

Copper Forging Alloys

Copper Number	Commercial Designation	Nominal Composition %	Relative Forgeability Rating* %	Mechanical Properties**				
				Tensile Strength psi	Yield Strength psi (1/2%ext.)	Elongation in 2" (%)	Shear Strength psi	Hardness Rockwell F
101	Oxygen Free Electronic	Cu 99.99	65	32000	10,000	50	22000	40
102	Oxygen Free	Cu 99.95	65	32,000	10,000	50	22000	40
110	Electrolytic Tough Pitch	Cu 99.90 O ₂ 0.04	65	32,000	10,000	50	22000	40
145	Phosphorus Deoxidized	Cu 99.50 Te 0.50 P .008	65	32,000	10,000	40	22000	40
150	Zirconium Copper	Cu 99.80 Zr 0.15	N/A	37,000	11,000	50	N/A	40
182	Chromium Copper	Cu 99.10 Cr 0.90	80	45,000	14,000	40	N/A	N/A
220	Commercial Bronze	Cu 90.00 Zn 10.00	N/A	37,000	10,000	45	28000	53

Notes:

* Relative forgeability rating takes into consideration such variables as pressure, die wear and plasticity (hot). Since it is impractical to reduce these variables to units, calibration in terms of a percentage of the most generally used alloys, "Forging Brass" (100%), is considered the most practical basis for such ratings. The values shown represent the general opinion and are intended for information to enable the designer to better understand the forging characteristics of these various alloys.

**Machinability related to "Free Cutting Brass Rod" (100%).

Copper Forging Alloys

Copper Number	Commercial Designation	Physical Properties						Rating For***			
		Relative Machinability Rating** %	Density lb./cu. in. at 68°F	Melting Point (Solidus) °F	Coeff. Thermal Exp. Per °F x 10 ⁻⁷	Thermal Cond. BTU / Ft ² /Ft.Hr. °F	Elec. Cond. % IACS at 68°F	Hot Working	Cold Working	Soft Soldering	Brazing
101	Oxygen Free Electronic	20	0.323	1981	98	226	101	E	E	E	E
102	Oxygen Free	20	0.323	1981	98	226	101	E	E	E	E
110	Electrolytic Tough Pitch	20	0.322	1949	98	226	101	E	E	E	G
145	Phosphorus Deoxidized	85	0.323	1925	99	205	93	G	G	E	G
150	Zirconium Copper	20	0.321	1796	112	212	93	E	E	E	G
182	Chromium Copper	20	0.321	1958	98	187	80	E	G	G	G
220	Commercial Bronze	20	0.318	1870	102	109	44	E	G	E	E

Notes:

*** E = Excellent, G = Good, F = Fair, P = Poor, N/R = Not Recommended

Mechanical properties of any forging are influenced by shape and size. Unless otherwise specified in the purchase order or on the Cerro Fabricated Products drawing sent for your approval, acceptance of forgings will not be determined by tensile or hardness testing. The data in this table does not imply any warranty and are given for information only.