# CDA COPPER NO. C 120 00
## Phosphorus Deoxidized, Low Residual Phosphorus

### Typical Uses

**ARCHITECTURAL:** Building fronts, downspouts, flashing, gutters, roofing, screening, spouting
**AUTOMOTIVE:** Gaskets, radiators
**ELECTRICAL:** Bus bars, conductivity wire, contacts, radio parts, switches, terminals
**HARDWARE:** Ball floats, burrs, cotter pins, nails, rivets, soldering copper, tacks
**MISCELLANEOUS:** Anodes, chemical process equipment, kettles, pans, printing rolls, rotating bands, road bed expansion plates, vats

### Composition—Percent

| | Nominal | Minimum | Maximum |
|---|---|---|---|
| Copper | — | 99.90 | — |
| Phosphorus | .004 to .012 | — | — |

### 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

### Physical Properties

| | English Units | C.G.S. Units |
|---|---|---|
| Melting Point (Liquidus) | 1981°F. | 1083°C. |
| Melting Point (Solidus) | 1949°F. | 1065°C. |
| Density | .321-.323 lb./cu. in. @ 68°F. | 8.89-8.94 gm./cu. cm. @ 20°C. |
| Specific Gravity | 8.89-8.94 | 8.89-8.94 |
| Coefficient of Thermal Expansion | .0000094 per °F. from 68°F. to 212°F. | .0000170 per °C. from 20°C. to 100°C. |
| Coefficient of Thermal Expansion | .0000096 per °F. from 68°F. to 392°F. | .0000173 per °C. from 20°C. to 200°C. |
| Coefficient of Thermal Expansion | .0000098 per °F. from 68°F. to 572°F. | .0000177 per °C. from 20°C. to 300°C. |
| Thermal Conductivity | 210 Btu./sq. ft./ft./hr./°F. @ 68°F. | .88 cal./sq. cm./cm./sec./°C. @ 20°C. |
| Electrical Resistivity (Annealed) | 11.0 Ohms (circ. mil./ft.) @ 68°F. | 1.91 Microhm-cm. @ 20°C. |
| Electrical Conductivity* (Annealed) | 97% IACS @ 68°F. | .536 Megohm-cm. @ 20°C. |
| Thermal Capacity (Specific Heat) | .092 Btu./lb./°F. @ 68°F. | .092 cal./gm./°C. @ 20°C. |
| Modulus of Elasticity (Tension) | 17,000,000 psi | 12,000 Kg./sq. mm. |
| Modulus of Rigidity | 6,400,000 psi | 4,500 Kg./sq. mm. |

*Volume and weight basis

### Fabrication Properties

Capacity for being Cold Worked . . . . . Excellent
Capacity for being Hot Formed . . . . . Excellent
Hot Forgeability Rating (Forging Brass = 100) . . . . . 65
Hot Working Temperature . . . . . 1400-1600°F. or 750-875°C.
Annealing Temperature . . . . . 700-1200°F. or 375-650°C.
Machinability Rating (Free Cutting Brass = 100) . . . . . 20

Suitability for being joined by:
Soldering . . . . . Excellent
Brazing . . . . . Good
Oxyacetylene Welding . . . . . Fair
Carbon Arc Welding . . . . . Fair
Gas Shielded Arc Welding . . . . . Fair
Coated Metal Arc Welding . . . . . Not Recommended
Resistance Welding { Spot . . . . . Not Recommended; Seam . . . . . Not Recommended; Butt . . . . . Good

### Mechanical Properties

| Form | Size Section | Temper | Tensile Strength psi | Yield Strength (½% Extension Under Load) psi | Reduction of Area % | Elongation in 2" % | Rockwell Hardness F | Rockwell Hardness B | Rockwell Hardness 30T | Shear Strength psi | Fatigue Strength psi | Fatigue Strength Million Cycles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FLAT PRODUCTS | 0.040 in. | 0.050 mm | 32,000 | 10,000 | — | 45 | 40 | — | — | 22,000 | — | — |
| | | 0.025 mm | 34,000 | 11,000 | — | 45 | 45 | — | — | 23,000 | 11,000 | 100 |
| | | Eighth Hard | 36,000 | 28,000 | — | 30 | 60 | 10 | 25 | 25,000 | — | — |
| | | Quarter Hard | 38,000 | 30,000 | — | 25 | 70 | 25 | 36 | 25,000 | — | — |
| | | Half Hard | 42,000 | 36,000 | — | 14 | 84 | 40 | 50 | 26,000 | 13,000 | 100 |
| | | Hard | 50,000 | 45,000 | — | 6 | 90 | 50 | 57 | 28,000 | 13,000 | 100 |
| | | Spring | 55,000 | 50,000 | — | 4 | 94 | 60 | 63 | 29,000 | 14,000 | 100 |
| | | Extra Spring | 57,000 | 53,000 | — | 4 | 95 | 62 | 64 | 29,000 | — | — |
| | | As Hot Rolled | 34,000 | 10,000 | — | 45 | 45 | — | — | 23,000 | — | — |
| | 0.250 in. | 0.050 mm | 32,000 | 10,000 | — | 50 | 40 | — | — | 22,000 | — | — |
| | | Eighth Hard | 36,000 | 28,000 | — | 40 | 60 | 10 | — | 25,000 | — | — |
| | | Quarter Hard | 38,000 | 30,000 | — | 35 | 70 | 25 | — | 25,000 | — | — |
| | | Hard | 50,000 | 45,000 | — | 12 | 90 | 50 | — | 28,000 | — | — |
| | | As Hot Rolled | 32,000 | 10,000 | — | 50 | 40 | — | — | 22,000 | — | — |
| | 1.0 in. | Hard | 45,000 | 40,000 | — | 20 | 85 | 45 | — | 26,000 | — | — |

The values listed above represent reasonable approximations suitable for general engineering use. Due to commercial variations in composition and to manufacturing limitations, they should not be used for specification purposes. See applicable A.S.T.M. specification references.