



# Chemical Composition of Copper Alloys

## Wrought Copper Alloys

Revision Date: December 3, 2014

### Coppers (C10100 - C15999)

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

UNS #	Cu		Pb		Zn		Fe		P		Al		Ag		As		B		O		Sb		Te		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%	
C10100* Oxygen-Free- Electronic OFE	99.99	<sup>(1)(2)(3)(4)</sup>							0.0003						0.0005					0.0005		0.0004			0.0002					active
C10200* Oxygen-Free OF	99.95	<sup>(5)(1)(4)</sup>																		0.0010									active	
C10300* Oxygen-Free Copper OFXLP	99.95	<sup>(4)(6)</sup>							0.001	0.005																			active	
C10400* Oxygen-Free with Ag OFS	99.95	<sup>(1)(4)(5)</sup>												0.027	<sup>(7)</sup>					0.0010									active	
C10500* Oxygen-Free with Ag OFS	99.95	<sup>(1)(4)(5)</sup>												0.034	<sup>(8)</sup>					0.001									active	
C10700* Oxygen-Free with Ag OFS	99.95	<sup>(4)(5)(1)</sup>												0.085	<sup>(9)</sup>					0.001									active	
C10800* OFLP	99.95	<sup>(6)(4)</sup>							0.005	0.012																			active	

UNS #	Cu		Pb		Zn		Fe		P		Al		Ag		As		B		O		Sb		Te		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%	
C10900* Oxygen-Free	99.99 <sup>(4)</sup>																								0.001 Bi	inactive 03/11	
C10910*	99.95 <sup>(10)(4)</sup>																		0.005								active
C10920*	99.90 <sup>(4)</sup>																		0.02								active
C10930*	99.90 <sup>(4)</sup>												0.044 <sup>(11)</sup>						0.02								active
C10940*	99.90 <sup>(4)</sup>												0.085 <sup>(9)</sup>						0.02								active
C11000* Electrolytic Tough Pitch ETP	99.90 <sup>(12)(10)(4)</sup>																										active
C11010* <sup>(12)</sup> Remelted High Conductivity RHC	99.90 <sup>(4)(10)</sup>																										active
C11020* <sup>(12)</sup> Fire-Refined High Conductivity FRHC	99.90 <sup>(10)(4)</sup>																										active
C11025 Fire Refined High Conductivity FRHC	99.90 <sup>(13)(14)(4)</sup>												.0150	.0010				.0100	.0400	.0050		.0010					active
C11030* <sup>(12)</sup> Chemically Refined Tough Pitch CRTP	99.90 <sup>(4)(10)</sup>																										active
C11040*	99.90 <sup>(4)(15)(10)</sup>														0.0005						0.0004		0.0002				active
C11045* ETP ETP	99.90 <sup>(16)(4)</sup>														0.0005							0.0004		0.0002			active
C11080 Replaced by C13100	99.8 <sup>(4)</sup>																										inactive 03/92
C11100* <sup>(10)</sup> Electronic Tough Pitch, Anneal Resistant ETP	99.90 <sup>(17)(4)</sup>																										active
C11111																											inactive

UNS #	Cu		Pb		Zn		Fe		P		Al		Ag		As		B		O		Sb		Te		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%		
C11300* Tough Pitch with Ag STP	99.90 <sup>(4)(12)(10)</sup>												0.027 <sup>(7)</sup>															active
C11400* Tough Pitch with Ag STP	99.90 <sup>(12)(4)(10)</sup>												0.034 <sup>(8)</sup>															active
C11500* Tough Pitch with Ag STP	99.90 <sup>(12)(10)(4)</sup>												0.054 <sup>(18)</sup>															active
C11600* Tough Pitch with Ag STP	99.90 <sup>(10)(4)(12)</sup>												0.085 <sup>(9)</sup>															active
C11700*	99.9 <sup>(4)(19)</sup>								0.04							0.004	0.02											active
C11900* Copper Alloy	99.93 <sup>(4)</sup>								0.002	0.010																		inactive 02/73
C11904* Copper Alloy	99.90 <sup>(4)</sup>												0.027 <sup>(20)</sup>															inactive 03/92
C11905* Copper Alloy	99.90 <sup>(4)</sup>												0.034 <sup>(8)</sup>															inactive 03/92
C11907* Copper Alloy	99.90 <sup>(4)</sup>												0.085 <sup>(9)</sup>															inactive 03/92
C12000* Phosphorus- Deoxidized, Low Residual P DLP	99.90 <sup>(4)</sup>								0.004	0.012																		active
C12100* Phosphorus- Deoxidized, Low Residual P DLPS	99.90 <sup>(4)</sup>								0.005	0.012			0.014 <sup>(21)</sup>															active
C12200* Phosphorus- Deoxidized, High Residual P DHP	99.9 <sup>(22)(4)</sup>								0.015	0.040																		active
C12210*	99.90 <sup>(4)</sup>								0.015	0.025																		active
C12220*	99.9 <sup>(4)</sup>								0.040	0.065																		active

UNS #	Cu		Pb		Zn		Fe		P		Al		Ag		As		B		O		Sb		Te		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%	
C12300* Phosphorus-Deoxidized, High Residual P DHPS	99.90 <sup>(4)</sup>								0.015	0.040			0.014 <sup>(21)</sup>														active
C12500* Fire-Refined Tough Pitch FRTP	99.88 <sup>(4)</sup>		0.004												0.012						0.003			0.025 <sup>(23)</sup>	0.050 Ni 0.003 Bi	active	
C12510*	99.9 <sup>(4)</sup>		0.020		0.080		0.05		0.03												0.003			0.025 <sup>(23)</sup>	0.05 Sn 0.050 Ni 0.005 Bi	active	
C12700* Copper Alloy	99.88 <sup>(4)</sup>		0.004										0.027 <sup>(20)</sup>		0.012						0.003			0.025 <sup>(23)</sup>	0.050 Ni 0.003 Bi	inactive 03/92	
C12800* Copper Alloy	99.76 <sup>(4)</sup>		0.004										0.034 <sup>(8)</sup>		0.012						0.003			0.025 <sup>(23)</sup>	0.050 Ni 0.003 Bi	inactive 03/92	
C12900* Fire-Refined Tough Pitch with Ag FRSTP	99.88 <sup>(4)</sup>		0.004										0.054 <sup>(18)</sup>		0.012						0.003			0.025 <sup>(24)</sup>	0.050 Ni 0.003 Bi	active	
C13000 Copper Alloy	99.88 <sup>(4)</sup>		0.004										0.085 <sup>(9)</sup>		0.012						0.003			0.025 <sup>(23)</sup>	0.05 Ni 0.003 Bi	inactive 03/92	
C13100*	99.8 <sup>(4)</sup>																									active	
C13150* Copper	99.5 <sup>(4)</sup>																									active	
C13400* Copper Alloy	99.99 <sup>(4)</sup>								0.0005				0.027 <sup>(20)</sup>													inactive 12/72	
C13500* Copper Alloy	99.99 <sup>(4)</sup>								0.0005				0.034 <sup>(8)</sup>													inactive 12/72	
C13600* Copper Alloy	99.99 <sup>(4)</sup>								0.0005				0.054 <sup>(18)</sup>													inactive 12/72	
C13700* Copper Alloy	99.99 <sup>(4)</sup>								0.0005				0.085 <sup>(9)</sup>													inactive 12/72	
C14100* Copper Alloy	99.40 <sup>(4)</sup>													0.15	0.50											inactive 07/74	
C14180*	99.90 <sup>(4)</sup>		0.02						0.075		0.01															active	
C14181*	99.90 <sup>(4)</sup>		0.002		0.002				0.002																0.005 C 0.002 Cd	active	

UNS #	Cu		Pb		Zn		Fe		P		Al		Ag		As		B		O		Sb		Te		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%		
C14200* Phosphorus-Deoxidized, Arsenical DPA	99.4 <sup>(4)</sup>								0.015	0.040					0.15	0.50												active
C14210* Copper Alloy	99.20 <sup>(4)</sup>								0.013	0.050					0.30	0.50												inactive 03/92
C14300* Cadmium Copper, Deoxidized	99.90 <sup>(4)(25)</sup>																								0.05 Cd	0.15 Cd	active	
C14310* Cadmium Copper	99.90 <sup>(4)(25)</sup>																								0.10 Cd	0.30 Cd	inactive 03/92	
C14400* Copper Alloy	99.90 <sup>(4)</sup>				0.05		0.03	0.013	0.025												0.003		0.02	0.10 Sn	0.20 Sn 0.05 Ni	inactive 03/92		
C14410* Copper Alloy	99.90 <sup>(26)(4)</sup>			0.05			0.05	0.005	0.020																0.10 Sn	0.20 Sn	active	
C14415* Copper Alloy	99.96 <sup>(26)</sup>																								0.10 Sn	0.15 Sn	active	
C14420* Copper Alloy	99.90 <sup>(4)(27)</sup>																						0.005	0.05	0.04 Sn	0.15 Sn	active	
C14425* Copper Copper	99.97 <sup>(28)(4)</sup>			0.10	0.10		0.020		0.010																0.25 Sn	0.35 Sn 0.020 Ni <sup>(29)</sup>	active	
C14430* Copper Alloy		Rem <sup>(4)</sup>																								0.25 Sn	0.35 Sn	inactive 03/92
C14440* Copper Alloy	99.96 <sup>(4)</sup>																								0.005 Sn	0.01 Sn	inactive 03/92	
C14500* Tellurium-Bearing PTE	99.90 <sup>(30)(31)(4)</sup>							0.004	0.012														0.40	0.7			active	
C14510* Tellurium-Bearing	99.85 <sup>(30)(4)</sup>			0.05				0.010	0.030														0.30	0.7			active	
C14520* Phosphorus-Deoxidized, Tellurium-Bearing DPTE	99.90 <sup>(30)(4)</sup>							0.004	0.020														0.40	0.7			active	
C14530* Copper Alloy	99.90 <sup>(32)</sup>							0.001	0.010														0.003 <sup>(33)</sup>	0.023	0.003 Sn	0.023 Sn	active	
C14700* Sulfur-Bearing	99.90 <sup>(4)(34)(31)</sup>							0.002 <sup>(34)</sup>	0.005																0.20 S	0.50 S <sup>(34)</sup>	active	

UNS #	Cu		Pb		Zn		Fe		P		Al		Ag		As		B		O		Sb		Te		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%	
C14710* Copper Alloy	99.90 <sup>(31)(35)</sup>			0.05 <sup>(35)</sup>					0.010 <sup>(35)</sup>	0.030															0.05 S	0.15 S <sup>(35)</sup>	inactive 03/92
C14720 Copper Alloy	99.50 <sup>(34)(31)(4)</sup>			0.1					0.010	0.030 <sup>(34)</sup>															0.20 S <sup>(34)</sup>	0.50 S	inactive 03/92
C14730 Sulfur Bearing Copper	99.80 <sup>(4)</sup>																										inactive 03/92
C14750 High Copper Alloy		Rem <sup>(4)(36)</sup>								0.012															0.05 Mn 0.20 S	0.50 Mn 0.50 S	active
C15000* Zirconium Copper		Rem <sup>(4)(37)</sup>																							0.10 Zr	0.20 Zr	active
C15100* Copper Alloy	99.80 <sup>(37)(4)</sup>																								0.05 Zr	0.15 Zr	active
C15150* Copper Alloy	99.90 <sup>(4)</sup>																								0.015 Zr	0.030 Zr	active
C15500* Copper Alloy	99.75 <sup>(4)</sup>								0.040	0.080			0.027	0.10 <sup>(20)</sup>											0.08 Mg	0.13 Mg	active
C15600* Copper Alloy	99.6 <sup>(4)</sup>								0.06	0.09															0.20 Co	0.30 Co 0.02 Mg	inactive 03/92
C15650* MA5J Copper	99.9 <sup>(4)</sup>								0.015	0.040															0.04 Co	0.06 Co	active
C15710* Copper Alloy	99.71 <sup>(4)</sup>			0.01				0.01			0.08	0.12								0.07	0.15						inactive 03/92
C15715* Dispersion Strengthened Alloy	99.62 <sup>(4)</sup>			0.01				0.01			0.13	0.17 <sup>(38)</sup>								0.12 <sup>(38)</sup>	0.19						active
C15720* Dispersion Strengthened Alloy	99.52 <sup>(4)</sup>			0.01				0.01			0.18 <sup>(38)</sup>	0.22								0.16	0.24 <sup>(38)</sup>						active
C15725* Dispersion Strengthened Alloy	99.43 <sup>(4)</sup>			0.01				0.01			0.23 <sup>(38)</sup>	0.27								0.20 <sup>(38)</sup>	0.28						active
C15730* Copper Alloy	98.94 <sup>(4)</sup>							0.04			0.26	0.34 <sup>(38)</sup>						0.22		0.32 <sup>(38)</sup>	0.46						active
C15735* Copper Alloy	99.24 <sup>(4)</sup>			0.01				0.01			0.33	0.37								0.29	0.37						inactive 03/92

UNS #	Cu		Pb		Zn		Fe		P		Al		Ag		As		B		O		Sb		Te		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%		
C15750* Dispersion Strengthened Copper C3/60	98.56 <sup>(4)</sup>						0.04				0.42 <sub>(38)</sub>	0.50					0.22	0.52	0.68 <sub>(38)</sub>									active
C15760* Dispersion Strengthened Alloy	98.77 <sup>(4)</sup>			0.01			0.01				0.58 <sub>(38)</sub>	0.62						0.52	0.59 <sub>(38)</sub>								active	
C15780* Copper Alloy	98.10 <sup>(4)</sup>						0.04				0.66 <sub>(38)</sub>	0.74					0.22	0.76 <sub>(38)</sub>	0.90								active	
C15790* Copper Alloy	97.68 <sup>(4)</sup>						0.04				0.88 <sub>(38)</sub>	0.96					0.22	0.96 <sub>(38)</sub>	1.10								active	
C15815* Dispersion Strengthened Alloy	97.82 <sup>(4)</sup>			0.01			0.01				0.13	0.17 <sub>(38)</sub>					1.2	1.8	0.19 <sub>(38)</sub>								active	
C15900* Dispersion Strengthened Coper C3/11	97.51 <sup>(4)</sup>						0.04				0.76	0.84 <sub>(38)</sub>						0.40 <sub>(38)</sub>	0.54						0.27 C 0.66 Ti	0.33 C 0.74 Ti	active	

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

- (1) = This is a high conductivity copper which has, in the annealed condition a minimum conductivity of 100% IACS except for Alloy C10100 which has a minimum conductivity of 101% IACS.
- (2) = The following additional impurity maximum limits shall apply: Bi, 1ppm (0.0001%); Cd, 1ppm (0.0001%); Fe, 10ppm (0.0010%); Pb, 5ppm (0.0005%); Mn, 0.5ppm (0.00005%); Ni, 10ppm (0.0010%); Se, 3ppm (0.0003%); Ag, 25ppm(0.0025%); S, 15ppm (.0015%); Sn, 2ppm (.0002%); Zn, 1ppm (.0001%).
- (3) = Cu is determined by the difference between the impurity total and 100 %. For alloy C10100 the Cu value is exclusive of Ag.
- (4) = Cu value includes Ag.
- (5) = Cu is determined by the difference between the impurity total and 100%.
- (6) = Includes P.
- (7) = Ag 0.027% min is the equivalent of, Ag 8 Troy Oz min.
- (8) = Ag 0.034% min is the equivalent of, Ag 10 Troy Oz min.
- (9) = Ag 0.085% min is the equivalent of, Ag 25 Troy Oz min.
- (10) = This is a high conductivity copper which has, in the annealed condition a minimum conductivity of 100% IACS.
- (11) = Ag 0.044% min is the equivalent of, Ag 13 Troy Oz min.
- (12) = Oxygen and trace elements may vary depending on the process.
- (13) = Includes Se 10 ppm (0.0010%); Bi 5 ppm (0.0005%); Sn 150 ppm (0.0150%); Pb 450 ppm (0.0450%); Fe 20 ppm (0.0020%); Ni 150 ppm (0.0150%); S 20 ppm (0.0020%); Ag 150 ppm

(0.0150%); Cd 100 ppm (0.0100%); Zn 80 ppm (0.0080%).

(14) = The total maximum allowable of 750 ppm (0.0750%).

(15) = The following additional maximum limits shall apply: Se, 2ppm (0.0002%); Bi, 1.0ppm (0.00010%); Group Total, Te + Se +Bi, 3ppm(0.0003%). Sn, 5ppm (0.0005%); Pb, 5ppm (0.0005%); Fe, 10ppm (0.0010%); Ni, 10ppm (.0010%), S, 15ppm (.0015%); Ag, 25ppm (.0025%) The following limits shall apply: Oxygen, 100-650 ppm (.010-.065%). The total maximum allowable of 65 ppm(.0065%)does not include oxygen.

(16) = These total maximum limits shall apply; Se 2ppm(0.0002%); Bi 0.5ppm (0.00005%); Sn 5 ppm (0.0005%); Pb 5ppm (0.0005%); Fe 10 ppm (0.0010%); Ni 10ppm (0.0010%); S 15 ppm (0.0015%); Ag 25 ppm (0.0025%); Oxygen 125 - 600ppm.

(17) = Small amounts of Cd or other elements may be added by agreement to improve the resistance to softening at elevated temperatures.

(18) = Ag 0.054% min is the equivalent of, Ag 16 Troy Oz min.

(19) = Includes B + P.

(20) = Ag 0.027 - 0.10% min is the equivalent of, Ag 8 - 30 Troy Oz min.

(21) = Ag 0.014% min is the equivalent of, Ag 4 Troy Oz min.

(22) = This includes oxygen-free Cu which contains P in an amount agreed upon.

(23) = 0.025 Te + Se.

(24) = Includes Te + Se.

(25) = Includes Cd. Deoxidized with Li or other suitable elements as agreed upon.

(26) = Includes Cu + Ag + Sn.

(27) = Includes Te + Sn.

(28) = Cu + Sum of Named Elements, 99.97% Min.

(29) = Includes Co.

(30) = Includes Te + P.

(31) = Includes oxygen-free or deoxidized grades with deoxidizers (such as phosphorus, boron, lithium or others ) in an amount agreed upon.

(32) = Includes Ag + Sn + Te + Se

(33) = Tellurium and/or Selenium

(34) = Includes Cu + S + P.

(35) = Includes Ag, S, P, and Pb

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

(37) = Cu + Sum of Named Elements, 99.9% min.

(38) = All aluminum present as Al<sub>2</sub>O<sub>3</sub>; 0.04% oxygen present as Cu<sub>2</sub>O with a negligible amount in solid solution with copper.





# Application Datasheet

## Standard Designation for Wrought Copper Alloys

Revision Date: November 17, 2014

### High Copper Alloys (C16000 - C19999)

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

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Be		Co		Cr		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%		
C16200* Cadmium Copper		Rem <sup>(1)(2)</sup>							0.02																0.7 Cd	1.2 Cd	active	
C16210* High Copper Alloy		Rem <sup>(1)(2)</sup>																							0.50 Cd	1.20 Cd	inactive 03/92	
C16400* High Copper Alloy	99.8 <sup>(2)</sup>				0.20	0.40			0.02																0.6 Cd	0.9 Cd	inactive 07/74	
C16500*		Rem <sup>(1)(2)</sup>			0.50	0.7			0.02																0.6 Cd	1.0 Cd	active	
C17000* Beryllium Copper		Rem <sup>(2)(1)</sup>												0.20	1.60	1.85	0.20 <sup>(3)</sup>						0.20					active
C17200* Beryllium Copper		Rem <sup>(1)(2)</sup>												0.20	1.80	2.00	0.20 <sup>(3)</sup>						0.20					active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Be		Co		Cr		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%	
C17300 Beryllium Copper		Rem <sup>(1)(2)</sup>	0.20	0.6											0.20	1.80	2.00	0.20 <sup>(3)</sup>					0.20				active
C17400* Beryllium Copper		Rem <sup>(2)(1)</sup>							0.20 <sup>(3)</sup>						0.20	0.15	0.50	0.15	0.35 <sup>(3)</sup>					0.20			inactive 03/92
C17410* Beryllium Copper		Rem <sup>(1)(2)</sup>							0.20						0.20	0.15	0.50	0.35	0.6					0.20			active
C17420* Beryllium Copper		Rem <sup>(2)</sup>							0.20						0.20	0.05	0.15	0.05	0.6					0.20			inactive 03/92
C17450* Beryllium Copper		Rem <sup>(1)(2)</sup>				0.25			0.20			0.50	1.0	0.20	0.15	0.50								0.20	0.50 Zr	active	
C17455 Beryllium Copper		Rem <sup>(1)(2)</sup>	0.20	0.6		0.25			0.20			0.50 <sup>(4)</sup>	1.0	0.20	0.15	0.50								0.20	0.50 Zr	active	
C17460* Beryllium Copper		Rem <sup>(1)(2)</sup>				0.25			0.20			1.0	1.4	0.20	0.15	0.50								0.20	0.50 Zr	active	
C17465 Beryllium Copper		Rem <sup>(1)(2)</sup>	0.20	0.6		0.25			0.20			1.0 <sup>(4)</sup>	1.4	0.20	0.15	0.50								0.20	0.50 Zr	active	
C17500* Beryllium Copper		Rem <sup>(2)(1)</sup>							0.10					0.20	0.4	0.7	2.4	2.7						0.20		active	
C17510* <sup>(1)</sup> Beryllium Copper		Rem <sup>(2)</sup>							0.10			1.4	2.2	0.20	0.2	0.6		0.3						0.20		active	
C17520* Beryllium Copper		Rem <sup>(2)</sup>										0.50	1.5			0.10	0.30							0.06 Mg 0.10 Zr	0.30 Mg 0.30 Zr	inactive 03/92	

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Be		Co		Cr		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%				
C17530* Beryllium Copper		Rem <sup>(2)(1)</sup>								0.20			1.8 <sup>(4)</sup>	2.5		0.6	0.20	0.40						0.20			active			
C17600* Beryllium Copper		Rem <sup>(2)</sup>								0.10						0.20	0.25	0.50	1.4	1.7				0	0.9 Ag	1.1 Ag	inactive 03/92			
C17700* Beryllium Copper		Rem <sup>(2)</sup>								0.10							0.40	0.70	2.4	2.7				0.20	0.40 Te	0.6 Te	inactive 03/92			
C18000		Rem <sup>(1)(2)</sup>								0.15			1.8	3.0 <sup>(4)</sup>								0.10	0.8	0.40	0.8		active			
C18020		Rem <sup>(2)(5)</sup>			0.05	0.25	0.10	0.30														0.10	0.30		0.05		active			
C18025 High Copper Alloy		Rem <sup>(2)(5)</sup>			0.15	0.25	0.05	0.15														0.20	0.30	0.03	0.07	0.01 Mg	0.03 Mg	active		
C18030		Rem <sup>(2)(5)</sup>			0.08	0.12					0.005	0.015										0.10	0.20				active			
C18040		Rem <sup>(6)(2)</sup>			0.20	0.30	0.05	0.15			0.005	0.015										0.25	0.35				active			
C18045	99.1 <sup>(5)(2)</sup>				0.20	0.30	0.15	0.30														0.20	0.35		0.05		active			
C18050		Rem <sup>(2)(7)</sup>																				0.05	0.15			0.005 Te	0.015 Te	active		
C18070	99.0 <sup>(2)(7)</sup>																					0.15	0.40	0.02	0.07	0.01 Ti	0.40 Ti	active		
C18080		Rem <sup>(8)(7)</sup>							0.02	0.20												0.20	0.7	0.01	0.10	0.01 Ag	0.30 Ag	0.01 Ti	0.15 Ti	active
C18090	96.0 <sup>(9)(2)</sup>				0.50	1.2							0.30	1.2								0.20	1.0			0.15 Ti	0.8 Ti	active		
C18100	98.7 <sup>(2)(1)</sup>																					0.40	1.2			0.03 Mg	0.06 Mg	0.08 Zr	0.20 Zr	active
C18135 <sup>(1)</sup>		Rem <sup>(2)</sup>																				0.20	0.6			0.20 Cd	0.6 Cd	active		
C18140		Rem <sup>(2)(1)</sup>																				0.15	0.45	0.005	0.05	0.05 Zr	0.25 Zr	active		
C18141 High Copper Alloy MZC1		Rem <sup>(2)(1)</sup>				0.20									0.10							0.20	0.40	0.01	0.03	0.002 Mg	0.05 Mg	0.07 Zr	0.13 Zr	active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Be		Co		Cr		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%	
C18143 High Copper		Rem <sup>(2)(1)</sup>				0.20									0.10						0.20	0.40	0.01	0.03	0.07 Zr	0.05 Mn 0.13 Zr	active
C18145		Rem <sup>(1)(2)</sup>					0.10	0.30													0.10	0.30			0.05 Zr	0.15 Zr	active
C18150		Rem <sup>(10)(2)</sup>																			0.50	1.5			0.02 Zr	0.20 Zr	active
C18200 Chromium Copper		Rem <sup>(1)(2)</sup>		0.05						0.10											0.6	1.2		0.10			active
C18400 Chromium Copper		Rem <sup>(2)(1)</sup>						0.7		0.15		0.05									0.40	1.2		0.10	0.005 As 0.005 Ca 0.05 Li	active	
C18500 High Copper		Rem <sup>(2)</sup>		0.015								0.04									0.40	1.0			0.08 Ag	0.12 Ag	inactive 03/92
C18550 Chromium Copper		Rem <sup>(2)</sup>			0.10	0.14															0.6	1.0					inactive 03/92
C18600		Rem <sup>(2)(1)</sup>							0.25	0.8			0.25							0.10	0.10	1.0			0.05 Ti 0.05 Zr	0.50 Ti 0.40 Zr	active
C18610		Rem <sup>(2)(1)</sup>								0.10			0.25						0.25	0.8	0.10	1.0			0.05 Ti 0.05 Zr	0.50 Ti 0.40 Zr	active
C18620* High Copper	99.40 <sup>(2)</sup>				0.03	0.15	0.02	0.10			0.040	0.075	0.02	0.06						0.14	0.21						active
C18625 HRSC	99.40 <sup>(2)(1)</sup>				.01	.10		.10			.05	.09		.10						.15	.35						active
C18660* High Copper Alloy		Rem <sup>(5)(2)</sup>			0.08	0			0.10	0.15	0.03	0.08									0.01	0.02	0.01	0.02	0.03 Mg	0.07 Mg	active
C18661*		Rem <sup>(1)(2)</sup>				0.20				0.10	0.001	0.02													0.10 Mg	0.7 Mg	active
C18665*	99.0 <sup>(2)</sup>										0.002	0.04													0.40 Mg	0.9 Mg	active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Be		Co		Cr		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%	
C18700 Free-Machining Cu	99.5 <sup>(2)(11)</sup>		0.8	1.5																							active
C18835*	99.0 <sup>(1)(2)</sup>		0.05	0.15	0.55		0.30		0.10		0.01																active
C18900*		Rem <sup>(1)(2)</sup>	0.02	0.6	0.9		0.10				0.05				0.01								0.15	0.40	0.10 Mn	0.30 Mn	active
C18910*		Rem <sup>(2)</sup>									0.15														0.50 Mn	inactive	
C18980* <sup>(1)</sup>	98.0 <sup>(2)</sup>		0.02		1.0						0.15													0.50		0.50 Mn	active
C18990		Rem <sup>(5)(2)</sup>			1.8	2.2				0.005	0.015										0.10	0.20					active
C19000*		Rem <sup>(2)(1)</sup>	0.05				0.8		0.10	0.15	0.35	0.9	1.3														active
C19002*		Rem <sup>(2)(1)</sup>	0.05	0.02	0.30	0.01	0.35		0.10		0.05	1.4	1.7 <sup>(4)</sup>										0.20	0.35	0.02 Ag 0.005 Zr	0.50 Ag 0.01 Mg 0.05 Zr	active
C19010*		Rem <sup>(2)(1)</sup>								0.01	0.05	0.8	1.8										0.15	0.35			active
C19015*		Rem <sup>(7)(2)</sup>								0.02	0.20	0.50	2.4										0.10	0.40	0.02 Mg	0.15 Mg	active
C19020*		Rem <sup>(7)(2)</sup>			0.30	0.9					0.01	0.20	0.50	3.0													active
C19022* High Copper Alloy		Rem <sup>(1)(2)</sup>	0.009	0.3	1.0		0.2		0.04	0.01	0.07	0.3	1.0 <sup>(4)</sup>														active
C19024 High Copper Alloy		Rem <sup>(5)(2)</sup>	0.01	.02	0.8		0.05		0.02	0.008	0.05	0.10	0.6														active
C19025*		Rem <sup>(2)(10)</sup>			0.7	1.1		0.20		0.10	0.03	0.07	0.8	1.2													active
C19027* NB 115 High Copper		Rem <sup>(10)(2)</sup>			1.20	1.80		0.20		0.10	0.03	0.15	0.50	1.20												0.20 Mg	active
C19030*		Rem <sup>(2)(10)</sup>	0.02	1.0	1.5				0.10	0.01	0.03	1.5	2.0														active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Be		Co		Cr		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%	
C19040* CAC5 High Copper	96.1 <sup>(2)(7)</sup>			0.02	1.0	2.0		0.8		0.06	0.02	0.09	0.7	0.9 <sup>(4)</sup>										0.010		0.02 Mn	active
C19050* SPKFC-5E High Copper	95.1 <sup>(2)(7)</sup>			0.02	0.8	2.5		1.0	0.05	0.15	0.08	0.20	0.50 <sup>(4)</sup>	1.0													active
C19100		Rem <sup>(1)(2)</sup>		0.10				0.50		0.20	0.15	0.35	0.9	1.3											0.35 Te	0.6 Te	active
C19140		Rem <sup>(1)(2)</sup>	0.40	0.8		0.05		0.50		0.05	0.15	0.35	0.8	1.2													active
C19150		Rem <sup>(1)(2)</sup>	0.50	1.0		0.05				0.05	0.15	0.35	0.8	1.2													active
C19160		Rem	0.8	1.2		0.05		0.50		0.05	0.15	0.35	0.8	1.2													active
C19170* KLF170 High Copper	96.8			0.02		0.8		1.0	0.05	0.15	0.08	0.20	0.50 <sup>(4)</sup>	1.0										0.010			active
C19200*	98.5 <sup>(7)</sup>							0.20	0.8	1.2	0.01	0.04															active
C19210*		Rem							0.05	0.15	0.025	0.04															active
C19215*		Rem <sup>(7)</sup>					1.1	3.5	0.05	0.20	0.025	0.050															active
C19220*		Rem			0.05	0.10			0.10	0.30	0.03	0.07	0.10	0.25											0.005 B	0.015 B	active
C19240* Super KFC	97.5 <sup>(7)</sup>			0.02		0.8		1.0	0.15	0.45	0.04	0.20												0.010		0.020 Mn	active
C19250* SPKFC-5W High Copper	95.8 <sup>(2)</sup>			0.02	0.8	2.5		1.0	0.15	0.45	0.04	0.20												0.010		0.02 Mn	active
C19260*	98.5 <sup>(5)</sup>								0.40	0.8															0.02 Mg 0.20 Ti	0.15 Mg 0.40 Ti	active
C19280*		Rem			0.30	0.7	0.30	0.7	0.50	1.5	0.005	0.015															active
C19300* High Copper Alloy	92.0	94.0		0.003		0.03		Rem	2.05	2.60						0.02											inactive 08/73
C19400*	97.0			0.03			0.05	0.20	2.1	2.6	0.015	0.15															active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Be		Co		Cr		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%		
C19410* <sup>(7)</sup>		Rem			0.6	0.9	0.10	0.20	1.8	2.3	0.015	0.050															active	
C19419* CAC19 High Copper	96.7			0.02	0.05	0.18	0.10	0.40	1.7	2.3		0.03		0.04 <sup>(4)</sup>										0.03	0.09		0.04 Mn	active
C19450*		Rem <sup>(7)</sup>			0.8	2.5			1.5	3.0	0.005	0.05															active	
C19500*	96.0 <sup>(7)</sup>			0.02	0.10	1.0		0.20	1.0	2.0	0.01	0.35			0.02				0.30	1.3							active	
C19520	96.6 <sup>(7)</sup>		0.01	3.5					0.50	1.5																	active	
C19600* High Copper Alloy		Rem						0.35	0.9	1.2	0.25	0.35															inactive 03/92	
C19700*		Rem <sup>(7)</sup>		0.05		0.20		0.20	0.30	1.2	0.10	0.40		0.05					0.05						0.01 Mg	0.20 Mg 0.05 Mn	active	
C19710*		Rem <sup>(1)</sup>		0.05		0.20		0.20	0.05	0.40	0.07	0.15		0.10 <sup>(4)</sup>											0.03 Mg	0.06 Mg 0.05 Mn	active	
C19720*		Rem <sup>(1)</sup>		0.05		0.20		0.20	0.05	0.50	0.05	0.15		0.10 <sup>(4)</sup>											0.06 Mg	0.20 Mg 0.05 Mn	active	
C19750*		Rem <sup>(7)</sup>		0.05	0.05	0.40		0.20	0.35	1.2	0.10	0.40		0.05					0.05						0.01 Mg	0.20 Mg 0.05 Mn	active	
C19800*		Rem <sup>(7)</sup>			0.10	1.0	0.30	1.5	0.02	0.50	0.01	0.10													0.10 Mg	1.0 Mg	active	
C19810* Hig Copper Alloy		Rem <sup>(7)</sup>					1.0	5.0	1.5	3.0		0.10										0.09				0.10 Mg 0.10 Ti 0.10 Zr	active	
C19900*		Rem <sup>(1)</sup>																							2.9 Ti	3.5 Ti	active	
C19910* NKT 322 High Copper		Rem <sup>(1)</sup>							0.17	0.23															2.9 Ti	3.4 Ti	active	

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

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

(2) = Cu value includes Ag.

(3) = Ni + Co, 0.20% min.: Ni + Fe + Co, 0.6% max.

(4) = Ni value includes Co.

(5) = Cu + Sum of Named Elements, 99.9% min.

(6) = Includes oxygen-free or deoxidized grades with deoxidizers (such as phosphorus, boron, lithium or others ) in an amount agreed upon.

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

(8) = Not including Ag.

(9) = Cu + Sum of Named Elements, 99.85% min.

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

(11) = Includes Pb.





# Application Datasheet

## Standard Designation for Wrought Copper Alloys

- C20000-C29999: Copper-Zinc Alloys (*Yellow Brasses*)
- C30000-C39999: Copper-Zinc-Lead Alloys (*Leaded Brasses*)
- C40000-C49999: Copper-Zinc-Tin Alloys (*Tin Brasses*)

Revision Date: November 17, 2014

### Brasses (C20000 - C49999)

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

UNS #	Cu		Pb		Sn		Zn		Fe		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C20000 Common Brasses															inactive
C20500* Brass	97.0	98.0		0.02				Rem		0.05					inactive 03/92
C21000* Gilding, 95%	94.0	96.0 <sup>(1)</sup>		0.05				Rem		0.05					active
C22000* Commercial Bronze, 90%	89.0	91.0 <sup>(1)</sup>		0.05				Rem		0.05					active
C22600* <sup>(1)</sup> Jewelry Bronze, 87-1/2%	86.0	89.0		0.05				Rem		0.05					active
C23000* Red Brass, 85%	84.0	86.0 <sup>(1)</sup>		0.05				Rem		0.05					active
C23030*	83.5 <sup>(1)</sup>	85.5		0.05				Rem		0.05			0.20 Si	0.40 Si	active
C23400*	81.0	84.0 <sup>(1)</sup>		0.05				Rem		0.05					active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C24000* Low Brass, 80%	78.5 <sup>(1)</sup>	81.5		0.05				Rem		0.05					active
C24080	78.0 <sup>(1)</sup>	82.0		0.20				Rem						0.10 Al	active
C25000* Brass	74.0	76.0		0.05				Rem		0.05					inactive 03/92
C25600*	71.0	73.0 <sup>(2)</sup>		0.05				Rem		0.05					active
C26000* Cartridge Brass, 70%	68.5 <sup>(2)</sup>	71.5		0.07				Rem		0.05					active
C26100* Brass	68.5	71.5 <sup>(2)</sup>		0.05				Rem		0.05	0.02	0.05	0.02 As	0.06 As	inactive 03/92
C26130*	68.5	71.5 <sup>(2)</sup>		0.05				Rem		0.05			0.02 As	0.08 As	active
C26200*	67.0	70.0 <sup>(2)</sup>		0.07				Rem		0.05					active
C26380 Brass	68.0	72.0		0.30				Rem		0.05				0.10 Ag	inactive 03/92
C26800* Yellow Brass, 66%	64.0	68.5 <sup>(2)</sup>		0.09				Rem		0.05					active
C27000* Yellow Brass, 65%	63.0	68.5 <sup>(2)</sup>		0.09				Rem		0.07					active
C27200* Yellow Brass	62.0	65.0 <sup>(2)</sup>		0.07				Rem		0.07					active
C27400* Yellow Brass, 63%	61.0	64.0 <sup>(2)</sup>		0.09				Rem		0.05					active
C27450 Yellow Brass	60.0 <sup>(3)</sup>	65.0		0.25				Rem		0.35					active
C27451 Yellow Brass Yellow Brass	61.0	65.0 <sup>(3)</sup>		0.25				Rem		0.35	0.05	0.20			active
C27453 Copper Zinc Alloy	61.5 <sup>(3)</sup>	63.5		0.25		0.15		Rem		0.15			0.02 As	0.15 As	active
C28000* Muntz Metal, 60%	59.0	63.0 <sup>(2)</sup>		0.09				Rem		0.07					active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C28200 Copper Zinc Alloy	58.0	61.0		0.03				Rem		0.05	0.12	0.22		0.005 Al 0.05 Si	inactive 02/73
C28300* Yellow Brass	58.0 <sup>(4)</sup>	62.0		0.09			31.0	41.0		0.35			0.10 S	0.20 B 0.01 Mn 0.65 S 0.20 Zr	active
C28310* Yellow Brass	58.0 <sup>(4)</sup>	62.0		0.09			31.0	41.0		0.35			0.01 Mn 0.10 S	0.20 B 0.20 Mn 0.65 S 0.20 Zr	active
C28320* Yellow Brass	58.0	62.0 <sup>(4)</sup>		0.09			31.0	41.0		0.35			0.10 S	0.20 B 0.10 C 0.20 Mn 0.65 S 0.30 Ti 0.20 Zr	active
C28330 Low-Lead Yellow Brass	58.0	62.0 <sup>(4)</sup>		0.09			31.0	39.0		0.35			0.10 Sb	0.10 B 0.10 C 0.20 Mn 0.25 S 1.5 Sb 0.10 Ti 0.10 Zr	active
C28340	61.0 <sup>(3)</sup>	62.0	.17	.25	.30	.40		Rem <sup>(5)</sup>		.12			.07 As .65 Bi	.20 Ni .17 As <sup>(6)</sup> .75 Bi .04 Cd .02 Cr .05 Mn .05 Sb .05 Si	active
C28500 Copper-Zinc- Alloy Brass	57.0	59.0 <sup>(7)</sup>		0.25				Rem		0.35					active
C28580 Brass	49.0	52.0		0.50				Rem		0.10				0.10 Al	inactive 03/92
C29800 Copper Zinc Alloy	49.0	52.0		0.50				Rem		0.10				0.10 Al	inactive 07/74
C31000 Copper Zinc Lead Alloy	89.0	91.0	0.30	0.7				Rem		0.10					inactive 07/74
C31200	87.5	90.5 <sup>(8)</sup>	0.7	1.2				Rem		0.10				0.25 Ni	active
C31400 Leaded Commercial Bronze	87.5	90.5 <sup>(8)</sup>	1.3	2.5				Rem		0.10				0.7 Ni	active
C31600 <sup>(8)</sup> Leaded Commercial Bronze (Nickel- Bearing)	87.5	90.5	1.3	2.5				Rem		0.10	0.04	0.10	0.7 Ni	1.2 Ni	active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C32000 Leaded Red Brass	83.5 <sup>(8)</sup>	86.5	1.5	2.2				Rem		0.10				0.25 Ni	active
C32500 Copper Zinc Lead Alloy	72.0	74.5	2.5	3.0				Rem		0.10					inactive 07/74
C32510 Leaded Brass	69.0	72.0	0.30	0.7				Rem					0.02 As	0.06 As	inactive 03/92
C33000 Low Leaded Brass (Tube)	65.0	68.0 <sup>(8)</sup>	0.25	0.7				Rem		0.07					active
C33100 Leaded Brass	65.0	68.0	0.8	1.5				Rem		0.06					inactive 03/92
C33200 High Leaded Brass (Tube)	65.0	68.0 <sup>(8)</sup>	1.5	2.5				Rem		0.07					active
C33500 Low-Leaded Brass	62.0 <sup>(8)</sup>	65.0	0.25	0.7				Rem		0.15 <sup>(9)</sup>					active
C33530 Leaded Brass	62.5	66.5	0.30	0.8				Rem		0.10			0.02 As	0.06 As	inactive 03/92
C34000 Medium Leaded Brass, 64-1/2%	62.0 <sup>(8)</sup>	65.0	0.8	1.5				Rem		0.15 <sup>(9)</sup>					active
C34200 High Leaded Brass, 64-1/2%	62.0 <sup>(8)</sup>	65.0	1.5	2.5				Rem		0.15 <sup>(9)</sup>					active
C34400 Leaded Brass	62.0	66.0	0.50	1.0				Rem		0.10					inactive 02/81
C34500	62.0 <sup>(8)</sup>	65.0	1.5	2.5				Rem		0.15					active
C34700 Leaded Brass	62.5	64.5	1.0	1.8				Rem		0.10					inactive 02/81
C34800 Leaded Brass	61.5	63.5	0.40	0.8				Rem		0.10					inactive 02/81
C34900 Leaded Brass	61.0	64.0	0.10	0.50				Rem		0.10					inactive 02/82
C35000 Medium Leaded Brass, 62%	60.0 <sup>(8)(10)</sup>	63.0	0.8	2.0				Rem		0.15 <sup>(9)</sup>					active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C35300 High Leaded Brass, 62%	60.0 <sup>(3)(10)</sup>	63.0	1.5	2.5				Rem		0.15 <sup>(9)</sup>					active
C35330 DZR Brass	59.5	64.0 <sup>(3)</sup>	1.5	3.5 <sup>(11)</sup>				Rem					0.02 As	0.25 As	active
C35340 Leaded Brass	60.0	63.0	1.5	2.5				Rem	0.10	0.30					inactive 03/92
C35350 Leaded Brass	61.0 <sup>(3)</sup>	63.0	2.0	4.5		0.30		Rem		0.40	0.05	0.20	0.05 Ni	0.30 Ni	active
C35600 Extra High Leaded Brass	60.0 <sup>(3)</sup>	63.0	2.0	3.0				Rem		0.15 <sup>(9)</sup>					active
C36000 Free-Cutting Brass	60.0	63.0 <sup>(3)</sup>	2.5	3.0				Rem		0.35					active
C36010 Leaded Brass Free-Cutting Brass	60.0	63.0 <sup>(3)</sup>	3.1	3.7				Rem		0.35					active
C36200 Leaded Brass	60.0	63.0	3.5	4.5				Rem		0.15					inactive 03/92
C36300 Copper-Zinc-Lead Alloy	61.0	63.0 <sup>(3)</sup>	0.25	0.7				Rem		0.15	0.04	0.15			active
C36500 Leaded Muntz Metal, Uninhibited	58.0 <sup>(8)</sup>	61.0	0.25	0.7		0.25		Rem		0.15					active
C36600 Leaded Muntz Metal, Arsenical	58.0	61.0	0.25	0.7		0.25		Rem		0.15			0.02 As	0.06 As	inactive 03/92
C36700 Leaded Muntz Metal, Antimonial	58.0	61.0	0.25	0.7		0.25		Rem		0.15			0.02 Sb	0.10 Sb	inactive 03/92
C36800 Leaded Brass	58.0	61.0	0.25	0.7		0.25		Rem		0.15	0.02	0.10			inactive 03/92
C37000 Free-Cutting Muntz Metal	59.0	62.0 <sup>(8)</sup>	0.8	1.5				Rem		0.15					active
C37100	58.0	62.0 <sup>(8)</sup>	0.6	1.2				Rem		0.15					active
C37700 Forging Brass	58.0 <sup>(3)</sup>	61.0	1.5	2.5				Rem		0.30					active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C37710	56.5 <sup>(3)</sup>	60.0	1.0	3.0				Rem		0.30					active
C37800 Leaded Brass	56.0	59.0	1.5	2.5				Rem		0.30					inactive 03/92
C38000 Architectural Bronze, Low Leaded	55.0	60.0 <sup>(3)</sup>	1.5	2.5		0.30		Rem		0.35				0.50 Al	active
C38010 Leaded Brass	55.0	60.0	1.5	3.0				Rem		0.30			0.10 Al	0.6 Al	inactive 03/92
C38500 Architectural Bronze	55.0 <sup>(3)</sup>	59.0	2.5	3.5				Rem		0.35					active
C38510 Leaded Brass	56.0	60.0	2.5	4.5				Rem							inactive 03/92
C38590 Leaded Brass	56.5	60.0	2.0	3.5				Rem		0.35					inactive 03/92
C38600 Leaded Brass	56.0	59.0	2.5	3.5				Rem		0.35				0.02 Sb	inactive 02/82
C40400*		Rem <sup>(2)</sup>			0.35	0.7	2.0	3.0							active
C40410* Copper-Zinc-Tin Alloy	95.0	99.0 <sup>(2)</sup>		0.05	0.1	0.40		Rem		0.05					active
C40500* Penny Bronze	94.0 <sup>(2)</sup>	96.0		0.05	0.7	1.3		Rem		0.05					active
C40800* Silicon Brass	94.0	96.0		0.05	1.8	2.2		Rem		0.05					inactive 03/92
C40810*	94.5 <sup>(2)</sup>	96.5		0.05	1.8	2.2		Rem	0.08	0.12	0.028	0.04	0.11 Ni	0.20 Ni	active
C40820*	94.0 <sup>(3)</sup>			0.02	1.0	2.5	0.20	2.5				0.05	0.10 Ni	0.50 Ni	active
C40850*	94.5 <sup>(2)</sup>	96.5		0.05	2.6	4.0		Rem	0.05	0.20	0.01	0.20	0.05 Ni	0.20 Ni	active
C40860*	94.0 <sup>(2)</sup>	96.0		0.05	1.7	2.3		Rem	0.01	0.05	0.02	0.04	0.05 Ni	0.20 Ni	active
C40900 Copper Zinc Tin Alloy	92.0	94.0		0.05	0.50	0.8		Rem		0.05					inactive 07/74
C40950	91.5 <sup>(2)</sup>	94.5		.05	.30	.8		Rem		.03	.01	.08	.30 Ni <sup>(12)</sup>	.8 Ni	active
C41000*	91.0 <sup>(2)</sup>	93.0		0.05	2.0	2.8		Rem		0.05					active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C41100* Tin Brass	89.0	92.0 <sup>(2)</sup>		0.09	0.30	0.7		Rem		0.05					active
C41110* Copper Zinc Tin Alloy	90.0	94.0 <sup>(2)</sup>		0.05	0.10	0.50		Rem		0.05					active
C41120*	89.0	92.0 <sup>(2)</sup>		0.05	0.30	0.7		Rem	0.05	0.20	0.01	0.35	0.05 Ni	0.20 Ni	active
C41125	86.5 <sup>(3)</sup>	90.5		.05	.50	.9		Rem		.03		.06		.8 Ni	active
C41300* Tin Brass	89.0 <sup>(2)</sup>	93.0		0.09	0.7	1.3		Rem		0.05					active
C41500* Tin Brass	89.0	93.0 <sup>(2)</sup>		0.09	1.5	2.2		Rem		0.05					active
C41900 Tin Brass	89.0	92.0		0.10	4.5	5.5		Rem		0.05					inactive 07/74
C42000* <sup>(2)</sup>	88.0	91.0			1.5	2.0		Rem				0.25			active
C42100* Tin Brass	87.5	89.0		0.05	2.2	3.0		Rem		0.05		0.35	0.15 Mn	0.35 Mn	inactive 03/92
C42200*	86.0 <sup>(2)</sup>	89.0		0.05	0.8	1.4		Rem		0.05		0.35			active
C42210* Tin Brass	86.0 <sup>(13)</sup>	89.0		0.01	1.1	1.6		Rem		0.035	0.001	0.010		0.5 Ni <sup>(14)</sup> 0.005 Te <sup>(15)</sup> 0.005 Se <sup>(15)</sup>	active
C42220*	88.0 <sup>(2)</sup>	91.0		0.05	0.7	1.4		Rem	0.05	0.20	0.02	0.05	0.05 Ni	0.20 Ni	active
C42500* <sup>(2)</sup>	87.0	90.0		0.05	1.5	3.0		Rem		0.05		0.35			active
C42510 <sup>(16)</sup>															inactive 12/98
C42520*	88.0 <sup>(2)</sup>	91.0		0.05	1.5	3.0		Rem	0.05	0.20	0.01	0.20	0.05 Ni	0.20 Ni	active
C42600* <sup>(2)</sup>	87.0	90.0 <sup>(13)</sup>		0.05	2.5	4.0		Rem	0.05	0.20	0.01	0.20	0.05 Ni	0.20 Ni <sup>(12)</sup>	active
C43000* Tin Brass	84.0	87.0 <sup>(2)</sup>		0.09	1.7	2.7		Rem		0.05					active
C43200 Tin Brass	85.0	88.0		0.35	0.40	0.6		Rem		0.05		0.35			inactive 03/92
C43400* <sup>(2)</sup>	84.0	87.0		0.05	0.40	1.0		Rem		0.05					active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C43500* Tin Brass	79.0	83.0 <sup>(2)</sup>		0.09	0.6	1.2		Rem		0.05					active
C43600*	80.0 <sup>(2)</sup>	83.0		0.05	0.20	0.50		Rem		0.05					active
C43800* Copper Zinc Tin Alloy	79.0	82.0		0.05	1.0	1.5		Rem		0.05					inactive 07/74
C44200* Copper Zinc Tin Alloy	70.0	73.0		0.07	0.8	1.2		Rem		0.06					inactive 05/71
C44250*	73.0 <sup>(8)</sup>	76.0		0.07	0.50	1.5		Rem		0.20		0.10		0.20 Ni	active
C44300* Admiralty, Arsenical	70.0	73.0 <sup>(8)</sup>		0.07	0.8	1.2 <sup>(17)</sup>		Rem		0.06			0.02 As	0.06 As	active
C44400* Admiralty, Antimonial	70.0	73.0 <sup>(8)</sup>		0.07	0.8 <sup>(17)</sup>	1.2		Rem		0.06			0.02 Sb	0.10 Sb	active
C44500* Admiralty, Phosphorized	70.0 <sup>(8)</sup>	73.0		0.07	0.8	1.2 <sup>(17)</sup>		Rem		0.06	0.02	0.10			active
C44730		Rem <sup>(3)</sup>		.05	.50	1.5	27.0	31.0		.6		.05	.8 Ni <sup>(12)</sup> .10 Si	2.5 Ni .7 Cr .40 Mg .40 Mn .6 Si .40 Zr	active
C44750 Tin Brass		Rem <sup>(8)</sup>		0.05	0.30	3.0	27.0	31.5	0.10	1.5					active
C45450* Tin Brass	65.0	66.0			0.10	0.30		Rem			0.10	0.30	0.20 Al	0.40 Al	inactive 03/92
C45470 Copper-Zinc-Tin Aluminum Alloy	64.0	69.0 <sup>(3)</sup>		.09	0.6	0.9		Rem					0.30 Al	0.8 Al	active
C46200 Naval Brass, 63-1/2%	62.0	65.0 <sup>(8)</sup>		0.20	0.50	1.0		Rem		0.10					active
C46210* Tin Brass	61.0	64.0		0.05		1.0		Rem						0.03 Al 0.50 Si	inactive 03/92
C46250 HONLUX 01	62.0	65.0 <sup>(18)(3)</sup>		.09	.50	1.0		37.0		.10	.05	.15	.05 Mg	.20 Mg	inactive
C46400 Naval Brass, Uninhibited	59.0 <sup>(8)</sup>	62.0		0.20	0.50	1.0		Rem		0.10					active



UNS #	Cu		Pb		Sn		Zn		Fe		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C46420 Tin Brass	61.0	63.5		0.20	1.0	1.4		Rem		0.20					inactive 03/92
C46500 Naval Brass, Arsenical	59.0 <sup>(8)</sup>	62.0		0.20	0.50	1.0		Rem		0.10			0.02 As	0.06 As	active
C46600 Tin Brass	59.0	62.0		0.20	0.50	1.0		Rem		0.10			0.02 Sb	0.10 Sb	inactive 03/92
C46700 Tin Brass	59.0	62.0		0.20	0.50	1.0		Rem		0.10	0.02	0.10			inactive 03/92
C46750	59.2 <sup>(3)</sup>	62.5		.25	1.00	1.80		Rem		.10	.05	.15	.05 Sb	.50 Ni <sup>(12)</sup> .15 Sb	active
C47000 Naval Brass Welding and Brazing Rod	57.0 <sup>(8)</sup>	61.0		0.05	0.25	1.0		Rem						0.01 Al	active
C47200 Copper Zinc Tin Alloy	49.0	52.0		0.50	3.0	4.0		Rem		0.10					inactive 07/74
C47600 Tin Brass	86.0	88.0	1.8	2.2	1.8	2.2		Rem		0.05	0.03	0.07	0.05 Mn	0.15 Mn	inactive 03/92
C47940	63.0 <sup>(8)</sup>	66.0	1.0	2.0	1.2	2.0		Rem	0.10	1.0			0.10 Ni	0.50 Ni <sup>(12)</sup>	active
C48200 Naval Brass, Medium Leaded	59.0 <sup>(8)</sup>	62.0	0.40	1.0	0.50	1.0		Rem		0.10					active
C48500 Naval Brass, High Leaded	59.0 <sup>(8)</sup>	62.0	1.3	2.2	0.50	1.0		Rem		0.10					active
C48510 Tin Brass	59.0	62.0	1.0	2.5	0.7	1.5		Rem					0.02 As	0.25 As	inactive 02/81
C48600 DZR Brass	59.0	62.0 <sup>(8)</sup>	1.0	2.5	0.30	1.5		Rem					0.02 As	0.25 As	active
C48650 Replaced by C48600															inactive 02/81
C49080 Tin Brass	49.0	52.0		0.50	3.0	4.0		Rem						0.10 Al	inactive 03/92
C49250* Copper-Zinc-Bismuth Copper-Zinc- Bismuth	58.0	61.0 <sup>(3)</sup>		0.09		0.30		Rem		0.50			1.8 Bi	2.4 Bi 0.001 Cd	active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C49255 Copper-Zinc-Bismuth	58.0 <sup>(3)</sup>	60.0		0.01		0.50		Rem		0.10		0.10	0.10 Ni 1.7 Bi 0.02 Se	0.30 Ni <sup>(12)</sup> 2.9 Bi 0.01 Cd 0.10 Si 0.07 Se	active
C49260* GEM Brass	58.0	63.0 <sup>(3)</sup>		0.09		0.50		Rem		0.50	0.05	0.15	0.50 Bi	1.8 Bi 0.001 Cd 0.10 Si	active
C49300* Lead-Free Bismuth Alloy Lead-Free	58.0	62.0 <sup>(3)</sup>		0.01	1.0	1.8		Rem		0.10		0.20	0.50 Bi	1.5 Ni <sup>(12)</sup> 0.50 Al 2.0 Bi 0.03 Mn 0.50 Sb 0.10 Si 0.20 Se	active
C49340* GEM Brass	60.0	63.0 <sup>(3)(13)</sup>		0.09	0.50	1.5		Rem		0.12	0.05	0.15	0.50 Bi	2.2 Bi 0.001 Cd 0.10 Si	active
C49350* Bismuth Brass Alloy	61.0 <sup>(3)</sup>	63.0		0.09	1.5	3.0		Rem		0.12	0.04	0.15	0.50 Bi 0.02 Sb	2.5 Bi 0.10 Sb 0.30 Si	active
C49355* Copper Zinc Bismuth Alloy	63.0 <sup>(3)</sup>	69.0		0.09	0.50	2.0	27.0	35.0		0.10			0.50 Bi 1.0 Si	0.001 B 1.5 Bi 0.10 Mn 2.0 Si	active
C49360* Tin-Eco(bismuth)		Rem <sup>(3)</sup>		0.09	1.0	2.0	19.0	22.0					0.50 Bi 2.0 Si	1.5 Bi 3.5 Si	active

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

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

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

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

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

(5) = For optimum DZR properties , Zn should not exceed 38%.

(6) = P may be substituted for As.

(7) = Cu + Sum of Named Elements, 99.1% min.

(8) = Cu + Sum of Named Elements, 99.6% min.

(9) = For flat products, the iron shall be .10% max.

(10) = Cu, 61.0% min. for rod.

(11) = Pb may be reduced to 1.0% by agreement.

(12) = Ni value includes Co.

(13) = Cu value includes Ag.

(14) = Includes Co.

(15) = Te + Se 0.006% max.

(16) = Alloy No. changed to C42220

(17) = For tubular products, the minimum Sn content may be .9%.

(18) = Includes Lanthanum 0.01-0.08



# Application Datasheet

## Standard Designation for Wrought Copper Alloys

- C50000-C52999: Copper-Tin-Phosphorus Alloys (*Phosphor Bronzes*)
- C53000-C54999: Copper-Tin-Lead-Phosphorus Alloys (*Leaded Phosphor Bronzes*)
- C55000-C55299: Copper-Phosphorus and Copper-Silver-Phosphorus Alloys (*Brazing Alloys*)
- C55300-C60799: Copper-Silver-Zinc-Alloys
- C60800-C64699: Copper-Aluminum Alloys (*Aluminum Bronzes*)
- C64700-C66199: Copper-Silicon Alloys (*Silicon Bronzes and Silicon Brasses*)
- C66200-C69999: Other Copper-Zinc Alloys

Revision Date: November 17, 2014

### Bronzes (C50000 - C69999)

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

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Ag		Mn		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%	
C50100 <sup>(1)</sup> *		Rem		0.05	0.50	0.8				0.05	0.01	0.05													active
C50150* Copper Tin Phos Zirconium	99.0 <sup>(2)</sup>				0.50	0.8					0.004	0.015											0.04 Zr	0.08 Zr	active
C50200*		Rem <sup>(1)</sup>		0.05	1.0	1.5				0.10		0.04													active
C50500* Phosphor Bronze, 1.25% E		Rem <sup>(1)</sup>		0.05	1.0	1.7		0.30		0.10	0.03	0.35													active
C50510*		Rem <sup>(3)</sup>			1.0	1.5	0.10	0.25			0.02	0.07	0.15	0.40											active
C50580*		Rem <sup>(1)</sup>		0.05	1.0	1.7		0.30	0.05	0.20	0.01	0.35	0.05	0.20											active
C50590*	97.0 <sup>(1)</sup>			0.02	0.50	1.5		0.50	0.05	0.40	0.02	0.15													active
C50700*		Rem <sup>(1)</sup>		0.05	1.5	2.0				0.10		0.30													active
C50705*	96.5 <sup>(1)</sup>			0.02	1.5	2.0		0.50	0.10	0.40	0.04	0.15													active
C50710*		Rem <sup>(1)</sup>			1.7	2.3						0.15	0.10	0.40											active
C50715*		Rem <sup>(4)</sup>		0.02	1.7	2.3 <sup>(4)</sup>			0.05	0.15 <sup>(4)</sup>	0.025 <sup>(4)</sup>	0.04													active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Ag		Mn		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%	
C50725*	94.0 <sup>(1)</sup>			0.02	1.5	2.5	1.5	3.0	0.05	0.20	0.02	0.06													active
C50780* <sup>(1)</sup>		Rem		0.05	1.7	2.3		0.30	0.05	0.20	0.01	0.35	0.05	0.20											active
C50800* Tin Brass		Rem		0.05	2.6	3.4				0.10	0.01	0.07													inactive 03/92
C50900*		Rem <sup>(1)</sup>		0.05	2.5	3.8		0.30		0.10	0.03	0.30													active
C51000* Phosphor Bronze, 5% A		Rem <sup>(1)</sup>		0.05	4.2	5.8		0.30		0.10	0.03	0.35													active
C51080*		Rem <sup>(1)</sup>		0.05	4.8	5.8		0.30	0.05	0.20	0.01	0.35	0.05	0.20											active
C51100* <sup>(1)</sup>		Rem		0.05	3.5	4.9		0.30		0.10	0.03	0.35													active
C51180*		Rem <sup>(1)</sup>		0.05	3.5	4.9		0.30	0.05	0.20	0.01	0.35	0.05	0.20											active
C51190*		Rem <sup>(1)</sup>		0.02	3.0	6.5			0.05	0.15	0.025	0.045											0.15 Co		active
C51800* Phosphor Bronze		Rem <sup>(1)</sup>		0.02	4.0	6.0					0.10	0.35				0.01									active
C51900*		Rem <sup>(1)</sup>		0.05	5.0	7.0		0.30		0.10	0.03	0.35													active
C51980* <sup>(1)</sup>		Rem		0.05	5.5	7.0		0.30	0.05	0.20	0.01	0.35	0.05	0.20											active
C52100* Phosphor Bronze, 8% C		Rem <sup>(1)</sup>		0.05	7.0	9.0		0.20		0.10	0.03	0.35													active
C52180*		Rem <sup>(1)</sup>		0.05	7.0	9.0		0.30	0.05	0.20	0.01	0.35	0.05	0.20											active
C52400* Phosphor Bronze 10% D		Rem <sup>(1)</sup>		0.05	9.0	11.0		0.20		0.10	0.03	0.35													active
C52480*		Rem <sup>(1)</sup>		0.05	9.0	11.0		0.30	0.05	0.20	0.01	0.35	0.05	0.20											active
C52600* Copper Tin Phosphorus Alloy		Rem		0.05	2.2	3.3		0.20		0.10	0.03	0.35							1.0	2.0					inactive 07/74
C52900* Copper Tin Phosphorus Alloy		Rem		0.05	7.0	9.0		0.20		0.10	0.03	0.35							1.0	2.0					inactive 07/74
C53200 Tin Brass		Rem	2.5	4.0	4.0	5.5		0.20		0.10	0.03	0.35													inactive 03/92
C53400 Phosphor Bronze B-1		Rem <sup>(1)</sup>	0.8	1.2	3.5	5.8		0.30		0.10	0.03	0.35													active
C53800		Rem <sup>(2)(5)</sup>	0.40	0.6	13.1	13.9		0.12		0.030				0.03 <sup>(6)</sup>						0.06					active
C54400 Phosphor Bronze B-2		Rem <sup>(1)</sup>	3.0	4.0	3.5	4.5	1.5	4.5		0.10	0.01	0.50													active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Ag		Mn		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%	
C54600 Copper Tin Phosphorus Alloy		Rem	3.5	4.6	3.5	4.5	1.5	4.5				0.50													inactive 07/74
C54800 Tin Brass		Rem	4.0	6.0	4.0	6.0		0.30		0.10	0.03	0.35													inactive 03/92
C55180*		Rem <sup>(7)</sup>									4.8	5.2													active
C55181*		Rem <sup>(7)</sup>									7.0	7.5													active
C55185																									inactive 08/04
C55280*		Rem <sup>(7)</sup>									6.8	7.2					1.8	2.2							active
C55281*		Rem <sup>(7)</sup>									5.8	6.2					4.8	5.2							active
C55282*		Rem <sup>(7)</sup>									6.5	7.0					4.8	5.2							active
C55283*		Rem <sup>(7)</sup>									7.0	7.5					5.8	6.2							active
C55284*		Rem <sup>(7)</sup>									4.8	5.2					14.5	15.5							active
C55285* Copper-Silver Phosphorus Alloy Brazing Alloy		Rem <sup>(1)</sup>									6.0	6.7					17.2	18.0							active
C55385*		Rem <sup>(7)</sup>			6.0	7.0					6.0	7.0									0.01	0.40			active
C55386* Other Copper Brazing Alloy		Rem <sup>(7)</sup>			5.5	6.5					6.8	7.2	3.0	5.0											active
C56000		Rem <sup>(1)</sup>					30.0	34.0									29.0	31.0							active
C60600* Aluminum Bronze		Rem								0.50					4.0	7.0									inactive 03/92
C60700* Copper-Aluminum Alloy Aluminum Bronze		Rem		0.01	1.7	2.0									2.3	2.9									inactive 03/92
C60800		Rem <sup>(1)(5)</sup>		0.10						0.10					5.0	6.5							0.02 As	0.35 As	active
C61000*		Rem <sup>(5)(1)</sup>		0.02				0.20		0.50					6.0	8.5					0.10				active
C61200* Copper Aluminum Alloy Aluminum Bronze		Rem								0.05					7.0	9.0									inactive 05/71
C61300*		Rem <sup>(5)(2)</sup>		0.01	0.20	0.50		0.10 <sup>(8)</sup>	2.0	3.0		0.015		0.15 <sup>(6)</sup>	6.0	7.5			0.20		0.10				active
C61400*		Rem <sup>(5)(1)</sup>		0.01				0.20	1.5	3.5		0.015			6.0	8.0			1.0						active
C61470 Aluminum Bronze Welding Electrode		Rem		0.02						0.50	5.0				8.5	11.0					2				inactive 05/71

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Ag		Mn		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%	
C61500*		Rem <sup>(1)(5)</sup>		0.015									1.8	2.2 <sup>(6)</sup>	7.7	8.3									active
C61550*		Rem <sup>(5)(1)</sup>		0.05		0.05				0.20			1.5	2.5 <sup>(6)</sup>	5.5	6.5				1.0					active
C61600* Copper Aluminum Alloy Aluminum Bronze		Rem				0.6		1.0		4.0				1.0	6.5	11.0				1.5		0.25			inactive 05/71
C61700* Copper Aluminum Alloy Aluminum Bronze		Rem				2.0		1.0		1.5				2.0	7.0					2.0			10.0 Sb		inactive 05/71
C61800*		Rem <sup>(1)(5)</sup>		0.02				0.02	0.50	1.5					8.5	11.0						0.10			active
C61810* Aluminum Bronze		Rem		0.02				0.02	0.50	1.5					8.5	11.0						0.10			inactive 02/85
C61900*		Rem <sup>(5)(1)</sup>		0.02		0.6		0.8	3.0	4.5					8.5	10.0									active
C62000* Copper Aluminum Alloy Aluminum Bronze		Rem							3.2	3.7					9.8	10.5									inactive 05/71
C62200*		Rem <sup>(1)(5)</sup>		0.02				0.02	3.0	4.2					11.0	12.0						0.10			active
C62300* Aluminum Bronze, 9%		Rem <sup>(5)(1)</sup>				0.6			2.0	4.0				1.0 <sup>(6)</sup>	8.5	10.0				0.50		0.25			active
C62400* Aluminum Bronze, 11%		Rem <sup>(5)(1)</sup>				0.20			2.0	4.5					10.0	11.5				0.30		0.25			active
C62500*		Rem <sup>(1)(5)</sup>							3.5	5.5					12.5	13.5				2.0					active
C62580*		Rem <sup>(1)(5)</sup>		0.02				0.02	3.0	5.0					12.0	13.0						0.04			active
C62581*		Rem <sup>(1)(5)</sup>		0.02				0.02	3.0	5.0					13.0	14.0						0.04			active
C62582*		Rem <sup>(5)(1)</sup>		0.02				0.20	3.0	5.0					14.0	15.0						0.04			active
C62600* Copper Aluminum Alloy Aluminum Bronze		Rem							2.0	4.5					9.7	10.7				1.5	3.0	4.5			inactive 05/71
C62700 Copper Aluminum Alloy		Rem																							inactive 05/71
C62730* Aluminum Bronze		Rem		0.05		0.10		0.40	4.0	6.0			4.0	6.0	8.5	11.0				0.05		0.10		0.05 Mg	inactive 09/92

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Ag		Mn		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%	
C62800* Copper Aluminum Alloy Aluminum Bronze		Rem							1.5	3.5			4.0	7.0	8.0	11.0			0.50	2.01.2					inactive 05/71
C63000* Aluminum Bronze		Rem <sup>(1)(5)</sup>			0.20		0.30		2.0	4.0			4.0 <sup>(6)</sup>	5.5	9.0	11.0				1.5		0.25			active
C63010*	78.0 <sup>(5)(2)</sup>				0.20		0.30		2.0	3.5			4.5 <sup>(6)</sup>	5.5	9.7	10.9				1.5					active
C63020*	74.5 <sup>(1)(5)</sup>			0.03		0.25		0.30	4.0	5.5			4.2	6.0 <sup>(6)</sup>	10.0	11.0				1.5			0.20 Co 0.05 Cr		active
C63200* Aluminum Bronze		Rem <sup>(5)(1)</sup>		0.02					3.5	4.3 <sup>(9)</sup>			4.0	4.8 <sup>(6)(9)</sup>	8.7	9.5			1.2	2.0		0.10			active
C63230* Aluminum Bronze	75.9	84.4		0.02					3.0	5.0			4.0	5.5	8.5	9.5				3.5		0.10			inactive 03/92
C63280*		Rem <sup>(1)(5)</sup>		0.02					3.0	5.0			4.0 <sup>(6)</sup>	5.5	8.5	9.5			0.6	3.5					active
C63300* Aluminum Bronze		Rem		0.02					2.0	6.0			1.0	2.5	5.0	7.5			11.0	13.0		1.5			inactive 03/92
C63380*		Rem <sup>(5)(1)</sup>		0.02			0.15		2.0	4.0			1.5 <sup>(6)</sup>	3.0	7.0	8.5			11.0	14.0		0.10			active
C63400* Aluminum Bronze		Rem <sup>(1)(5)</sup>		0.05		0.20		0.50		0.15				0.15 <sup>(6)</sup>	2.6	3.2					0.25	0.45		0.09 As	active
C63500* Plus Bright Gold Copper Aluminum Zinc Alloy		Rem <sup>(5)(1)</sup>			0.50	2.0	4.5	7.0	0.15	0.50						4.5	7.0								active
C63600		Rem <sup>(5)(1)</sup>		0.05		0.20		0.50		0.15				0.15 <sup>(6)</sup>	3.0	4.0					0.7	1.3		0.15 As	active
C63700* Copper Aluminum Alloy Aluminum Bronze		Rem <sup>(5)</sup>		0.05		0.6		1.0		0.30				0.25	6.5	8.5					1.2	2.2			inactive 05/71
C63800*		Rem <sup>(1)(5)</sup>		0.05				0.8		0.20				0.20 <sup>(10)</sup>	2.5	3.1				0.10	1.5	2.1	0.25 Co	0.55 Co	active
C63900* Copper Aluminum Alloy Aluminum Bronze		Rem <sup>(5)</sup>		0.05						1.0					6.5	8.0					1.5	3.0			inactive 05/71
C64100 Copper Aluminum Alloy		Rem <sup>(5)</sup>																							inactive 05/71
C64110 Aluminum Bronze		Rem <sup>(5)</sup>	1.0	2.0											8.0	11.0				0.50					inactive 03/92
C64200* Aluminum Bronze		Rem <sup>(5)(1)</sup>		0.05		0.20		0.50		0.30				0.25 <sup>(6)</sup>	6.3	7.6				0.10	1.5	2.2		0.09 As	active



UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Ag		Mn		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%		
C64210* Aluminum Silicon Bronze		Rem <sup>(1)(5)</sup>		0.05		0.20		0.50		0.30				0.25 <sup>(6)</sup>	6.3	7.0				0.10	1.5	2.0		0.09 As	active	
C64250* Aluminum Bronze		Rem								1.0					5.5	7.5				0.50	0.0	3.0			inactive 03/92	
C64400* Aluminum Bronze		Rem		0.03		0.10		0.20		0.05			4.2 <sup>(6)</sup>	5.0	3.5	4.5						0.8	1.3			inactive 03/92
C64700* Silicon Bronze		Rem		0.09				0.50		0.10			1.6	2.2 <sup>(6)</sup>							0.40	0.8			active	
C64710*	95.0 <sup>(5)(1)</sup>						0.20	0.50					2.9	3.5 <sup>(6)</sup>						0.10	0.50	0.9			active	
C64720* Silicon Bronze		Rem					0.10	0.40					1.6	2.2							0.35	0.6	0.01 Mg	0.03 Mg	inactive 03/92	
C64725* Copper Silicon Alloy	95.0			0.01	0.20	0.8	0.50	1.5		0.25			1.3 <sup>(6)</sup>	2.7							0.20	0.8		0.01 Ca 0.09 Cr 0.20 Mg	active	
C64727* Copper Silicon Alloy MAX375		Rem		0.01	0.20	0.8	0.20	1.0		0.25			2.5	3.0							0.50	0.8	0.002 Mg	0.01 Ca 0.01 Cr 0.20 Mg	active	
C64728* Copper-Nickel-Zinc-Silicon Alloy		Rem <sup>(1)(5)</sup>		0.05	0.10	1.0	0.10	2.0		0.20			2.0	3.6								0.30	0.9			active
C64730*	93.5 <sup>(5)(1)</sup>				1.0	1.5	0.20	0.50					2.9 <sup>(6)</sup>	3.5						0.10	0.50	0.9			active	
C64740*	95.0 <sup>(5)(1)</sup>			0.01	1.5	2.5	0.20	1.0		0.25			1.0	2.0 <sup>(6)</sup>							0.05	0.50		0.01 Ca 0.05 Mg	active	
C64745* NKC164		Rem <sup>(1)(5)</sup>		0.05	0.20	0.80	0.20	0.8		0.20			0.7	2.5 <sup>(6)</sup>						0.10	0.10	0.7			active	
C64750*		Rem <sup>(1)(5)</sup>			0.05	0.8		1.0		1.0		0.10	1.0	3.0 <sup>(6)</sup>								0.10	0.7	0.10 Mg 0.10 Zr	active	
C64760*	93.5 <sup>(5)(1)</sup>			0.02		0.30	0.20	2.5					0.40	2.5 <sup>(6)</sup>							0.05	0.6		0.05 Mg	active	
C64770*		Rem <sup>(5)(1)</sup>		0.05	0.05	0.50	0.30	0.8		0.10			1.5 <sup>(6)</sup>	3.0						0.10	0.40	0.8		0.30 Mg	active	
C64775 Copper-nickel-silicon		Rem		0.05	0.05	1.0	0.30	0.8		0.10			1.5	3.5 <sup>(6)</sup>						0.10	0.40	0.9		0.50 Cr 0.30 Mg	active	
C64780*	90.0 <sup>(1)(5)</sup>			0.02	0.10	2.0	0.20	2.5					1.0	3.5					0.01	1.0	0.20	0.9		0.01 Cr 0.01 Mg 0.01 Ti 0.01 Zr	active	
C64785*		Rem <sup>(1)(5)</sup>		0.015	0.50	2.0	3.0	6.0		0.02		0.015	0.40	1.6 <sup>(10)</sup>	3.0	6.0				0.20	1.0		0.15		active	
C64790		Rem		0.05	0.05	0.50	0.30	0.8		0.10			2.5 <sup>(6)</sup>	4.5						0.10	0.6	1.2	0.05 Cr 0.05 Mg	0.50 Cr 0.30 Mg	active	
C64800 NKC4419		Rem		0.05		0.50		0.50		1.0		0.50									0.20	1.0	1.0 Co	3.0 Co 0.09 Cr	active	
C64900*		Rem <sup>(5)(1)</sup>		0.05	1.2	1.6		0.20		0.10			0.10 <sup>(6)</sup>		0.10						0.8	1.2			active	
C65100* Low-Silicon Bronze B		Rem <sup>(5)(1)</sup>		0.05				1.5		0.8										0.7	0.8	2.0			active	

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Ag		Mn		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%		
C65300* Silicon Bronze		Rem		0.05						0.08											2.0	2.6			inactive 03/92	
C65400		Rem <sup>(1)(5)</sup>		0.05	1.2	1.9		0.50													2.7	3.4	0.01 Cr	0.12 Cr	active	
C65500* High-Silicon Bronze A		Rem <sup>(1)(5)</sup>		0.05				1.5		0.8				0.6 <sup>(6)</sup>					0.50	1.3	2.8	3.8			active	
C65600*		Rem		0.02		1.5		1.5		0.50						0.01				1.5	2.8	4.0			active	
C65620* Silicon Bronze	90.0 <sup>(5)</sup>							1.5	4.0	1.0	2.0		0.10							1.0	2.4	4.0			inactive 03/92	
C65700 Copper Silicon Alloy																									inactive 11/74	
C65800* Silicon Bronze		Rem <sup>(5)</sup>		0.05						0.25				0.6					0.50	1.3	2.5	3.8			inactive 03/92	
C66100		Rem <sup>(1)(5)</sup>	0.20	0.8				1.5		0.25										1.5	2.8	3.5			active	
C66200*	86.6	91.0		0.05	0.20	0.7		Rem		0.05	0.05	0.20	0.30 <sup>(6)</sup>	1.0											active	
C66300*	84.5	87.5 <sup>(1)(5)</sup>		0.05	1.5	3.0		Rem	1.4	2.4 <sup>(12)</sup>														0.20 Co <sup>(12)</sup>	active	
C66400*		Rem <sup>(1)(5)</sup>		0.015		0.05	11.0	12.0	1.3 <sup>(13)</sup>	1.7			0.35											0.30 Co <sup>(13)</sup>	0.7 Co	active
C66410*		Rem <sup>(5)(1)</sup>		0.015		0.05	11.0	12.0	1.8	2.3															active	
C66420*		Rem <sup>(1)(5)</sup>					12.7	17.0	0.50	1.5															active	
C66430*		Rem <sup>(1)(5)</sup>		0.05	0.6	0.9	13.0	15.0	0.6	0.9		0.10													active	
C66500* Copper Zinc Alloy	80.0	82.0		0.05				Rem		0.10									0.7	1.5					inactive 02/72	
C66700* Manganese Brass	68.5	71.5 <sup>(1)(5)</sup>		0.07				Rem		0.10									0.8	1.5					active	
C66800	60.0 <sup>(5)(1)</sup>	63.0		0.50		0.30		Rem		0.35			0.25 <sup>(6)</sup>		0.25				2.0	3.5	0.50	1.5			active	
C66850* Copper Zinc Alloy	60.0	64.0		0.09		0.6		Rem	0.50	1.5		0.05	0.50 <sup>(6)</sup>	0.50	1.5				4.0	8.0					active	
C66900* Manganese Brass	62.5	64.5		0.05				Rem		0.25									11.5	12.5					active	
C66908* Copper-Zinc-Manganese		Rem <sup>(14)(1)</sup>		0.05		0.50	6.0	9.0	0.01	2.0			0.01	3.5		0.25			4.0	7.0					active	
C66910* Copper-Zinc-Manganese		Rem		0.05		0.05	6.0	8.0	0.01	1.5			0.01	3.5		0.25			12.0	15.0				0.01 Co 0.15 Ti 0.15 Zr 0.05 Nb	active	
C66913* Copper-Zinc-Manganese		Rem		0.05		0.50	8.0	12.5	0.01	1.5			0.01	3.5		0.25			12.0	15.0				0.01 Co	active	

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Ag		Mn		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%	
C66915* Copper-Zinc-Manganese		Rem		0.05		0.50	8.0	12.5	0.01	1.5			0.01	3.5		0.25			12.0	15.0			0.01 Co	0.50 Co	active
C66920 White Alloy	66.0 <sup>(15)(14)</sup>	70.0		.09			10.0	14.0		.6			3.0	6.0 <sup>(6)</sup>					12.0	16.0		.05	.10 Sb	.10 C .25 S 1.0 Sb	active
C66925* Copper-Zinc-Manganese		Rem <sup>(14)(1)</sup>		0.05		0.50	17.0	21.0		0.50			0.01	3.5		0.25			8.0	11.0				0.01 Co	active
C66930* Copper-Manganese Alloy		Rem <sup>(5)(16)</sup>		0.02		0.05		0.05		0.05		0.02		0.02 <sup>(6)</sup>					19.0	20.5					active
C66950*		Rem <sup>(1)(5)</sup>		0.01			14.0	15.0		0.50					1.0	1.5			14.0	15.0					active
C67000 Manganese Bronze B	63.0 <sup>(1)(5)</sup>	68.0		0.20		0.50		Rem	2.0	4.0					3.0	6.0			2.5	5.0					active
C67100 Copper Zinc Alloy	59.0 <sup>(5)</sup>	62.0	0.15	0.35	0.50	1.0		Rem	0.20	0.8									0.05	0.25					inactive 02/72
C67130 Copper Zinc	56.0	59.0 <sup>(5)</sup>	0.50	1.5	0.50	1.5		Rem					0.50	1.5	0.10	1.0			0.50	1.5					inactive 03/92
C67200 Copper Zinc Alloy	57.5	61.0		0.05				Rem		0.25			4.0	6.0					6.0	8.0					inactive 12/72
C67300	58.0	63.0	0.40	3.0		0.30		Rem		0.50			0.25 <sup>(6)</sup>		0.25				2.0	3.5	0.50	1.5			active
C67400	57.0	60.0 <sup>(1)(5)</sup>		0.50		0.30		Rem		0.35			0.25 <sup>(6)</sup>	0.50	2.0				2.0	3.5	0.50	1.5			active
C67410 Copper Zinc	55.0	59.0		0.8		0.50		Rem		1.0			2.0	1.3	2.3				1.0	2.4	0.7	1.3			inactive 03/92
C67420	57.0	58.5 <sup>(1)(5)</sup>	0.25	0.8		0.35		Rem	0.15	0.55			0.25 <sup>(6)</sup>	1.0	2.0				1.5	2.5	0.25	0.7			active
C67500 Manganese Bronze A	57.0	60.0 <sup>(5)(1)</sup>		0.20	0.50	1.5		Rem	0.8	2.0					0.25				0.05	0.50					active
C67600	57.0	60.0 <sup>(5)(1)</sup>	0.50	1.0	0.50	1.5		Rem	0.40	1.3									0.05	0.50					active
C67610 Copper Zinc	56.0 <sup>(5)</sup>	59.0	0.50	1.5	0.50	1.0		Rem					0.50	1.5	0.40	1.0			0.5	1.5					inactive 02/81
C67620 Copper Zinc	55.0	57.0 <sup>(5)</sup>	0.50	1.5				Rem	0.50	1.2									1.0	2.0					inactive 03/92
C67700 Copper Zinc	55.5 <sup>(5)</sup>	58.0	0.50	1.0				Rem	0.7	1.5			1.5	2.3					0.05	0.30			0.40 As	0.8 As	inactive 03/92
C67800 Copper Zinc	56.0	59.0		0.30		0.20		Rem	0.7	1.5					0.50	1.5			0.20	0.6					inactive 03/92
C67810 Copper Zinc	56.5	59.5		1.0		0.50	41.9	Rem		1.0			1.5	0.40	1.6				0.40	1.8		0.6			inactive 03/92
C67820 Copper Zinc	56.5	59.5 <sup>(5)</sup>		0.10	0.30	1.0		Rem	0.50	1.2					0.30	1.2			0.30	2.0					inactive 03/92

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Ag		Mn		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%	
C67830 Copper Zinc	56.0	60.0 <sup>(5)</sup>	0.50	1.5	0.20	1.0		Rem	0.50	1.2					0.30	1.5			0.30	2.0					inactive 02/81
C67900 Copper Zinc Alloy	49.0	52.0		0.50				Rem	1.05	2.5			3.0	5.0					7.5	8.5					inactive 02/72
C68000 Bronze, Low Fuming (Nickel)	56.0	60.0		0.05	0.75	1.10		Rem	0.25	1.25			0.20	0.8 <sup>(6)</sup>		0.01			0.01	0.50	0.04	0.15			active
C68100 Bronze, Low Fuming	56.0	60.0		0.05	0.75	1.10		Rem	0.25	1.3						0.01			0.01	0.50	0.04	0.15			active
C68200 Copper Zinc	58.0	60.0						Rem											0.6	1.0	0.07	0.15			inactive 03/92
C68300* Copper-Zinc Alloy Silicon Modified Brass	59.0 <sup>(1)(5)</sup>	63.0		0.09	0.05	0.20		Rem													0.30	1.0	0.30 Sb	0.01 Cd 1.0 Sb	active
C68350* Low Silicon Brass	59.0	64.0		0.09		0.6		Rem		0.15	0.05	0.40		0.20 <sup>(6)</sup>		0.30					0.30	1.0			active
C68400	59.0	64.0 <sup>(5)(1)</sup>		.09		.50		Rem		1.0	.03	.30		.50 <sup>(6)</sup>		.50			.20	1.5	1.5	2.5	.001 B	.03 B	active
C68410	59.0	64.0 <sup>(1)</sup>		.09		.50		Rem		1.0	.03	.30		.50 <sup>(6)</sup>		.50			.20	1.5	1.0	1.5	.001 B	.03 B	active
C68600 Copper Zinc	56.0	60.0	0.50	1.5	0.20	1.0		Rem	0.50	1.2					0.30	1.5			0.30	2.0					active
C68700* Aluminum Brass, Arsenical	76.0	79.0		0.07				Rem		0.06					1.8	2.5							0.02 As	0.06 As	active
C68800*		Rem		0.05			21.3 <sup>(17)</sup>	24.1		0.20					3.0	3.8 <sup>(17)</sup>							0.25 Co	0.55 Co	active
C68900* Copper Zinc Alloy	65.0	67.0 <sup>(5)</sup>		0.03				Rem	0.8	1.4		0.02			1.1	2.0									inactive 02/72
C69000* Copper Zinc	72.0	74.5 <sup>(1)(5)</sup>		0.025				Rem		0.05		0.025	0.50 <sup>(6)</sup>	0.8	3.3	3.5									inactive 03/92
C69050*	70.0	75.0 <sup>(1)(5)</sup>						Rem					0.50 <sup>(6)</sup>	1.5	3.0	4.0					0.10	0.6	0.01 Zr	0.20 Zr	active
C69100*	81.0	84.0		0.05		0.10		Rem		0.25			0.8	1.4 <sup>(6)</sup>	0.7	1.2			0.10		0.8	1.3			active
C69150* Copper Zinc Alloy Copper Zinc Alloy	82.5 <sup>(5)(18)</sup>	87.5		0.05		0.025		Rem		0.25				0.20 <sup>(6)</sup>	0.7	1.3			0.25	0.6		0.02			active
C69200* Copper Zinc Alloy	89.0	91.0 <sup>(5)</sup>		0.05				Rem		0.05									0.8	1.8					inactive 02/72
C69220* Copper Zinc Alloy	69.0	71.0		0.08		0.30		Rem		0.10	0.05	0.20		0.20 <sup>(6)</sup>					0.8	1.8	1.8	2.6		0.10 Sb	active
C69230 <sup>(1)</sup>	70.0	73.0 <sup>(5)</sup>		.08		.20		Rem		.10		.20		.10 <sup>(6)</sup>					.10	.8	3.0	3.6	.10 Ca	.15 Ca	active
C69240	71.0 <sup>(1)</sup>	72.5		0.25		0.30		Rem		0.20	0.06	0.12	0.10 <sup>(6)</sup>	0.50					0.6	1.2	1.8	2.2			active

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		Ag		Mn		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%		
C69250* Copper-Zinc-Manganese		Rem		0.05		0.20	7.5	8.5		0.20				2.0	3.0	1.0	2.0			5.0	6.0					active
C69300* ECO Brass	73.0	77.0		0.09		0.20		Rem		0.10	0.04	0.15		0.10 <sup>(6)</sup>						0.10	2.7	3.4				active
C69310 SnEco	74.0 <sup>(1)(5)</sup>	79.0		.09	.30	.7		Rem		.10	.04	.15		.20 <sup>(6)</sup>						.10	2.6	3.4				active
C69350	73.0	77.0 <sup>(1)(5)</sup>		.20		.20		Rem	.10	.50	.04	.10		.10 <sup>(6)</sup>		.10				.10	3.0	3.4				active
C69400 Silicon Red Brass	80.0 <sup>(1)(5)</sup>	83.0		0.30				Rem		0.20												3.5	4.5			active
C69430	80.0	83.0		0.30				Rem		0.20												3.5	4.5	0.03 As	0.06 As	active
C69440 Copper Zinc	80.0 <sup>(5)</sup>	83.0		0.30				Rem		0.20												3.5	4.5	0.03 Sb	0.06 Sb	inactive 03/92
C69450 Copper Zinc	80.0	83.0		0.30				Rem		0.20	0.03	0.06								0.40	3.5	4.5				inactive 03/92
C69700	75.0	80.0 <sup>(5)(1)</sup>	0.50	1.5				Rem		0.20										0.40	2.5	3.5				active
C69710	75.0	80.0	0.50	1.5				Rem		0.20										0.40	2.5	3.5	0.03 As	0.06 As	active	
C69720 Copper Zinc	75.0	80.0 <sup>(5)</sup>	0.50	1.5				Rem		0.20										0.40	2.5	3.5	0.03 Sb	0.06 Sb	inactive 03/92	
C69730 Copper Zinc	75.0 <sup>(5)</sup>	80.0	0.50	1.5				Rem		0.20	0.03	0.06										2.5	3.5			inactive 03/92
C69750	78.0 <sup>(5)(1)</sup>	83.0	0.8	1.3		0.05		Rem		0.05		0.02		0.01 <sup>(6)</sup>						0.05	1.9	2.22				active
C69800 Copper Zinc	66.0	70.0		0.8				Rem		0.40				0.50								0.7	1.3			inactive 03/92
C69900 Copper Zinc		Rem <sup>(5)</sup>		0.02				0.14		0.10				0.10	1.4	2.3		0.10	40.0	48.0				0.01 As 0.05 C 0.05 Cd 0.20 Co	inactive 03/92	
C69910 Copper Zinc		Rem <sup>(5)</sup>		0.01			3.0	5.0	1.0	1.4					0.25	0.8			28.0	32.0					inactive 03/92	
C69950 Copper Zinc	51.0 <sup>(5)</sup>	54.0											8.5	10.5					36.0	40.0					inactive 03/92	

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

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

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

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

(4) = Cu + Sn + Fe + P, 99.5% min

(5) = Cu value includes Ag.

(6) = Ni value includes Co.

(7) = Cu + Sum of Named Elements, 99.85% min.

(8) = When the product is for subsequent welding applications and is so specified by the purchaser, Cr, Cd, Zr, and Zn shall each be 0.05%max.

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

(10) = Not including Co.

(11) = Cu + Sum of Named Elements, 99.92% min.

(12) = Fe + Co, 1.4 - 2.4%

(13) = Fe + Co, 1.8 - 2.3%.

(14) = Not including Ag.

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

(16) = Cu + Sum of Named Elements, 99.9% min.

(17) = Al + Zn, 25.1 - 27.1%.

(18) = Cu + Sum of Named Elements, 99.6% min.



# Application Datasheet

## Standard Designation for Wrought Copper Alloys

Revision Date: November 17, 2014

### Copper-Nickel Alloys (C70000 - C73499)

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

UNS #	Cu		Pb		Sn		Zn		Fe		Ni		Mn		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C70100*		Rem <sup>(1)(2)</sup>						0.25		0.05	3.0 <sup>(3)</sup>	4.0		0.50			active
C70200*		Rem <sup>(1)(2)</sup>		0.05						0.10	2.0 <sup>(3)</sup>	3.0		0.40			active
C70230*		Rem <sup>(2)(1)</sup>			0.10	0.50	0.50	2.0			2.2	3.2			0.40 Si	0.10 Ag <sup>(4)</sup> 0.8 Si	active
C70240*		Rem		0.05			0.30	0.8		0.10	1.0	4.0 <sup>(3)</sup>	0.01	0.20	0.01 Ag 0.40 Si	0.10 Ag 0.8 Si	active
C70250*		Rem <sup>(1)(2)</sup>		0.05				1.0		0.20	2.2	4.2 <sup>(3)</sup>		0.10	0.05 Mg 0.25 Si	0.30 Mg 1.2 Si	active
C70252* Copper Nickel NKC 388		Rem <sup>(2)(1)</sup>		0.05				1.0		0.20	3.0 <sup>(3)</sup>	4.2	0.11	0.20	0.05 Mg 0.40 Si	0.30 Mg 1.2 Si	active
C70260*		Rem <sup>(1)(2)</sup>									1.0	3.0 <sup>(3)</sup>			0.20 Si	0.01 P 0.7 Si	active
C70265*		Rem <sup>(2)(1)</sup>		0.05	0.05	0.8		0.30			1.0	3.0 <sup>(3)</sup>			0.20 Si	0.01 P 0.7 Si	active
C70270* <sup>(2)</sup>		Rem <sup>(1)</sup>		0.05	0.10	1.0		1.0	0.28	1.0	1.0	3.0 <sup>(3)</sup>		0.15	0.20 Si	1.0 Si	active
C70275* Copper Nickel Alloy MAX126		Rem		0.01	0.30	1.0	0.30	1.0		0.25	0.50	1.5			0.002 Mg 0.10 Si	0.01 Ca 0.06 Cr 0.20 Mg 0.50 Si	active
C70280*		Rem		0.02	1.0	1.5		0.30		0.015	1.3 <sup>(3)</sup>	1.7			0.02 P 0.22 Si	0.04 P 0.30 Si	active
C70290*		Rem		0.02	2.1	2.7		0.30		0.015	1.3 <sup>(3)</sup>	1.7			0.02 P 0.22 Si	0.04 P 0.30 Si	active

UNS #	Cu		Pb		Sn		Zn		Fe		Ni		Mn		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C70300* Copper Nickel Alloy		Rem <sup>(1)</sup>							0.05		4.7	5.7		0.05			inactive 07/74
C70310*		Rem		0.05		1.0		2.0	0.10		1.0	4.0 <sup>(3)</sup>			0.02 Ag 0.08 Si 0.005 Zr	0.05 P 0.50 Ag 0.10 Mg 1.0 Si 0.05 Zr	active
C70320 Copper Nickel		Rem <sup>(1)</sup>									2.5	5.0 <sup>(3)</sup>			0.20 Al 0.18 Cr 0.20 Si	1.2 Al 0.50 Cr 1.2 Si	inactive 03/92
C70350*		Rem		0.05				1.0	0.20		1.0	2.5		0.20	1.0 Co 0.50 Si	2.0 Co 0.04 Mg 1.2 Si	active
C70370*		Rem		0.05				1.0	0.20		1.0	2.0		0.20	0.20 Ag 1.0 Co 0.50 Si	0.70 Ag 2.0 Co 0.04 Mg 1.0 Si	active
C70400* Copper-Nickel, 5%		Rem <sup>(1)(2)</sup>		0.05				1.0	1.3	1.7	4.8 <sup>(3)</sup>	6.2	0.30	0.8			active
C70440 95/5 Copper-Nickel		Rem <sup>(1)(2)</sup>		0.05				1.0	1.0	1.8	4.5 <sup>(3)</sup>	6.0	1.0	1.5	0.35 Si	0.05 C 0.05 S 0.45 Si	inactive 03/92
C70500* Copper-Nickel, 7%		Rem <sup>(2)(1)</sup>		0.05				0.20	0.10		5.8 <sup>(3)</sup>	7.8		0.15			active
C70600* Copper-Nickel, 10%		Rem		0.05				1.0	1.0	1.8	9.0	11.0 <sup>(3)</sup>		1.0			active
C70610*		Rem <sup>(1)(2)</sup>		0.01					1.0	2.0	10.0 <sup>(3)</sup>	11.0	0.50	1.0		0.05 C 0.05 S	active
C70620*	86.5 <sup>(1)(2)</sup>			0.02				0.50	1.0	1.8	9.0	11.0 <sup>(3)</sup>		1.0		0.02 P 0.05 C 0.02 S	active
C70690*		Rem <sup>(1)(5)(2)</sup>		0.001				0.001	0.005		9.0 <sup>(3)</sup>	11.0		0.001			active
C70700*		Rem <sup>(1)(2)</sup>							0.05		9.5	10.5 <sup>(3)</sup>		0.50			active
C70800* Copper-Nickel, 11%		Rem <sup>(1)(2)</sup>		0.05				0.20	0.10		10.5 <sup>(3)</sup>	12.5		0.15			active
C70900* Copper Nickel		Rem <sup>(1)</sup>		0.05				1.0	0.6		13.5 <sup>(3)</sup>	16.5		0.6			inactive 03/92
C71000* Copper-Nickel, 20%		Rem <sup>(2)(1)</sup>		0.05				1.0	1.0		19.0 <sup>(3)</sup>	23.0		1.0			active
C71100*		Rem <sup>(1)(2)</sup>		0.05				0.20	0.10		22.0 <sup>(3)</sup>	24.0		0.15			active



UNS #	Cu		Pb		Sn		Zn		Fe		Ni		Mn		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C71110* Copper Nickel		Rem									21.5 <sup>(3)</sup>	23.5		0.35		0.008 S 0.05 Ti	inactive 03/92
C71300* <sup>(2)</sup>		Rem <sup>(1)</sup>		0.05				1.0		0.20	23.5 <sup>(3)</sup>	26.5		1.0			active
C71500* Copper-Nickel, 30%		Rem <sup>(2)(1)</sup>		0.05				1.0	0.40	1.0	29.0	33.0 <sup>(3)</sup>		1.0			active
C71520*	65.0 <sup>(1)(2)</sup>			0.02				0.50	0.40	1.0	29.0 <sup>(3)</sup>	33.0		1.0		0.02 P 0.05 C 0.02 S	active
C71580*		Rem <sup>(6)(1)(2)</sup>		0.05				0.05		0.50	29.0 <sup>(3)</sup>	33.0		0.30			active
C71581*		Rem <sup>(7)(2)(1)</sup>		0.02					0.40	0.7	29.0 <sup>(3)</sup>	32.0		1.0			active
C71590*		Rem <sup>(5)(1)</sup>		0.001		0.001		0.001		0.15	29.0 <sup>(3)</sup>	31.0		0.50			active
C71600* Copper Nickel Alloy		Rem <sup>(1)</sup>		0.05				1.0	4.8	5.8	29.0 <sup>(3)</sup>	33.0		1.0			inactive 05/71
C71630* Copper Nickel		Rem		0.01					0.40	1.0	30.0 <sup>(3)</sup>	32.0	0.50	1.5		0.06 C 0.08 S	inactive 03/92
C71640*		Rem <sup>(2)(8)(1)</sup>		0.05 <sup>(8)</sup>				1.0 <sup>(8)</sup>	1.7	2.3	29.0 <sup>(3)</sup>	32.0	1.5	2.5		0.06 C 0.03 S	active
C71700*		Rem <sup>(1)(2)</sup>						1.0	0.40	1.0	29.0 <sup>(3)</sup>	33.0		1.0	0.30 Be	0.7 Be	active
C71900		Rem <sup>(1)(2)</sup>		0.015				0.05		0.50	28.0 <sup>(3)</sup>	33.0	0.20	1.0	2.2 Cr 0.01 Ti 0.02 Zr	0.02 P 0.04 C 3.0 Cr 0.015 S 0.25 Si 0.20 Ti 0.35 Zr	active
C72000 Copper-Nickel Alloy		Rem		0.05				0.30	1.5	2.5	40.0	43.0 <sup>(3)</sup>	0.8	1.7			inactive 02/71
C72150		Rem <sup>(1)(2)</sup>		0.05				0.20		0.10	43.0 <sup>(3)</sup>	46.0		0.05		0.10 C 0.50 Si	active
C72200		Rem		0.05 <sup>(8)</sup>				1.0 <sup>(8)</sup>	0.50	1.0	15.0 <sup>(3)</sup>	18.0		1.0	0.30 Cr	0.7 Cr 0.03 Si 0.03 Ti	active
C72400 Copper Nickel		Rem <sup>(1)</sup>		0.05		0.05		0.50		0.10	11.0	15.0 <sup>(3)</sup>		1.0	1.5 Al 0.05 Mg	2.5 Al 0.40 Mg 1.0 Hg	inactive 03/92

UNS #	Cu		Pb		Sn		Zn		Fe		Ni		Mn		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C72420		Rem <sup>(1)(9)</sup>		0.02		0.10		0.20	0.7	1.2	13.5 <sup>(3)</sup>	16.5	3.5	5.5	1.0 Al	0.01 P 2.0 Al 0.05 C 0.50 Cr 0.05 Mg 0.15 S 0.15 Si	active
C72500*		Rem		0.05	1.8	2.8		0.50		0.6	8.5 <sup>(3)</sup>	10.5		0.20			active
C72600* Copper Nickel	91.0	93.0 <sup>(9)(1)</sup>			3.5	4.5		0.50		0.20	3.5 <sup>(3)</sup>	4.5		0.20		0.05 P	inactive 03/92
C72650*		Rem <sup>(9)(1)</sup>		0.01	4.5	5.5		0.10		0.10	7.0 <sup>(3)</sup>	8.0		0.10			active
C72660		Rem <sup>(2)</sup>		.02	4.5	5.5		.50		.50	7.0	8.0 <sup>(10)</sup>	.05	.30		.15 Mg	inactive
C72700*		Rem <sup>(9)(1)</sup>		0.02 <sup>(11)</sup>	5.5	6.5		0.50		0.50	8.5	9.5 <sup>(3)</sup>	0.05	0.30		0.15 Mg 0.10 Nb	active
C72800*		Rem <sup>(9)(1)</sup>		0.005	7.5	8.5		1.0		0.50	9.5 <sup>(3)</sup>	10.5	0.05	0.30	0.005 Mg 0.10 Nb	0.005 P 0.10 Al 0.001 B 0.001 Bi 0.15 Mg 0.0025 S 0.02 Sb 0.05 Si 0.01 Ti 0.30 Nb	active
C72900*		Rem <sup>(9)(1)</sup>		0.02 <sup>(11)</sup>	7.5	8.5		0.50		0.50	14.5	15.5 <sup>(3)</sup>		0.30		0.15 Mg 0.10 Nb	active
C72950*		Rem <sup>(9)(1)</sup>		0.05	4.5	5.7				0.6	20.0 <sup>(3)</sup>	22.0		0.6			active
C73100 Copper Zinc Nickel Alloy		Rem <sup>(1)(2)</sup>		0.05		0.10	18.0	22.0		0.10	4.0	6.0		0.50			active
C73150* Copper Nickel		Rem		0.10			9.0	15.0		0.25	4.0	7.0		0.50			inactive 03/92
C73200* Copper Nickel		Rem		0.05			3.0	6.0		0.6	19.0	23.0		1.0			inactive 03/92

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

(1) = Cu value includes Ag.

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

(3) = Ni value includes Co.

(4) = Ag Includes B

(5) = The following additional maximum limits shall apply: 0.02% C, 0.015% Si, 0.003% S, 0.002% Al, 0.001% P, 0.0005%Hg, 0.001% Ti, 0.001% Sb, 0.001% As, 0.001% Bi, 0.05% Co, 0.10% Mg and 0.005% Oxygen.

For C70690, Co shall be 0.02% max.

(6) = The following additional maximum limits shall apply: 0.07% C, 0.15% Si, 0.024% S, 0.05% Al and 0.03% P.

(7) = Includes 0.02% P, max.; 0.25% Si, max.; 0.01% S, max.; 0.02 - 0.50% Ti.

(8) = The following additional maximum limits shall apply: When the product is for subsequent welding applications and is so specified by the purchaser, 0.50% Zn, 0.02% P, 0.02% Pb, 0.02% S and 0.05% C.

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

(10) = Includes Co.

(11) = 0.005% Pb, max., for hot rolling.



# Application Datasheet

## Standard Designation for Wrought Copper Alloys

Revision Date: November 17, 2014

### Copper-Nickel-Zinc Alloys (Nickel Silvers) (C73500 - C79999)

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

UNS #	Cu		Pb		Zn		Fe		Ni		Mn		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C73500* Nickel Silver	70.5	73.5 <sup>(1)(2)</sup>		0.09		Rem		0.25	16.5	19.5 <sup>(3)</sup>		0.50			active
C73600 Copper Nickel Zinc Alloy	69.0 <sup>(2)</sup>	73.5		0.10		Rem		0.25							inactive 05/72
C73800* Copper Nickel	68.5 <sup>(2)</sup>	71.6		0.05		Rem		0.25	11.0	13.0		0.50			inactive 03/92
C74000* Copper Nickel Zinc Alloy	69.0	73.5		0.05		Rem		0.25	9.0	11.0 <sup>(3)</sup>		0.50			active
C74100 Copper Nickel Zinc Alloy		Rem <sup>(2)</sup>													inactive 11/74
C74200 Copper Nickel Zinc Alloy															inactive 11/74
C74300* Nickel Silver	63.0	66.0		0.09		Rem		0.25	7.0	9.0 <sup>(3)</sup>		0.50			active
C74400* Nickel Silver	62.0 <sup>(2)(4)</sup>	66.0		0.05		Rem		0.05	2.0	4.0 <sup>(3)</sup>					active
C74500* Nickel Silver, 65-10	63.5 <sup>(2)(1)</sup>	66.5		0.09 <sup>(5)</sup>		Rem		0.25	9.0	11.0 <sup>(3)</sup>		0.50			active
C75200* Nickel Silver, 65-18	63.0	66.5		0.05		Rem		0.25	16.5	19.5 <sup>(3)</sup>		0.50			active
C75400 Nickel Silver, 65-15	63.5	66.5		0.10		Rem		0.25	14.0	16.0 <sup>(3)</sup>		0.50			active
C75700* Nickel Silver, 65-12	63.5	66.5		0.05		Rem		0.25	11.0	13.0 <sup>(3)</sup>		0.50			active

UNS #	Cu		Pb		Zn		Fe		Ni		Mn		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C75720* Copper Nickel Zinc	60.0	65.0		0.04		Rem		0.25	11.0	13.0	0.05	0.30			inactive 03/92
C75900 Copper Nickel Zinc	60.0	65.0 <sup>(2)</sup>		0.10		Rem		0.25	17.0	19.0		0.50			inactive 03/92
C76000	60.0 <sup>(1)(2)</sup>	63.0		0.10		Rem		0.25	7.0 <sup>(3)</sup>	9.0		0.50			active
C76100 Copper Nickel Zinc	59.0 <sup>(2)</sup>	63.0		0.10		Rem		0.25	7.0	9.0		0.50			inactive 03/92
C76200 Nickel Silver	57.0	61.0		0.09		Rem		0.25	11.0	13.5 <sup>(3)</sup>		0.50			active
C76300 Copper Nickel Zinc	60.0	64.0 <sup>(2)</sup>	0.50	2.0		Rem		0.50	17.0	19.0		0.50			inactive 03/92
C76390 Copper Nickel Zinc	59.0	63.0 <sup>(2)</sup>	0.8	1.1		Rem		0.25	23.0	26.0		0.50	0.40 Sn	0.6 Sn	inactive 03/92
C76400* Nickel Silver	58.5	61.5		0.05		Rem		0.25	16.5	19.5 <sup>(3)</sup>		0.50			active
C76600 Copper Nickel Zinc	55.0 <sup>(2)</sup>	58.0		0.10		Rem		0.25	11.0	13.5		0.50			inactive 03/92
C76700 Nickel Silver, 56.5-15	55.0 <sup>(1)(2)</sup>	58.0				Rem			14.0 <sup>(3)</sup>	16.0		0.50			active
C76800 WNS7	47.5	50.0 <sup>(2)(1)</sup>		.09		Rem			8.0 <sup>(3)</sup>	9.5	4.5	6.5			inactive
C77000 Nickel Silver, 55-18	53.5	56.5 <sup>(1)(2)</sup>		0.05		Rem		0.25	16.5 <sup>(3)</sup>	19.5		0.50			active
C77010 Copper Nickel Zinc	54.0 <sup>(2)</sup>	56.0		0.03		Rem			17.0	19.0	0.05	0.35			inactive 03/92
C77100	52.0	56.0 <sup>(6)(1)</sup>		.03		Rem			9.0 <sup>(7)</sup>	12.0		.9			active
C77300	46.0	50.0 <sup>(2)(1)</sup>		0.05		Rem			9.0 <sup>(3)</sup>	11.0			0.04 Si	0.01 Al 0.25 Si	active
C77310 Copper Nickel Zinc	46.0	56.0		0.05		Rem			9.0	11.0		0.50	0.04 Si	0.01 Al 0.25 Si	inactive 03/92
C77400	43.0	47.0 <sup>(1)(2)</sup>		0.09		Rem			9.0 <sup>(3)</sup>	11.0					active
C77600	42.0	45.0		0.25		Rem		0.20	12.0	14.0 <sup>(3)</sup>		0.25		0.15 Sn	active
C78150 Replaced by C78270															inactive 12/07
C78200	63.0 <sup>(1)(2)</sup>	67.0	1.5	2.5		Rem		0.35	7.0	9.0 <sup>(3)</sup>		0.50			active
C78270 <sup>(1)</sup> Nickel Silver Nickel Silver	65.0 <sup>(2)</sup>	68.0	1.0	1.8		Rem		0.35	4.5	6.0 <sup>(3)</sup>		0.50			active
C78400 Copper Nickel Zinc Alloy	60.0 <sup>(2)</sup>	63.0	0.8	1.4		Rem		0.25	9.0	11.0		0.50			inactive 05/72
C78600 Copper Nickel Zinc Alloy	60.0	63.0 <sup>(2)</sup>	1.25	1.75		Rem		0.35	8.5	11.0		0.50			inactive 05/72

UNS #	Cu		Pb		Zn		Fe		Ni		Mn		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C78800 Copper Nickel Zinc	63.0	67.0 <sup>(2)</sup>	1.5	2.0		Rem		0.25	9.0	11.0		0.50			inactive 03/92
C79000 <sup>(1)</sup>	63.0 <sup>(2)</sup>	67.0	1.5	2.2		Rem		0.35	11.0 <sup>(3)</sup>	13.0		0.50			active
C79200	59.0	66.5	0.8	1.4		Rem		0.25	11.0	13.0 <sup>(3)</sup>		0.50			active
C79300 Copper Nickel Zinc	55.0	59.0	0.50	2.0		Rem		0.50	11.0	13.0		0.50			inactive 03/92
C79350	59.0	63.0	0.8	1.1		Rem		0.25	23.0 <sup>(3)</sup>	26.0		0.50	0.40 Sn	0.6 Sn	active
C79400 Copper Nickel Zinc Alloy	59.0	66.5	0.8	1.2		Rem		0.3	16.5	19.5		0.50			inactive 05/72
C79600 Leaded Nickel Silver, 10% Nickel Silver	43.5	46.5	0.8	1.2		Rem			9.0	11.0 <sup>(7)</sup>	1.5	2.5			active
C79620 Copper Nickel Zinc	46.0	48.0 <sup>(2)</sup>	0.50	2.0		Rem			8.0	11.0		0.50			inactive 03/92
C79800	45.5	48.5 <sup>(2)(1)</sup>	1.5	2.5		Rem		0.25	9.0 <sup>(3)</sup>	11.0	1.5	2.5			active
C79810 Copper Nickel Zinc	46.0	48.0	2.0	3.5		Rem			8.0	11.0		0.50			inactive 03/92
C79820 Copper Nickel Zinc	46.0	48.0	2.0	3.5		Rem			8.0	11.0		0.50			inactive 02/81
C79830	45.5	47.0	1.0	2.5		Rem		0.45	9.0 <sup>(3)</sup>	10.5	0.15	0.55			active
C79860	42.3	43.7 <sup>(8)(2)</sup>	1.3	1.8		Rem		0.20	11.8 <sup>(3)</sup>	12.7	5.6	6.4		0.10 Sn 0.06 Si	active
C79900 Copper Nickel Zinc	47.5	50.5	1.0	1.5		Rem		0.3	6.5	8.5 <sup>(3)</sup>		0.50			inactive 03/92

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

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

(2) = Cu value includes Ag.

(3) = Ni value includes Co.

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

(5) = 0.05% Pb, max., for rod, wire, and tube.

(6) = Includes Ag.

(7) = Includes Co.

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



# Application Datasheet

## Standard Designation for Cast Copper Alloys

Revision Date: November 17, 2014

### Coppers (C80000 - C81399)

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

UNS #	Cu		P		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	
C80100*	99.95 <sup>(1)</sup>						active
C80300* Copper Alloy	99.95 <sup>(1)</sup>				0.034 Ag	0.02 As	inactive 03/92
C80410*	99.9 <sup>(1)</sup>						active
C80500* Copper Alloy	99.75 <sup>(1)</sup>				0.034 Ag	0.02 B	inactive 03/92
C80700* Copper Alloy	99.75 <sup>(1)</sup>					0.02 B	inactive 03/92
C80900* Copper Alloy	99.70 <sup>(1)</sup>				0.034 Ag		inactive 03/92
C81100*	99.70 <sup>(1)</sup>						active
C81200*	99.9 <sup>(1)</sup>		0.045	0.065			active
C81300* Copper Alloy	98.5 <sup>(1)(2)</sup>				0.02 Be 0.6 Co	0.10 Be 1.0 Co	inactive 03/92

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

(1) = Cu value includes Ag.

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





# Application Datasheet

## Standard Designation for Cast Copper Alloys

Revision Date: November 17, 2014

### High Copper Alloys (C81400 - C83299)

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

UNS #	Cu		Pb		Sn		Zn		Fe		Ni		Al		Ag		Be		Co		Cr		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%		
C81400 Beryllium Copper 70C		Rem <sup>(1)</sup>															0.02	0.10			0.6	1.0						active
C81500 Chrome Copper		Rem <sup>(1)</sup>	0.02		0.10		0.10		0.10				0.10								0.40	1.5		0.15				active
C81540	95.1 <sup>(1)(2)</sup>		0.02		0.10		0.10		0.15	2.0	3.0 <sup>(3)</sup>		0.10								0.10	0.6	0.40	0.8				active
C81700* Copper Beryllium	94.2 <sup>(1)</sup>									0.25	1.5			0.8	1.2	0.30	0.55	0.25	1.5									inactive 03/92
C81800* Beryllium Copper 50C	95.6 <sup>(1)</sup>													0.8	1.2	0.30	0.55	1.4	1.7									inactive 03/92

UNS #	Cu		Pb		Sn		Zn		Fe		Ni		Al		Ag		Be		Co		Cr		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%		
C82000* Beryllium Copper 10C		Rem <sup>(1)</sup>		0.02		0.10		0.10		0.10		0.20 <sup>(4)</sup>		0.10				0.45	0.8	2.40 <sup>(4)</sup>	2.70		0.09		0.15			active
C82100* Copper Beryllium	95.5										0.25	1.5						0.35	0.8	0.25	1.5						inactive 03/92	
C82200* Beryllium Copper 30C		Rem <sup>(1)</sup>									1.0	3.0						0.35	0.8		0.30			0.15			active	
C82400* Beryllium Copper 165C		Rem <sup>(1)</sup>		0.02		0.10		0.10		0.20		0.20		0.15				1.60	1.85	0.20	0.65		0.09				active	
C82500* Beryllium Copper 20C		Rem <sup>(1)</sup>		0.02		0.10		0.10		0.25		0.20 <sup>(4)</sup>		0.15				1.90	2.25	0.35 <sup>(4)</sup>	0.70		0.09	0.20	0.35		active	
C82510* Beryllium Copper 21C		Rem <sup>(1)</sup>		0.02		0.10		0.10		0.25		0.20		0.15				1.90	2.15	1.0	1.2		0.09	0.20	0.35		active	
C82600* Beryllium Copper 245C		Rem <sup>(1)</sup>		0.02		0.10		0.10		0.25		0.20		0.15				2.25	2.55	0.35	0.65		0.09	0.20	0.35		active	
C82700* High Copper Alloy		Rem <sup>(1)</sup>		0.02		0.10		0.10		0.25	1.0	1.5		0.15				2.35	2.55				0.09		0.15		active	

UNS #	Cu		Pb		Sn		Zn		Fe		Ni		Al		Ag		Be		Co		Cr		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%		
C82800* Beryllium Copper 275C		Rem <sup>(1)</sup>		0.02		0.10		0.10		0.25		0.20 <sup>(4)</sup>		0.15				2.50	2.85	0.35 <sup>(4)</sup>	0.70		0.09	0.20	0.35			active

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

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

(2) = Cu value includes Ag.

(3) = Ni value includes Co.

(4) = Ni + Co.



# Application Datasheet

## Standard Designation for Cast Copper Alloys

- C83300-C83999: Copper-Tin-Zinc and Copper-Tin-Zinc-Lead Alloys (*Red and Leaded Red Brasses*)
- C84000-C84999: Copper-Tin-Zinc and Copper-Tin-Zinc-Lead Alloys (*Semi-Red and Leaded Semi-Red Brasses*)
- C85000-C85999: Copper-Zinc Alloys (*Yellow Brasses*)
- C86000-C86999: Manganese Bronze and Leaded Manganese Bronze Alloy (*High Strength Yellow Brasses*)
- C87000-C87999: Copper-Silicon Alloys (*Silicon Bronzes and Silicon Brasses*)
- C88000-C89999: Copper-Bismuth and Copper-Bismuth-Selenium Alloys

Revision Date: November 17, 2014

### Brasses (C83300 - C89999)

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

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		As		Bi		Mg		Mn		S		Sb		Si		Se		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%	Min%	Max%	Min%	Max%	Min%	Max%	
C83300	92.0 <sup>(1)(2)</sup>	94.0	1.0	2.0	1.0	2.0	2.0	6.0																											active
C83400	88.0	92.0		0.50		0.20	8.0	12.0		0.25		0.03 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005										0.08		0.25		0.005					active
C83410 Red Brass	88.0	91.0		0.10	1.0	2.0		Rem		0.05				0.05		0.005													0.005					inactive 03/92	
C83420 Red Brass	88.0 <sup>(1)(2)</sup>	92.0		0.50	0.25	0.7		Rem		0.10																								inactive 03/92	
C83450	87.0 <sup>(2)(1)</sup>	89.0	1.5	3.0	2.0	3.5	5.5	7.5		0.30		0.03 <sup>(3)</sup>	0.8	2.0 <sup>(4)</sup>		0.005										0.08		0.25		0.005				active	
C83460		Rem <sup>(5)(2)</sup>		.09	2.5	4.5	4.0	6.0	.50	1.0	.05	.10		1.0 <sup>(4)</sup>		.005									.15	.6	.25		.005					active	
C83470* Copper Tin Zinc Alloy	90.0	96.0 <sup>(2)(5)</sup>		0.09	3.0	5.0	1.0	3.0		0.50		0.10 <sup>(6)</sup>		1.0 <sup>(4)</sup>		0.01									0.20	0.6		0.20		0.01				active	
C83500	86.0 <sup>(1)(2)</sup>	88.0	3.5	5.5	5.5	6.5	1.0	2.5		0.25		0.03 <sup>(3)</sup>	0.50 <sup>(4)</sup>	1.0		0.005									0.08		0.25		0.005					active	
C83520 Red Brass		Rem	3.5	4.5	3.5	4.5				0.30				1.0																				inactive 03/92	

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		As		Bi		Mg		Mn		S		Sb		Si		Se		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%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%		
C83600 Ounce Metal	84.0	86.0 <sup>(2)(1)</sup>	4.0	6.0	4.0	6.0	4.0	6.0		0.30		0.05 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005										0.08		0.25		0.005								active
C83700 Red Brass	83.0	88.0		0.50		1.00		Rem		0.30		0.05		0.30		0.005	0.05	0.20												0.005								inactive 03/92
C83800 Hydraulic Bronze	82.0 <sup>(1)(2)</sup>	83.8	5.0	7.0	3.3	4.2	5.0	8.0		0.30		0.03 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005										0.08		0.25		0.005								active
C83810		Rem <sup>(1)(2)</sup>	4.0	6.0	2.0	3.5	7.5	9.5		0.50 <sup>(7)</sup>				2.0 <sup>(4)</sup>		0.005														0.10								active
C84000* Semi-Red Brass	82.0	89.0 <sup>(1)</sup>		0.09	2.0	4.0	5.0	14.0		0.40		0.05	0.50	2.0		0.005									0.01	0.10	0.65		0.02							0.10 B 0.10 Zr	active	
C84010* Semi-Red Brass	82.0 <sup>(1)</sup>	89.0		0.09	2.0	4.0	5.0	14.0		0.40		0.05	0.50	2.0		0.005							0.01	0.20	0.10	0.65		0.02							0.10 B 0.10 Zr	active		
C84020* Semi-Red Brass	82.0 <sup>(1)</sup>	89.0		0.09	2.0	4.0	5.0	14.0		0.40		0.05	0.50	2.0											0.20	0.10	0.65		0.02						0.10 B 0.10 C 0.10 Ti 0.10 Zr	active		
C84030 Low Lead Semi-Red Brass	82.0 <sup>(1)</sup>	89.0		0.09	2.0	4.0	5.0	14.0		0.40		0.05	0.50	2.0											0.20	0.10	0.65	0.10	1.5						0.10 B 0.10 C 0.10 Ti 0.10 Zr	active		
C84200	78.0	82.0 <sup>(1)(2)</sup>	2.0	3.0	4.0	6.0	10.0	16.0		0.40		0.05 <sup>(3)</sup>		0.8 <sup>(4)</sup>		0.005										0.08		0.25		0.005								active
C84400 Valve Metal	78.0 <sup>(1)(2)</sup>	82.0	6.0	8.0	2.3	3.5	7.0	10.0		0.40		0.02 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005										0.08		0.25		0.005								active
C84410		Rem <sup>(2)(1)</sup> <sub>(8)</sub>	7.0	9.0	3.0	4.5	7.0	11.0						1.0 <sup>(4)</sup>		0.01			0.05											0.2								active
C84500	77.0	79.0	6.0	7.5	2.0	4.0	10.0	14.0		0.40		0.02 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005										0.08		0.25		0.005								active
C84800 Plumbing Goods Brass	75.0	77.0	5.5	7.0	2.0	3.0	13.0	17.0		0.40		0.02 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005										0.08		0.25		0.005								active
C85200 Leaded Yellow Brass	70.0	74.0	1.5	3.8	0.7	2.0	20.0	27.0		0.6		0.02		1.0		0.005										0.05		0.20		0.05								active
C85210	70.0	75.0 <sup>(9)(2)</sup>	2.0	5.0	1.0	3.0		Rem		0.8				1.0		0.005	0.02	0.06												0.005								inactive

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		As		Bi		Mg		Mn		S		Sb		Si		Se		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%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%			
C85300 <sup>(10)</sup> Yellow Brass	68.0	72.0		0.50		0.50		Rem					0.50																										inactive 08/77
C85310 Yellow Brass	68.0	73.0	2.0	5.0		1.5		Rem		0.8					1.0	0.0	0.02	0.06																					inactive 03/92
C85400 No.1 Yellow Brass	65.0	70.0	1.5	3.8	0.50	1.5	24.0	32.0		0.7				1.0 <sup>(4)</sup>	0.35														0.05								active		
C85450* Copper Zinc Alloy	60.0 <sup>(5)</sup>	64.0		0.09	0.50	1.5		Rem	0.30	1.0				1.0 <sup>(4)</sup>	1.0								0.6														active		
C85470	60.0	65.0 <sup>(5)</sup>		.09	1.0	4.0		Rem	.20	.02	.25				.10	1.0																					active		
C85500	59.0 <sup>(2)(10)</sup>	63.0		0.20		0.20		Rem	0.20					0.20 <sup>(4)</sup>									0.20														active		
C85550* Low Silicon Brass	59.0	64.0 <sup>(5)</sup>		0.09		0.30		Rem	0.15					0.20 <sup>(11)</sup>	0.30													0.30	1.0							active			
C85560	60.0	64.0 <sup>(12)(5)</sup>	.10	.25	.20	.50		Rem <sup>(13)</sup>	.15					.20		.05	.20 <sup>(14)</sup>	.60	.90																		active		
C85600 Copper Zinc Alloy	59.0	63.0		0.20		0.20		Rem						0.20									0.20														inactive 02/82		
C85610 Yellow Brass	63.0	66.0	1.0	2.0	1.2	2.0		Rem	0.10	1.0				2.0																				1.0 Be	inactive 05/82				
C85700 Leaded Yellow Brass	58.0	64.0	0.8	1.5	0.50	1.5	32.0	40.0		0.7				1.0	0.8														0.05							active			
C85710 Yellow Brass	58.0	63.0	1.0	2.5		1.0		Rem	0.8					1.0	0.20	0.8							0.50						0.05							inactive 03/92			
C85800	57.0			1.5		1.5	31.0	41.0		0.50				0.50 <sup>(4)</sup>	0.55	0.05							0.25	0.05	0.05	0.25										active			
C85900* Yellow Brass	58.0	62.0		0.09		1.5	31.0	41.0		0.50				1.5	0.10	0.6							0.01	0.10	0.65	0.20		0.25						0.20 B 0.20 Zr	active				
C85910* Yellow Brass	58.0 <sup>(1)</sup>	62.0		0.09		1.5	31.0	41.0		0.50				1.5	0.10	0.6							0.01	0.20	0.10	0.65	0.20		0.25					0.20 B 0.20 Zr	active				

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		As		Bi		Mg		Mn		S		Sb		Si		Se		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%	Min%	Max%	Min%	Max%	Min%	Max%		
C85920* Yellow Brass	58.0	62.0 <sup>(1)</sup>		0.09		1.5	31.0	41.0		0.50				1.5	0.10	0.6										0.10	0.65		0.20		0.25				0.20 B 0.10 C 0.30 Ti 0.20 Zr	active
C85930 Low-Lead Yellow Brass	58.0 <sup>(1)</sup>	62.0		0.09		1.5	31.0	41.0		0.50				1.5	0.10	0.6										0.10	0.65	0.10	1.5		0.25				0.20 B 0.10 C 0.30 Ti 0.20 Zr	active
C86100 Manganese Bronze	66.0 <sup>(15)(2)</sup>	68.0		0.20		0.20		Rem	2.0	4.0					4.5	5.5							2.5	5.0												active
C86200	60.0 <sup>(15)(2)</sup>	66.0		0.20		0.20	22.0	28.0	2.0	4.0				1.0 <sup>(4)</sup>	3.0	4.9								2.5	5.0											active
C86300 Manganese Bronze	60.0	66.0 <sup>(15)(2)</sup>		0.20		0.20	22.0	28.0	2.0	4.0				1.0 <sup>(4)</sup>	5.0	7.5								2.5	5.0											active
C86350* Manganese Bronze Alloy	60.0	64.0		0.09		0.8		Rem		1.0				0.50 <sup>(4)</sup>	0.30	1.1						0.10	2.0	5.0												active
C86400 Manganese Bronze	56.0	62.0 <sup>(15)(2)</sup>	0.50	1.5	0.50	1.5	34.0	42.0	0.40	2.0				1.0 <sup>(4)</sup>	0.50	1.5								0.10	1.5											active
C86500 Manganese Bronze	55.0	60.0 <sup>(2)(15)</sup>		0.40		1.0	36.0	42.0	0.40	2.0				1.0 <sup>(4)</sup>	0.50	1.5								0.10	1.5											active
C86550	57.0 <sup>(2)(15)</sup>			0.50		1.0		Rem	0.7	2.0				1.0 <sup>(4)</sup>	0.50	2.5								0.10	3.0				0.10							active
C86700	55.0	60.0 <sup>(15)(2)</sup>	0.50	1.5		1.5	30.0	38.0	1.0	3.0				1.0 <sup>(4)</sup>	1.0	3.0								0.10	3.5											active
C86800	53.5	57.0 <sup>(15)(2)</sup>		0.20		1.0		Rem	1.0	2.5			2.5	4.0 <sup>(4)</sup>		2.0								2.5	4.0											active
C87200 Silicon Bronze	89.0			0.50		1.0		5.0		2.5		0.50			1.5														1.0	5.0						active
C87300* Silicon Bronze	94.0 <sup>(5)</sup>			0.09				0.25		0.20													0.8	1.5					3.5	4.5						active
C87400	79.0 <sup>(16)</sup>			1.0			12.0	16.0							0.8														2.5	4.0						active
C87410 Yellow Brass	79.0 <sup>(16)</sup>			1.0			12.0	16.0							0.8	0.03	0.06												2.5	4.0						inactive 03/92
C87420 Copper Silicon	79.0 <sup>(16)</sup>			1.0			12.0	16.0							0.8												0.03	0.06	2.5	4.0						inactive 03/92

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		As		Bi		Mg		Mn		S		Sb		Si		Se		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%	Min%	Max%	Min%	Max%	Min%	Max%	
C87430 Copper Silicon	79.0 <sup>(16)</sup>		1.0		12.0	16.0			0.03	0.06			0.8															2.5	4.0					inactive 03/92	
C87500* Coppe Silicon Alloy	79.0 <sup>(5)</sup>		0.09		12.0	16.0							0.50															3.0	5.0					active	
C87510	79.0		0.50		12.0	16.0							0.50	0.03	0.06													3.0	5.0					inactive	
C87520 Copper Silicon	79.0		0.50		12.0	16.0							0.50													0.03	0.06	3.0	5.0					inactive 03/92	
C87530 Copper Silicon	79.0		0.50		12.0	16.0			0.03	0.06			0.50															3.0	5.0					inactive 03/92	
C87600* Copper Silicon Alloy	88.0		0.09		4.0	7.0		0.20														0.25						3.5	5.5					active	
C87610* Cast Copper- Silicon	90.0 <sup>(5)</sup>		0.09		3.0	5.0		0.20														0.25						3.0	5.0					active	
C87700* Silicon Bronze Silicon Bronze	87.5 <sup>(16)</sup>		0.09	2.0	7.0	9.0		0.50		0.15		0.25															0.10	2.5	3.5					active	
C87710* Silicon Bronze Silicon Bronze	84.0 <sup>(16)</sup>		0.09	2.0	9.0	11.0		0.50		0.15		0.25															0.10	3.0	5.0					active	
C87800* Cast Silicon Bronze	80.0 <sup>(5)</sup>		0.09	0.25	12.0	16.0		0.15		0.01		0.20 <sup>(4)</sup>	0.15		0.05				0.01			0.15		0.05		0.05	3.8	4.2					active		
C87845* Copper- Silicon- Brass	75.0	78.0 <sup>(5)</sup>	0.02	0.10	Rem		0.10	0.03	0.06		0.20 <sup>(4)</sup>	0.09		0.015								0.10				0.015	2.5	2.9				0.015 Cr	active		
C87850* Copper Silicon Alloy	74.0 <sup>(5)</sup>	78.0	0.09	0.30	Rem		0.10	0.05	0.20		0.20 <sup>(4)</sup>											0.10				0.10	2.7	3.4					active		



UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		As		Bi		Mg		Mn		S		Sb		Si		Se		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%	Min%	Max%	Min%	Max%	Min%	Max%	
C87860	75.0 <sup>(5)</sup>	79.0	.09	.30		Rem		.10	.05	.20		.20 <sup>(4)</sup>											.10					2.7	3.5			.002 Zr	.030 Zr	active	
C87870	75.0	79.0 <sup>(5)</sup>	.09	.30	.7	16.0	23.0	.10	.05	.20		.20 <sup>(4)</sup>											.10					2.7	3.5			.030 Zr		active	
C87900 Copper Silicon	63.0		0.25	0.25	30.0	36.0		0.40		0.01		0.50		0.15		0.05							0.15		0.05	0.05	0.8	1.2						active	
C89320*	87.0 <sup>(5)</sup>	91.0	0.09	5.0	7.0		1.0		0.20		0.30		1.0 <sup>(4)</sup>	0.005			4.0	6.0							0.08	0.35	0.005							active	
C89325	84.0	88.0 <sup>(15)(17)</sup>	0.10	9.0	11.0		1.0		0.15		0.10		1.0 <sup>(4)</sup>	0.005			2.7	3.7							0.08	0.50	0.005							active	
C89510* SeBiLOY I (EnviroBrass I)	86.0 <sup>(5)</sup>	88.0	0.09	4.0	6.0	4.0	6.0		0.20		0.05		1.0 <sup>(4)</sup>	0.005			0.50	1.5 <sup>(18)</sup>							0.08	0.25	0.005	0.35 <sup>(18)</sup>	0.75					active	
C89520* SeBiLOY II (EnviroBrass II)	85.0	87.0 <sup>(5)</sup>	0.09	5.0	6.0	4.0	6.0		0.20				1.0 <sup>(4)</sup>	0.005			1.6 <sup>(19)</sup>	2.2							0.10	0.65	0.25		0.8	1.1 <sup>(19)</sup>					active
C89530 Copper- Bismuth- Selenium Alloy Brasses	84.0 <sup>(5)</sup>	89.0	0.20	3.5	6.0	7.0	9.0		0.30		0.05		1.0 <sup>(4)</sup>	0.01			1.0	2.0									0.20	0.01	0.10	0.30					active
C89535 Copper- Bismuth Alloy	84.0	89.0 <sup>(5)</sup>	0.25	2.5	5.5	5.0	9.0		0.30		0.40	0.30 <sup>(4)</sup>	1.0	0.01			0.8	2.0									0.20	0.01		0.50					active
C89537	84.0 <sup>(5)</sup>	86.0	.09	3.0	6.0	5.0	13.0		.50								.50	3.0	.01	.10							.6	1.2			.0005 B	.0020 B	active		
C89540	58.0	64.0 <sup>(5)</sup>	0.10		1.2	32.0	38.0		0.50				1.0 <sup>(4)</sup>	0.10	0.60		0.6	1.2												0.10					active
C89550* SeBiLOY III (EnviroBrass III)	58.0 <sup>(5)</sup>	64.0	0.09	0.00	1.2	32.0	38.0		0.50		0.01		1.0 <sup>(4)</sup>	0.10	0.6		0.6	1.2							0.05	0.05	0.25	0.01	0.10						active
C89560* Copper- Zinc- Bismuth	58.0 <sup>(5)</sup>	61.0	0.09		0.25		Rem		0.12					0.30	0.8		1.0	2.4														0.0003 B	0.0015 B 0.001 Cd	active	
C89570	58.0	63.0 <sup>(5)</sup>	.09	.20	1.5	35.0	38.0		.50	.05	.15	.15	.50 <sup>(4)</sup>	.10	1.0		.05	1.5													.0001 B	.0020 B	active		
C89580	57.0 <sup>(5)</sup>	64.0	.09		.50		Rem		.10				.30 <sup>(4)</sup>	.10	1.2		.10	1.0																active	

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		As		Bi		Mg		Mn		S		Sb		Si		Se		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%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C89720* Copper-Bismuth Alloy TECO	63.0 <sup>(5)</sup>		0.09	0.6	1.5	26.0	32.0		0.10		0.02		0.10 <sup>(4)</sup>	0.35	1.5			0.50	2.0				0.10			0.02	0.20	0.40	1.0				0.0005 B	0.01 B		active	
C89831	87.0 <sup>(15)</sup> (17)	91.0	0.10	2.7	3.7	2.0	4.0		0.30		0.050		1.0 <sup>(4)</sup>		0.005			2.7	3.7						0.08		0.25		0.005							active	
C89833* Copper Bismuth Alloy	86.0 <sup>(1)</sup>	91.0	0.09	4.0	6.0	2.0	6.0		0.30		0.050		1.0 <sup>(4)</sup>		0.005			1.7	2.7						0.08		0.25		0.005							active	
C89835* Federalloy III-932	85.0	89.0 <sup>(15)(17)</sup>	0.09	6.0	7.5	2.0	4.0		0.20		0.10		1.0 <sup>(4)</sup>		0.005			1.7	2.7						0.08		0.35		0.005							active	
C89836 Copper Bismuth Alloy	87.0 <sup>(5)</sup>	91.0	0.25	4.0	7.0	2.0	4.0		0.35		0.06		0.90 <sup>(4)</sup>		0.005			1.5	3.5						0.08		0.25		0.005							active	
C89837	84.0	88.0 <sup>(17)(15)</sup>	0.10	3.0	4.0	6.0	10.0		0.30		0.050		1.0 <sup>(4)</sup>		0.005			0.7	1.2						0.08		0.25		0.005							active	
C89841 Copper-Bismuth Alloy	73.0	77.0 <sup>(5)</sup>			0.30	18.0	23.0		0.10				0.20 <sup>(11)</sup>		0.01			0.50	1.0				0.10				0.10	2.8	3.4							active	
C89842* Copper-Zinc-Tin-Bismuth	78.0	82.0 <sup>(5)</sup>	0.09	2.0	3.0		Rem		0.30	0.005	0.02	0.10 <sup>(4)</sup>	0.50		0.005			1.5	2.5								0.05		0.005							active	
C89844	83.0	86.0 <sup>(1)</sup>	0.20	3.0	5.0	7.0	10.0		0.30		0.05		1.0 <sup>(4)</sup>		0.005			2.0	4.0						0.08		0.25		0.005							active	
C89845* Copper-Bismuth-Alloy	82.5	87.5 <sup>(5)</sup>	0.09	3.0	5.0	6.0	9.0		0.30		0.05	1.5 <sup>(4)</sup>	2.5		0.01			1.0	2.0								0.25		0.01							active	
C89940*	64.0	68.0 <sup>(5)</sup>	0.01	3.0	5.0	3.0	5.0	0.7	2.0	0.10	0.15	20.0 <sup>(4)</sup>	23.0		0.005			4.0	5.5				0.20		0.05		0.10		0.15							active	

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

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

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

(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) = For continuous castings, P shall be 1.0% max.

(7) = Fe + Sb + As shall be 0.50% max.

(8) = Fe + Sb + As shall be .8% max.

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

(10) = Cu + Sum of Named Elements, 99.1% min.

(11) = Includes Co.

(12) = Cu value includes Ag.

(13) = For optimum DZR properties , Zn should not exceed 38%.

(14) = P may be substituted for As.

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

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

(17) = 0.01 - 2.0% as any single or combination of Ce, La or other rare earth(x) elements, as agreed upon. (x)ASM International definition: one of the group of chemically similar metals with atomic numbers 57 through 71, commonly referred to as lanthanides

(18) = Experience favors Bi:Se  $\geq$  2:1

(19) = Bi:Se  $\geq$  2:1



# 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: November 17, 2014

### 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 <sup>(1)</sup> 91.0 <sup>(2)</sup>	94.0		0.30	6.0	8.0		0.50		0.20		0.05 <sup>(3)</sup>		0.50 <sup>(4)</sup>		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 <sup>(5)</sup>	90.0		.09	9.0	11.0			.30	.6		.05									.30	.6							active	
C90300 Tin Bronze	86.0	89.0 <sup>(1)(2)</sup>		0.30	7.5	9.0	3.0	5.0		0.20		0.05 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005						0.05		0.20		0.005			active	
C90400* Tin Bronze	86.0 <sup>(6)</sup>	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		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 <sup>(6)</sup>	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 <sup>(6)</sup> Low-Lead Tin Bronze	86.0	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 <sup>(7)(1)</sup>		0.30	9.0	11.0	1.0	3.0		0.20		0.05 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005						0.05		0.20		0.005			active
C90700 Tin Bronze, 65	88.0	90.0 <sup>(2)(1)</sup>		0.50	10.0	12.0		0.50		0.15		0.30 <sup>(3)</sup>		0.50 <sup>(4)</sup>		0.005						0.05		0.20		0.005			active
C90710		Rem <sup>(1)</sup> <sub>(2)</sub>		0.25	10.0	12.0		0.05		0.10	0.05 <sup>(3)</sup>	1.2		0.10 <sup>(4)</sup>		0.005						0.05		0.20		0.005			active
C90800 Tin Bronze	85.0	89.0 <sup>(2)(1)</sup>		0.25	11.0	13.0		0.25		0.15		0.30 <sup>(3)</sup>		0.50 <sup>(4)</sup>		0.005						0.05		0.20		0.005			active
C90810		Rem <sup>(2)</sup> <sub>(1)</sub>		0.25	11.0	13.0		0.30		0.15	0.15	0.8 <sup>(3)</sup>		0.50 <sup>(4)</sup>		0.005						0.05		0.20		0.005			active
C90900	86.0 <sup>(1)</sup> <sub>(2)</sub>	89.0		0.25	12.0	14.0		0.25		0.15		0.05 <sup>(3)</sup>		0.50 <sup>(4)</sup>		0.005						0.05		0.20		0.005			active
C91000	84.0 <sup>(2)</sup> <sub>(1)</sub>	86.0		0.20	14.0	16.0		1.5		0.10		0.05 <sup>(3)</sup>		0.8 <sup>(4)</sup>		0.005						0.05		0.20		0.005			active
C91100	82.0 <sup>(1)</sup> <sub>(2)</sub>	85.0		0.25	15.0	17.0		0.25		0.25		1.0 <sup>(3)</sup>		0.50 <sup>(4)</sup>		0.005						0.05		0.20		0.005			active
C91300	79.0	82.0 <sup>(2)(1)</sup>		0.25	18.0	20.0		0.25		0.25		1.0 <sup>(3)</sup>		0.50 <sup>(4)</sup>		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 <sup>(2)(1)</sup>		0.25	9.7	10.8		0.25		0.20		0.30 <sup>(3)</sup>	1.2	2.0 <sup>(4)</sup>		0.005						0.05		0.20		0.005			active
C91700 Nickel Gear Bronze	84.0 <sup>(2)</sup> <sub>(1)</sub>	87.0		0.25	11.3	12.5		0.25		0.20		0.30 <sup>(3)</sup>	1.2 <sup>(4)</sup>	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 <sup>(1)</sup> (6)	90.0	1.0	2.0	5.5	6.5	3.0	5.0		0.25		0.05 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005						0.05		0.25		0.005				active
C92210	86.0	89.0 <sup>(1)(6)</sup>	1.7	2.5	4.5	5.5	3.0	4.5		0.25		0.03 <sup>(3)</sup>	0.7	1.0 <sup>(4)</sup>		0.005						0.05		0.20		0.005				active
C92220 <sup>(6)</sup>	86.0	88.0	1.5	2.5	5.0	6.0	3.0	5.5		0.25		0.05 <sup>(3)</sup>	0.50 <sup>(4)</sup>	1.0																active
C92300 Leaded Tin Bronze	85.0 <sup>(6)</sup> (1)	89.0	0.30	1.0	7.5	9.0	2.5	5.0		0.25		0.05 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005						0.05		0.25		0.005				active
C92310		Rem <sup>(6)</sup> (1)	0.30	1.5	7.5	8.5	3.5	4.5						1.0 <sup>(4)</sup>		0.005				0.03						0.005				active
C92400	86.0 <sup>(1)</sup> (6)	89.0	1.0	2.5	9.0	11.0	1.0	3.0		0.25		0.05 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005						0.05		0.25		0.005				active
C92410		Rem <sup>(1)</sup> (6)	2.5	3.5	6.0	8.0	1.5	3.0		0.20				0.20 <sup>(4)</sup>		0.005				0.05				0.25		0.005				active
C92500	85.0	88.0 <sup>(6)(1)</sup>	1.0	1.5	10.0	12.0		0.50		0.30		0.30 <sup>(3)</sup>	0.8	1.5 <sup>(4)</sup>		0.005						0.05		0.25		0.005				active
C92600 <sup>(6)</sup>	86.0	88.5 <sup>(1)</sup>	0.8	1.5	9.3	10.5	1.3	2.5		0.20		0.03 <sup>(3)</sup>		0.7 <sup>(4)</sup>		0.005						0.05		0.25		0.005				active
C92610		Rem <sup>(1)</sup> (6)	0.30	1.5	9.5	10.5	1.7	2.8		0.15				1.0 <sup>(4)</sup>		0.005				0.03						0.005				active
C92700 Leaded Tin Bronze	86.0	89.0 <sup>(6)(1)</sup>	1.0	2.5	9.0	11.0		0.7		0.20		0.25 <sup>(3)</sup>		1.0 <sup>(4)</sup>		0.005						0.05		0.25		0.005				active
C92710		Rem <sup>(6)</sup> (1)	4.0	6.0	9.0	11.0		1.0		0.20		0.10 <sup>(3)</sup>		2.0 <sup>(4)</sup>		0.005						0.05		0.25		0.005				active
C92800	78.0 <sup>(6)</sup> (1)	82.0	4.0	6.0	15.0	17.0		0.8		0.20		0.05 <sup>(3)</sup>		0.8 <sup>(4)</sup>		0.005						0.05		0.25		0.005				active
C92810	78.0	82.0 <sup>(1)(6)</sup>	4.0	6.0	12.0	14.0		0.50		0.50		0.05 <sup>(3)</sup>	0.8	1.2 <sup>(4)</sup>		0.005						0.05		0.25		0.005				active
C92900	82.0	86.0 <sup>(6)(1)</sup>	2.0	3.2	9.0	11.0		0.25		0.20		0.50 <sup>(3)</sup>	2.8	4.0 <sup>(4)</sup>		0.005						0.05		0.25		0.005				active
C93100		Rem <sup>(6)</sup> (1)	2.0	5.0	6.5	8.5		2.0		0.25		0.30 <sup>(3)</sup>		1.0 <sup>(4)</sup>		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 <sup>(8)(1)</sup>	6.0	8.0	6.3	7.5	1.0	4.0		0.20		0.15 <sub>(3)</sub>		1.0 <sup>(4)</sup>		0.005						0.08		0.35		0.005				active
C93400	82.0 <sub>(8)</sub> <sup>(1)</sup>	85.0	7.0	9.0	7.0	9.0		0.8		0.20		0.50 <sub>(3)</sub>		1.0 <sup>(4)</sup>		0.005						0.08		0.50		0.005				active
C93500	83.0 <sub>(8)</sub> <sup>(1)</sup>	86.0	8.0	10.0	4.3	6.0		2.0		0.20		0.05 <sub>(3)</sub>		1.0 <sup>(4)</sup>		0.005						0.08		0.30		0.005				active
C93600	79.0	83.0 <sup>(6)</sup>	11.0	13.0	6.0	8.0		1.0		0.20		0.15 <sub>(3)</sub>		1.0 <sup>(4)</sup>		0.005						0.08		0.55		0.005				active
C93700 Bearing Bronze	78.0 <sup>(8)</sup>	82.0	8.0	11.0	9.0	11.0		0.8		0.7 <sup>(9)</sup>		0.10 <sub>(3)</sub>		0.50 <sub>(4)</sub>		0.005						0.08		0.50		0.005				active
C93720	83.0 <sup>(8)</sup>		7.0	9.0	3.5	4.5		4.0		0.7		0.10 <sub>(3)</sub>		0.50 <sub>(4)</sub>									0.50							active
C93800 Anti-acid Metal	75.0 <sup>(8)</sup>	79.0	13.0	16.0	6.3	7.5		0.8		0.15		0.05 <sub>(3)</sub>		1.0 <sup>(4)</sup>		0.005						0.08		0.8		0.005				active
C93900 79-6-15	76.5	79.5 <sup>(10)</sup>	14.0	18.0	5.0	7.0		1.5		0.40		1.5 <sup>(3)</sup>		0.8 <sup>(4)</sup>		0.005						0.08		0.50		0.005				active
C94000	69.0	72.0 <sup>(11)</sup>	14.0	16.0	12.0	14.0		0.50		0.25		0.05 <sub>(3)</sub>	0.50	1.0 <sup>(4)</sup>		0.005						0.08 <sub>(12)</sub>		0.50		0.005				active
C94100	72.0 <sup>(11)</sup>	79.0	18.0	22.0	4.5	6.5		1.0		0.25		0.50 <sub>(3)</sub>		1.0 <sup>(4)</sup>		0.005						0.08 <sub>(12)</sub>		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 <sup>(8)</sup>	23.0	27.0	4.5	6.0		0.8		0.15		0.08 <sub>(3)</sub>		1.0 <sup>(4)</sup>		0.005						0.08 <sub>(12)</sub>		0.8		0.005				active
C94310		Rem <sup>(8)</sup>	27.0	34.0	1.5	3.0		0.50		0.50		0.05 <sub>(3)</sub>	0.25	1.0 <sup>(4)</sup>										0.50						active
C94320		Rem <sup>(8)</sup>	24.0	32.0	4.0	7.0				0.35																				active
C94330	68.5 <sup>(8)</sup>	75.5	21.0	25.0	3.0	4.0		3.0		0.7		0.10 <sub>(3)</sub>		0.50 <sub>(4)</sub>										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%		Min%	Max%
C94400		Rem <sup>(8)</sup>	9.0	12.0	7.0	9.0		0.8		0.15		0.50 <sub>(3)</sub>		1.0 <sup>(4)</sup>		0.005						0.08		0.8		0.005					active
C94500		Rem <sup>(8)</sup>	16.0	22.0	6.0	8.0		1.2		0.15		0.05 <sub>(3)</sub>		1.0 <sup>(4)</sup>		0.005						0.08		0.8		0.005					active
C94700* Cast Nickel-Tin Bronze	85.0	90.0 <sup>(11)</sup>		0.09 <sub>(13)</sub>	4.5	6.0	1.0	2.5		0.25		0.05	4.5 <sup>(4)</sup>	6.0		0.005					0.20		0.05		0.15		0.005				active
C94800	84.0 <sup>(11)</sup>	89.0	0.30	1.0	4.5	6.0	1.0	2.5		0.25		0.05	4.5	6.0 <sup>(4)</sup>		0.005					0.20		0.05		0.15		0.005				active
C94900	79.0 <sup>(2)</sup>	81.0	4.0	6.0	4.0	6.0	4.0	6.0		0.30		0.05	4.0	6.0 <sup>(4)</sup>		0.005					0.10		0.08		0.25		0.005				active
C95200*	86.0 <sup>(8)</sup>									2.5	4.0					8.5	9.5														active
C95210*	86.0 <sup>(8)</sup>			0.05		0.10		0.50	2.5	4.0				1.0 <sup>(4)</sup>	8.5	9.5		0.05			1.0					0.25					active
C95220*		Rem <sup>(5)</sup>								2.5	4.0				2.5 <sup>(4)</sup>	9.5	10.5				0.50										active
C95300*	86.0 <sup>(8)</sup>									0.8	1.5					9.0	11.0														active
C95400*	83.0 <sup>(5)</sup>									3.0	5.0			1.5 <sup>(4)</sup>	10.0	11.5					0.50										active
C95410*	83.0 <sup>(5)</sup>									3.0	5.0			1.5	2.5 <sup>(4)</sup>	10.0	11.5				0.50										active
C95420*	83.5 <sup>(5)</sup>									3.0	4.3				0.50 <sub>(4)</sub>	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 <sup>(5)</sup>									3.0	5.0			3.0	5.5 <sup>(4)</sup>	10.0	11.5				3.5										active
C95510*	78.0 <sup>(14)</sup>					0.20		0.30	2.0	3.5				4.5	5.5 <sup>(4)</sup>	9.7	10.9				1.5										active
C95520*	74.5 <sup>(5)</sup>			0.03		0.25		0.30	4.0	5.5				4.2	6.0 <sup>(4)</sup>	10.5	11.5				1.5					0.15		0.20 Co 0.05 Cr			active
C95600*	88.0 <sup>(8)</sup>													0.25 <sub>(4)</sub>	6.0	8.0									1.8	3.2				active	
C95700*	71.0 <sup>(5)</sup>									2.0	4.0			1.5 <sup>(4)</sup>	3.0	7.0	8.5				11.0	14.0				0.10				active	
C95710*	71.0 <sup>(5)</sup>			0.05		1.0		0.50	2.0	4.0		0.05	1.5 <sup>(4)</sup>	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 <sup>(5)</sup>			0.03		0.10		0.10	1.5	3.5			3.0 <sup>(4)</sup>	6.0	6.0	8.0			12.0	15.0						0.10		0.09 Cr	active
C95800*	79.0 <sup>(5)</sup>			0.03					3.5 <sup>(15)</sup>	4.5			4.0	5.0 <sup>(15)</sup>	8.5	9.5			0.8	1.5						0.10			active
C95810* Cast Aluminum Bronze	79.0 <sup>(5)</sup>			0.09			0.50	3.5 <sup>(15)</sup>	4.5				4.0 <sup>(15)</sup>	5.0	8.5	9.5	0.05		0.8	1.5						0.10			active
C95820*	77.5 <sup>(16)</sup>			0.02		0.20	0.20	4.0	5.0				4.5	5.8 <sup>(4)</sup>	9.0	10.0				1.5						0.10			active
C95900*		Rem <sup>(5)</sup>						3.0	5.0					0.50 <sup>(4)</sup>	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.



# Application Datasheet

## Standard Designation for Cast Copper Alloys

Revision Date: November 17, 2014

### Copper-Nickel-Iron Alloys (Copper-Nickels) (C96000 - C96999)

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

UNS #	Cu		Pb		Fe		Ni		Be		C		Mn		Si		Nb		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C96200*		Rem <sup>(1)</sup>	0.01	1.0	1.8	9.0 <sup>(2)</sup>	11.0				0.10		1.5		0.50		1.0 <sup>(3)</sup>		0.02 P 0.02 S	active	
C96300*		Rem <sup>(1)</sup>	0.01	0.50	1.5	18.0	22.0 <sup>(2)</sup>				0.15	0.25	1.5		0.50	0.50	1.5		0.02 P 0.02 S	active	
C96400* 70-30 Copper Nickel		Rem <sup>(1)</sup>	0.01	0.25	1.5	28.0	32.0 <sup>(2)</sup>				0.15		1.5		0.50	0.50	1.5		0.02 P 0.02 S	active	
C96600*		Rem <sup>(1)</sup>	0.01	0.8	1.1	29.0	33.0 <sup>(2)</sup>	0.40	0.7				1.0		0.15						active
C96700*		Rem <sup>(1)</sup>	0.01	0.40	1.0	29.0	33.0 <sup>(2)</sup>	1.1	1.2			0.40	1.0		0.15			0.15 Ti 0.15 Zr	0.35 Ti 0.35 Zr	active	
C96800*		Rem <sup>(4)(1)</sup>	0.005		0.50	9.5 <sup>(2)</sup>	10.5					0.05	0.30		0.05	0.10	0.30	7.5 Sn 0.005 Mg	8.5 Sn 1.0 Zn 0.15 Mg	active	
C96900*		Rem <sup>(1)</sup>	0.02		0.50	14.5 <sup>(2)</sup>	15.5					0.05	0.30				0.10	7.5 Sn	8.5 Sn 0.50 Zn 0.15 Mg	active	
C96950*		Rem <sup>(1)</sup>	0.02		0.50	11.0 <sup>(2)</sup>	15.5					0.05	0.40		0.30		0.10	5.8 Sn	8.5 Sn 0.15 Mg	active	
C96970*		Rem <sup>(1)</sup>	0.02		0.50	8.5 <sup>(2)</sup>	9.5						0.30				0.10	5.5 Sn	6.5 Sn 0.50 Zn 0.15 Mg	active	

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

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

(2) = Ni value includes Co.

(3) = When product or casting is intended for subsequent welding applications, and so specified by the purchaser, the Nb content shall be 0.40% max.

(4) = The following additional maximum impurity limits shall apply: 0.10% Al, 0.001% B, 0.001% Bi, 0.005% P, 0.0025% S, 0.02% Sb, 0.01%Ti.



# Application Datasheet

## Standard Designation for Cast Copper Alloys

Revision Date: November 17, 2014

### Cast Copper Alloys: Nickel Silvers (C97000 - C97999)

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

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Al		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%	
C97300	53.0	58.0 <sup>(1)</sup>	8.0	11.0	1.5	3.0	17.0	25.0		1.5		0.05	11.0 <sup>(2)</sup>	14.0		0.005		0.50		0.08		0.35		0.15			active
C97400	58.0 <sup>(1)</sup>	61.0	4.5	5.5	2.5	3.5		Rem		1.5			15.5	17.0 <sup>(2)</sup>			0.50										active
C97600	63.0 <sup>(3)</sup>	67.0	3.0	5.0	3.5	4.5	3.0	9.0		1.5		0.05	19.0 <sup>(2)</sup>	21.5		0.005		1.0		0.08		0.25		0.15			active
C97800	64.0	67.0 <sup>(4)</sup>	1.0	2.5	4.0	5.5	1.0	4.0		1.5		0.05	24.0	27.0 <sup>(2)</sup>		0.005		1.0		0.08		0.20		0.15			active

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

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

(2) = Ni value includes Co.

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

(4) = Cu + Sum of Named Elements, 99.6% min.



# Application Datasheet

## Standard Designation for Cast Copper Alloys

Revision Date: November 17, 2014

### Copper-Lead Alloys (C98000 - C98999)

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

UNS #	Cu		Pb		Sn		Zn		Fe		P		Ni		Ag		Sb		Other Named Elements		Status
	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	Min%	Max%	
C98200		Rem <sup>(1)</sup>	21.0	27.0	0.6	2.0		0.50		0.7		0.10		0.50				0.50			active
C98400		Rem <sup>(1)</sup>	26.0	33.0		0.50		0.50		0.7		0.10		0.50		1.5		0.50			active
C98600	60.0	70.0	30.0	40.0		0.50				0.35					1.5						active
C98800	56.5 <sup>(2)</sup>	62.5	37.5 <sup>(3)</sup>	42.5		0.25		0.10		0.35		0.02			5.5 <sup>(3)</sup>						active
C98820		Rem	40.0	44.0	1.0	5.0				0.35											active
C98840		Rem	44.0	58.0	1.0	5.0				0.35											active

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

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

(2) = Cu value includes Ag.

(3) = Pb and Ag may be adjusted to modify alloy hardness.



# Application Datasheet

## Standard Designation for Cast Copper Alloys

Revision Date: November 17, 2014

### Special Alloys (C99000 - C99999)

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

UNS #	Cu		Pb		Sn		Fe		Ni		Al		Co		Mn		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%		
C99300* Incramet 800 Incramet 800		Rem <sup>(1)</sup>		0.02		0.05	0.40	1.0	13.5	16.5	10.7	11.5	1.0	2.0					0.02			active
C99350		Rem <sup>(1)</sup>		0.15				1.0	14.5 <sup>(2)</sup>	16.0	9.5	10.5				0.25			7.5 Zn	9.5 Zn	active	
C99400* Non-Dezincification Alloy		Rem <sup>(1)</sup>		0.09			1.0	3.0	1.0	3.5	0.50	2.0				0.50	0.50	2.0	0.50 Zn	5.0 Zn	active	
C99500* Special Alloys		Rem <sup>(1)</sup>		0.09			3.0	5.0	3.5	5.50	0.50	2.0				0.50	0.50	2.0	0.50 Zn	2.0 Zn	active	
C99600 Incramute 1 Incramute 1		Rem <sup>(1)</sup>		0.02		0.10		0.20		0.20	1.0	2.8		0.20	39.0	45.0		0.10		0.20 Zn 0.05 C	active	
C99700 White Manganese Brass	54.0 <sup>(1)</sup>			2.0		1.0		1.0	4.0	6.0	0.50	3.0			11.0	15.0			19.0 Zn	25.0 Zn	active	
C99710* Special Alloys	60.0 <sup>(3)(1)</sup>			0.09		1.0		1.0	4.0	6.0		1.0			11.0	15.0			19.0 Zn	25.0 Zn	active	

UNS #	Cu		Pb		Sn		Fe		Ni		Al		Co		Mn		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%	
C99720 Special Alloy	54.0	59.0 <sup>(4)</sup>		0.05	1.5	2.0	0.6	1.0	5.0	6.0	1.0	1.4			11.0	14.0		0.05	18.0 Zn 2.0 Bi	24.0 Zn 0.05 P 3.0 Bi	active
C99740 Special Alloy	55.0	60.0 <sup>(4)</sup>		0.05	1.5	2.0	0.6	1.0	5.0	6.0	1.0	1.4			11.0	14.0		0.05	17.0 Zn	23.0 Zn 0.1 P 4.0 Bi	active
C99750	55.0	61.0 <sup>(1)</sup>	0.50	2.5				1.0	5.0	0.25	3.0			17.0	23.0			17.0 Zn	23.0 Zn		active
C99760	61.0 <sup>(5)</sup>	67.0		0.09	0.20	1.0		0.6	8.0 <sup>(2)</sup>	12.0		0.6			10.0	16.0		0.05	8.0 Zn 0.10 Sb	14.0 Zn 0.05 P 0.10 C 0.25 S 1.0 Sb	active
C99761 White Alloy	58.0	64.0 <sup>(5)</sup>		0.09	0.20	1.5		0.6	8.0	10.0 <sup>(2)</sup>	0.10	2.0			8.0	12.0		0.05	16.0 Zn 0.10 Sb	21.0 Zn 0.05 P 0.10 C 0.25 S 1.0 Sb	active
C99770	66.0	70.0 <sup>(5)</sup>		0.09	0.20	1.0		0.6	3.0	6.0 <sup>(2)</sup>		0.6			10.0	16.0		0.05	8.0 Zn 0.10 Sb	14.0 Zn 0.05 P 0.10 C 0.25 S 1.0 Sb	active
C99771 White Alloy	62.0 <sup>(5)</sup>	70.0		0.09	0.20	1.5		0.6	2.0 <sup>(2)</sup>	4.0	0.01	2.0			8.0	12.0		0.05	16.0 Zn 0.10 Sb	21.0 Zn 0.05 P 0.10 C 0.25 S 1.0 Sb	active
C99780 Special Alloy	62.0 <sup>(4)</sup>	66.0		0.05	0.50	2.0		0.50	4.0	6.0	0.30	1.0			12.0	15.0		0.05	16.0 Zn 0.50 Bi	20.0 Zn 0.05 P 2.0 Bi	active

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

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

(2) = Ni value includes Co.

(3) = Cu value includes Ag.

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

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