



Designation: B 176 – 95

Standard Specification for Copper-Alloy Die Castings¹

This standard is issued under the fixed designation B 176; 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 Department of Defense.

1. Scope *

1.1 This specification establishes requirements for copper-alloy die castings. The alloys are designated as follows:

Former Designation	Copper Alloy UNS No. ²	Former Designation ASTM
Standard alloys	C85700	...
	C85800	Z30A
	C86500	...
	C87800	ZS144A
	C99700	...
Special alloys	C99700	...
	C99750	...

1.2 The values stated in inch-pound units are standard. SI values in parentheses are for information only.²

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:

B 824 Specification for General Requirements for Copper Alloy Castings³

E 8 Test Methods for Tension Testing of Metallic Materials⁴

E 23 Test Methods for Notched Bar Impact Testing of Metallic Materials⁴

E 527 Practice for Numbering Metals and Alloys (UNS)⁵

2.3 American Die Casting Institute:

“E” Series Product Standards⁶

2.4 Federal Standard:

¹ This practice 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 Jan. 15, 1995. Published March 1995. Originally published as B 176 – 42. Last previous edition B 176 – 93a.

² The UNS system for copper and copper alloys (see Practice E 527) 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 Annual Book of ASTM Standards, Vol 02.01.

⁴ Annual Book of ASTM Standards, Vol 03.01.

⁵ Annual Book of ASTM Standards, Vol 01.01.

⁶ Available from the American Die Casting Institute, 2340 Des Plaines Ave., Des Plaines, IL 60018.

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)⁷

2.5 Military Standards:

MIL-STD-129 Marking for Shipment and Storage (Military Agencies)⁷

MIL-P-116 Methods of Preservation⁷

3. Ordering Information

3.1 Orders for die castings under this specification should include the following information:

3.1.1 Specification title, number, and year of issue,

3.1.2 Part name and number,

3.1.3 Copper Alloy UNS Number,

3.1.4 Quantity and delivery schedule, as required,

3.1.5 Drawing of die casting, when required, giving all necessary dimensions and showing latest revisions and allowances for machining, if any. Location of ejector pin marks or parting lines shall be at the option of the manufacturer unless specifically designated on the drawing.

3.1.6 When die castings are purchased for agencies of the U.S. Government the Supplementary Requirements of Specification B 824 may be specified.

3.2 The following requirements are optional and should be specified in the purchase order when required.

3.2.1 Inspection lot sampling (Section 8),

3.2.2 Chemical analysis of residual elements (Section 4),

3.2.3 Soundness requirements (Section 9),

3.2.4 Mechanical requirements (Section 5),

3.2.5 Special requirements (Section 9),

3.2.6 Certification (Specification B 824),

3.2.7 Foundry test report (Specification B 824),

3.2.8 Witness inspection (Specification B 824),

3.2.9 Product marking (Specification B 824),

3.2.10 Packaging requirements (Section 12),

4. Chemical Composition

4.1 The castings shall conform to the requirements for major elements as shown in Table 1.

⁷ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, ATTN: NPODS.

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



TABLE 1 Chemical Requirements

Copper Alloy UNS No.	Composition, % max. (unless shown as a range or min.)									
	Major Elements					Residual Elements				
	Copper	Tin	Lead	Zinc	Iron	Nickel including Cobalt	Aluminum	Manganese	Silicon	Iron
C85700	58.0–64.0	0.50–1.5	0.8–1.5	32.0–40.0	...	...	...	...	...	0.70
C85800	57.0 min	1.5	1.5	31.0–41.0	...	...	...	...	...	0.50
C86500	55.0–60.0	1.0	0.40	36.0–42.0	0.40–2.0	...	0.50–1.5	0.10–1.5	...	...
C87800	80.0 min.	0.25	0.15	12.0–16.0	...	...	...	...	3.8–4.2	0.15
C99700	54.0 min.	1.0	2.0	19.0–25.0	...	4.0–6.0	0.50–3.0	11.0–15.0	...	1.0 ^c
C99750	55.0–61.0	...	0.50–2.5	17.0–23.0	...	5.0	0.25–3.0	17.0–23.0	...	1.0 ^c

^A Arsenic 0.05 max.
^B Magnesium 0.01 max.
^C Iron content above the nickel content may cause hard spots resulting in decreased machinability.