

Fluidseal

Solutions for all sealing applications

DYNA-MAX®

Self-lubricating
Bearing Materials

Markets we serve:

Fluid Power
Hydro Power
Marine
Oil & Gas
and more...



PERFORMANCE COMPARISON BULLETIN

WHAT IS DYNA-MAX?

DYNA-MAX is a thermoset composite, reinforced with woven synthetic fibers. The end result is a material with outstanding integral strength, impact resistance and dimensional stability. The precise formulation of DYNA-MAX may vary to suit specific applications but all grades have outstanding chemical and mechanical properties. An extremely low coefficient of friction makes DYNA-MAX an ideal bearing material, particularly when working with heavy loads, and demonstrates superior wear performance. The performance of the material can be enhanced, in most applications, using process liquids, oils, water, or grease as a lubricant.

TOLERANCES ARE IMPORTANT!!!

The method of manufacturing plays an important role in the dimensional tolerances for each bearing material. Standard methods of manufacturing such as net molding and extruding, result in a larger cross-sectional tolerance band than with DYNA-MAX. We can maintain $\pm .001$ " on bearing cross-sections while most others maintain a .005" tolerance band. In addition, due to thermal gradient cooling after molding or extruding, flatness can become a problem as this can create a convex or concave "cupping". DYNA-MAX is not molded or extruded, but a special manufacturing process allows these tolerances to be realised and consistent.

WHY CHOOSE DYNA-MAX COMPOSITE FOR YOUR BEARING NEEDS?

DYNA-MAX composite offers engineers a REAL cost effective alternative to phosphor-bronze and nylon.

ADVANTAGES OVER PHOSPHOR-BRONZE

- DYNA-MAX COSTS YOU LESS
- Ability to take higher compressive loads before reaching yield point.
- Self-lubricating, can run dry in gritty environments.
- No damaged stock due to poor handling in stores.

ADVANTAGES OVER NYLON

- Filled nylon materials are limited to relatively lightly loaded applications.
- DYNA-MAX is dimensionally stable in fluids with absorption less than 0.1 % compared to 4-6% for nylon. Tighter running clearances are possible.

DESIGN OF BEARINGS

DYNA-MAX has a laminated construction and the best results are obtained when the bearing surface is parallel to or concentric with the layers of the material and at right angles to the load direction.

DYNA-MAX bushings are available over a wide range of diameters and thicknesses for normal applications.



Shaft Diameter	Minimum Wall Thickness
1/4 - 1" (6-25mm)	1/16" (1.59 mm)
1" - 2" (25-51mm)	3/32" (2.38 mm)
2" - 3" (51-76 mm)	1/8" (3.18 mm)
3" - 4 1/2" (76-114 mm)	3/16" (4.76 mm)
4 1/2" - 6" (114-152 mm)	1/4" (6.35 mm)

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DYNA-MAX

TYPICAL APPLICATIONS

- Idler sprocket bushings
- Pivot bushings in scissor lifts & material handling
- Bearings in positioning robots
- Head bushings in automatic welding machines
- Conveyors and assembly line bushings
- Slides in industrial trash compactors
- Wear pads in extendable boom cranes and lift trucks
- Steering gear bushings and mast guides in fork lifts
- Wear pads in chemical sprayers
- Hydraulic cylinder wear rings
- Rail car pivot washers
- Swivel bearings on portable cranes and off-road machinery
- Expansion joint slides for bridges and overpasses
- Spherical eye bearings
- Conveyor chain guides
- Screw conveyor hanger bearings
- Pin bushings for body arms and attachments
- Bushings for cylinder eyes



DECK MACHINERY APPLICATIONS:

- Hatch cover wear pads
- Fairlead bushings
- Stern rollers
- Winch and windless bearings
- Door bushing

GENERAL APPLICATIONS:

- Manual and automatic valve bearings
- Water turbine bearings
- Waste water treatment plants
- Pump bearings and casing rings for water and fuel oil
- Paper mill bleaching lines

BELOW WATER LINE APPLICATIONS:

- Rudder bearings
- Fixed and folding fin stabilizer bearings
- Bow thrusters
- Shaft seal insulating rings and housing
- Dock gate bearings
- Mine director bearings
- Towed array bearings
- Spherical bearings

SUBMARINE APPLICATIONS:

- Steering gear bushings
- Bowcap bushings
- Torpedo tube guide strips
- Periscope bearings
- Communications mast bearings
- Sonar equipment bearings

PRESS-FIT INTERFERENCE ALLOWANCE

An allowance must be made in calculating the bushing bore free diameter and as a general rule bushings with a wall thickness up to 12 mm the full 100% transfer of interference is reflected in the bearing bore.

For bushings over 12 mm wall thickness an allowance of 50% transfer is reflected in the bearing bore.

Keying and mechanical location of DYNA-MAX is not normally required. Due to its low modulus of elasticity moderate interference fits can be applied and these are normally sufficient to locate and hold the bushings. The recommended interference fits for all grades of DYNA-MAX are given below.

Housing/Bore		Bearing pressures up to 2000 psi Interference fit on O.D.	
inches	mm	inches	mm
1/2	13	+.002	+.050
1	25	+.002	+.050
1 1/2	38	+.003	+.076
2	51	+.003	+.076
2 1/2	64	+.003	+.076
3	76	+.003	+.076
3 1/2	89	+.004	+.10
4	102	+.004	+.10
4 1/2	114	+.004	+.10
5	127	+.004	+.10
5 1/2	140	+.005	+.13
6	152	+.005	+.13
8	203	+.006	+.15
10	254	+.006	+.15
12	305	+.006	+.15
14	356	+.007	+.18

JOURNAL CLEARANCES • RUNNING FITS

Listed are recommended allowances for a range of bushing sizes under different load conditions. These include factors for final running clearance and transfer of interference fit.

Shaft Diameter		Machining Allowance on I.D. up to 1000 psi (70 kg/cm ²)			
		Grades L7M, L8T		Other Grades	
inches	mm	inches	mm	inches	mm
1/2	13	+.006	+0.15	+.008	+0.20
1	25	+.006	+0.15	+.008	+0.20
1 1/2	38	+.008	+0.20	+.010	+0.25
2	51	+.009	+0.23	+.011	+0.28
2 1/2	64	+.011	+0.28	+.013	+0.33
3	76	+.012	+0.30	+.014	+0.36
3 1/2	89	+.013	+0.33	+.015	+0.38
4	102	+.013	+0.33	+.015	+0.38
5	127	+.014	+0.36	+.016	+0.41
6	152	+.016	+0.41	+.018	+0.46
8	203	+.018	+0.46	+.020	+0.51

Shaft Diameter		Machining Allowance on I.D. 1000 - 2000 psi (70 - 140 kg/cm ²)			
		Grades L7M, L8T		Other Grades	
inches	mm	inches	mm	inches	mm
1/2	13	+.008	+0.20	+.010	+0.25
1	25	+.008	+0.20	+.010	+0.25
1 1/2	38	+.010	+0.25	+.012	+0.30
2	51	+.011	+0.28	+.013	+0.33
2 1/2	64	+.013	+0.33	+.015	+0.38
3	76	+.014	+0.36	+.016	+0.41
3 1/2	89	+.015	+0.38	+.017	+0.43
4	102	+.015	+0.38	+.017	+0.43
5	127	+.016	+0.41	+.018	+0.46
6	152	+.018	+0.46	+.020	+0.51
8	203	+.020	+0.51	+.022	+0.56

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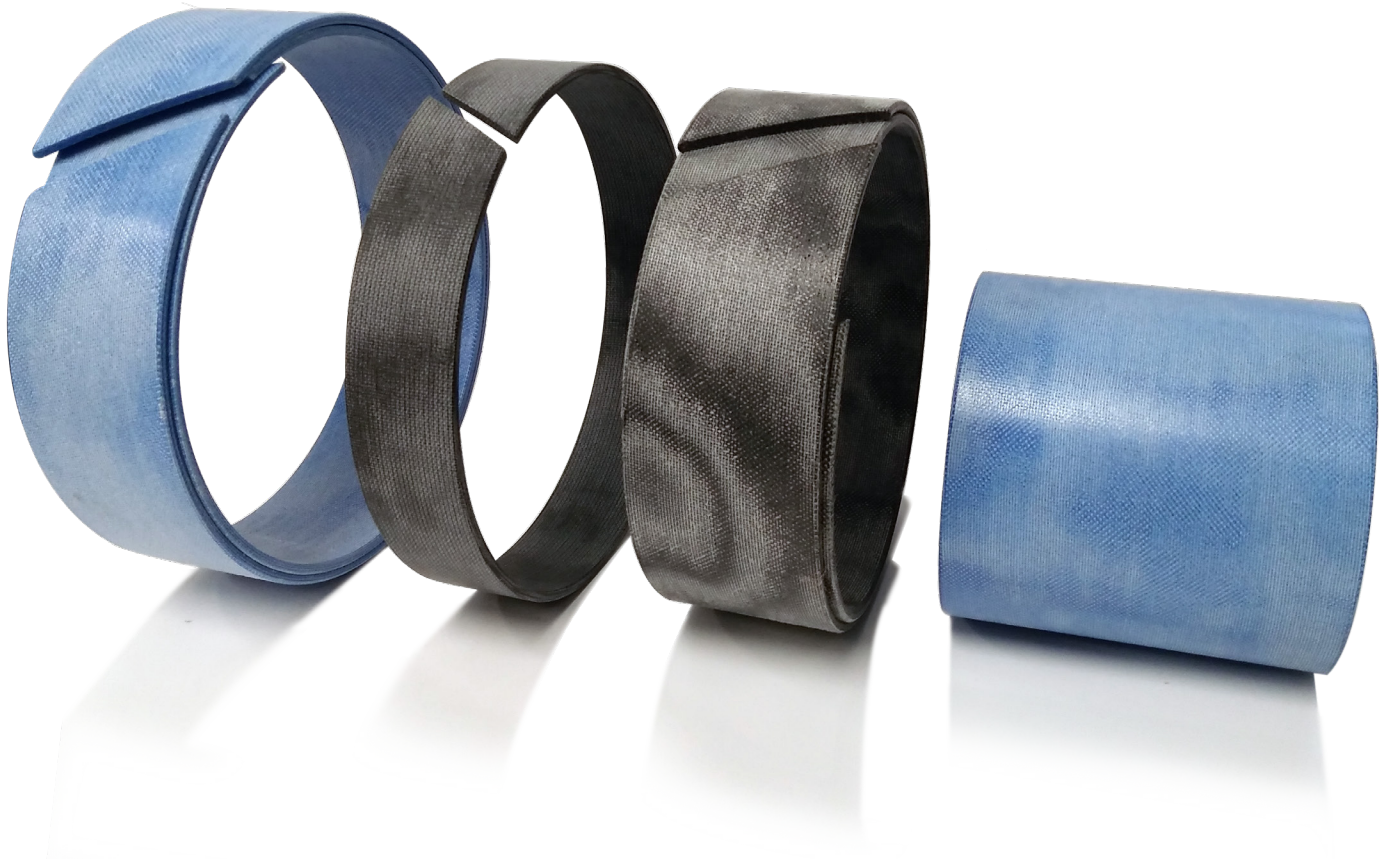
	DYNA-MAX	40 % Bronze Filled PTFE	15 % Glass Filled Nylon	Bearing Bronze 660
Compressive Strength Yield (psi)	47 100	600	14 500	18 000
Water Absorption (%)	> 0.10	0.10	5.50	0
Coefficient of Friction (dry)	0.12	0.16	0.28	0.40
Tensile@break (psi)	17 500	3000	27 000	35 000
Max. Continuous service temp. (F)	275	550	250	650

DYNA-MAX MECHANICAL PROPERTIES

Property	Unit		Values	
Compressive strength	MPa	Psi	325	47 100
Shear strength	MPa	Psi	95	13 700
Modulus of elasticity	MPa	Psi	1600	23 200
Hardness	Rockwell M		100	
Density	(103 k.g/m3)	(lb/in3)	1.25	0,045
Water absorption	(%)		0.1 %	
Coefficient of thermal expansion	(10-6/°C)	(10 -6/ci=)	65	36
Chemical resistance	(-)		good	
Colour	(-)		grey	
Maximum temperature	(°C)	°F	135	275
Minimum temperature	(°C)	°F	<200	<330
Advised maximum working temperature	(°C)	°F	100	212
Typical friction value	(-)		.10-.14	
General wear resistance	(-)		very good	
Resistance against abrasive wear	(-)		good	



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