Copper Development Association Inc.

Application Datasheet

Standard Designation for Cast Copper Alloys

- C90000-C91999: Copper-Tin Alloys *(Tin Bronzes)*
- C92000-C92900: Copper-Tin-Lead Alloys *(Leaded Tin Bronzes)*
- C93000-C94500: Copper-Tin-Lead Alloys *(High-Leaded Tin Bronzes)*
- C94600-C94999: Copper-Tin-Nickel Alloys *(Nickel-Tin Bronzes)*
- C95000-C95999: Copper-Aluminum-Iron and Copper-Aluminum-Iron-Nickel Alloys *(Aluminium Bronzes)*

Revision Date: June 10, 2020

Bronzes (C90000 - C95999)

* = are alloys registered with the U.S. EPA as Antimicrobial.

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Mg		Mn		S		Sb		Si		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C90200	91.0 (1)(2)	94.0		0.30	6.0	8.0		0.50		0.20		0.05 (3)		0.50 (4)		0.005						0.05		0.20		0.005			active
C90250 Tin Bronze	89.0	91.0		0.30	9.0	11.0		0.50		0.25		0.05		2.0		0.005				0.20		0.05		0.02		0.005			inactive 03/92
C90280*	87.0	90.0 (5)		.09	9.0	11.0			.30	.6		.05									.30	.6							active
C90300 Tin Bronze	86.0	89.0 (1)(2)		0.30	7.5	9.0	3.0	5.0		0.20		0.05 (3)		1.0 (4)		0.005						0.05		0.20		0.005			active
C90400* Tin Bronze	86.0 (6)	89.0		0.09	7.5	8.5	1.0	5.0		0.40		0.05		1.0		0.005				0.01	0.10	0.65		0.02		0.005		0.10 B 0.10 Zr	active
C90410* Tin Bronze	86.0	89.0 (6)		0.09	7.5	8.5	1.0	5.0		0.40		0.05		1.0		0.005			0.01	0.20	0.10	0.65		0.02		0.005		0.10 B 0.10 Zr	active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Mg		Mn		S		Sb		Si		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C90420* Tin Bronze	86.0 (6)	89.0		0.09	7.5	8.5	1.0	5.0		0.40		0.05		1.0						0.20	0.10	0.65		0.02				0.10 B 0.10 C 0.10 Ti 0.10 Zr	active
C90430* Low-Lead Tin Bronze	86.0 (6)	89.0		0.09	7.5	8.5	1.0	5.0		0.40		0.05		1.0						0.20	0.10	0.65	0.10	1.5				0.10 B 0.10 C 0.10 Ti 0.10 Zr	active
C90500 Gun Metal	86.0	89.0 (7)(1)		0.30	9.0	11.0	1.0	3.0		0.20		0.05 (3)		1.0 (4)		0.005						0.05		0.20		0.005			active
C90700 Tin Bronze, 65	88.0	90.0 (2)(1)		0.50	10.0	12.0		0.50		0.15		0.30 (3)		0.50 (4)		0.005						0.05		0.20		0.005			active
C90710		Rem (1) (2)		0.25	10.0	12.0		0.05		0.10	0.05 (3)	1.2		0.10 (4)		0.005						0.05		0.20		0.005			active
C90800 Tin Bronze	85.0	89.0 (2)(1)		0.25	11.0	13.0		0.25		0.15		0.30 (3)		0.50 (4)		0.005						0.05		0.20		0.005			active
C90810		Rem (2) (1)		0.25	11.0	13.0		0.30		0.15	0.15	0.8 (3)		0.50 (4)		0.005						0.05		0.20		0.005			active
C90900	86.0 (1) (2)	89.0		0.25	12.0	14.0		0.25		0.15		0.05 (3)		0.50 (4)		0.005						0.05		0.20		0.005			active
C91000	84.0 (2) (1)	86.0		0.20	14.0	16.0		1.5		0.10		0.05 (3)		0.8 (4)		0.005						0.05		0.20		0.005			active
C91100	82.0 (1) (2)	85.0		0.25	15.0	17.0		0.25		0.25		1.0 (3)		0.50 (4)		0.005						0.05		0.20		0.005			active
C91300	79.0 (2) (1)	82.0		0.25	18.0	20.0		0.25		0.25		1.0 (3)		0.50 (4)		0.005						0.05		0.20		0.005			active
C91500 Copper Tin Alloy		Rem	2.0	3.2	9.0	11.0						0.50	2.8	4.0															inactive 01/73
C91600	86.0	89.0 (2)(1)		0.25	9.7	10.8		0.25		0.20		0.30 (3)	1.2	2.0 (4)		0.005						0.05		0.20		0.005			active
C91700 Nickel Gear Bronze	84.0 (2) (1)	87.0		0.25	11.3	12.5		0.25		0.20		0.30 (3)	1.2 (4)	2.0		0.005						0.05		0.20		0.005			active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Mg		Mn		S		Sb		Si		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C92200 Navy M Bronze	86.0 (1) (6)	90.0	1.0	2.0	5.5	6.5	3.0	5.0		0.25		0.05 (3)		1.0 (4)		0.005						0.05		0.25		0.005			active
C92210	86.0	89.0 (1)(6)	1.7	2.5	4.5	5.5	3.0	4.5		0.25		0.03 (3)	0.7	1.0 (4)		0.005						0.05		0.20		0.005			active
C92220 (6)	86.0 (1)	88.0	1.5	2.5	5.0	6.0	3.0	5.5		0.25		0.05 (3)	0.50 (4)	1.0															active
C92300 Leaded Tin Bronze	85.0 (6) (1)	89.0	0.30	1.0	7.5	9.0	2.5	5.0		0.25		0.05 (3)		1.0 (4)		0.005						0.05		0.25		0.005			active
C92310		Rem (6) (1)	0.30	1.5	7.5	8.5	3.5	4.5						1.0 (4)		0.005				0.03						0.005			active
C92400	86.0 (1) (6)	89.0	1.0	2.5	9.0	11.0	1.0	3.0		0.25		0.05 (3)		1.0 (4)		0.005						0.05		0.25		0.005			active
C92410		Rem (1) (6)	2.5	3.5	6.0	8.0	1.5	3.0		0.20				0.20 (4)		0.005				0.05				0.25		0.005			active
C92500	85.0	88.0 (6)(1)	1.0	1.5	10.0	12.0		0.50		0.30		0.30 (3)	0.8	1.5 (4)		0.005						0.05		0.25		0.005			active
C92600 (6)	86.0 (1)	88.5	0.8	1.5	9.3	10.5	1.3	2.5		0.20		0.03 (3)		0.7 (4)		0.005						0.05		0.25		0.005			active
C92610		Rem (1) (6)	0.30	1.5	9.5	10.5	1.7	2.8		0.15				1.0 (4)		0.005				0.03						0.005			active
C92700 Leaded Tin Bronze	86.0	89.0 (6)(1)	1.0	2.5	9.0	11.0		0.7		0.20		0.25 (3)		1.0 (4)		0.005						0.05		0.25		0.005			active
C92710		Rem (6) (1)	4.0	6.0	9.0	11.0		1.0		0.20		0.10 (3)		2.0 (4)		0.005						0.05		0.25		0.005			active
C92800	78.0 (6) (1)	82.0	4.0	6.0	15.0	17.0		0.8		0.20		0.05 (3)		0.8 (4)		0.005						0.05		0.25		0.005			active
C92810	78.0	82.0 (1)(6)	4.0	6.0	12.0	14.0		0.50		0.50		0.05 (3)	0.8	1.2 (4)		0.005						0.05		0.25		0.005			active
C92900	82.0	86.0 (6)(1)	2.0	3.2	9.0	11.0		0.25		0.20		0.50 (3)	2.8	4.0 (4)		0.005						0.05		0.25		0.005			active
C93100		Rem (8) (1)	2.0	5.0	6.5	8.5		2.0		0.25		0.30 (3)		1.0 (4)		0.005						0.05		0.25		0.005			active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Mg		Mn		S		Sb		Si		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C93200	81.0	85.0 (8)(1)	6.0	8.0	6.3	7.5	1.0	4.0		0.20		0.15 (3)		1.0 (4)		0.005						0.08		0.35		0.005			active
C93400	82.0 (1) (8)	85.0	7.0	9.0	7.0	9.0		0.8		0.20		0.50 (3)		1.0 (4)		0.005						0.08		0.50		0.005			active
C93500	83.0 (1) (8)	86.0	8.0	10.0	4.3	6.0		2.0		0.20		0.05 (3)		1.0 (4)		0.005						0.08		0.30		0.005			active
C93600	79.0	83.0 (6)	11.0	13.0	6.0	8.0		1.0		0.20		0.15 (3)		1.0 (4)		0.005						0.08		0.55		0.005			active
C93700 Bearing Bronze	78.0 (8)	82.0	8.0	11.0	9.0	11.0		0.8		0.7 (9)		0.10 (3)		0.50 (4)		0.005						0.08		0.50		0.005			active
C93720	83.0 (8)		7.0	9.0	3.5	4.5		4.0		0.7		0.10 (3)		0.50 (4)										0.50					active
C93800 Anti-acid Metal	75.0 (8)	79.0	13.0	16.0	6.3	7.5		0.8		0.15		0.05 (3)		1.0 (4)		0.005						0.08		0.8		0.005			active
C93900 79-6-15	76.5	79.5 (10)	14.0	18.0	5.0	7.0		1.5		0.40		1.5 (3)		0.8 (4)		0.005						0.08		0.50		0.005			active
C94000	69.0	72.0 (11)	14.0	16.0	12.0	14.0		0.50		0.25		0.05 (3)	0.50	1.0 (4)		0.005						0.08 (12)		0.50		0.005			active
C94100	72.0 (11)	79.0	18.0	22.0	4.5	6.5		1.0		0.25		0.50 (3)		1.0 (4)		0.005						0.08 (12)		0.8		0.005			active
C94200 Cast High-Leaded Tin Bronze	68.5	75.5	3.0	4.0	3.0	4.0		3.0		0.35				0.50										0.50					inactive 03/92
C94300 Soft Bronze	67.0	72.0 (8)	23.0	27.0	4.5	6.0		0.8		0.15		0.08 (3)		1.0 (4)		0.005						0.08 (12)		0.8		0.005			active
C94310		Rem (8)	27.0	34.0	1.5	3.0		0.50		0.50		0.05 (3)	0.25 (4)	1.0										0.50					active
C94320		Rem (8)	24.0	32.0	4.0	7.0				0.35																			active
C94330	68.5 (8)	75.5	21.0	25.0	3.0	4.0		3.0		0.7		0.10 (3)		0.50 (4)										0.50					active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Mg		Mn		S		Sb		Si		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C94400		Rem (8)	9.0	12.0	7.0	9.0		0.8		0.15		0.50 (3)		1.0 (4)		0.005						0.08		0.8		0.005			active
C94500		Rem (8)	16.0	22.0	6.0	8.0		1.2		0.15		0.05 (3)		1.0 (4)		0.005						0.08		0.8		0.005			active
C94700* Cast Nickel-Tin Bronze	85.0	90.0 (11)		0.09 (13)	4.5	6.0	1.0	2.5		0.25		0.05	4.5 (4)	6.0		0.005				0.20		0.05		0.15		0.005			active
C94800	84.0 (11)	89.0	0.30	1.0	4.5	6.0	1.0	2.5		0.25		0.05	4.5	6.0 (4)		0.005				0.20		0.05		0.15		0.005			active
C94900	79.0 (2)	81.0	4.0	6.0	4.0	6.0	4.0	6.0		0.30		0.05	4.0	6.0 (4)		0.005				0.10		0.08		0.25		0.005			active
C95200*	86.0 (8)								2.5	4.0					8.5	9.5													active
C95210*	86.0 (8)			0.05		0.10		0.50	2.5	4.0				1.0 (4)	8.5	9.5		0.05		1.0						0.25			active
C95220*		Rem (5)							2.5	4.0				2.5 (4)	9.5	10.5				0.50									active
C95300*	86.0 (8)								0.8	1.5					9.0	11.0													active
C95400*	83.0 (5)								3.0	5.0				1.5 (4)	10.0	11.5				0.50									active
C95410*	83.0 (5)								3.0	5.0			1.5	2.5 (4)	10.0	11.5				0.50									active
C95420*	83.5 (5)								3.0	4.3				0.50 (4)	10.5	12.0				0.50									active
C95430* Copper Aluminum Iron Alloy		Rem												0.50	10.5	12.0				0.50									inactive 03/92
C95500*	78.0 (5)								3.0	5.0			3.0	5.5 (4)	10.0	11.5				3.5									active
C95510*	78.0 (14)					0.20		0.30	2.0	3.5			4.5	5.5 (4)	9.7	10.9				1.5									active
C95520*	74.5 (5)			0.03		0.25		0.30	4.0	5.5			4.2	6.0 (4)	10.5	11.5				1.5						0.15		0.20 Co 0.05 Cr	active
C95600*	88.0 (8)													0.25 (4)	6.0	8.0									1.8	3.2			active
C95700*	71.0 (5)								2.0	4.0			1.5 (4)	3.0	7.0	8.5			11.0	14.0						0.10			active
C95710*	71.0 (5)			0.05		1.0		0.50	2.0	4.0		0.05	1.5 (4)	3.0	7.0	8.5			11.0	14.0						0.15			active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Mg		Mn		S		Sb		Si		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C95720* Copper Aluminum Iron Alloy	73.0 (5)			0.03		0.10		0.10	1.5	3.5			3.0 (4)	6.0	6.0	8.0			12.0	15.0						0.10		0.09 Cr	active
C95800*	79.0 (5)			0.03					3.5 (15)	4.5			4.0	5.0 (15)	8.5	9.5			0.8	1.5						0.10			active
C95810* Cast Aluminum Bronze	79.0 (5)			0.09				0.50	3.5 (15)	4.5			4.0 (15)	5.0	8.5	9.5		0.05	0.8	1.5						0.10			active
C95820*	77.5 (16)			0.02		0.20		0.20	4.0	5.0			4.5	5.8 (4)	9.0	10.0				1.5						0.10			active
C95900*		Rem (5)							3.0	5.0				0.50 (4)	12.0	13.5				1.5									active

* = are alloys registered with the U.S. EPA as Antimicrobial.

(1) = In determining Cu min., Cu may be calculated as Cu + Ni.

(2) = Cu + Sum of Named Elements 99.4% min.

(3) = For continuous castings P shall be 1.5% max.

(4) = Ni value includes Co.

(5) = Cu + Sum of Named Elements 99.5% min.

(6) = Cu + Sum of Named Elements 99.3% min.

(7) = Cu + Sum of Named Elements 99.7% min.

(8) = Cu + Sum of Named Elements 99.0% min.

(9) = Fe shall be 0.35% max. when used for steel-backed bearings

(10) = Cu + Sum of Named Elements 98.9% min.

(11) = Cu + Sum of Named Elements 98.7% min.

(12) = For continuous castings S shall be 0.25% max.

(13) = The mechanical properties of C94700 (heat treated) may not be attainable if the Pb content exceeds 0.01%.

(14) = Cu + Sum of Named Elements 99.8% min.

(15) = Fe content shall not exceed Ni content.

(16) = Cu + Sum of Named Elements 99.2% min.