



Designation: **B30—22 B30 – 23**

## Standard Specification for Copper Alloys in Ingot and Other Remelt Forms<sup>1</sup>

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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

*This standard has been approved for use by agencies of the U.S. Department of Defense.*

### 1. Scope\*

1.1 This specification ~~establishes~~ covers the requirements for copper alloys in ingot and other forms including granules, nuggets, pellets, or shot 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**. Product delivered in forms other than ingot shall be upon agreement between the supplier and purchaser.

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.

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 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:<sup>2</sup>

- [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](#)

<sup>1</sup> 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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<sup>2</sup> 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.

\*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	Ni-ckel	Sul-fur	Iron	Alu-mi-num	Man-ga-nese	Anti-mony	Sili-con	Nio-bium	Bis-muth
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	...	...	...	...	...	...	...	...	...
	C84800	5B	semi-red brass, 76-2½-6½-15	76	2.5	6.5	15	...	...	...	...	...	...	...	...	...
Leaded yellow brass	C85200	6A	high-copper yellow brass	72	1	3	24	...	...	...	...	...	...	...	...	...
	C85400	6B	commercial No. 1 yellow brass	67	1	3	29	...	...	...	...	...	...	...	...	...
Yellow brass	C85470 <sup>A</sup>	...	...	62.5	2.5	...	34.3	...	...	...	0.5	...	...	...	...	...
Leaded yellow brass	C85700	6C	60–40 leaded yellow (naval) brass	61	1	1	37	...	...	...	...	...	...	...	...	...
	C85800	...	die-cast yellow brass	62	1	1	36	...	...	...	...	...	...	...	...	...
	C86100	...	high-strength manganese bronze	67	...	...	21	...	...	3	5	4	...	...	...	...
Leaded high-strength yellow brass and high-strength yellow brass	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	...	...	...	...
Silicon bronze	C87300	...	silicon bronze	95	...	...	...	...	...	...	1	...	...	...	...	...
Silicon brass	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	86	...	...	14	...	...	...	...	...	...	4	...	...
	C87845 <sup>B</sup>	...	...	76	...	...	21.26	...	...	...	...	...	...	2.7	...	...
	C87850 <sup>C</sup>	...	Silicon brass	76	...	...	20.9	...	...	...	...	...	...	3	...	...
Bismuth tin bronze	C89320 <sup>D</sup>	...	lead-free bronze	89	6	...	...	...	...	...	...	...	...	...	...	...
Bismuth selenium brass	C89510 <sup>E</sup>	...	lead-free bronze	87	5.0	...	5.0	...	...	...	...	...	...	...	...	1.0
	C89520 <sup>F</sup>	...	lead-free brass	86	5.5	...	5	...	...	...	...	...	...	...	...	1.9
	C89530 <sup>G</sup>	...	...	86.5	4.7	...	8.0	...	...	...	...	...	...	...	...	1.5
	C89535 <sup>G</sup>	...	...	86.5	3.0	...	7.0	0.65	...	...	...	...	...	...	...	1.4
Bismuth brass	C89537	...	...	85.0	4.5	...	9.0	...	...	...	...	...	...	0.9	...	1.7
Bismuth selenium yellow brass	C89540 <sup>H</sup>	...	lead-free yellow brass	61	0.8	...	36	0.5	...	0.3	0.4	...	...	...	...	0.9
	C89545 <sup>I</sup>	...	...	69.0	...	...	29.0	0.5	...	...	1.0	...	...	...	...	0.55
Bismuth brass	C89570 <sup>J</sup>	...	...	60.5	0.8	...	36.5	0.32	...	...	0.5	...	...	...	...	1.0
	C89720 <sup>K</sup>	...	...	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
	C89838	...	...	81.5	2.75	...	15.0	...	...	...	...	...	...	...	...	0.55
Bismuth semi-red brass	C89844	...	cast bismuth brass	84.5	4	...	8	...	...	...	...	...	...	...	...	3
	C89845	...	...	85.0	4.0	...	7.5	2.0	...	...	...	...	...	...	...	1.5
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	...	...	...	...	...	...	...	...	...
	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	...	...	...	...	...	...	...	...

**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	
High-leaded tin bronze	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	...	...	...	...	...	...	...	...	...	...	...
	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	...	...	...	...	...	...	...	...	...	...	...	
Nickel-tin bronze and leaded nickel tin bronze	C94700	...	nickel-tin bronze Grade "A"	88	5	...	2	5	...	...	...	...	...	...	...	...	
	C94800	...	leaded nickel-tin bronze Grade "B"	87	5	1	2	5	...	...	...	...	...	...	...	...	
	C94900	...	leaded nickel-tin bronze Grade "C"	80	5	5	5	5	...	...	...	...	...	...	...	...	
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	...	...	...	...	...	...	
Silicon aluminum bronze	C95600	9E	silicon-aluminum bronze	91	...	...	...	...	...	7	...	...	2	...	...		
Manganese aluminum bronze	C95700	9F	manganese-aluminum bronze	75	...	...	...	2	3	8	12	...	...	...	...		
Nickel aluminum bronze	C95800	...	nickel-aluminum bronze	81	...	...	4.5	...	4	9	1.5	...	...	...	...		
Aluminum bronze 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	...	...	...	...		

<sup>A</sup> Phosphorus 0.13.  
<sup>B</sup> Phosphorus 0.04.  
<sup>C</sup> Phosphorus 0.12.  
<sup>D</sup> Bismuth 5.0.  
<sup>E</sup> Selenium 0.5.  
<sup>F</sup> Selenium 0.9.  
<sup>G</sup> Selenium 0.20.  
<sup>H</sup> Selenium 0.03.  
<sup>I</sup> Phosphorus 0.05.  
<sup>J</sup> Phosphorus 0.40.1.  
<sup>K</sup> Antimony 0.07, Boron 0.001.

**B271/B271M** Specification for Copper-Base Alloy Centrifugal Castings  
**B369** Specification for Copper-Nickel Alloy Castings  
**B427** Specification for Gear Bronze Alloy Castings

**TABLE 2 Nominal Compositions**

Alloy Name	Copper Alloy UNS No.	Previous Designation	Copper	Nickel	Iron	Silicon	Beryllium	Cobalt	Chromium	Zirconium	Titanium	Manganese
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 <sup>A</sup>	165C, 165CT <sup>A</sup>	97.8	...	...	...	1.7	0.5	...	...	...	...
	C82500 <sup>A</sup>	20C, 20CT <sup>A</sup>	97.2	...	...	0.3	2.0	0.5	...	...	...	...
	C82510	21C	96.6	...	...	0.3	2.0	1.1	...	...	...	...
	C82600 <sup>A</sup>	245C, 245CT <sup>A</sup>	96.8	...	...	0.3	2.4	0.5	...	...	...	...
	C82800 <sup>A</sup>	275C, 275CT <sup>A</sup>	96.6	...	...	0.3	2.6	0.5	...	...	...	...
	C96700	72C	67.2	31.0	0.6	...	1.2	...	...	0.3	0.3	0.6

<sup>A</sup> When fine grained castings are specified, 0.02–0.12 titanium is added.

[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](#)

[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 \(Withdrawn 2002\)<sup>3</sup>](#)

[E62 Test Methods for Chemical Analysis of Copper and Copper Alloys \(Photometric Methods\) \(Withdrawn 2010\)<sup>3</sup>](#)

[E76 Test Methods for Chemical Analysis of Nickel-Copper Alloys \(Withdrawn 2003\)<sup>3</sup>](#)

[E255 Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition \(Withdrawn 2023\)<sup>3</sup>](#)

[E478 Test Methods for Chemical Analysis of Copper Alloys](#)

[E581 Test Methods for Chemical Analysis of Manganese-Copper Alloys](#)

2.3 *JIS Standard*<sup>4</sup>

[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 – 20),

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,

3.1.4 When purchase is for agencies of U.S. government,

3.1.5 Form, and

3.1.6 Packaging requirements.

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](#)).

3.2.4 Lot consisting of ingots from more than a single heat or melt ([Section 10.1.1](#)).

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

<sup>4</sup> Available from Japanese Standards Association (JSA) Group, Mita MT Bldg., 3-13-12 Mita, Minato-ku, Tokyo, 108-0073, Japan, <http://www.jsa.or.jp/en>.

**TABLE 3 Alloy/Specification Cross Reference**

Copper Alloy UNS No.	ASTM Copper Alloy Casting Specification															
	B22/ B22M	B30	B61	B62	B66	B67	B148	B176	B271/ B271M	B369	B427	B505/ B505M	B584	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	...	...	...	...
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
C89545	...	X	...	...	...	...	...	...	...	...	...	X	X	...	...	...
C89570	...	X	...	...	...	...	...	...	...	...	...	X	X	X	...	X
C89720	...	X	...	...	...	...	...	...	...	...	...	X	X	X	...	...
C89833	...	X	...	...	...	...	...	...	...	...	...	...	X	...	...	...
C89836	...	X	...	...	...	...	...	...	...	...	...	...	X	...	...	...
C89838	...	X	...	...	...	...	...	...	...	...	...	X	X	...	...	...
C89844	...	X	...	...	...	...	...	...	...	...	...	...	X	X	...	...
C89845	...	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	...	...	...	...	...	...	...	...	...	X	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	...	...	...	...

**TABLE 3** *Continued*

Copper Alloy UNS No.	ASTM Copper Alloy Casting Specification															
	B22/ B22M	B30	B61	B62	B66	B67	B148	B176	B271/ B271M	B369	B427	B505/ B505M	B584	B763/ B763M	B770	B806
C93500	...	X	...	...	...	...	...	...	X	...	...	X	X	X	...	...
C93600	...	X	...	...	X	...	...	...	X	...	...	X	...	...	...	...
C93700	X	X	...	...	X	...	...	...	X	...	...	X	X	X	...	...
C93800	...	X	...	...	X	...	...	...	X	...	...	X	X	X	...	...
C93900	...	X	...	...	...	...	...	...	...	...	...	X	...	...	...	...
C94000	...	X	...	...	...	...	...	...	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	...	...
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	...	...
C97600	...	X	...	...	...	...	...	...	X	...	...	X	X	X	...	...
C97800	...	X	...	...	...	...	...	...	X	...	...	X	X	X	...	...
C99400	...	X	...	...	...	...	...	...	...	...	...	...	...	X	...	...
C99500	...	X	...	...	...	...	...	...	...	...	...	...	...	X	...	...
C99700	...	X	...	...	...	...	...	...	X	...	...	...	...	...	...	...
C99750	...	X	...	...	...	...	...	...	X	...	...	...	...	...	...	...

Document Preview

3.2.5 Place of inspection (Section 14).

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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.

4.2 *Manufacture*:

4.2.1 Any manufacturing process may be used that will yield ingot of uniform composition that is free of defects of a nature that would render the ingot unsuitable for remelting.

4.2.2 Each heat or lot of ingot shall maintain heat identification numbers.

**5. Workmanship, Finish, and Appearance**

5.1 The ingots or other remelt forms shall have the surface specified in the purchase order (3.2.6).

**6. Chemical Composition**

6.1 The ingot shall conform to the requirements given in Table 4 or Table 5 for the specified alloy. Ingot is an intermediate product, therefore the limits listed in Table 4 and Table 5 may be more restrictive than those applicable for cast products produced from the ingot after remelting.

**TABLE 4 Ingot Chemical Requirements**

Classification	Copper Alloy UNS No.	Composition, % max except as indicated													Corresponding ASTM Casting Specifications <sup>A</sup>	
		Copper	Tin	Lead	Zinc	Iron	Anti-mony	Nickel (incl Cobalt)	Sulfur	Phosphorus	Aluminum	Manganese	Silicon	Bismuth		Other
Leaded red brass	C83450	87.0–89.0 <sup>B,C</sup>	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/B763M (C83450)
Low-lead sulfur tin bronze	C83470	90.0–96.0 <sup>B,D</sup>	3.0–5.0	0.09	1.0–3.0	0.50	0.20	1.0	0.20–0.6	0.10	0.01	...	0.01	...	...	B584 (C83470)
Leaded red brass	C83600	84.0–86.0 <sup>B,C</sup>	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/B271M (C83600) B505/B505M (C83600) B584 (C83600)
	C83800	82.0–83.5 <sup>B,C</sup>	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/B271M (C83800) B505/B505M (C83800) B763/B763M (C83800)
Low-lead semi-red brass	C84020	82.0–89.0 <sup>C</sup>	2.0–4.0	0.09	5.0–14.0	0.40	0.02	0.50–2.0	0.10–0.65	0.05	0.005	0.20	0.005	...	B 0.10 C 0.10 Ti 0.10 Zr 0.10	B584 (C84020)
	C84030	82.0–89.0 <sup>C</sup>	2.0–4.0	0.09	5.0–14.0	0.40	0.10–1.5	0.50–2.0	0.10–0.65	0.05	0.005	0.20	0.005	...	B 0.10 C 0.10 Ti 0.10 Zr	B584 (C84030)
Leaded semi-red brass	C84200	78.0–82.0 <sup>B,C</sup>	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 <sup>B,C</sup>	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/B271M (C84400) B505/B505M (C84400) B763/B763M (C84400)
	C84800	75.0–76.7 <sup>B,C</sup>	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/B271M (C84800) B505/B505M (C84800) B763/B763M (C84800)
Leaded yellow brass	C85200	70.0–73.0 <sup>B,E</sup>	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/B271M (C85200) B584 (C85200) B763/B763M (C85200)
	C85400	66.0–69.0 <sup>B,F</sup>	0.50–1.5	1.5–3.5	25.0–31.0	0.50	...	0.8	...	...	0.005	...	0.05	...	...	B271/B271M (C85400) B584 (C85400) B763/B763M (C85400)
Yellow brass	C85470	60.0–65.0 <sup>D</sup>	1.0–4.0	0.09	Rem	0.20	...	...	...	0.02–0.25	0.10–1.0	...	0.40–1.0	...	...	B176 (C85470) B271/B271M (C85470) B505/B505M (C85470) B584 (C85470) B763/B763M (C85470) B806 (C85470)
Leaded yellow brass	C85700	58.0–63.0 <sup>B,G</sup>	0.50–1.5	0.8–1.5	33.0–40.0	0.50	...	0.8	...	...	0.80	...	0.05	...	...	B271/B271M (C85700) B176 (C85700) B584 (C85700)
	C85800	57.0 min <sup>B,G</sup>	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	B763/B763M (C85700) B763/B763M (C85710) B176
	C86100	66.0–68.0 <sup>B,H</sup>	0.10	0.10	remainder	2.0–4.0	...	...	...	...	4.5–5.5	2.5–5.0	...	...	...	As
High-strength yellow brass	C86200	60.0–66.0 <sup>B,H</sup>	0.10	0.10	22.0–28.0	2.0–4.0	...	0.8	...	...	3.0–4.9	2.5–5.0	...	...	...	B271/B271M (C86200) B505/B505M (C86200) B584 (C86200)
	C86300	60.0–66.0 <sup>B,H</sup>	0.10	0.10	22.0–28.0	2.0–4.0	...	0.8	...	...	5.0–7.5	2.5–5.0	...	...	...	B763/B763M (C86200) B22/B22M (C86300) B271/B271M (C86300) B505/B505M (C86300) B584 (C86300) B763/B763M (C86300)