LAMITEX®

FRANKLIN FIBRE COMPOSITE BEARINGS

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FRANKLIN FIBRE-LAMITEX CORPORATION

SERVING INDUSTRY SINCE 1921

Lamitex® Composite Bearing Design Considerations

Lamitex® bearings are ideal low friction bearings for use in high load applications where high compressive strength and low creep is required. Lamitex® bearings have superior load bearing properties when compared to most thermoplastic or metal bearings.

Lamitex® bearings are also excellent thermal insulators so flow through lube oil or water is strongly encouraged to help cool bearings and minimize heat related dimensional growth. Cooled bearings retain their hardness and extend bearing life. The following material characteristics should be considered for "fit" of Lamitex® bearings.

Running Clearance – Running clearance is the space between a shaft and a Lamitex® bearing. Recommended running clearance is 0.001" per inch of shaft diameter from a minimum base of 0.005".

*Example: The running clearance of a 5.000" diameter shaft is 0.010" (5.000*0.010) + 0.005" = 0.010") The Lamitex® bearing should have an ID of 5.010"*

Swelling Allowance – An additional allowance for radial swelling should be made at a rate of 0.010" per inch of bearing wall thickness.

Example: Your shaft inner diameter is 5.010" and the casing diameter is 5.500"
*Swelling allowance = (5.500 – 5.010)/2 * .010 = 0.002495" ~0.003*
Thus the Lamitex® bearing should have an OD (5.500" – 0.003") or 5.497"

Longitudinal Growth Allowance – Longitudinal growth allowance is only required when both ends of a Lamitex® sleeve type bearing are tightly enclosed. If the bearing application requires tight enclosure, an allowance of 0.005" per inch of captured bearing length should be made for longitudinal growth.

*Example: The "Longitudinal Growth Allowance" for a 6.575" long bearing enclosure is 0.033". (6.575 * 0.005) = 0.032875" ~0.033" Thus the bearing should be (6.565" - .033") or 6.542" long*

Lamitex® Composite Bearing Material Selection Guide

		WEAR FACTOR		COEFFICIENT OF FRICTION		
Generic Designation	Additive	10^{-10} in^3min/ Ft/lb/Hr Bearing	10^{-8} inch/ Hr Steel	Static 40 psi	Dynamic 40 psi, 50 fpm	Limiting PV (LPV) 100 fpm
C	–	410	42	.46	.40	22,500
L	–	720	0	.29	.26	27,500
CG	Graphite	1,110	20	.29	.25	37,500
CM	Moly-Sulfide	1,200	0	.37	.34	25,000
SBE-25	Graphite, Al_2O_3	1,800	7,000	.36	.34	30,000
SBE-30	Al_2O_3	850	1,000	.37	.36	35,000
SBE-50	–	1,200	13	.33	.30	30,000
SBE-60	Moly-Sulfide	1,600	2,000	.35	.32	28,000
SBE-70	Silica, Red	330	220	.36	.32	27,500
Bronze	Oil Impregnated	100	–	.24	.20	–
Nylon 6	–	200	–	.22	.24	2,000
Nylon 6	30% glass	90	–	.26	.32	2,500
Urethane	–	340	–	.32	.37	2,000

Molding Process Provides Excellent Performance

Franklin Fibre compression molds bearings, thrust collars and neck bearings in various sizes and configurations up to 24 inches in diameter.

High-pressure presses with computer-assisted controls ensure Franklin Fibre bearings are manufactured to specifications with the correct pressures, cycle times, conditions, and temperatures. Our bearings are manufactured with pressures applied perpendicular to bearing load surfaces that gives Franklin Fibre bearings exceptional mechanical strengths and extended wear cycles.

Lamitex® Grades To Meet Your Specific Application

All Lamitex® SBE composite materials offer load-bearing capacities equivalent to those of brass and bronze but, unlike metallic bearings, will not seize to metal shafts. They provide superior load-bearing properties and have a coefficient of thermal expansion (CTE) that closely matches the CTE of metal shafts. Franklin Fibre SBE grade bearings are frequently preferred to metal and thermoplastic bearing applications because of their longer life and ease of replacement.

SBE 25 composite is a coarse weave cotton fabric impregnated with a modified phenolic resin. Carbon-graphite and Alumina are added to the SBE25 formulation to provide internal lubrication that reduces frictional heat and extends the wear life of metal shafts. Carbon-graphite manufactured entirely with carbonaceous bonding combine the strength, hardness and wear resistance of carbon with the corrosion resistance and self lubricating properties of graphite without the high friction properties of straight carbon. The thermal conductivity of alumina improves heat dissipation and its mechanical characteristics add hardness and strength to the finished composite bearing.

SBE 30 composite is a coarse weave cotton fabric impregnated with a modified phenolic/alumina resin formulation. The thermal conductivity of alumina improves heat dissipation and its mechanical characteristics add hardness and strength to the finished composite bearing. SBE 30 was designed for highly loaded bearing applications where lubrication is provided by oil, water or a commercial lubricant.

SBE 50 composite is a coarse weave cotton fabric impregnated with a phenolic resin formulation. It is considered the basic multipurpose phenolic bearing material and is available in black and natural.

SBE 60 composite is a coarse weave cotton fabric impregnated with a molybdenum disulfide (moly) filled phenolic resin system. Molybdenum disulfide is an inorganic non-conductive mineral that is similar to graphite and is used for its low friction and hardness properties and high temperature resistance. SBE 60 was specifically designed for highly loaded bearing applications that require bearings with self-lubricating properties.

SBE 70 composite is an SBE 30 composite bearing material made in a red color for easier inspection of bearing surfaces. Like SBE 30, it was designed for highly loaded bearing applications where lubrication is provided by oil, water or commercial lubricant.

Custom Grades are continually being developed to meet specific customer applications using the latest materials available from the composite industry.

1-800-233-9739
www.franklinfibre.com

Characteristics

- Lightweight
- Extended Wear Life
- High Density
- High Impact Strength
- High Chemical Resistance
- Engineered Grain Direction
- Self-Lubricating
- No Scoring or Galling
- Low Friction
- No Cold Flow
- Excellent Resiliency
- High Dielectric strength

Types of Bearings

- Thrust Collar
- Spindle Carrier
- Roll Neck
- Top Roll Rider
- Bushing Liners
- Flat Back
- Neck
- Slipper
- Shaft
- Sleeve

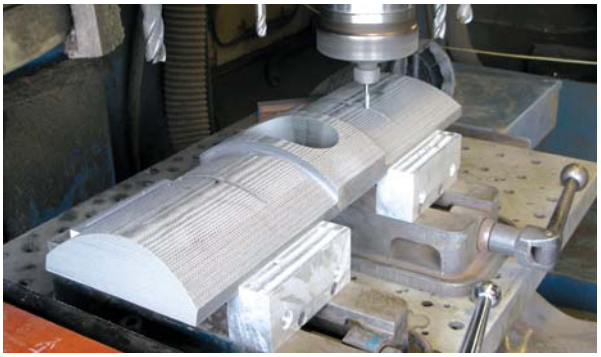
Applications

- Steel and Aluminum Rolling Mills
- Bar and Rod Rolling Mills
- Precious Metal Sheet Rolling Mills
- Paper and Pulp Mill Equipment
- Chemical Processing Parts
- Rock Crushing and Grinding Equipment
- Steel Mill Spindle Carriers
- Shafts For Drum Driers
- Marine Winches
- Mining Equipment
- Thrust Wear Pads

Complete Machining Capabilities

Franklin is equipped to handle any bearing fabricating need you may have. We are continually improving our technical expertise and fabricating capabilities to keep ahead of the ever increasing demands of industry. Franklin fabricates thermoplastic materials, vulcanized fibre and all NEMA grade phenolic, epoxy, melamine and glass polyester materials. We specialize in the fabrication of glass, Kevlar® and graphite filled composite sheet and tube.

Franklin can machine composite sheet up to 6 inches thick. Large and small quantity orders for machined parts are routinely processed and our CNC mills provide an economical solution for machining large bearings with dependable quality.



Lamitex® Composite Bearing Physical Properties

PROPERTIES		UNITS	SBE 25	SBE 30	SBE 50	SBE 50B	SBE 60	SBE 70
Specific Gravity		—	1.34	1.40	1.34	1.34	1.40	1.42
Rockwell Hardness (.062")		M Scale	80	102	80	80	80	95
Moisture Absorption (.062")		%	0.70	0.70	0.70	0.70	0.78	0.63
Flexural Strength	Lengthwise	psi	16,100	16,100	16,100	16,100	16,200	20,200
	Crosswise		11,200	11,200	11,200	11,200	12,700	13,600
Flexural Modulus	Lengthwise	psi	811	1800	811	811	937	1358
	Crosswise		657	1290	657	657	818	1034
Tensile Strength	Lengthwise	psi	12,000	6,900	12,000	12,000	10,200	11,400
	Crosswise		9,700	6,700	9,700	9,700	6,300	11,300
Izod Impact E-48/50 (.500")	Lengthwise	ft-lb/in notched	6.07	5.96	6.07	6.07	6.00	6.36
	Crosswise		2.84	2.96	2.84	2.84	2.89	2.83
Compressive Strength (flatwise) (.500")		psi	37,400	35,200	34,100	34,100	34,000	36,500
Bond Strength (.500")	Condition A	lbs	2,000	2,400	2,000	2,000	2,100	2,300
	D-48/50		1,770	2,000	1,800	1,800	2,000	2,100
Shear Strength (perpendicular) (.062")		psi	12,500	12,600	12,500	12,500	12,200	13,900
Maximum Continuous Operating Temperature			125°C / 257°F					
Coefficient of Thermal Expansion (.062")	X-axis	"/"/"/°C x 10^{-6}	25	36.3	25	25	39.4	27.6
	Y-axis		18	27.4	18	18	26.4	19.5

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