



Designation: **B30—12 B30 – 14**

Standard Specification for Copper Alloys in Ingot Form¹

This standard is issued under the fixed designation B30; 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 establishes the requirements for copper alloys in ingot form for remelting for the manufacturing of castings having the Copper Alloy UNS No. designation, commercial designations and nominal composition shown in **Table 1** and **Table 2**.

1.2 A cross reference of Copper Alloy UNS Nos. and copper alloy casting specifications is given in **Table 3**.

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.

2. Referenced Documents

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

2.2 *ASTM Standards:*²

- [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](#)
- [B194 Specification for Copper-Beryllium Alloy Plate, Sheet, Strip, and Rolled Bar](#)
- [B208 Practice for Preparing Tension Test Specimens for Copper Alloy Sand, Permanent Mold, Centrifugal, and Continuous Castings](#) [/standards.iteh.ai/catalog/standards/sist/f8ac3fe8-d616-4c7d-b151-66fe41e9ce6a/astm-b30-14](#)
- [B27/B271/B271M Specification for Copper-Base Alloy Centrifugal Castings](#)
- [B369 Specification for Copper-Nickel Alloy Castings](#)
- [B427 Specification for Gear Bronze Alloy Castings](#)
- [B505/B505M Specification for Copper Alloy Continuous Castings](#)
- [B584 Specification for Copper Alloy Sand Castings for General Applications](#)
- [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](#)
- [E8/E8M Test Methods for Tension Testing of Metallic Materials](#)
- [E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)
- [E54 Test Methods for Chemical Analysis of Special Brasses and Bronzes \(Withdrawn 2002\)³](#)
- [E62 Test Methods for Chemical Analysis of Copper and Copper Alloys \(Photometric Methods\) \(Withdrawn 2010\)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 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 The last approved version of this historical standard is referenced on www.astm.org.

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

TABLE 1 Nominal Compositions

Alloy Name	Copper Alloy UNS No.	Previously Used Designation	Commercial Designation	Nominal Composition, %										
				Copper	Tin	Lead	Zinc	Nickel	Iron	Aluminum	Manganese	Silicon	Niobium	Bismuth
Leaded red brass	G83450	---	---	88	2.5	2	6.5	4	---	---	---	---	---	---
	G83600	4A	85-5-5-5 or No. 1 composition	85	5	5	5	---	---	---	---	---	---	---
	G83800	4B	commercial red brass, 83-4-6-7	83	4	6	7	---	---	---	---	---	---	---
Leaded semi-red brass	G84200	---	semi-red brass, 80-5-2-13	80	5	2	13	---	---	---	---	---	---	---
	G84400	5A	valve composition 81-3-7-9	81	3	7	9	---	---	---	---	---	---	---
Leaded yellow brass	G84800	5B	semi-red brass, 76-2½-6½-15	76	2.5	6.5	15	---	---	---	---	---	---	---
	G85200	6A	high-copper yellow brass	72	1	3	24	---	---	---	---	---	---	---
	G85400	6B	commercial No. 1 yellow brass	67	1	3	29	---	---	---	---	---	---	---
	G85700	6C	60-40 leaded yellow (naval) —brass	61	1	1	37	---	---	---	---	---	---	---
	G85800	---	die-cast yellow brass	62	1	1	36	---	---	---	---	---	---	---
	G86100	---	high-strength manganese —bronze	67	---	---	21	---	3	5	4	---	---	---
Leaded high-strength —yellow brass and —high-strength —yellow brass	G86200	8B	high-strength manganese —bronze	63	---	---	27	---	3	4	3	---	---	---
	G86300	8C	high-strength manganese —bronze	61	---	---	27	---	3	6	3	---	---	---
	G86400	7A	leaded manganese bronze	58	1	1	38	---	1	0.5	0.5	---	---	---
Silicon-bronze	G86500	8A	No. 1 manganese bronze	58	---	---	39	---	1	1	1	---	---	---
	G86700	---	leaded manganese bronze	58	1	1	34	---	2	2	2	---	---	---
	G87300	---	silicon-bronze	95	---	---	---	---	---	---	1	4	---	---
	G87400	13A	silicon-bronze	82	---	0.5	14	---	---	---	---	3.5	---	---
	G87500	13B	silicon-bronze	82	---	---	14	---	---	---	---	4	---	---
Silicon-bronze	G87600	---	silicon-bronze	91	---	---	5	---	---	---	---	4	---	---
	G87610	---	silicon-bronze	92	---	---	4	---	---	---	---	4	---	---
	G87700	---	silicon-bronze	88.5	---	---	8	---	---	---	---	3	---	---
	G87710	---	silicon-bronze	86	---	---	10	---	---	---	---	4	---	---
Silicon-brass	G87800	---	die-cast silicon-brass	82	---	---	14	---	---	---	---	4	---	---
	G87845 ^D	---	---	76	---	---	21-26	---	---	---	---	2.7	---	---
	G87850 ^A	---	Silicon-brass	76	---	---	20.9	---	---	---	---	3	---	---
	G89320 ^B	---	lead-free-bronze	89	6	---	---	---	---	---	---	---	---	---
Bismuth-tin bronze	G89510 ^C	---	lead-free-bronze	87	5.0	---	5.0	---	---	---	---	---	1.0	
Bismuth-selenium brass	G89520 ^D	---	lead-free brass	86	5.5	---	5	---	---	---	---	---	---	1.9
	G89530 ^E	---	---	86.5	4.7	---	8.0	---	---	---	---	---	---	1.5
	G89535 ^E	---	---	86.5	3.0	---	7.0	---	6.5	---	---	---	---	1.4
	G89540 ^E	---	lead-free yellow brass	61	0.8	---	36	0.5	0.3	0.4	---	---	---	0.9
Bismuth-brass	G89720 ^H	---	---	67.5	1	---	29.8	---	---	0.5	---	0.5	---	0.7
Bismuth-red brass	G89833	---	Lead-free brass	89	5	---	3	---	---	---	---	---	---	2.2
Bismuth-Bronze	G89836	---	lead-free-bronze	89.5	5.5	---	3.0	---	---	---	---	---	---	2.0
Bismuth semi-red brass	G89844	---	east bismuth brass	84.5	4	---	8	---	---	---	---	---	---	3
Tin-bronze and leaded —tin-bronze	G90300	1B	88-8-0-4 or modified "G" —bronze	88	8	---	4	---	---	---	---	---	---	---
	G90500	1A	88-10-0-2 or "G" bronze	88	10	---	2	---	---	---	---	---	---	---
	G90700	---	89-11 gear-bronze	89	11	---	---	---	---	---	---	---	---	---
	G90800	---	88-12 gear-bronze	88	12	---	---	---	---	---	---	---	---	---
	G91000	---	85-15 tin-bronze	85	15	---	---	---	---	---	---	---	---	---
	G91100	---	84-16 tin-bronze	84	16	---	---	---	---	---	---	---	---	---
	G91300	---	81-19 tin-bronze or bell-metal	81	19	---	---	---	---	---	---	---	---	---
	G91600	---	nickel gear-bronze	88	10.5	---	---	1.5	---	---	---	---	---	---
	G91700	---	nickel gear-bronze	86.5	12	---	---	1.5	---	---	---	---	---	---
	G92200	2A	steam or valve bronze-Navy "M"	88	6	1.5	4.5	---	---	---	---	---	---	---
	G92210	---	---	88	5	2	4	1	---	---	---	---	---	---
	G92300	2B	87-8-1-4 Navy P-C	87	8	1	4	---	---	---	---	---	---	---
	G92500	---	87-11-1-0-1 leaded gear —bronze	87	11	1	---	1	---	---	---	---	---	---
	G92600	---	87-10-1-2 leaded tin-bronze	87	10	1	2	---	---	---	---	---	---	---
	G92700	---	88-10-2-0 leaded tin-bronze	88	10	2	---	---	---	---	---	---	---	---
G92800	---	79-16-5 leaded tin-bronze	79	16	5	---	---	---	---	---	---	---	---	
G92900	---	leaded gear-bronze	84	10	2.5	---	3.5	---	---	---	---	---	---	

TABLE 1 *Continued*

Alloy Name	Copper Alloy UNS No.	Previously Used Designation	Commercial Designation	Nominal Composition, %										
				Copper	Tin	Lead	Zinc	Nickel	Iron	Aluminum	Manganese	Silicon	Niobium	Bismuth
High-lead tin bronze	G93200	3B	83-7-7-3	83	7	7	3	...	...	...	...	...	...	...
	G93400		84-8-8	84	8	8	...	...	...	...	...	...	...	...
	G93500	3C	85-5-9-1	85	5	9	1	...	...	...	...	...	...	...
	G93600		81-7-12	81	7	12	...	...	...	...	...	...	...	...
	G93700	3A	80-10-10	80	10	10	...	...	...	...	...	...	...	...
	G93800	3D	78-7-15	78	7	15	...	...	...	...	...	...	...	...
	G93900		77-6-16-1 high-lead tin bronze	77	6	16	1	...	...	...	...	...	...	...
	G94000		72-13-15	72	13	15	...	...	...	...	...	...	...	...
	G94100		journal-bronze	75	5	18	2	...	...	...	...	...	...	...
	G94300		71-5-24	71	5	24	...	...	...	...	...	...	...	...
	G94400		81-8-11	81	8	11	...	...	...	...	...	...	...	...
	G94500		73-7-20	73	7	20	...	...	...	...	...	...	...	...
	G94700		nickel-tin-bronze Grade "A"	88	5	...	2	5	...	...	...	...	...	...
	Nickel-tin bronze and leaded-nickel tin bronze	G94800		leaded nickel-tin-bronze Grade "B"	87	5	1	2	5
G94900			leaded nickel-tin-bronze Grade "C"	80	5	5	5	5	...	...	...	...	...	...
Aluminum-bronze	G95200	9A	Grade-A	88	...	...	...	...	3	9	...	...	...	...
	G95300	9B	Grade-B	89	...	...	...	...	1	10	...	...	...	...
	G95400	9C	Grade-C	86	...	...	...	...	4	10	...	...	...	...
	G95410			84	...	...	...	...	2	4	10	...	...	...
	G95500	9D	Grade-D	81	...	...	...	...	4	4	11	...	...	...
	G95520		nickel-aluminum-bronze	78.5	...	...	...	...	5.5	5.0	11	...	...	...
Silicon-aluminum bronze	G95600	9E	silicon-aluminum-bronze	91	...	...	...	...	...	7	...	2	...	...
Manganese aluminum bronze	G95700	9F	manganese-aluminum-bronze	75	...	...	...	2	3	8	12	...	...	...
Nickel-aluminum bronze	G95800		nickel-aluminum-bronze	81	...	...	...	4.5	4	9	1.5	...	...	...
Aluminum-bronze	G95900		aluminum-bronze	82.5	...	...	...	...	4.5	13	...	...	...	...
Cupro-nickel	G96200		90-10 cupro-nickel	87	...	...	...	10	1.5	...	1	...	1	...
	G96400		70-30 cupro-nickel	66	...	...	...	30.5	0.5	...	1	...	1	...
	G96800		spinodal-alloy	82	8	...	...	...	10	...	...	...	0.2	...
Leaded nickel bronze	G97300	10A	12% leaded nickel-silver	57	2	9	20	12	...	...	...	...	...	...
	G97600	11A	20% leaded nickel-silver	64	4	4	8	20	...	...	...	...	...	...
	G97800	11B	25% leaded nickel-silver	66	5	2	2	25	...	...	...	...	...	...
Special alloys	G99400			87	...	...	4.4	3.0	3.0	1.6	...	1.0	...	...
	G99500			87	...	...	1.5	4.5	4.0	1.7	...	1.3	...	...
White brass	G99700			58	...	1.5	22.5	5.0	...	1.0	12	...	...	...
	G99750			58	...	1.0	20.0	...	...	1.0	20	...	...	...

TABLE 1 Nominal Compositions

Alloy Name	Copper Alloy UNS No.	Previously Used Designation	Commercial Designation	Nominal Composition, %											
				Copper	Tin	Lead	Zinc	Nickel	Sulfur	Iron	Aluminum	Manganese	Antimony	Silicon	Niobium	Bismuth
Leaded red brass	C83450	...		88	2.5	2	6.5	1	...	...	...	...	...	...	...
Low-lead sulfur tin bronze	C83470	...		93	4	...	2	0.5	0.5	...	...	...	...	...	...
Leaded red brass	C83600	4A	85-5-5-5 or No. 1 composition	85	5	5	5	...	...	...	...	...	...	...	...
	C83800	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	...	...	...	...	...	...
	C84030	...		85.5	3	...	9	1.2	0.38	...	...	...	0.8	...	...
Leaded semi-red brass	C84200	...	semi-red brass, 80-5-2-13	80	5	2	13	...	...	...	...	...	...	...	...
	C84400	5A	valve composition 81-3-7-9	81	3	7	9	...	...	...	...	...	...	...	...
Leaded yellow brass	C84800	5B	semi-red brass, 76-2½-6½-15	76	2.5	6.5	15	...	...	...	...	...	...	...	...
	C85200	6A	high-copper yellow brass	72	1	3	24	...	...	...	...	...	...	...	...
	C85400	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	6C	60-40 leaded yellow (naval) brass	61	1	1	37	...	...	...	...	...	...	...	...

TABLE 1 *Continued*

Alloy Name	Copper Alloy UNS No.	Previously Used Designation	Commercial Designation	Nominal Composition, %													
				Copper	Tin	Lead	Zinc	Ni-ckel	Sul-fur	Iron	Alu-mi-num	Man-ga-nese	Anti-mony	Sili-con	Nio-bium	Bis-muth	
Leaded high-strength yellow brass and high-strength yellow brass	C85800	...	die-cast yellow brass	62	1	1	36	...	...	...	...	...	...	...	...	...	...
	C86100	...	high-strength manganese bronze	67	...	...	21	...	...	3	5	4	...	...	...	...	...
	C86200	8B	high-strength manganese bronze	63	...	...	27	...	...	3	4	3	...	...	...	...	...
	C86300	8C	high-strength manganese bronze	61	...	...	27	...	...	3	6	3	...	...	...	...	...
	C86400	7A	leaded manganese bronze	58	1	1	38	...	...	1	0.5	0.5	...	...	...	...	...
	C86500	8A	No. 1 manganese bronze	58	...	...	39	...	...	1	1	1	...	...	...	...	...
	C86700	...	leaded manganese bronze	58	1	1	34	...	...	2	2	2	...	...	...	...	...
	C87300	...	silicon bronze	95	...	...	...	...	...	...	...	1	...	...	...	...	...
	C87400	13A	silicon brass	82	...	0.5	14	...	...	...	...	...	...	3.5	...	...	...
	C87500	13B	...	82	...	...	14	...	...	...	...	...	...	4	...	...	...
Silicon bronze	C87600	...	silicon bronze	91	...	...	5	...	...	...	...	...	...	4	...	...	...
	C87610	...	silicon bronze	92	...	...	4	...	...	...	...	...	...	4	...	...	...
	C87700	...	silicon bronze	88.5	...	...	8	...	...	...	...	...	...	3	...	...	...
	C87710	...	silicon bronze	86	...	...	10	...	...	...	...	...	...	4	...	...	...
Silicon brass	C87800	...	die-cast silicon brass	82	...	...	14	...	...	...	...	...	...	4	...	...	...
	C87845 ^B	...	...	76	...	...	21.26	...	...	...	...	...	...	2.7	...	...	...
	C87850 ^C	...	Silicon brass	76	...	...	20.9	...	...	...	...	...	...	3	...	...	...
	C89320 ^D	...	lead-free bronze	89	6	...	...	...	...	...	...	...	...	...	...	...	...
Bismuth tin bronze	C89510 ^E	...	lead-free bronze	87	5.0	...	5.0	...	...	...	...	...	...	...	...	...	1.0
	C89520 ^F	...	lead-free brass	86	5.5	...	5	...	...	...	...	...	...	...	...	...	1.9
	C89530 ^G	...	...	86.5	4.7	...	8.0	...	...	...	...	...	...	...	...	...	1.5
	C89535 ^G	...	...	86.5	3.0	...	7.0	65	...	...	...	...	...	...	...	...	1.4
Bismuth brass	C89537	...	...	85.0	4.5	...	9.0	...	...	...	...	...	...	0.9	...	...	1.7
	C89540 ^H	...	lead-free yellow brass	61	0.8	...	36	0.5	...	0.3	0.4	...	...	...	...	...	0.9
Bismuth selenium yellow brass	C89570 ^I	...	...	60.5	0.8	...	36.5	0.32	...	...	0.5	...	...	...	...	...	1.0
	C89720 ^J	...	...	67.5	1	...	29.8	...	...	...	0.5	...	...	0.5	...	...	0.7
Bismuth red brass	C89833	...	Lead-free brass	89	5	...	3	...	...	...	...	...	...	...	...	...	2.2
Bismuth Bronze	C89836	...	lead-free bronze	89.5	5.5	...	3.0	...	...	...	...	...	...	...	...	...	2.0
Bismuth semi-red brass	C89844	...	cast bismuth brass	84.5	4	...	8	...	...	...	...	...	...	...	...	...	3
Tin bronze and leaded tin bronze	C90300	1B	88-8-0-4 or modified "G" bronze	88	8	...	4	...	...	...	...	...	...	...	...	...	...
Low-lead tin bronze	C90420	...	...	87.5	8	...	3	...	0.38	...	...	...	...	...	...	...	...
Tin bronze and leaded tin bronze	C90500	1A	88-10-0-2 or "G" bronze	88	10	...	2	...	...	...	...	...	...	...	...	...	...
High-leaded tin bronze	C90700	...	89-11 gear bronze	89	11	...	...	...	...	...	...	...	...	...	...	...	...
	C90800	...	88-12 gear bronze	88	12	...	...	...	...	...	...	...	...	...	...	...	...
	C91000	...	85-15 tin bronze	85	15	...	...	...	...	...	...	...	...	...	...	...	...
	C91100	...	84-16 tin bronze	84	16	...	...	...	...	...	...	...	...	...	...	...	...
	C91300	...	81-19 tin bronze or bell metal	81	19	...	...	...	...	...	...	...	...	...	...	...	...
	C91600	...	nickel gear bronze	88	10.5	...	...	1.5	...	...	...	...	...	...	...	...	...
	C91700	...	nickel gear bronze	86.5	12	...	...	1.5	...	...	...	...	...	...	...	...	...
	C92200	2A	steam or valve bronze-Navy "M"	88	6	1.5	4.5	...	...	...	...	...	...	...	...	...	...
	C92210	...	...	88	5	2	4	1	...	...	...	...	...	...	...	...	...
	C92300	2B	87-8-1-4 Navy P-C	87	8	1	4	...	...	...	...	...	...	...	...	...	...
	C92500	...	87-11-1-0-1 leaded gear bronze	87	11	1	...	1	...	...	...	...	...	...	...	...	...
	C92600	...	87-10-1-2 leaded tin bronze	87	10	1	2	...	...	...	...	...	...	...	...	...	...
	C92700	...	88-10-2-0 leaded tin bronze	88	10	2	...	...	...	...	...	...	...	...	...	...	...
	C92800	...	79-16-5 leaded tin bronze	79	16	5	...	...	...	...	...	...	...	...	...	...	...
	C92900	...	leaded gear bronze	84	10	2.5	...	3.5	...	...	...	...	...	...	...	...	...
C93200	3B	83-7-7-3	83	7	7	3	...	...	...	...	...	...	...	...	...	...
C93400	...	84-8-8	84	8	8	...	...	...	...	...	...	...	...	...	...	...
C93500	3C	85-5-9-1	85	5	9	1	...	...	...	...	...	...	...	...	...	...
C93600	...	81-7-12	81	7	12	...	...	...	...	...	...	...	...	...	...	...
C93700	3A	80-10-10	80	10	10	...	...	...	...	...	...	...	...	...	...	...
C93800	3D	78-7-15	78	7	15	...	...	...	...	...	...	...	...	...	...	...
C93900	...	77-6-16-1 high-lead-tin bronze	77	6	16	1	...	...	...	...	...	...	...	...	...	...
C94000	...	72-13-15	72	13	15	...	...	...	...	...	...	...	...	...	...	...

TABLE 1 *Continued*

Alloy Name	Copper Alloy UNS No.	Previously Used Designation	Commercial Designation	Nominal Composition, %													
				Copper	Tin	Lead	Zinc	Ni-ckel	Sul-fur	Iron	Alu-mi-num	Man-ga-nese	Anti-mony	Sili-con	Nio-bium	Bis-muth	
Nickel-tin bronze and leaded nickel tin bronze	C94100	...	journal bronze	75	5	18	2	...	...	...	...	...	...	...	...	...	...
	C94300	...	71-5-24	71	5	24	...	...	...	...	...	...	...	...	...	...	...
	C94400	...	81-8-11	81	8	11	...	...	...	...	...	...	...	...	...	...	...
	C94500	...	73-7-20	73	7	20	...	...	...	...	...	...	...	...	...	...	...
	C94700	...	nickel-tin bronze Grade "A"	88	5	...	2	5	...	...	...	...	...	...	...	...	...
Aluminum bronze	C94800	...	leaded nickel-tin bronze Grade "B"	87	5	1	2	5	...	...	...	...	...	...	...	...	...
	C94900	...	leaded nickel-tin bronze Grade "C"	80	5	5	5	5	...	...	...	...	...	...	...	...	...
Silicon aluminum bronze	C95200	9A	Grade A	88	...	...	...	...	...	3	9	...	...	...	...	...	...
	C95300	9B	Grade B	89	...	...	...	...	...	1	10	...	...	...	...	...	...
	C95400	9C	Grade C	86	...	...	...	...	...	4	10	...	...	...	...	...	...
	C95410	...	...	84	...	...	...	2	...	4	10	...	...	...	...	...	...
	C95500	9D	Grade D	81	...	...	...	4	...	4	11	...	...	...	...	...	...
	C95520	...	nickel-aluminum bronze	78.5	...	...	...	5.5	...	5.0	11	...	...	...	...	...	...
Manganese aluminum bronze	C95600	9E	silicon-aluminum bronze	91	...	...	...	...	...	...	7	...	...	...	2	...	...
	C95700	9F	manganese-aluminum bronze	75	...	...	...	2	...	3	8	12	...	...	...	...	...
Nickel aluminum bronze	C95800	...	nickel-aluminum bronze	81	...	...	...	4.5	...	4	9	1.5	...	...	...	...	...
Cupro-nickel	C95900	...	aluminum bronze	82.5	...	...	...	...	...	4.5	13	...	...	...	...	...	...
	C96200	...	90-10 cupro-nickel	87	...	...	...	10	...	1.5	...	1	...	...	1	...	...
	C96400	...	70-30 cupro-nickel	66	...	...	...	30.5	...	0.5	...	1	...	...	1	...	...
	C96800	...	spinodal alloy	82	8	...	...	10	...	...	...	...	...	...	...	0.2	...
Leaded nickel bronze	C97300	10A	12 % leaded nickel silver	57	2	9	20	12	...	...	...	...	...	...	...	...	...
	C97600	11A	20 % leaded nickel silver	64	4	4	8	20	...	...	...	...	...	...	...	...	...
	C97800	11B	25 % leaded nickel silver	66	5	2	2	25	...	...	...	...	...	...	...	...	...
Special alloys	C99400	...	...	87	...	...	4.4	3.0	...	3.0	1.6	...	...	1.0	...	...	...
	C99500	...	...	87	...	...	1.5	4.5	...	4.0	1.7	...	...	1.3	...	...	...
White brass	C99700	...	...	58	...	1.5	22.5	5.0	...	...	1.0	12	...	...	...	...	...
	C99750	...	...	58	...	1.0	20.0	...	...	...	1.0	20	...	...	...	...	...

^A Phosphorus 0.12-0.13.
^B Phosphorus 0.04.
^C Phosphorus 0.12.
^D Bismuth 5.0.
^E Selenium 0.5.
^F Selenium 0.9.
^G Selenium 0.20.
^H Selenium 0.03.
^I Phosphorus 0.04, Phosphorus 0.1
^J Antimony 0.07, Boron 0.00±0.001.

- [E76 Test Methods for Chemical Analysis of Nickel-Copper Alloys \(Withdrawn 2003\)³](#)
- [E255 Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition](#)
- [E478 Test Methods for Chemical Analysis of Copper Alloys](#)
- [E581 Test Methods for Chemical Analysis of Manganese-Copper Alloys](#)
- 2.3 *JIS Standards Standard*⁴
- [JIS H1068 Methods for Determination of Bismuth in Copper and Copper Alloys](#)

3. Ordering Information

- 3.1 Orders for ingot should include the following information:
 - 3.1.1 ASTM designation and year of issue (for example, B30 – 05),
 - 3.1.2 Copper Alloy UNS No. (for example, C83450 and [Table 1](#), [Table 2](#), [Table 4](#), and [Table 5](#)),
 - 3.1.3 Quantity; total weight, and
 - 3.1.4 When purchase is for agencies of U.S. government.

⁴ Available from Japanese Standards Organization (JSA), 4-1-24 Akasaka Minato-Ku, Tokyo 107-8440, Japan, <http://www.jsa.or.jp>.

TABLE 2 Nominal Compositions

Alloy Name	Copper Alloy —UNS No.	Previous Designation	Copper	Nickel	Iron	Silicon	Beryllium	Cobalt	Chro- mium	Zircon- ium	Titan- ium	Man- ganese
Copper beryllium	C81400	70G	99.1	...	...	...	0.06	...	0.8	...	...	...
	C82000	10G	97	...	...	...	0.5	2.5	...	...	...	...
	C82200	3G, 14G	98	1.5	...	...	0.5	...	...	...	...	...
	C82400 ^A	165C, 165CT ^A	97.8	...	...	...	1.7	0.5	...	...	...	...
	C82500 ^A	20C, 20CT ^A	97.2	...	...	0.3	2.0	0.5	...	...	...	...
	C82510	21C	96.6	...	...	0.3	2.0	1.1	...	...	...	...
	C82600 ^A	245C, 245CT ^A	96.8	...	...	0.3	2.4	0.5	...	...	...	...
	C82800 ^A	275C, 275CT ^A	96.6	...	...	0.3	2.6	0.5	...	...	...	...
	C96700	72G	67.2	31.0	0.6	...	1.2	...	...	0.3	0.3	0.6

TABLE 2 Nominal Compositions

Alloy Name	Copper Alloy UNS No.	Previous Designation	Copper	Nickel	Iron	Silicon	Beryllium	Cobalt	Chro- mium	Zircon- ium	Titan- ium	Man- ganese
Copper beryllium	C81400	70C	99.1	...	...	...	0.06	...	0.8	...	...	...
	C82000	10C	97	...	...	...	0.5	2.5	...	...	...	...
	C82200	3C, 14C	98	1.5	...	...	0.5	...	...	...	...	...
	C82400 ^A	165C, 165CT ^A	97.8	...	...	...	1.7	0.5	...	...	...	...
	C82500 ^A	20C, 20CT ^A	97.2	...	...	0.3	2.0	0.5	...	...	...	...
	C82510	21C	96.6	...	...	0.3	2.0	1.1	...	...	...	...
	C82600 ^A	245C, 245CT ^A	96.8	...	...	0.3	2.4	0.5	...	...	...	...
	C82800 ^A	275C, 275CT ^A	96.6	...	...	0.3	2.6	0.5	...	...	...	...
	C96700	72C	67.2	31.0	0.6	...	1.2	...	...	0.3	0.3	0.6

^A When fine grained castings are specified, 0.02–0.12 titanium is added.

3.2 The following options are available under this specification and shall be specified in the contract or purchase order when required:

- 3.2.1 Mechanical requirements, when specified in the purchase order (Section 7).
- 3.2.2 Nickel content in Copper Alloys UNS Nos. C90300, C90500, C92200, and C92300 (Table 4).
- 3.2.3 Weldability test for Copper Alloys UNS Nos. C96200 and C96400 (Section 8).

Document Preview

ASTM B30-14

<https://standards.iteh.ai/catalog/standards/sist/f8ac3fe8-d616-4c7d-b151-66fe41e9ce6a/astm-b30-14>

TABLE 3 Alloy/Specification Cross Reference

Copper Alloy UNS No.	ASTM Copper Alloy Casting Specification															
	B22/B22M	B30	B61	B62	B66	B67	B148	B270/B271M	B369	B427	B505/ B505M	B663/B663M	B763/B763M	B770	B806	
C81400	...	X	...	...	...	...	...	...	...	...	...	...	...	...	X	...
C82000	...	X	...	...	...	...	...	...	...	...	...	...	...	...	X	...
C82200	...	X	...	...	...	...	...	...	...	...	...	...	...	...	X	...
C82400	...	X	...	...	...	...	...	...	...	...	...	...	...	...	X	...
C82500	...	X	...	...	...	...	...	...	...	...	...	...	...	...	X	...
C82510	...	X	...	...	...	...	...	...	...	...	...	...	...	...	X	...
C82600	...	X	...	...	...	...	...	...	...	...	...	...	...	...	X	...
C82800	...	X	...	...	...	...	...	...	...	...	...	...	...	...	X	...
C83450	...	X	...	...	...	...	...	...	...	...	...	...	X	X	...	...
C83470	...	X	...	...	...	...	...	...	...	...	X	X	...	...	...	...
C83600	...	X	...	X	...	...	...	...	X	...	X	X	...	...	...	...
C83800	...	X	...	...	...	...	...	...	X	...	X	X	X	...	...	...
C84020	...	X	...	...	...	...	...	...	...	...	X	X	...	...	...	...
C84030	...	X	...	...	...	...	...	...	...	...	X	X	...	...	...	...
C84200	...	X	...	...	...	...	...	...	...	...	X	...	...	...	...	...
C84400	...	X	...	...	...	...	...	...	X	...	X	X	X	...	...	...
C84800	...	X	...	...	...	...	...	...	X	...	X	X	X	...	...	...
C85200	...	X	...	...	...	...	...	...	X	...	...	X	X	...	...	...
C85400	...	X	...	...	...	...	...	...	X	...	...	X	X	...	...	...
C85470	...	X	...	...	...	...	...	X	X	...	X	X	X	...	...	X
C85700	...	X	...	...	...	...	...	X	X	...	X	X	X	...	...	...
C85800	...	X	...	...	...	...	...	X	...	...	...	...	...	...	...	...
C86100	...	X	...	...	...	...	...	...	...	...	...	...	...	...	...	...
C86200	...	X	...	...	...	...	...	...	X	...	X	X	X	...	...	...
C86300	X	X	...	...	...	...	...	...	X	...	X	X	X	...	...	...
C86400	...	X	...	...	...	...	...	...	X	...	...	X	X	...	...	...
C86500	...	X	...	...	...	...	...	X	X	...	X	X	X	...	...	...
C86700	...	X	...	...	...	...	...	...	X	...	...	X	X	...	...	...
C87300	...	X	...	...	...	...	...	...	X	...	...	X	X	...	...	...
C87400	...	X	...	...	...	...	...	...	X	...	...	X	X	...	...	...
C87500	...	X	...	...	...	...	...	...	X	...	...	X	X	...	...	X
C87600	...	X	...	...	...	...	...	...	X	...	...	X	X	...	...	...
C87610	...	X	...	...	...	...	...	...	X	...	...	X	X	...	...	...
C87700	...	X	...	...	...	...	...	...	...	...	X	X	...	...	...	...
C87710	...	X	...	...	...	...	...	...	...	...	X	X	...	...	...	...
C87800	...	X	...	...	...	...	...	X	...	...	...	...	...	...	...	X
C87845	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...
C87850	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	X
C89320	...	X	...	...	...	...	...	...	...	...	X	...	...	...	...	...
C89510	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...
C89520	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...
C89530	...	X	...	...	...	...	...	...	...	...	...	X	X	...	...	...
C89535	...	X	...	...	...	...	...	...	...	...	...	X	X	...	...	...
C89537	...	X	...	...	...	...	...	...	...	...	...	X	X	...	...	X
C89540	...	X	...	...	...	...	...	...	...	...	...	...	...	...	...	X
C89570	...	X	...	...	...	...	...	...	...	...	...	X	X	...	...	X
C89720	...	X	...	...	...	...	...	...	...	...	X	X	X	...	...	...
C89833	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...
C89836	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...
C89844	...	X	...	...	...	...	...	...	...	...	...	X	X	...	...	...
C90300	...	X	...	...	...	...	...	...	X	...	X	X	X	...	...	...
C90420	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...
C90500	X	X	...	...	...	...	...	...	X	...	X	X	X	...	...	...
C90700	...	X	...	...	...	...	...	...	...	X	X	...	...	...	...	...
C90800	...	X	...	...	...	...	...	...	...	X	...	...	...	...	...	...
C91000	...	X	...	...	...	...	...	...	...	...	X	...	...	...	...	...
C91100	X	X	...	...	...	...	...	...	...	...	...	...	...	...	...	...
C91300	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...	...
C91600	...	X	...	...	...	...	...	...	...	X	...	...	...	...	...	...
C91700	...	X	...	...	...	...	...	...	...	X	...	...	...	...	...	...
C92200	...	X	X	...	...	...	...	...	X	...	X	X	...	...	...	...
C92210	X	...	...	...	...
C92300	...	X	...	...	...	...	...	...	X	...	X	X	X	...	...	...
C92500	...	X	...	...	...	...	...	...	...	...	X	...	...	...	...	...
C92600	...	X	...	...	...	...	...	...	...	...	...	X	X	...	...	...
C92700	...	X	...	...	...	...	...	...	...	...	X	...	...	...	...	...
C92800	...	X	...	...	...	...	...	...	...	...	X	...	...	...	...	...
C92900	...	X	...	...	...	...	...	...	...	X	X	...	...	...	...	...
C93200	...	X	...	...	X	...	...	...	X	...	X	X	X	...	...	...
C93400	...	X	...	...	X	...	...	...	...	...	X	...	...	...	...	...
C93500	...	X	...	...	...	...	...	...	X	...	X	X	X	...	...	...
C93600	...	X	...	...	X	...	...	...	X	...	X	...	...	...	...	...

TABLE 3 *Continued*

Copper Alloy UNS No.	ASTM Copper Alloy Casting Specification															
	B22/B22M	B30	B61	B62	B66	B67	B148	B271/B271M	B369	B427	B505/ B505M	B763/B763M	B770	B806		
C93700	X	X	...	...	X	...	...	...	X	...	...	X	X	X	...	...
C93800	...	X	...	...	X	...	...	...	X	...	...	X	X	X	...	...
C93900	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...
C94000	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...
C94100	...	X	...	...	...	X	...	...	...	...	...	X	...	...	...	...
C94300	...	X	...	...	X	...	...	...	X	...	...	X	X	X	...	...
C94400	...	X	...	...	X	...	...	...	...	...	...	...	...	...	...	...
C94500	...	X	...	...	X	...	...	...	...	...	...	...	...	...	...	...
C94700	...	X	...	...	...	...	...	...	...	...	...	X	X	X	...	...
C94800	...	X	...	...	...	...	...	...	...	...	...	X	X	X	...	...
C94900	...	X	...	...	...	...	...	...	...	...	...	X	X	X	...	...
C95200	...	X	...	...	...	...	X	...	X	...	...	X	...	X	...	...
C95300	...	X	...	...	...	...	X	...	X	...	...	X	...	X	...	X
C95400	...	X	...	...	X	...	X	...	X	...	...	X	...	X	...	X
C95410	...	X	...	...	...	...	X	...	X	...	...	X	...	X	...	X
C95500	...	X	...	...	...	...	X	...	X	...	...	X	...	X	...	X
C95520	...	X	...	...	...	...	X	...	X	...	...	X	...	...	...	...
C95600	...	X	...	...	...	...	X	...	...	...	...	...	X	...	...	...
C95700	...	X	...	...	...	...	X	...	...	...	...	X	...	...	...	...
C95800	...	X	...	...	...	...	X	...	X	...	...	X	...	X	...	X
C95900	...	X	...	...	...	...	X	...	X	...	...	X	...	...	...	...
C96200	...	X	...	...	...	...	...	...	X	...	...	...	...	...	...	...
C96400	...	X	...	...	...	...	...	...	X	...	...	X	...	...	...	...
C96700	...	X	...	...	...	...	...	...	...	...	...	...	...	X	...	...
C96800	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...
C97300	...	X	...	...	...	...	...	X	...	...	...	X	X	X	...	...
C97600	...	X	...	...	...	...	...	X	...	...	...	X	X	X	...	...
C97800	...	X	...	...	...	...	...	X	...	...	...	X	X	X	...	...
C99400	...	X	...	...	...	...	...	...	...	...	...	...	...	X	...	...
C99500	...	X	...	...	...	...	...	...	...	...	...	...	...	X	...	...
C99700	...	X	...	...	...	...	...	X	...	...	...	...	...	...	...	...
C99750	...	X	...	...	...	...	...	X	...	...	...	...	...	...	...	...

- 3.2.4 Lot consisting of ingots from more than a single heat or melt (Section 10.1.1).
- 3.2.5 Place of inspection (Section 14).
- 3.2.6 Type of ingot surface (5.1).

4. Material and Manufacture

4.1 *Material*—Any material may be used which when melted will produce an alloy of the required chemical composition and mechanical requirements.

TABLE 4 Ingot Chemical Requirements

Classification	Copper Alloy UNS No.	Composition, % max except as indicated													Corresponding ASTM Casting Specifications ^A
		Copper	Tin	Lead	Zinc	Iron	Antimony	Nickel (incl Cobalt)	Sulfur	Phosphorus	Aluminum	Manganese	Silicon	Bismuth		Other
Leaded red-brass	C83450	87.0–89.0 ^{B,C}	2.2–3.0	1.5–2.5	5.8–7.5	0.25	0.25	0.8–1.5	0.08	0.03	0.005	...	0.005	...	B584 (C83450) B763 (C83450)
	C83600	84.0–86.0 ^{B,C}	4.3–6.0	4.0–5.7	4.3–6.0	0.25	0.25	0.8	0.08	0.03	0.005	0.005	...	B62 (C83600) B271 (C83600) B505/B505M (C83600) B584 (C83600)	
	C83800	82.0–83.5 ^{B,C}	3.5–4.2	5.8–6.8	5.5–8.0	0.25	0.25	0.8	0.08	0.02	0.005	0.005	...	B584 (C83800) B271 (C83800) B505/B505M (C83800) B763 (C83800)	
Leaded semi-red-brass	C84200	78.0–82.0 ^{B,C}	4.3–6.0	2.0–2.8	10.0–16.0	0.35	0.25	0.8	0.08	0.02	0.005	0.005	...	B505/B505M (C84200)	
	C84400	79.0–82.0 ^{B,C}	2.5–3.5	6.3–7.7	7.0–10.0	0.35	0.25	0.8	0.08	0.02	0.005	0.005	...	B584 (C84400) B271 (C84400) B505/B505M (C84400) B763 (C84400)	
	C84800	75.0–76.7 ^{B,C}	2.3–3.0	5.5–6.7	13.0–16.0	0.35	0.25	0.8	0.08	0.02	0.005	0.005	...	B584 (C84800) B271 (C84800) B505/B505M (C84800) B763 (C84800)	
Leaded yellow-brass	C85200	70.0–73.0 ^{B,D}	0.8–1.7	1.5–3.5	21.0–27.0	0.50	0.20	0.8	0.05	0.01	0.005	0.05	...	B271 (C85200) B584 (C85200) B763 (C85200)	
	C85400	66.0–69.0 ^{B,E}	0.50–1.5	1.5–3.5	25.0–31.0	0.50	...	0.8	...	...	0.005	0.05	...	B271 (C85400) B584 (C85400) B763 (C85400)	
	C85700	58.0–63.0 ^{B,E}	0.50–1.5	0.8–1.5	33.0–40.0	0.50	...	0.8	...	...	0.80	0.05	...	B271 (C85700) B176 (C85700) B584 (C85700) B763 (C85700)	
	C85800	57.0 min ^{B,E}	1.5	1.5	31.0–41.0	0.50	0.05	0.50	0.05	0.01	0.50	0.25	0.25	0.05 As	B176
	C86100	66.0–68.0 ^{B,G}	0.10	0.10	rem-ainder	2.0–4.0	...	...	...	...	4.5–5.5	2.5–5.0	...	...	...
High-strength yellow-brass	C86200	60.0–66.0 ^{B,G}	0.10	0.10	22.0–28.0	2.0–4.0	...	0.8	...	...	3.0–4.9	2.5–5.0	...	...	B271 (C86200) B505/B505M (C86200) B584 (C86200) B763 (C86200)
	C86300	60.0–66.0 ^{B,G}	0.10	0.10	22.0–28.0	2.0–4.0	...	0.8	...	...	5.0–7.5	2.5–5.0	...	...	B22 (C86300) B271 (C86300) B505/B505M (C86300) B584 (C86300) B763 (C86300)
	C86400	56.0–62.0 ^{B,G}	0.50–1.0	0.50–1.3	34.0–42.0	0.40–2.0	...	0.8	...	...	0.50–1.5	0.10–1.0	...	...	B271 (C86400) B584 (C86400) B763 (C86400)
	C86500	55.0–60.0 ^{B,G}	1.0	0.30	36.0–42.0	0.40–2.0	...	0.8	...	...	0.50–1.5	0.10–1.5	...	...	B271 (C86500) B176 (C86500) B505/B505M (C86500)
	C86700	55.0–60.0 ^{B,G}	1.5	0.50–1.5	30.0–38.0	1.0–3.0	...	0.8	...	...	1.0–3.0	1.0–3.5	...	...	B584 (C86500) B763 (C86500) B584 (C86700) B271 (C86700) B763 (C86700)
Silicon-bronze and silicon-brass	C87300	94.0 min ^H	0.09	0.25	0.20	...	...	...	...	...	0.8–1.5	3.5–4.5	...	...	B271 (C87300) B584 (C87300) B763 (C87300)
	C87400	79.0 min ^I	1.0	12.0–16.0	...	...	...	...	...	0.5	2.5–4.0	...	...	...	B271 (C87400) B584 (C87400) B763 (C87400)
	C87500	79.0 min ^H	0.09	12.0–16.0	...	...	...	...	...	0.50	3.0–5.0	...	...	...	B271 (C87500) B806 (C87500) B763 (C87500) B584 (C87500)

TABLE 4 Continued

Classification	Copper Alloy UNS No.	Composition, % max except as indicated												Corresponding ASTM Casting Specifications ^A		
		Copper	Tin	Lead	Zinc	Iron	Anti- mony	Nickel (incl Cobalt)	Sulfur	Phos- phorus	Alumi- num	Man- gan- ese	Sili- con		Bis- muth	Other
Bismuth -tin -bronze	C87600	88.0 min ^H	...	0.09	4.0 —7.0	0.20	...	...	...	...	0.25	3.5 —5.5	...	...	B584 (C87600) B271 (C87600) B763 (C87600)	
	C87610	90.0 min ^H	...	0.09	3.0 —5.0	0.20	...	...	...	...	0.25	3.0 —5.0	...	...	B584 (C87610) B763 (C87610)	
	C87700	87.5 min ^L	2.0	0.09	7.0 9.0	0.50	0.10	0.25	...	0.15	...	0.80	2.5 3.5	...	...	B505/B505M (87700)
	C87710	84.0 min ^L	2.0	0.09	9.0 11.0	0.50	0.10	0.25	...	0.15	...	0.80	3.0 5.0	...	...	B584 (C87710)
	C87800	80.0 min ^H	0.25	0.09	12.0 —16.0	0.15	0.05	0.20	0.05	0.01	0.15	0.15	3.8 —4.2	...	As 0.05 Mg 0.01	B176 (C87800) B806 (C87800)
	C87845	75.0 —78.0 ^H	0.10	0.02	rem- ain- der	0.10	0.015	0.20	...	0.03 0.06	0.09	0.10	2.5 2.9	...	As 0.015 Cr 0.015	B584 (C87845)
	C87850	75.0 —78.0 ^H	0.30	0.09	rem- ain- der	0.10	0.10	0.20	...	0.05 —0.20	...	0.10	2.7 —3.4	...	...	B584 (C87850)
	C89320	87.0 —91.0 ^H	5.0 —7.0	0.09	1.0	0.20	0.35	1.0	0.08	0.30	0.005	...	0.005	...	Bi 4.0 —6.0	B806 (C87850) B505/B505M (C89320)
Bismuth -selenium -brass	C89510	86.0 —88.0 ^H	4.0 —6.0	0.09	4.0 —6.0	0.20	0.25	1.0	0.08	0.05	0.005	...	0.005	0.5 —1.5 ^L	Se ^L 0.35 —0.75	B584 (C89520)
	C89520	85.0 —87.0 ^H	5.0 —6.0	0.09	4.0 —6.0	0.20	0.25	1.0	0.08	0.05	0.005	...	0.005	1.6 —2.2 ^K	Se ^K 0.8 —1.1	
	C89530	84.0 —89.0 ^L	3.5 6.0	.20	7.0 9.0	.30	.20	1.0	.05	.01	.01	.01	1.0 2.0	1.0 2.0	Se .10 .30	
	C89535	84.0 —89.0 ^L	2.5 5.5	.25	5.0 9.0	.30	.20	.30 1.0	.40	.01	.01	.01	.8 2.0	.8 2.0	Se .50	
Bismuth selenium yellow brass	C89540	58.0 —64.0 ^H	1.2	0.10	32.0 —38.0	0.50	...	1.0	...	...	0.10 —0.60	...	...	0.6 —1.2	Se 0.10	B806 (C89540)
Bismuth brass	C89720	63.0 min ^H	0.6 —1.5	0.09	26.0 —32.0	0.10	0.02 —0.20	0.10	...	0.02	0.35 —1.5	0.10	0.40 —1.0	0.50 2.0	Boron 0.0005 —0.01	B505/B505M (C89720) B584 (C89720) B763 (C89720)
Bismuth red brass	C89833	86.0 —91.0 ^C	4.0 6.0	0.09	2.0 6.0	0.30	0.25	1.0	0.08	0.050	0.005	...	0.005	1.7 2.7	...	B584 (C89833)
Bismuth bronze	C89836	87.0 —91.0 ^H	4.5 7.0	0.25	2.0 4.0	0.35	0.25	0.90	0.08	0.06	0.005	...	0.005	1.5 2.5	...	...
Bismuth -semi- -red -brass	C89844	83.0 —86.0 ^{B,C}	3.0 —5.0	0.20	7.0 —10.0	0.30	0.25	1.0	0.08	0.05	0.005	...	0.005	2.0 —4.0	...	B584 (C89844) B763 (C89844)
Tin -Bronze -and -lead -tin -bronzes	C90300	86.0 —89.0 ^{B,M}	7.8 —9.0	0.25	3.5 —5.0	0.15	0.20	0.8	0.05	0.03	0.005	...	0.005	...	...	B271 (C90300) B763 (C90300) B505/B505M (C90300) B584 (C90300)
	C90500	86.0 —89.0 ^{B,N}	9.5 —10.5	0.25	1.5 —3.0	0.15	0.20	0.8	0.05	0.03	0.005	...	0.005	...	...	B22 (C90500) B271 (C90500) B763 (C90500) B505/B505M (C90500) B584 (C90500)
	C90700	88.0 —90.0 ^{B,M}	10.3 —12.0	0.50 ^Q	0.50 ^Q	0.15	0.20	0.50 ^{Q,P}	0.05	0.30	0.005	...	0.005	...	...	B505/B505M (C90700)
	C90800	85.0 —89.0 ^{B, Q,M}	11.3 —13.0	0.25	0.25	0.15	0.10	0.50	0.05	0.30	0.005	...	0.005	...	...	B427 (C90700) B427 (C90800)
	C91000	84.0 —86.0 ^{B,M}	14.3 —16.0	0.20	1.5	0.10	0.10	0.8	0.05	0.03	0.005	...	0.005	...	...	B505/B505M (C9100)
	C91100	82.0 —85.0 ^{B,M}	15.3 —17.0	0.25	0.25	0.15	0.20	0.50	0.05	1.0	0.005	...	0.005	...	...	B22 (C91100)