



# Application Datasheet

## Standard Designation for Wrought Copper Alloys

Revision Date: May 23, 2017

### 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%		
C10100* Oxygen-Free-Electronic OFE	99.99 <sup>(1)(2)(3)</sup>			0.0005		0.0001		0.0010		0.0003				0.0025		0.0005				0.0005		0.0004		0.0002				active
C10200* Oxygen-Free OF	99.95 <sup>(4)(1)(5)</sup>																			0.0010							active	
C10300* Oxygen-Free Copper OFXLP	99.95 <sup>(5)(6)</sup>							0.001	0.005																		active	
C10400* Oxygen-Free with Ag OFS	99.95 <sup>(1)(5)(4)</sup>												0.027 <sup>(7)</sup>							0.0010							active	
C10500* Oxygen-Free with Ag OFS	99.95 <sup>(1)(5)(4)</sup>												0.034 <sup>(8)</sup>							0.001							active	
C10700* Oxygen-Free with Ag OFS	99.95 <sup>(5)(4)(1)</sup>												0.085 <sup>(9)</sup>							0.001							active	
C10800* OFLP	99.95 <sup>(6)(5)</sup>							0.005	0.012																		active	

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	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>(5)</sup>																								0.001 Bi	inactive 03/11		
C10910*	99.95 <sup>(10)(5)</sup>																		0.005								active	
C10920*	99.90 <sup>(5)</sup>																		0.02								active	
C10930*	99.90 <sup>(5)</sup>												0.044 <sup>(11)</sup>						0.02								active	
C10940*	99.90 <sup>(5)</sup>												0.085 <sup>(9)</sup>						0.02								active	
C11000* Electrolytic Tough Pitch ETP	99.90 <sup>(12)(10)(5)</sup>																										active	
C11010* Remelted High Conductivity RHC	99.90 <sup>(5)(12)(10)</sup>																										active	
C11020* Fire-Refined High Conductivity FRHC	99.90 <sup>(10)(12)(5)</sup>																										active	
C11025* Fire Refined High Conductivity FRHC	99.90 <sup>(13)(14)(5)</sup>		0.0150	0.0450		0.0080		0.0020						0.0150		0.0010				0.0100	0.0400			0.0050		0.0010		active
C11030* Chemically Refined Tough Pitch CRTP	99.90 <sup>(5)(10)(12)</sup>																										active	
C11040*	99.90 <sup>(15)(16)(10)</sup>			0.0005				0.0010						0.0025		0.0005				0.0100	0.0650			0.0004		0.0002		active
C11045* ETP ETP	99.90 <sup>(17)(5)</sup>			0.0005				0.0010						0.0025		0.0005				0.0100	0.0650			0.0004		0.0002		active
C11080 Replaced by C13100	99.8 <sup>(5)</sup>																										inactive 03/92	
C11100* Electronic Tough Pitch, Anneal Resistant ETP	99.90 <sup>(18)(5)(10)</sup>																										active	
C11300* Tough Pitch with Ag STP	99.90 <sup>(5)(12)(10)</sup>													0.027 <sup>(7)</sup>													active	

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	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%		
C11400* Tough Pitch with Ag STP	99.90 <sup>(12)(5)(10)</sup>													0.034 <sup>(8)</sup>														active
C11500* Tough Pitch with Ag STP	99.90 <sup>(12)(10)(5)</sup>													0.054 <sup>(19)</sup>														active
C11600* Tough Pitch with Ag STP	99.90 <sup>(10)(5)(12)</sup>													0.085 <sup>(9)</sup>														active
C11700*	99.9 <sup>(5)(20)</sup>								0.04							0.004	0.02											active
C11900* Copper Alloy	99.93 <sup>(5)</sup>							0.002	0.010																			inactive 02/73
C11904* Copper Alloy	99.90 <sup>(5)</sup>													0.027 <sup>(21)</sup>														inactive 03/92
C11905* Copper Alloy	99.90 <sup>(5)</sup>													0.034 <sup>(8)</sup>														inactive 03/92
C11906	99.90													0.054														inactive
C11907* Copper Alloy	99.90 <sup>(5)</sup>													0.085 <sup>(9)</sup>														inactive 03/92
C12000* Phosphorus- Deoxidized, Low Residual P DLP	99.90 <sup>(5)</sup>							0.004	0.012																			active
C12100* Phosphorus- Deoxidized, Low Residual P DLPS	99.90 <sup>(5)</sup>							0.005	0.012					0.014 <sup>(22)</sup>														active
C12200* Phosphorus- Deoxidized, High Residual P DHP	99.9 <sup>(23)(5)</sup>							0.015	0.040																			active
C12210*	99.90 <sup>(5)</sup>							0.015	0.025																			active
C12220*	99.9 <sup>(5)</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>(5)</sup>								0.015	0.040				0.014 <sup>(22)</sup>													active	
C12500* Fire-Refined Tough Pitch FRTP	99.88 <sup>(5)</sup>			0.004												0.012									0.025 <sup>(24)</sup>	0.050 Ni 0.003 Bi	active	
C12510*	99.9 <sup>(5)</sup>			0.020		0.080		0.05		0.03														0.003	0.025 <sup>(24)</sup>	0.05 Sn 0.050 Ni 0.005 Bi	active	
C12600	99.5 <sup>(5)</sup>								0.20	0.40																	active	
C12700* Copper Alloy	99.88 <sup>(5)</sup>			0.004									0.027 <sup>(21)</sup>		0.012										0.003	0.025 <sup>(24)</sup>	0.050 Ni 0.003 Bi	inactive 03/92
C12800* Copper Alloy	99.76 <sup>(5)</sup>			0.004									0.034 <sup>(8)</sup>		0.012										0.003	0.025 <sup>(24)</sup>	0.050 Ni 0.003 Bi	inactive 03/92
C12900* Fire-Refined Tough Pitch with Ag FRSTP	99.88 <sup>(5)</sup>			0.004										0.054 <sup>(19)</sup>		0.012									0.003	0.025 <sup>(25)</sup>	0.050 Ni 0.003 Bi	active
C13000 Copper Alloy	99.88 <sup>(5)</sup>			0.004									0.085 <sup>(9)</sup>		0.012										0.003	0.025 <sup>(24)</sup>	0.05 Ni 0.003 Bi	inactive 03/92
C13100*	99.8 <sup>(5)</sup>																										active	
C13150* Copper	99.5 <sup>(5)</sup>																										active	
C13400* Copper Alloy	99.99 <sup>(5)</sup>									0.0005			0.027 <sup>(21)</sup>														inactive 12/72	
C13500* Copper Alloy	99.99 <sup>(5)</sup>									0.0005			0.034 <sup>(8)</sup>														inactive 12/72	
C13600* Copper Alloy	99.99 <sup>(5)</sup>									0.0005			0.054 <sup>(19)</sup>														inactive 12/72	
C13700* Copper Alloy	99.99 <sup>(5)</sup>									0.0005			0.085 <sup>(9)</sup>														inactive 12/72	
C14100* Copper Alloy	99.40 <sup>(5)</sup>														0.15	0.50											inactive 07/74	
C14180*	99.90 <sup>(5)</sup>			0.02						0.075		0.01															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%		
C14181*	99.90 <sup>(5)</sup>			0.002		0.002				0.002																0.005 C 0.002 Cd	active	
C14200* Phosphorus-Deoxidized, Arsenical DPA	99.4 <sup>(5)</sup>								0.015	0.040					0.15	0.50												active
C14210* Copper Alloy	99.20 <sup>(5)</sup>								0.013	0.050					0.30	0.50												inactive 03/92
C14300* Cadmium Copper, Deoxidized	99.90 <sup>(5)(26)</sup>																								0.05 Cd	0.15 Cd	active	
C14310* Cadmium Copper	99.90 <sup>(5)(26)</sup>																								0.10 Cd	0.30 Cd	inactive 03/92	
C14400* Copper Alloy	99.90 <sup>(5)</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>(27)(5)</sup>			0.05				0.05	0.005	0.020															0.10 Sn	0.20 Sn	active	
C14415* Copper Alloy	99.96 <sup>(27)</sup>																								0.10 Sn	0.15 Sn	active	
C14420* Copper Alloy	99.90 <sup>(5)(28)</sup>																						0.005	0.05	0.04 Sn	0.15 Sn	active	
C14425* Copper Copper	99.97 <sup>(29)(5)</sup>			0.10		0.10		0.020		0.010															0.25 Sn	0.35 Sn <sup>(30)</sup> 0.020 Ni	active	
C14430* Copper Alloy		Rem <sup>(5)</sup>																							0.25 Sn	0.35 Sn	inactive 03/92	
C14440* Copper Alloy	99.96 <sup>(5)</sup>																								0.005 Sn	0.01 Sn	inactive 03/92	
C14500* Tellurium-Bearing PTE	99.90 <sup>(31)(32)(5)</sup>								0.004	0.012													0.40	0.7			active	
C14510* Tellurium-Bearing	99.85 <sup>(31)(5)</sup>			0.05					0.010	0.030													0.30	0.7			active	
C14520* Phosphorus-Deoxidized, Tellurium-Bearing DPTE	99.90 <sup>(31)(5)</sup>								0.004	0.020													0.40	0.7			active	
C14530* Copper Alloy	99.90 <sup>(33)</sup>								0.001	0.010															0.003 <sup>(34)</sup> Sn	0.023 Sn	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%		
C14700* Sulfur-Bearing	99.90 <sup>(5)(35)(32)</sup>								0.002 <sup>(35)</sup>	0.005 <sup>(35)</sup>																0.20 S	0.50 S <sup>(35)</sup>	active
C14710* Copper Alloy	99.90 <sup>(32)(36)</sup>			0.05 <sup>(36)</sup>					0.010 <sup>(36)</sup>	0.030 <sup>(36)</sup>																0.05 S	0.15 S <sup>(36)</sup>	inactive 03/92
C14720 Copper Alloy	99.50 <sup>(35)(32)(5)</sup>			0.1					0.010	0.030 <sup>(35)</sup>																0.20 S <sup>(35)</sup>	0.50 S	inactive 03/92
C14730 Sulfur Bearing Copper	99.80 <sup>(5)</sup>																											inactive 03/92
C14750* High Copper Alloy		Rem <sup>(5)(37)</sup>								0.012																0.05 Mn 0.20 S	0.50 Mn 0.50 S	active
C15000* Zirconium Copper		Rem <sup>(5)(38)</sup>																								0.10 Zr	0.20 Zr	active
C15100* Copper Alloy	99.80 <sup>(38)(5)</sup>																									0.05 Zr	0.15 Zr	active
C15150* Copper Alloy	99.90 <sup>(5)</sup>																									0.015 Zr	0.030 Zr	active
C15500* Copper Alloy	99.75 <sup>(5)</sup>								0.040	0.080			0.027	0.10 <sup>(21)</sup>												0.08 Mg	0.13 Mg	active
C15600* Copper Alloy	99.6 <sup>(5)</sup>								0.06	0.09																0.20 Co	0.30 Co 0.02 Mg	inactive 03/92
C15650* MA5J Copper	99.9 <sup>(5)</sup>								0.015	0.040																0.04 Co	0.06 Co	active
C15710* Copper Alloy	99.71 <sup>(5)</sup>			0.01				0.01			0.08	0.12								0.07	0.15							inactive 03/92
C15715* Dispersion Strengthened Alloy	99.62 <sup>(5)</sup>			0.01				0.01			0.13	0.17 <sup>(39)</sup>								0.12 <sup>(39)</sup>	0.19							active
C15720* Dispersion Strengthened Alloy	99.52 <sup>(5)</sup>			0.01				0.01			0.18 <sup>(39)</sup>	0.22								0.16	0.24 <sup>(39)</sup>							active
C15725* Dispersion Strengthened Alloy	99.43 <sup>(5)</sup>			0.01				0.01			0.23 <sup>(39)</sup>	0.27								0.20 <sup>(39)</sup>	0.28							active
C15730* Copper Alloy	98.94 <sup>(5)</sup>							0.04			0.26	0.34 <sup>(39)</sup>					0.22			0.32 <sup>(39)</sup>	0.46							active

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	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%		
C15735* Copper Alloy	99.24 <sup>(5)</sup>			0.01				0.01				0.33	0.37						0.29	0.37								inactive 03/92
C15750* Dispersion Strengthened Copper C3/60	98.56 <sup>(5)</sup>							0.04				0.42 <sub>(39)</sub>	0.50					0.22	0.52	0.68 <sub>(39)</sub>								active
C15760* Dispersion Strengthened Alloy	98.77 <sup>(5)</sup>			0.01				0.01				0.58 <sub>(39)</sub>	0.62						0.52	0.59 <sub>(39)</sub>								active
C15780* Copper Alloy	98.10 <sup>(5)</sup>							0.04				0.66 <sub>(39)</sub>	0.74					0.22	0.76 <sub>(39)</sub>	0.90								active
C15790* Copper Alloy	97.68 <sup>(5)</sup>							0.04				0.88 <sub>(39)</sub>	0.96					0.22	0.96 <sub>(39)</sub>	1.10								active
C15815* Dispersion Strengthened Alloy	97.82 <sup>(5)</sup>			0.01				0.01				0.13	0.17 <sub>(39)</sub>				1.2	1.8		0.19 <sub>(39)</sub>								active
C15900* Dispersion Strengthened Coper C3/11	97.51 <sup>(5)</sup>							0.04				0.76	0.84 <sub>(39)</sub>						0.40 <sub>(39)</sub>	0.54					0.27 C 0.66 Ti	0.33 C 0.74 Ti	active	

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- (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) = Cu is determined by the difference between the impurity total and 100 %. For alloy C10100 the Cu value is exclusive of Ag.
- (3) = The following additional impurity maximum limits shall apply: Bi 1ppm (0.0001%); Cd 1ppm (0.0001%); Mn 0.5ppm (0.00005%); Ni 10ppm (0.0010%); Se 3ppm (0.0003%); S 15ppm (0.0015%); Sn 2ppm (0.0002).
- (4) = Cu is determined by the difference between the impurity total and 100%.
- (5) = Cu value includes Ag.
- (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) = The following additional maximum limits shall apply: Se 10 ppm (0.0010%); Bi 5 ppm (0.0005%); Sn 150 ppm (0.0150%); Ni 150 ppm (0.0150%); S 20 ppm (0.0020%); Cd 100 ppm (0.0100%).
- (14) = The total maximum allowable of named elements is 750 ppm (0.0750%) not including oxygen.
- (15) = Cu value is exclusive of Ag
- (16) = 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%); Ni 10ppm (0.0010%); S 15ppm (0.0015%). The total maximum allowable of named elements is 65 ppm (0.0065%) - does not include oxygen.
- (17) = These total maximum limits shall apply; Se 2ppm(0.0002%); Bi 0.5ppm (0.00005%); Sn 5 ppm (0.0005%); Ni 10ppm (0.0010%); S 15 ppm (0.0015%).
- (18) = Small amounts of Cd or other elements may be added by agreement to improve the resistance to softening at elevated temperatures.
- (19) = Ag 0.054% min is the equivalent of, Ag 16 Troy Oz min.
- (20) = Includes B + P.
- (21) = Ag 0.027 - 0.10% min is the equivalent of, Ag 8 - 30 Troy Oz min.
- (22) = Ag 0.014% min is the equivalent of, Ag 4 Troy Oz min.
- (23) = This includes oxygen-free Cu which contains P in an amount agreed upon.
- (24) = 0.025 Te + Se.
- (25) = Includes Te + Se.
- (26) = Includes Cd. Deoxidized with Li or other suitable elements as agreed upon.
- (27) = Includes Cu + Ag + Sn.
- (28) = Includes Te + Sn.
- (29) = Cu + Sum of Named Elements, 99.97% Min.
- (30) = Includes Co.
- (31) = Includes Te + P.
- (32) = Includes oxygen-free or deoxidized grades with deoxidizers (such as phosphorus boron lithium or others in an amount agreed upon).
- (33) = Includes Ag + Sn + Te + Se
- (34) = Tellurium and/or Selenium
- (35) = Includes Cu + S + P.
- (36) = Includes Ag, S, P, and Pb
- (37) = Cu + Sum of Named Elements 99.8% min.
- (38) = Cu + Sum of Named Elements 99.9% min.
- (39) = 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.