

**CDA101 (Oxygen-Free-Electronic)****US EPA Registered Antimicrobial**

Chemical Composition

(%max., unless shown as range or min.)

	Cu⁽¹⁾	Sb	As	O	P	Te
Min. /Max.	99.99 min	.0004	.0005	.0005	.0003	.0002
Nominal	-	-	-	-	-	-

(1) Cu is determined by the difference between the impurity total and 100%. The Cu value is exclusive of Ag.

Note: The following additional maximum limits shall apply: Bi, 1ppm (.0001%); Cd, 1ppm (.0001%); Fe, 10ppm (.0010%); Pb, 5ppm (.0005%); Mn, 0.5ppm (.00005%); Ni, 10ppm (.0010%); Se, 3ppm (.0003%); Ag, 25ppm (.0025%); S, 15ppm (.0015%); Sn, 2ppm (.0002%); Zn, 1ppm (.0001%).

Note: 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.

Applicable Specifications

Product	Specification
Bar	ASTM B152, F68
Bar, Bus	ASTM B187
Foil, Printed Circuits	ASTM B451, F68
Pipe, Bus	ASTM B188
Plate	ASTM B152, F68
Plate, Clad	ASTM B432
Rod	ASTM F68
Rod, Bus	ASTM B187
Shapes	ASTM F68
Shapes, Bus	ASTM B187
Sheet	ASTM B152, F68
Sheet, Printed Circuits	ASTM B451, F68
Strip	ASTM B152, B272, F68
Strip, Printed Circuits	ASTM B451, F68
Tube, Bus	ASTM B188
Tube, Finned	ASTM B359
Tube, Rectangular Waveguide	ASTM F68, MILITARY MIL-W-85
Tube, Seamless	ASTM B641, B75, F68
Tube, Welded	ASTM B447, B641
Tube, Welded for Air Conditioning and Refrigeration Service	ASTM B640
Wire, Medium-Hard Drawn	ASTM B2, F68
Wire, Coated With Lead Alloy	ASTM B189
Wire, Coated With Nickel	ASTM B355
Wire, Coated With Silver	ASTM B298
Wire, Coated With Tin	ASTM B246, B33
Wire, Hard Drawn	ASTM B1, B272, F68, FEDERAL QQ-W-343
Wire, Soft	AMS 4700, ASTM B3, B48, F68
Wire, Stranded	ASTM B172, B173, B8, B496, B470, B286, B226, B174, FEDERAL QQ-B-575

**Common Fabrication Processes**

Blanking, Coining, Coppersmithing, Drawing, Etching, Forming and Bending, Heading and Upsetting, Hot Forging and Pressing, Piercing and Punching, Roll Threading and Knurling, Shearing, Spinning, Squeezing and Swaging, Stamping

Fabrication Properties

Joining Technique	Suitability
Soldering	Excellent
Brazing	Excellent
Oxyacetylene Welding	Fair
Gas Shielded Arc Welding	Good
Coated Metal Arc Welding	Not Recommended
Spot Weld	Not Recommended
Seam Weld	Not Recommended
Butt Weld	Good
Capacity for Being Cold Worked	Excellent
Capacity for Being Hot Formed	Excellent
Forgeability Rating	65
Machinability Rating	20

Mechanical Properties (measured at room temperature, 68 F (20 C))

Temper	Section Size	Cold Work %	Temp Min	Tensile Strength	Yield Strength (0.5% ext. under load)	Yield Strength (0.2% offset)	Yield Strength (0.05% offset)	Rockwell Hardness	Vickers Hard.	Brinell Hard.	Shear Strength	Fatigue Strength*	Izod Impact Strength
	in. mm.	%	F C	ksi MPa	ksi MPa	ksi MPa	ksi MPa	% B CF 30T500			ksi MPa	ksi MPa	ft-lb J
Flat Products													
H02	0.04	0	TYP 68	42	36	-	-	1440- 8450	-	-	26	13	0.0
	1		20	290	248	-	-	1440- 8450	-	-	179	90	0.0
M20	0.025	0	TYP 68	32	10	-	-	50- 40-	-	-	22	-	0.0
	0.64		20	221	69	-	-	50- 40-	-	-	152	-	0.0
Rod													
M20	1	0	TYP 68	32	10	-	-	55- 40-	-	-	22	-	0.0
	25.4		20	221	69	-	-	55- 40-	-	-	152	-	0.0
Shapes													
M30	0.5	0	TYP 68	32	10	-	-	50- 40-	-	-	22	-	0.0
	12.7		20	221	69	-	-	50- 40-	-	-	152	-	0.0
M20	0.5	0	TYP 68	32	10	-	-	50- 40-	-	-	22	-	0.0
	12.7		20	221	69	-	-	50- 40-	-	-	152	-	0.0
Flat Products													
H04	0.04	0	TYP 68	50	45	-	-	6 50- 9057	-	-	28	-	0.0
	1		20	345	310	-	-	6 50- 9057	-	-	193	-	0.0
Rod													
H04	0.25	40	TYP 68	55	50	-	-	1060- 94-	-	-	29	-	0.0
	6.35		20	379	345	-	-	1060- 94-	-	-	200	-	0.0
Wire													
OS050	0.08	0	TYP 68	35	-	-	-	35- - - -	-	-	24	-	0.0
	2		20	241	-	-	-	35- - - -	-	-	165	-	0.0
Flat Products													
H08	0.04	0	TYP 68	55	50	-	-	4 60- 9463	-	-	29	14	0.0
	1		20	379	345	-	-	4 60- 9463	-	-	200	97	0.0
H01	0.025	0	TYP 68	38	30	-	-	3525- 70-	-	-	25	-	0.0
	0.64		20	262	207	-	-	3525- 70-	-	-	172	-	0.0
Rod													
OS050	1	0	TYP 68	32	10	-	-	55- 40-	-	-	22	-	0.0
	25.4		20	221	69	-	-	55- 40-	-	-	152	-	0.0
Wire													
H08	0.08	0	TYP 68	66	-	-	-	1 - - - -	-	-	33	-	0.0
	2		20	455	-	-	-	1 - - - -	-	-	228	-	0.0
Flat Products													
H04	1	0	TYP 68	45	40	-	-	2045- 85-	-	-	26	-	0.0
	25.4		20	310	276	-	-	2045- 85-	-	-	179	-	0.0
OS050	0.025	0	TYP 68	32	10	-	-	50- 40-	-	-	22	-	0.0
	0.64		20	221	69	-	-	50- 40-	-	-	152	-	0.0
H00	0.025	0	TYP 68	36	28	-	-	4010- 60-	-	-	25	-	0.0
	0.64		20	248	193	-	-	4010- 60-	-	-	172	-	0.0
Rod													
H04	2	16	TYP 68	45	40	-	-	2045- 85-	-	-	26	-	0.0



	51		20	310	276	-	-	2045- 85-	-	-	-	179	-	0.0
H04	1	35	TYP 68	48	44	-	-	1647- 87-	-	-	-	27	17	0.0
	25.4		20	331	303	-	-	1647- 87-	-	-	-	186	117	0.0
Tube														
OS025	0.065	0	TYP 68	34	11	-	-	45- - 45-	-	-	-	23	-	0.0
	1.65		20	234	76	-	-	45- - 45-	-	-	-	159	-	0.0
H80	0.065	40	TYP 68	55	50	-	-	8 60- 9563	-	-	-	29	-	0.0
	1.65		20	379	345	-	-	8 60- 9563	-	-	-	200	-	0.0
H55	0.065	15	TYP 68	40	32	-	-	2535- 7745	-	-	-	26	-	0.0
	1.65		20	276	221	-	-	2535- 7745	-	-	-	179	-	0.0
Flat Products														
M20	0.04	0	TYP 68	34	10	-	-	45- - 45-	-	-	-	23	-	0.0
	1		20	234	69	-	-	45- - 45-	-	-	-	159	-	0.0
Shapes														
OS050	0.5	0	TYP 68	32	10	-	-	50- - 40-	-	-	-	22	-	0.0
	12.7		20	221	69	-	-	50- - 40-	-	-	-	152	-	0.0
Wire														
H04	0.08	0	TYP 68	55	-	-	-	1 - - - -	-	-	-	29	-	0.0
	2		20	379	-	-	-	1 - - - -	-	-	-	200	-	0.0
Flat Products														
OS050	0.04	0	TYP 68	32	10	-	-	45- - 40-	-	-	-	22	-	0.0
	1		20	221	69	-	-	45- - 40-	-	-	-	152	-	0.0
Shapes														
H04	0.5	15	TYP 68	40	32	-	-	3035- - - -	-	-	-	26	-	0.0
	12.7		20	276	221	-	-	3035- - - -	-	-	-	179	-	0.0
Tube														
OS050	0.065	0	TYP 68	32	10	-	-	45- - 40-	-	-	-	22	-	0.0
	1.65		20	221	69	-	-	45- - 40-	-	-	-	152	-	0.0
Flat Products														
OS025	0.04	0	TYP 68	34	11	-	-	45- - 45-	-	-	-	23	11	0.0
	1		20	234	76	-	-	45- - 45-	-	-	-	159	76	0.0
H10	0.04	0	TYP 68	57	53	-	-	4 62- 9564	-	-	-	29	-	0.0
	1		20	393	365	-	-	4 62- 9564	-	-	-	200	-	0.0
H01	0.04	0	TYP 68	38	30	-	-	2525- 7036	-	-	-	25	-	0.0
	1		20	262	207	-	-	2525- 7036	-	-	-	172	-	0.0
H00	0.04	0	TYP 68	36	28	-	-	3010- 6025	-	-	-	25	-	0.0
	1		20	248	193	-	-	3010- 6025	-	-	-	172	-	0.0
H04	0.025	0	TYP 68	50	45	-	-	1250- 90-	-	-	-	28	-	0.0
	0.64		20	345	310	-	-	1250- 90-	-	-	-	193	-	0.0

*Fatigue Strength: 100 x 10⁶ cycles,
unless indicated as [N] X 10⁶.

Physical Properties

	US Customary	Metric
Melting Point - Liquidus	1981 F	1083 C
Melting Point - Solidus	1981 F	1083 C
Density	0.323 lb/in ³ at 68 F	8.94 gm./cm ³ @ 20 C
Specific Gravity	8.94	8.94
Electrical Resistivity	10.3 ohms-cmil/ft @ 68 F	1.71 microhm-cm @ 20 C
Electrical Conductivity*	101 %IACS @ 68 F	0.591 MegaSiemens/cm @ 20 C
Thermal Conductivity	226.0 Btu · ft/(hr · ft ² ·°F) at 68F	391.1 W/m · °K at 20 C
Coefficient of Thermal Expansion	9.4 · 10 ⁻⁶ per °F (68-212 F)	16.9 · 10 ⁻⁶ per °C (20-100 C)
Coefficient of Thermal Expansion	9.6 · 10 ⁻⁶ per °F (68-392 F)	17.3 · 10 ⁻⁶ per °C (20-200 C)
Coefficient of Thermal Expansion	9.8 · 10 ⁻⁶ per °F (68-572 F)	17.6 · 10 ⁻⁶ per °C (20-300 C)
Specific Heat Capacity	0.092 Btu/lb/°F at 68 F	393.5 J/kg · °K at 293 K
Modulus of Elasticity in Tension	17000 ksi	117000 MPa
Modulus of Rigidity	6400 ksi	44130 MPa

*Volume and weight basis, minimum value.



Temper Most Commonly Used

Flat Products	
BAR, DRAWN	H01, H04, H06, O60
BAR, ROLLED	H01, H04, H06, M20, O60
PLATE	H00, M20
SHEET	H00, H02, M20, O60
STRIP, DRAWN	H04, O60
STRIP, ROLLED	H00, H01, H02, H04, H08, H10, M20, O60, OS025, OS050
WIRE, DRAWN	H04, H06, O60

Other	
PIPE	H58
ROD	H04, H08, M20, M30, O60, OS050
SHAPES	H04, M20, M30, O60, OS050
TUBE	H55, H58, H80, O60, OS025, OS050
WIRE	H00, H01, H04, H08, O60, OS050

Typical Uses

Automotive

Automotive Rectifiers

Electrical

Conductors, Glass-to-Metal Seals, High Resistance-Ratio Cryogenic Shunts, Bus Bars, Lead-in Wire, Vacuum Seals, Transistor Component Bases, Bus Conductors, Wave Guides, Hollow Conductors, Anodes for Vacuum Tubes, Coaxial Cable, Coaxial Tube, Klystrons, Microwave Tubes