

**CDA110 (Electrolytic Tough Pitch)**

US EPA Registered Antimicrobial

Chemical Composition

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

	Cu⁽¹⁾	O
Min. /Max.	99.90 min	-
Nominal	-	.04

(1) Cu value includes Ag.

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.

Note: Oxygen and trace elements may vary depending on the process.

Applicable Specifications

Product	Specification
Bands, Projectile Rotating	MILITARY MIL-B-20292
Bar	ASME SB133 ASTM B152 SAE J463, J461
Bar, Bus	ASTM B187
Bar, Forging	ASTM B124
Bolts	ASTM F468
Brazing Filler Metal	FEDERAL QQ-B-650
Foil, Printed Circuits	ASTM B451
Forgings, Die	ASTM B283
Nuts	ASTM F467
Pipe, Bus	ASTM B188
Plate	AMS 4500 ASTM B152 SAE J463, J461
Rod	ASME SB133 MILITARY MIL-C-12166 SAE J463, J461
Rod, Bus	ASTM B187
Rod, Forging	ASTM B124
Screws	ASTM F468
Shapes	SAE J461, J463
Shapes, Bus	ASTM B187
Shapes, Forging	ASTM B124
Sheet	AMS 4500 ASTM B152, B694 SAE J461, J463
Sheet, Building Construction	ASTM B370
Sheet, Clad	ASTM B506
Sheet, Lead Coated	ASTM B101
Sheet, Printed Circuits	ASTM B451



Strip	AMS 4500 ASTM B694, B152 SAE J463, J461
Strip, Building Construction	ASTM B370
Strip, Clad	ASTM B506
Strip, Printed Circuits	ASTM B451
Studs	ASTM F468
Tube, Bus	ASTM B188
Tube, Welded	ASTM B447
Wire, Medium-Hard Drawn	ASTM B2 FEDERAL QQ-W-343
Wire, Coated With Lead Alloy	ASTM B189
Wire, Coated With Nickel	ASTM B355
Wire, Coated With Silver	ASTM B298
Wire, Coated With Tin	ASTM B33, B246
Wire, Flat	AMS 4500 ASTM B272
Wire, Hard Drawn	ASTM B1 FEDERAL QQ-W-343
Wire, Metalizing	MILITARY MIL-W-6712
Wire, Soft	ASTM B3, B738, B48 FEDERAL QQ-W-343 SAE J461, J463
Wire, Stranded	ASTM B8, B496, B470, B286, B229, B226, B174, B173, B172 FEDERAL QQ-B-575
Wire, Trolley	ASTM B47, B116

Common Fabrication Processes

Blanking, Coining, Copper smithing, 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	Good
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Fair
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

**Thermal Properties**

Treatment	Temp./Time - US	Temp./Time - SI
Stress Temperature		
Solution Minimum		
Solution Maximum		
Solution Time		
Solution Medium	None	
Precipitation Value		
Precipitation Time		
Precipitation Medium	None	
Annealing Minimum	700	371
Annealing Maximum	1200	649
Annealing Time		
Hot Works Minimum	1400	761
Hot Works Maximum	1600	872

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

Temper	Section Size	Cold Work	Temp	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		5003000ksi	MPa	ksi MPa	ft-lb J
Flat Products													
H02	0.04	0	TYP68	42	36	-	-	1440- 8450	-	-	26	13	0.0
	1		20	290	248	-	-	1440- 8450	-	-	179	90	0.0
M20	0.025	0	TYP68	32	10	-	-	50- - 40-	-	-	22	-	0.0
	0.64		20	221	69	-	-	50- - 40-	-	-	152	-	0.0
Rod													
M20	1	0	TYP68	32	10	-	-	55- - 40-	-	-	22	-	0.0
	25.4		20	221	69	-	-	55- - 40-	-	-	152	-	0.0
Shapes													
M30	0.5	0	TYP68	32	10	-	-	50- - 40-	-	-	22	-	0.0
	12.7		20	221	69	-	-	50- - 40-	-	-	152	-	0.0
M20	0.5	0	TYP68	32	10	-	-	50- - 40-	-	-	22	-	0.0
	12.7		20	221	69	-	-	50- - 40-	-	-	152	-	0.0
Flat Products													
H04	0.04	0	TYP68	50	45	-	-	6 50- 9057	-	-	28	-	0.0
	1		20	345	310	-	-	6 50- 9057	-	-	193	-	0.0
Rod													
H04	0.25	40	TYP68	55	50	-	-	1060- 94-	-	-	29	-	0.0
	6.35		20	379	345	-	-	1060- 94-	-	-	200	-	0.0
Wire													
OS050	0.08	0	TYP68	35	-	-	-	35- - - -	-	-	24	-	0.0
	2		20	241	-	-	-	35- - - -	-	-	165	-	0.0
Flat Products													
H08	0.04	0	TYP68	55	50	-	-	4 60- 9463	-	-	29	14	0.0
	1		20	379	345	-	-	4 60- 9463	-	-	200	97	0.0
H01	0.025	0	TYP68	38	30	-	-	3525- 70-	-	-	25	-	0.0
	0.64		20	262	207	-	-	3525- 70-	-	-	172	-	0.0
Rod													
OS050	1	0	TYP68	32	10	-	-	55- - 40-	-	-	22	-	0.0
	25.4		20	221	69	-	-	55- - 40-	-	-	152	-	0.0
Wire													
H08	0.08	0	TYP68	66	-	-	-	1 - - - -	-	-	33	-	0.0
	2		20	455	-	-	-	1 - - - -	-	-	228	-	0.0
Flat Products													
H04	1	0	TYP68	45	40	-	-	2045- 85-	-	-	26	-	0.0
	25.4		20	310	276	-	-	2045- 85-	-	-	179	-	0.0
OS050	0.025	0	TYP68	32	10	-	-	50- - 40-	-	-	22	-	0.0
	0.64		20	221	69	-	-	50- - 40-	-	-	152	-	0.0
H00	0.025	0	TYP68	36	28	-	-	4010- 60-	-	-	25	-	0.0
	0.64		20	248	193	-	-	4010- 60-	-	-	172	-	0.0
Rod													
H04	2	16	TYP68	45	40	-	-	2045- 85-	-	-	26	-	0.0
	51		20	310	276	-	-	2045- 85-	-	-	179	-	0.0
H04	1	35	TYP68	48	44	-	-	1647- 87-	-	-	27	17	0.0
	25.4		20	331	303	-	-	1647- 87-	-	-	186	117	0.0
Tube													
OS025	0.065	0	TYP68	34	11	-	-	45- - 45-	-	-	23	-	0.0
	1.65		20	234	76	-	-	45- - 45-	-	-	159	-	0.0
H80	0.065	40	TYP68	55	50	-	-	8 60- 9563	-	-	29	-	0.0



	1.65		20	379	345	-	-	8 60- 9563	-	-	-	200	-	0.0
H55	0.065	15	TYP68	40	32	-	-	2535- 7745	-	-	-	26	-	0.0
	1.65		20	276	221	-	-	2535- 7745	-	-	-	179	-	0.0
Flat Products														
M20	0.04	0	TYP68	34	10	-	-	45- - 45-	-	-	-	23	-	0.0
	1		20	234	69	-	-	45- - 45-	-	-	-	159	-	0.0
Shapes														
OS050	0.5	0	TYP68	32	10	-	-	50- - 40-	-	-	-	22	-	0.0
	12.7		20	221	69	-	-	50- - 40-	-	-	-	152	-	0.0
Wire														
H04	0.08	0	TYP68	55	-	-	-	1 - - - -	-	-	-	29	-	0.0
	2		20	379	-	-	-	1 - - - -	-	-	-	200	-	0.0
Flat Products														
OS050	0.04	0	TYP68	32	10	-	-	45- - 40-	-	-	-	22	-	0.0
	1		20	221	69	-	-	45- - 40-	-	-	-	152	-	0.0
Shapes														
H04	0.5	15	TYP68	40	32	-	-	3035- - - -	-	-	-	26	-	0.0
	12.7		20	276	221	-	-	3035- - - -	-	-	-	179	-	0.0
Tube														
OS050	0.065	0	TYP68	32	10	-	-	45- - 40-	-	-	-	22	-	0.0
	1.65		20	221	69	-	-	45- - 40-	-	-	-	152	-	0.0
Flat Products														
OS025	0.04	0	TYP68	34	11	-	-	45- - 45-	-	-	-	23	11	0.0
	1		20	234	76	-	-	45- - 45-	-	-	-	159	76	0.0
H10	0.04	0	TYP68	57	53	-	-	4 62- 9564	-	-	-	29	-	0.0
	1		20	393	365	-	-	4 62- 9564	-	-	-	200	-	0.0
H01	0.04	0	TYP68	38	30	-	-	2525- 7036	-	-	-	25	-	0.0
	1		20	262	207	-	-	2525- 7036	-	-	-	172	-	0.0
H00	0.04	0	TYP68	36	28	-	-	3010- 6025	-	-	-	25	-	0.0
	1		20	248	193	-	-	3010- 6025	-	-	-	172	-	0.0
H04	0.025	0	TYP68	50	45	-	-	1250- 90-	-	-	-	28	-	0.0
	0.64		20	345	310	-	-	1250- 90-	-	-	-	193	-	0.0

*Fatigue Strength: 100×10^6 cycles,
unless indicated as [N] X 10^6 .

Physical Properties

	US Customary	Metric
Melting Point - Liquidus	1981 F	1083 C
Melting Point - Solidus	1949 F	1065 C
Density*	0.322 lb/in ³ at 68 F	8.91 gm/cm ³ @ 20 C
Specific Gravity	8.910	8.91
Electrical Resistivity	10.30 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 Btu · ft/(hr · ft ² ·°F) at 68F	391.1 W/m · °K at 20 C
Coefficient of Thermal Expansion	$9.40 \cdot 10^{-6}$ per °F (68-212 F)	$16.9 \cdot 10^{-6}$ per °C (20-100 C)
Coefficient of Thermal Expansion	$9.60 \cdot 10^{-6}$ per °F (68-392 F)	$17.3 \cdot 10^{-6}$ per °C (20-200 C)
Coefficient of Thermal Expansion	$9.80 \cdot 10^{-6}$ per °F (68-572 F)	$17.6 \cdot 10^{-6}$ 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

*Actual value .321 - .323.

**Volume and weight basis.

**Tempers Most Commonly Used**

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

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

Typical Uses**Architecture**

Building Fronts, Gutters, Skylight Frames, Roofing, Flashing, Downspouts, Spouting

Automotive

Radiators, Gaskets

Builders Hardware

Cotter Pins, Butts, Ball Floats, Nails, Tacks, Soldering Copper, Rivets

Building

Screening, Wire Screening

Consumer

Christmas Ornaments

Electrical

Switches, Terminals, Trolley Wire, Contacts, Radio Parts, Magnet Wire, Busbars, Terminal Connectors, Conductors, Electrical, Stranded Conductors, Wire, Electrical

Fasteners

Fasteners

Industrial

Pressure Vessels, Chemical Process Equipment, Chlorine Cells, Chimney Cap Screens, Heat Exchangers, Printing Rolls, Anodes, Rotating Bands, Kettles, Pans, Vats, Road Bed Expansion Plates

Casting Characteristics

No casting characteristics available for this alloy.