C87850

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 resistance. The alloys tested ranged from traditional bearing bronze alloys to newer lead-free alloys in the market.

ALLOYS TESTED

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

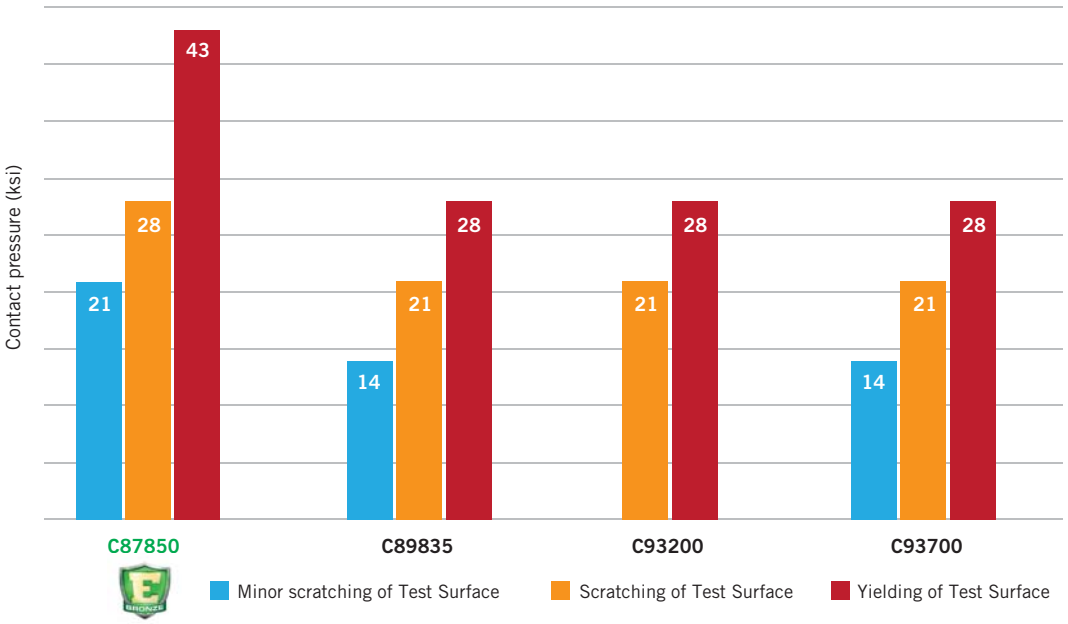
TEST: ECO BRONZE was tested for its galling resistance against common bearing alloys. The counter face material was 4140 steel with hardness of HRC 28.

RESULTS

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)



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COMPRESSION STRENGTH

Load-bearing capacity is one of the most important criteria when choosing a suitable bronze bearing material.

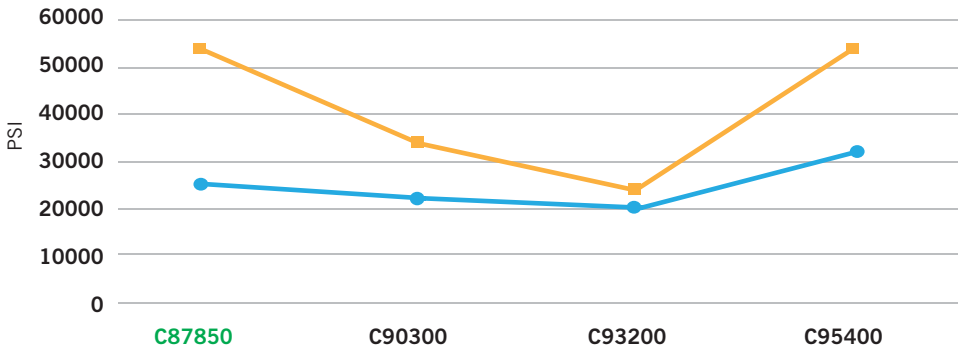
TEST

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

RESULTS

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%



MACHINABILITY

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

TEST

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

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%

Recommendations for machining C87850 ECO BRONZE

Machining Speeds and Feeds

- Surface feet per minute: for high speed form tools use M42 or T15PM starting at 275 SFPM.
- For carbide forms 1100 SFPM. Carbide inserts 1170 SFPM. Use ceramic coatings (e.g.TiAlN).
- For interrupted cuts start at 225 SFPM and feed rate of 0.006 – 0.008 IPR
- 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 Speeds and Feeds

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

MADE IN THE USA

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