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**Hydro Power/  
Water Control**

**Lubron®**

**TX**

**Self-Lubricating PTFE  
Composite Bearings**



**Lubron Bearing Systems**

*Bearings to move the world.*



# Lubron TX Self-Lubricating PTFE Composite Bearings

LUBRON® TX self-lubricating bearings combine high performance reinforcing polyester fibers with thermosetting resins and PTFE solid lubricants. Designed to provide low coefficient of friction for moderate to high loads, LUBRON TX bearings are completely maintenance-free and require no supplemental lubrication.

LUBRON TX bearings incorporate PTFE solid lubricants dispersed throughout the fabric/resin matrix, providing low tangential shear stress and high wear resistance.

LUBRON TX bearings are designed for both wet and dry operating conditions, and are especially suitable for hydro power generation and water control applications.

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## FEATURES

LUBRON TX advantages include:

- Low coefficient of friction
- High wear resistance
- High load capacity
- Shock load resistant
- Long maintenance-free service life
- Low water absorption
- High edge loading & misalignment
- Non-metallic & non-magnetic
- Non-toxic & pollution free
- Machinable on-site

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## HIGH LOAD CAPACITY

LUBRON TX bearings are generally designed to accommodate normal operating loads from 1.5 ksi (10 N/mm<sup>2</sup>) to 15 ksi (103 N/mm<sup>2</sup>), and can withstand severe loads up to 48 ksi (330 N/mm<sup>2</sup>).



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## LOW FRICTION

LUBRON TX bearings typically have a coefficient of friction of less than 10%, depending on the load, velocity, temperature, finish and hardness of the mating surface. Static coefficient of friction is only slightly higher than dynamic, minimizing stick-slip.

## APPLICATIONS

Hydroelectric and water control applications for LUBRON TX bearings include:

- Wicket gates (guide vanes)
- Hubs & blades
- Operating rings (regulating rings)
- Linkage
- Floating mooring bits
- Roller chains
- Sheaves

## PROPERTIES

Maximum Operating Load – Static	48 ksi	330 MPa
Maximum Operating Load – Dynamic	12 ksi	80 MPa
Maximum Sliding Speed	500 ft/min	2.5 m/s
Maximum PV (dry)	7.5 ksi-ft/min	15 MPa-m/min
Coefficient of Friction (dry)	0.05 - 0.10	0.05 - 0.10
Ultimate Compression Strength – Normal to laminate	47.9 psi	330 MPa
Ultimate Compression Strength – Parallel to laminate	14.5 psi	100 MPa
Impact Strength (Charpy)		50 kJ/m <sup>2</sup>
Shear Strength	11.6 ksi	80 MPa
Density	0.046 lb/in <sup>3</sup>	1.25 g/cm <sup>3</sup>
Hardness (Rockwell M)	100	100
Maximum Temperature – Continuous	248°F	120°C
Maximum Temperature – Intermittent	284°F	140°C
Coefficient Thermal Expansion – Normal to laminate	40 x 10 <sup>-6</sup> /°F	70 x 10 <sup>-6</sup> /°C
Coefficient Thermal Expansion – Parallel to laminate	36 x 10 <sup>-6</sup> /°F	65 x 10 <sup>-6</sup> /°C
Maximum Swell in Water (% wall thickness @ 20°C)	0.1%	0.1%



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## AVAILABILITY

LUBRON TX bearings are generally furnished finish machined to meet the exacting requirements of each application. LUBRON TX is also available rough machined or supplied in cylindrical tubes and flat plates.

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## SHAPES

LUBRON TX bearings are available in many different configurations depending on the application. Most common shapes include sleeve bushings, flange bushings, thrust washers, plates and self-aligning spherical bearings. LUBRON TX bearings are also available with a variety of backup materials.

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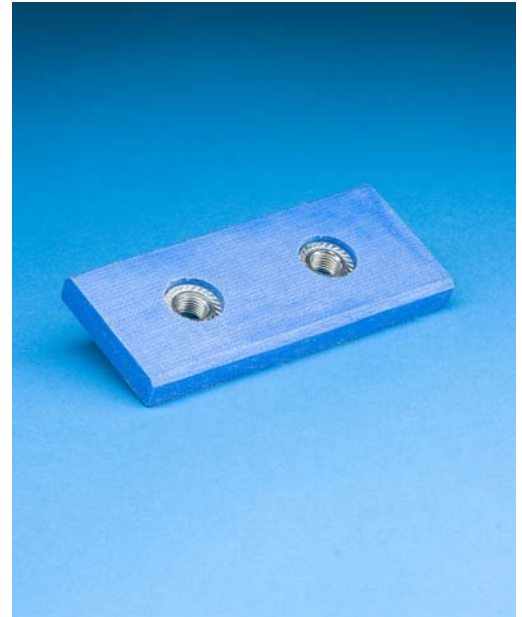
## SIZING

Inside and outside diameters for sleeve bushings are dependent on the bearing load, shaft diameter, required wall thickness and size of the housing bore. Bushing length is usually determined by the amount of projected area required to accommodate the radial load, and can be calculated by dividing the shaft load by the desired bearing pressure multiplied by the inside diameter. Flange and washer thickness generally correspond to the bushing wall thickness. Machining tolerances for most LUBRON TX bushings range from  $\pm .001$ " (.025 mm) to  $\pm .002$ " (.050 mm) for the inside and outside diameters. As running clearance and press fit tolerances vary with each application, contact Lubron Bearing Systems for design recommendations.

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## MATING SURFACES

For maximum wear resistance and service life, shafts should be corrosion resistant and polished to a surface finish not exceeding 32 microinches (0.8 micrometers). Austenitic (Types 304 & 316) and precipitation-hardened (17-4 PH) stainless steels are generally used for smaller diameters. For larger shaft sizes, stainless steel sleeving or weld overlay is recommended.







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## SEALS

Seals are recommended for applications subject to excessive ingress of foreign debris. LUBRON TX bearings can be furnished with seals, or we can offer recommendations for their specification.

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## INSTALLATION

LUBRON TX bearings are generally supplied fully machined and ready for installation. Even though LUBRON TX bearings are very durable, care must be taken to ensure the bearings are not damaged during installation. The bearings may be press fit into the housing, or shrunk fit with refrigeration, dry ice or liquid nitrogen. Bearings that are press fit should be properly sized to accommodate a 100% interference fit reduction of the inside diameter. Bearings chill fit should be protected with wax paper to avoid condensation or ice buildup on the bearing surfaces. If high axial loads are anticipated, adhesives can be used to insure that the bearing remains securely in place.

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## QUALITY ASSURANCE

All LUBRON TX bearings are manufactured and inspected in strict accordance with the requirements of ISO 9002. Every phase of manufacture is planned, performed, checked and certified in writing by Quality Control.

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## ENGINEERING SERVICES

We offer a variety of engineering services from bearing design to in-house testing of prototype and full size bearings to simulate load, movement, temperature and other environmental conditions present during actual operations. Bearing design, AutoCAD® drawing preparation, testing, consulting and on-site engineering services are available upon request.



# Lubron TX Self-Lubricating PTFE Composite Bearings

## LUBRON Self-Lubricating Bearings for Hydro Applications

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### LUBRON AQ

LUBRON AQ bearings are constructed of high strength bronze alloys permanently embedded with PTFE solid lubricants, and are unequalled for toughness and durability. Specified and approved by engineering design firms and waterwise, LUBRON AQ bearings are the proven choice for hydro pump-turbine and dam gate applications.

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### LUBRON HP

LUBRON HP bearings are specifically designed for smaller hydro turbine wicket gates and control linkage, and employ a variety of bronze alloys permanently embedded with PTFE solid lubricants. LUBRON HP bearings eliminate larger running clearances required for water swell, and are especially suitable for small oscillating movements and long periods of dwell.

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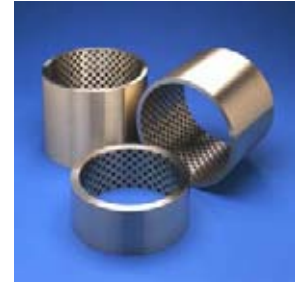
### LUBRON TF

LUBRON TF bearings are constructed of woven PTFE fabric liners permanently bonded and mechanically locked to rigid bronze or stainless steel backings. Capable of very low friction and high wear resistance, LUBRON TF bearings offer exceptional performance for hydro turbine wicket gate, control linkage, and dam gate applications.

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### LUBRON TX

LUBRON TX bearings consist of synthetic fiber reinforced PTFE polyester materials capable of high loads and low friction. LUBRON TX bearings have excellent dimensional stability in water, and are ideally suited for many hydroelectric turbine and water control applications. LUBRON TX bearings can be machined on-site, and are a lower cost alternative to many other self-lubricating bearings.



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