	...	...	...	...	...	...	...
C93900	high-leaded tin bronze	78	6	16	...	...	...	...	...	...	...	...	...
C94000	high-leaded tin bronze	70.5	13	15	...	...	...	...	...	...	...	...	...
C94100	high-leaded tin bronze	75.5	5.5	20	...	...	...	...	...	...	...	...	...
C94300	high-leaded tin bronze	69.5	5.2	25	...	...	...	...	...	...	...	...	...
C94700	nickel-tin bronze	87.5	5.2	0	1.8	5.2	...	...	...	...	...	...	...
C94800	leaded nickel-tin bronze	86.5	5.2	0.6	1.8	5.2	...	...	...	...	...	...	...
C95200	aluminum bronze	87.8	...	...	...	...	9	3.2	...	...	...	...	...
C95300	aluminum bronze	88.8	...	...	...	...	10	1.2	...	...	...	...	...
C95400	aluminum bronze	85.2	...	...	...	...	10.8	4	...	...	...	...	...
C95410	aluminum bronze	83.2	...	...	...	2	10.8	4	...	...	...	...	...
C95500	nickel-aluminum bronze	81	...	...	...	4.2	10.8	4	...	...	...	...	...
C95520	nickel-aluminum bronze	79.1	...	...	...	5.1	11	4.8	...	...	...	...	...
C95700	manganese nickel aluminum bronze	74.8	...	...	...	2.2	7.5	3	12.5	...	...	...	...
		...	...	...	...	...	...	...	...	...	...	...	...
C95800	nickel-aluminum bronze	81.3	...	...	...	4.5	9	4	1.2	...	...	...	...
C95900	aluminum bronze	83.2	...	...	...	...	12.8	4.0	...	...	...	...	...
C96400	copper-nickel	67	...	...	...	30	...	0.90	...	...	...	...	...
C96900	copper-nickel	76.8	8	...	...	15	...	...	0.20	...	...	...	...
C96970	copper-nickel-tin	85	6	...	...	9.0	...	...	...	...	...	...	...
C97300	leaded nickel bronze	55.5	2.2	9.5	21	12.5	...	...	...	...	...	...	...
C97600	leaded nickel bronze	65	4	4	6	20.2	...	...	...	...	...	...	...
C97800	leaded nickel bronze	65.5	4.8	1.8	2.5	25.5	...	...	...	...	...	...	...
C99500	special alloy	89.1	...	...	1.2	4.5	1.2	4.0	...	1.3	...	...	...

[A] Antimony 0.07, Boron 0.001.