

ALLOY 544

C54400 (CDA 544) - PHOSPHOR BRONZE (FREE-CUTTING)

C54400 Phosphor Bronze alloy possess a higher yield strength than is readily available in most cast products. Typical applications for phosphor bronze include bearings, bushings, gears, pinions, shafts, thrust washers and valve parts. C54400 Phosphor bronze can be readily brazed or soldered. Capacity for being cold worked is good.

C54400 STANDARDS & PROPERTIES

Calculations are theoretically based on the density of C51000 = 0.320 lb/cu in @ 68 F.

C54400 - PHOSPHOR BRONZE "B-2"- STANDARDS & PROPERTIES

SIZE CHARTS: ROUNDS

Chemical Composition

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

	Cu	Fe	Pb	P	Sn	Zn
Min./Max.	Rem.	.10	3.5-4.5	.01-.50	3.5-4.5	1.5-4.5
Nominal	88.0	-	4.0	.25	4.0	4.0

Note: Cu + Sum of Named Elements, 99.5% min.

Applicable Specifications

Product	Specification
Bar	ASTM B103, B139 SAE J461, J463
Bearings and Bushings	MILITARY MIL-B-13501
Plate	ASTM B103
Rod	ASTM B139 SAE J461, J463
Shapes	ASTM B139
Sheet	ASTM B103 SAE J461, J463
Strip	AMS 4520 ASTM B103 SAE J461, J463

Common Fabrication Processes

Blanking, Drawing, Forming and Bending, Machining, Shearing, Stamping

Fabrication Properties

Joining Technique	Suitability
Soldering	Excellent
Brazing	Good
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Not Recommended
Coated Metal Arc Welding	Not Recommended
Spot Weld	Not Recommended
Seam Weld	Not Recommended
Butt Weld	Fair
Capacity for Being Cold Worked	Good
Machinability Rating	80

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

Temper	Section Size	Cold Work	Typ/Min	Temp	Tensile Strength	Yield Strength (0.5% ext. under load)	Yield Strength (0.2% offset)	Yield Strength (0.05% offset)	El	Rockwell Hardness				Vickers Hard.	Brinell Hard.		Shear Strength	Fatigue Strength*	Izod Impact Strength
	in.	%		F	ksi	ksi	ksi	ksi	%	B	C	F	30T	500	500	3000	ksi	ksi	ft-lb
	mm.			C	MPa	MPa	MPa	MPa									MPa	MPa	J
Rod																			
H04	1	25	TYP	68	68	57	-	-	20	80	-	-	-	-	-	-	-	-	0.0
	25.4			20	469	393	-	-	20	80	-	-	-	-	-	-	-	-	0.0
H04	0.5	35	TYP	68	75	63	-	-	15	83	-	-	-	-	-	-	-	-	0.0
	12.7			20	517	434	-	-	15	83	-	-	-	-	-	-	-	-	0.0
Flat Products																			
H02	0.04	0	TYP	68	58	40	-	-	24	68	-	-	-	-	-	-	-	-	0.0
	1			20	400	276	-	-	24	68	-	-	-	-	-	-	-	-	0.0
OS035	0.04	0	TYP	68	44	19	-	-	50	-	-	65	-	-	-	-	-	-	0.0
	1			20	303	131	-	-	50	-	-	65	-	-	-	-	-	-	0.0

Physical Properties

	US Customary	Metric
Melting Point - Liquidus	1830 F	999 C
Melting Point - Solidus	1700 F	927 C
Density	0.32 lb/in ³ at 68 F	8.89 gm/cm ³ @ 20 C
Specific Gravity	8.89	8.89
Electrical Resistivity	54.6 ohms-cmil/ft @ 68 F	9.08 microhm-cm @ 20 C
Electrical Conductivity	19 %IACS @ 68 F	0.111 MegaSiemens/cm @ 20 C
Thermal Conductivity	50.0 Btu · ft/(hr · ft ² ·°F) at 68F	86.5 W/m · °K at 20 C
Coefficient of Thermal Expansion	9.6 · 10 ⁻⁶ per °F (68-572 F)	17.3 · 10 ⁻⁶ per °C (20-300 C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 F	377.1 J/kg · °K at 293 K
Modulus of Elasticity in Tension	15000 ksi	103400 MPa
Modulus of Rigidity	5600 ksi	38610 MPa

Temper Most Commonly Used

Flat Products	
STRIP, ROLLED H02, OS035	
Other	
ROD	H04
SHAPES	M30

Typical Uses

Electrical
Electrical Connectors
Industrial

Bearings, Bushings, Gears, Pinions, Shafts, Thrust Washers, Valve Parts, Sleeve Bearings, Thrust Bearings, Screw Machine Products