



**ECO BRONZE™**  
HIGH PERFORMANCE LEAD-FREE BRONZE



# TESTED TO BE TOUGH STUFF

YOUR LEAD-FREE/COST COMPETITIVE SOLUTION

## GALLING RESISTANCE, COMPRESSION STRENGTH AND MACHINABILITY TESTING

ECO BRONZE™ was put through a variety of performance tests by independent laboratories to prove its suitability as a quality bearing material, including galling. The alloys tested ranged from traditional bearing bronze alloys to newer lead-free alloys in the market.

Alloy	Cu (%)	Pb (%)	Sn (%)	Zn (%)	Si (%)	Bi (%)	P (%)	UTS (ksi)	YS (ksi)	E (%)	Brinell 500kg Load	P Max	V Max	PV Max
C87850*	76	0.09*	0.30*	21	3		0.1	65	25	8	103	4,400	450	100,000
C89835	87	0.09*	7	3		2		30	14	6	65	4,000	500	75,000
C93200*	83	7	7	3				35	20	10	65	4,000	750	75,000
C93700*	80	10	10					35	25	6	60	4,000	1,000	85,000

\* ASTM B505 normal chemistry, minimum mechanical properties

### GALLING

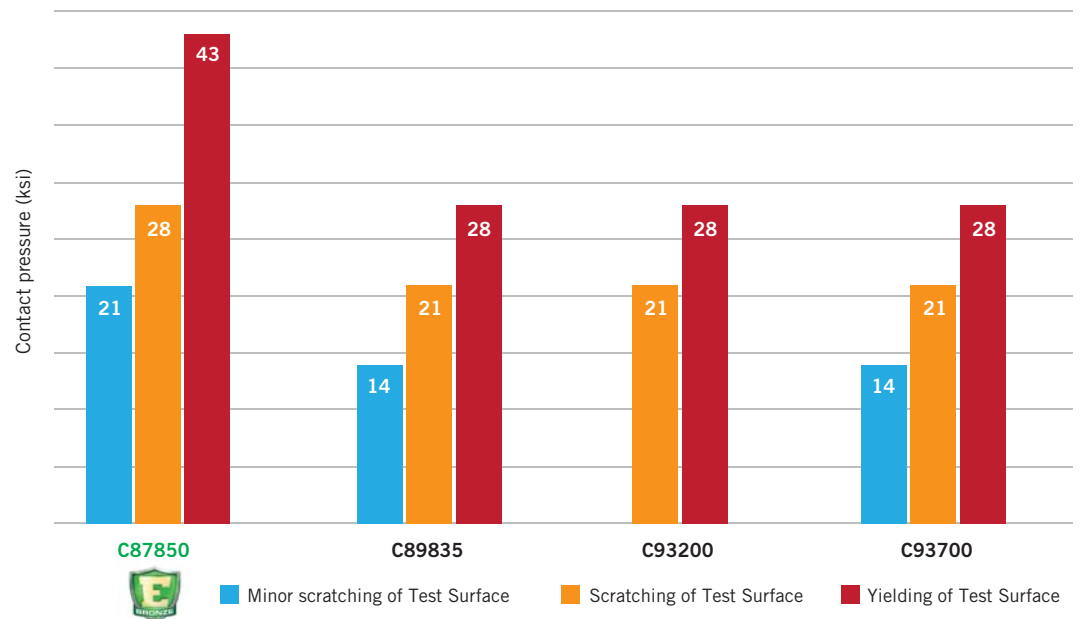
Of particular importance to engineers, galling resistance is a major factor when specifying the correct bearing material.

**TEST:** ECO BRONZE was tested for its galling resistance against common bearing alloys. The counter face material was 4140 steel with hardness of HRC 28.

**RESULTS:** ECO BRONZE compared positively versus the other bearing alloys in the galling resistance test

### Galling Threshold - ASTM G98

(Contact surface = 4140 Steel @ HRC 28)



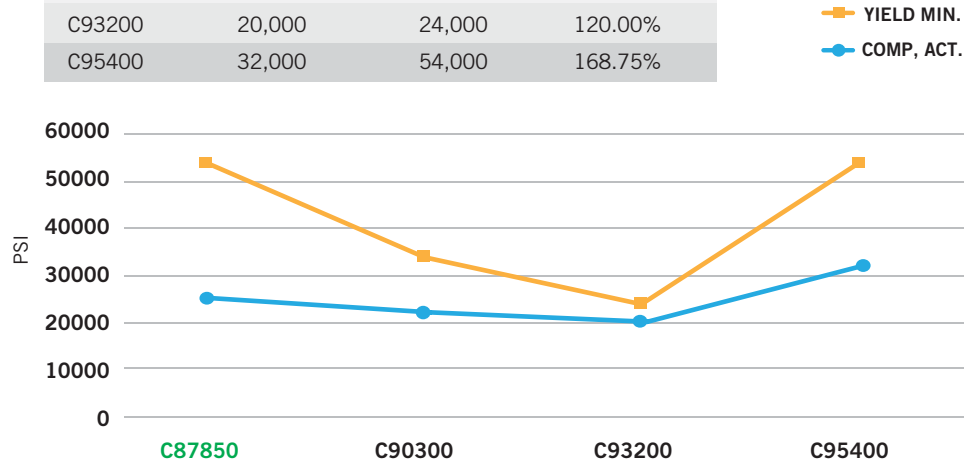
## COMPRESSION STRENGTH

The capacity of a bearing to be able to handle loads is one of the most important criteria when choosing a suitable bronze bearing material.

**TEST:** Independent testing compared the compression strength of lead-free ECO BRONZE versus other traditional bearing alloys using the ASTM E9 test methodology.

**RESULTS:** ECO BRONZE C87850 proved to be a capable bearing alloy when compared to other materials.

ALLOY	YIELD STRENGTH (PSI)	COMPRESSION (PSI)	% OF YIELD
C87850	25,000	54,000	216.00%
C90300	22,000	34,000	154.55%
C93200	20,000	24,000	120.00%
C95400	32,000	54,000	168.75%



TEST

RESULTS

## MACHINABILITY

Machinability is a key attribute in the selection process when it comes to bearing materials.

**TEST:** ECO BRONZE was tested against common bearing materials utilizing the recommended machining parameters for C87850.

**Stock Size 2.125" Diameter. Surface feet per minute = 800.**

**Turn No 1.** Turn to 1.875" Dia. Depth of cut = 0.250" Feed per revolution = 0.010"

**Turn No 2.** Turn to 1.625" Dia. Depth of cut = 0.250" Feed per revolution = 0.010"

**Turn No 3.** Turn to 1.500" Dia. Depth of cut = 0.125" Feed per revolution = 0.010"

**RESULTS:** ECO BRONZE C87850 proved to be the most machinable of the group

Alloy	Torque Turn 1	Torque Turn 2	Torque Turn 3	Turn Average	Machinability % vs C93200
C87850	10.17	11.00	7.83	9.67	111%
C93200	11.50	12.17	8.50	10.72	100%
C95400	16.71	9.67	9.67	11.83	91%
C89835	11.83	8.67	9.50	10.00	107%

TEST

RESULTS

### Recommendations for machining C87850 ECO BRONZE

#### Machining

- Surface feet per minute. For high speed form tools use M42 or T15PM starting at 275 SFPM.
- For interrupted cuts start at 225 SFPM. Use a higher feed rate 0.006 – 0.008 IPR
- For carbide forms 1100 SFPM. Carbide inserts 1170 SFPM. Use ceramic coatings (e.g.TiAIN).
- Use minimum dwell time.

#### Tool Clearances

- Use larger top rakes (e.g. 5 – 18 degrees) clearance.
- Start skive tools at 20 degrees draft and clearance.

#### Drilling

- Start drilling at 160-167 SFPM.
- Use drills with higher helix angles and increased flute width and thin web.
- Use lower RPM and higher feed rates than C360. Start at (0.008 – 0.012 IPR).
- Use higher back taper drills to reduce frictional heating.
- Use carbide coolant through drills whenever possible.



#### For Chase Brass Contact

ph: 800-537-4291  
email: ecobronze@chasebrass.com  
www.chasebrass.com

#### For Bunting Bearings Contact

ph: 888.286.8464  
email: ecobronze@buntingbearings.com  
www.buntingbearings.com

