



Designation: B584 – 22

Standard Specification for Copper Alloy Sand Castings for General Applications¹

This standard is issued under the fixed designation B584; 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 copper alloy sand castings for general applications. Nominal compositions of the alloys defined by this specification are shown in [Table 1](#).² This is a composite specification replacing former documents as shown in [Table 1](#).

NOTE 1—Other copper alloy castings are included in the following ASTM Specifications: [B22/B22M](#), [B61](#), [B62](#), [B66](#), [B67](#), [B148](#), [B176](#), [B271/B271M](#), [B369/B369M](#), [B427](#), [B505/B505M](#), [B763/B763M](#), [B770](#), and [B806](#).

1.2 Component part castings produced to this specification may be manufactured in advance and supplied from stock. In such cases the manufacturer shall maintain a general quality certification of all castings without specific record or date of casting for a specific casting.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *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

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.

[B22/B22M](#) Specification for Bronze Castings for Bridges and Turntables

[B61](#) Specification for Steam or Valve Bronze Castings

[B62](#) Specification for Composition Bronze or Ounce Metal Castings

[B66](#) Specification for Bronze Castings for Steam Locomotive Wearing Parts

[B67](#) Specification for Car and Tender Journal Bearings, Lined

[B148](#) Specification for Aluminum-Bronze Sand Castings

[B176](#) Specification for Copper-Alloy Die Castings

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

[B271/B271M](#) Specification for Copper-Base Alloy Centrifugal Castings

[B369/B369M](#) Specification for Copper-Nickel Alloy Castings

[B427](#) Specification for Gear Bronze Alloy Castings

[B505/B505M](#) Specification for Copper Alloy Continuous Castings

[B763/B763M](#) Specification for Copper Alloy Sand Castings for Valve Applications

[B770](#) Specification for Copper-Beryllium Alloy Sand Castings for General Applications

[B806](#) Specification for Copper Alloy Permanent Mold Castings for General Applications

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

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

[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 ASME Code:⁴

[ASME Boiler and Pressure Vessel Code](#)

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 Compositions

Classification	Copper Alloy UNS No.	Previous Designation	Commercial Designation	Copper	Tin	Lead	Zinc	Nickel	Sulfur	Iron	Aluminum	Manganese	Antimony	Silicon	Niobium	Phosphorus	Bismuth
Leaded red brass	C83450	...	...	88	2½	2	6½	1	...	...	...	...	...	...	...	...	...
Low-lead sulfur tin bronze	C83470	...	...	93	4	...	2	0.5	0.5	...	...	...	...	...	...	...	...
Leaded red brass	C83600	B145-4A	85-5-5-5 or No. 1 composition	85	5	5	5	...	...	...	...	...	...	...	...	...	...
	C83800	B145-4B	commercial red brass, 83-4-6-7	83	4	6	7	...	...	...	...	...	...	...	...	...	...
Low-lead semi-red brass	C84020	...	...	85.5	3	...	9	1.2	0.38	...	...	...	...	...	...	...	...
Leaded semi-red brass	C84030	...	...	85.5	3	...	9	1.2	0.38	...	...	...	0.8	...	...	...	...
	C84400	B145-5A	valve composition, 81-3-7-9	81	3	7	9	...	...	...	...	...	...	...	...	...	...
	C84800	B145-5B	semi-red brass, 76-2½-6½-15	76	2½	6½	15	...	...	...	...	...	...	...	...	...	...
Leaded yellow brass	C85200	B146-6A	high-copper yellow brass	72	1	3	24	...	...	...	...	...	...	...	...	...	...
	C85400	B146-6B	commercial No. 1 yellow brass	67	1	3	29	...	...	...	...	...	...	...	...	...	...
Yellow brass	C85470 ^A	...	...	62.5	2.5	...	34.3	...	...	...	0.5	...	...	...	...	...	...
Leaded yellow brass	C85700	B146-6C	leaded naval brass	61	1	1	37	...	...	...	...	...	...	...	...	...	...
High-strength yellow brass	C86200	B147-8B	high-strength manganese bronze	63	...	...	27	...	...	3	4	3	...	...	...	...	...
	C86300	B147-8C	high-strength manganese bronze	61	...	...	27	...	...	3	6	3	...	...	...	...	...
	C86400	B147-7A	leaded manganese bronze	58	1	1	38	...	...	1	½	½	...	...	...	...	...
	C86400	B 132-A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	C86500	B147-8A	No. 1 manganese bronze	58	...	...	39	...	...	1	1	1	...	...	...	...	...
	C86700	B 132-B	leaded manganese bronze	58	1	1	34	...	...	2	2	2	...	...	...	...	...
Silicon bronze + silicon brass	C87300	B198-12A	silicon bronze	95	...	...	...	...	...	...	...	1	...	4	...	...	...
	C87400	B198-13A	silicon brass	82	...	½	14	...	...	...	...	...	...	3½	...	...	...
	C87500	B198-13B	silicon brass	82	...	...	14	...	...	...	...	...	...	4	...	...	...
	C87600	B198-13C	silicon bronze	91	...	...	5	...	...	...	...	...	...	4	...	...	...
	C87610	B198-12A	silicon bronze	92	...	...	4	...	...	...	...	...	...	4	...	...	...
	C87710	...	silicon bronze	86	...	...	10	...	...	...	...	...	...	4	...	...	...
	C87845 ^B	...	silicon bronze	76	...	...	21.26	...	...	...	...	...	...	2.7	...	...	...
	C87850 ^C	...	silicon brass	76	...	...	20.9	...	...	...	...	...	...	3	...	...	...
Bismuth selenium brass	C89510 ^D	...	sebiloy I	87	5	...	5	...	...	...	...	...	...	...	...	...	1.0
	C89520 ^E	...	sebiloy II	86	5½	...	5	...	...	...	...	...	...	...	...	...	1.9
	C89530 ^F	...	...	86.5	4.7	...	8.0	...	...	...	...	...	...	...	...	...	1.5
Bismuth brass	C89535	...	...	86.5	3.0	...	7.0	0.65	...	...	...	...	...	...	...	...	1.4
	C89537	...	...	85.0	4.5	...	9.0	...	...	...	...	...	...	0.9	...	...	1.7
	C89545 ^G	...	...	69.0	...	...	29.0	0.5	...	...	1.0	...	...	...	0.13	0.55	...
	C89570 ^H	...	...	60.5	0.8	...	36.5	0.32	...	...	0.5	...	...	...	...	1.0	...
	C89720 ^I	...	...	67.5	1	...	29.8	...	...	...	0.5	...	...	0.5	...	0.7	...
Bismuth red brass	C89833	...	bismuth brass	89	5	...	3	...	...	...	...	...	...	...	...	...	2.2
Bismuth bronze	C89836	...	lead-free bronze	89.5	5.5	...	3.0	...	...	...	...	...	...	...	...	...	2
Bismuth brass	C89838	...	...	81.5	2.75	...	15.0	...	...	...	...	...	...	...	...	...	0.55
Bismuth semi-red brass	C89844	...	bismuth brass	84½	4	...	8	...	...	...	...	...	...	...	...	...	3
	C89845	...	...	85.0	4.0	...	7.5	2.0	...	...	...	...	...	...	...	...	1.5
Tin bronze + leaded tin bronze	C90300	B143-1B	modified "G" bronze, 88-8-0-4	88	8	...	4	...	...	...	...	...	...	...	...	...	...
Low-lead tin bronze	C90420	...	...	87.5	8	...	3	...	0.38	...	...	...	...	...	...	...	...
Tin bronze + leaded tin bronze	C90500	B143-1A	"G" bronze, 88-10-0-2	88	10	...	2	...	...	...	...	...	...	...	...	...	...
	C92200	B143-2A	steam or valve bronze-Navy "M"	88	6	1½	4½	...	...	...	...	...	...	...	...	...	...
	C92210	...	...	88	5	2	4	1	...	...	...	...	...	...	...	...	...