

National Enduralube Bearings

The Worlds Most Reliable Bronze Bearing



www.nationalbronze.com

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National Enduralube

INTRODUCTION

Since 1911 National Bronze Mfg. Co. has been a leading manufacturer of bronze based components. Throughout the last 100 plus years, National Bronze Mfg. has developed various technologically advanced product lines to meet customers' needs.

National's Enduralube Bearings were designed to withstand industries with severe and harsh applications. The combination of the cast bronze alloy base and the solid lubricant results in a bronze bearing that is maintenance free. This self lubricating bearing has gained in popularity over the years with the increasing need to meet industrial requirements for energy and labor cost reductions.

National's Enduralube Bearing products simplify your lubrication requirements by taking the difficult and seemingly impossible and providing a reliable, efficient, and economical solution. The simplicity of the Everlube Bearing opens the way for product improvements and economies impossible with other types of lubrication. These benefits can make your products more competitive, simpler, and more desirable to the end user.



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ADVANTAGES

Ordinary oil, grease, and liquid lubrication systems, in many instances, require involved engineering and complex manufacturing techniques... using costly lubricating lines, flex hoses, swivel connections, pumps, controls, etc. These methods necessitate constant maintenance in order to provide needed lubrication. The use of conventional liquid systems may be limited by rotating parts, limited space, extreme high or low temperatures, super clean environments, inaccessibility or hostile atmospheres.

National's Enduralube Bearings, on the other hand, carry and dispense their own lubricant on a continuous basis and virtually do away with all the disadvantages inherent in oil, grease, and liquid lubrication systems.

Benefits of National's Enduralube Bearings:

- Continuous lubrication over long periods without maintenance
- Simplification of product design by eliminating need for lubrication lines, hoses, pumps, etc...
- Long term resistance to scoring and wearing of moving parts.
- Ideal for environments that can be contaminated by leaking lubricants.
- Extended product life by assuring lubrication every time bearing surfaces move.
- Able to withstand high temperature environments where traditional lubricated bearings normally fail.



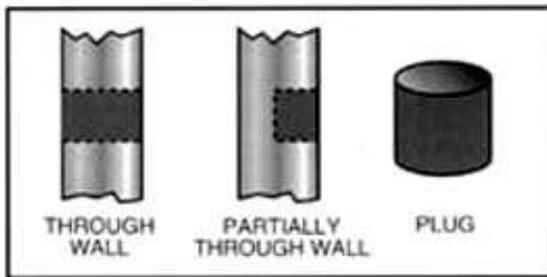
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Self Lubricating Plugs



Under load, National Enduralube Bearings lower the coefficient of friction so all surfaces coming into contact with it glide over each other, reducing part wear, replacement, and maintenance.

Enduralube plug type bearings come with our exclusive unidirectional plug pattern which provides maximum lubrication whether the shaft movement is linear or rotating. National's Enduralube plugs never are on the same axis, providing the maximum lubrication and minimum bearing wear.



National designs a pattern of recessed areas to be machined into the part wall (either through or partially through) for the receipt of the solid lubricant material to provide reliable lubrication every time the bearing surface is acted upon.

The bearing surface pattern is then machined precisely into the part and filled with plugs of lubricating material to complete the part.



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Self Lubricating Grooves

This lubrication system is recommended for the following applications:

- Light to medium service
- Thin wall sections.
- Part/product cost critical
- Low percentage of lubrication required

Like other Enduralube systems the part and lubricating surface are designed for the application. This includes the metal to be used for the part, the size, quantity, and shape of the lubricant holding grooves.

For filled grooves type bearing surfaces, the groove pattern is machine precisely into the part. Then the lubricant material is applied into the grooves, filling the grooves with the compound. Finally the bearing surface is cured in a controlled atmosphere.



National **Loop**



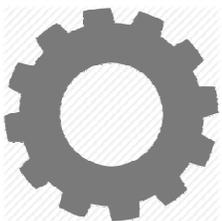
National **Multiple Loop**



National **Multiple Circular**

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APPLICATIONS



High Temperature

- Steel Mills
- Furnace Dragouts
- Drying Equipments
- Heat Exchangers

Automobile Manufacturing

- Press Dies
- Welding, Assembly Lines
- Chain Conveyors
- Machine Tools

Water Resisting

- Dam Gates
- Submersible Pumps
- Hydro-Electric Surfaces
- Off Shore Structures

Heavy Industries

- Steel Tube Plant Machinery
- Tire & Paper Mills
- Power Generating Stations
- Injection Mold Machinery

Construction, Mining, Loading

- Mixers & Grinders
- Construction Machines
- Mining Rigs
- Power Shovels

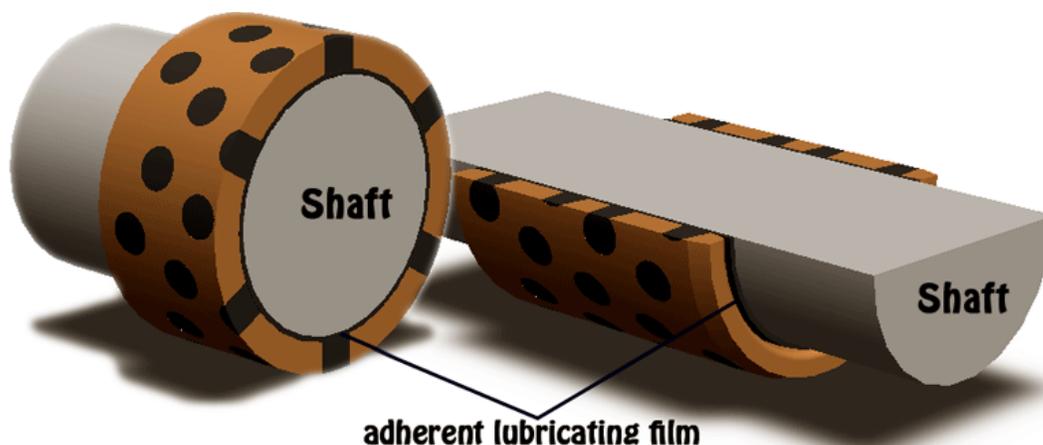
MATERIAL PROPERTIES

- Allows maintenance-free operation due to the solid lubricant content
- Can accommodate high static and dynamic loads
- Is resistant to dirt, corrosion, impact stress, and edge loading
- Can be used over a large temperature range.
- Can be used in salt water
- Tolerates a high level of misalignment
- Can also be used in applications involving additional, convention lubrication



MATERIAL STRUCTURE

National Enduralube bearings consist of a highly wear resistant cast bronze alloy containing sliding surfaces with evenly provided solid lubricant material. The plug type lubricants are arranged according to the movement requirement. The high density of the bronze guarantees high stability under load coupled with good dirt particle embedding properties into the lubricant plugs. Under dry running conditions the solid lubricant is transferred to the mating material at the first contact between the sliding partners.



CHEMICAL RESISTANCE

The following decision chart provides guidance on the selection of the 3 most popular bronze alloys according to the environmental conditions of the application.

Definitions	
R	Resistant
O	Resistant depending on construction, oxygen content, temperature, etc.
X	Not Recommended

STRONG ACIDS	Concentration %	Temperature in °C	C93200	C95400	C86300
Hydrochloric Acid	5	20	X	O	X
Hydrofluoric Acid	5	20	O	O	X
Nitric Acid	5	20	X	X	X
Sulfuric Acid	5	20	O	R	X
Phosphoric Acid	5	20	O	O	X
WEAK ACIDS					
Acetic Acid	5	20	X	O	X
Formic Acid	5	20	X	R	X
Boric Acid	5	20	X	R	X
Citric Acid	5	20	X	R	X
BASES					
Ammonia	10	20	X	X	X
Sodium Hydroxide	5	20	O	R	O
Potassium Hydroxide	5	20	O	R	O
SOLVENTS					
Acetone		20	O	R	O
Carbon Tetrachloride		20	O	O	O
Ethanol		20	O	R	O
Ethyl Chloride		20	O	R	O
Glycerin		20	O	R	O
SALTS					
Ammonium Nitrate			X	X	X
Calcium Chloride			R	R	R
Magnesium Chloride			R	R	R
Magnesium Sulfate			R	R	R
Sodium Chloride			R	R	R
Sodium Nitrate			R	R	R
Zinc Chloride			X	O	X
Zinc Sulfate			O	O	O
GASES					
Ammonia			O	O	O
Chlorine			X	X	X
Carbon Dioxide			R	R	O
Fluorine			X	X	X
Sulfur Dioxide			O	O	X
Hydrogen Sulfide			O	O	O
Nitrogen			O	R	X
Hydrogen			O	R	X
FUELS & LUBRICANTS					
Paraffin		20	R	R	R
Petroleum		20	R	R	R
Fuel Oil		20	R	R	R
Diesel Fuel		20	R	R	R
Mineral Oil		70	R	R	R
OTHERS					
Water			R	R	O
Sea Water			O	R	X
Resin			R	R	O
Hydrocarbon			R	R	O

HANDLING INSTRUCTIONS

Installation

In most cases, Enduralube Bearings are used with a press fit in the same manner as general sleeve Bearings. Fit the Bearings into housings using mandrels or press. In case of a relatively large interference, provide both the ID of the housing and the OD of the Bearing with chamfers, and fit the Bearing into the housing with mandrel for easy installation.

Break-in Instruction for Enduralube Bearings

At the on start of the operations, contact surfaces of shafts and Bearing are smooth, however, microscopic irregularities are inevitable to develop after continued use. A deviation from true center alignment may also exist. Thus the initial contact between sliding surfaces could be local.

Do not immediately start a regular loaded operation. It may result in damaging the bearing surfaces, leading to a shorter service life. Instead, gradually break-in operations so to smooth out the microscopic irregularities, and allow the entire pressure support area to slowly come in contact without causing damage. This is called a “break-in for familiarity”.

The performance of Enduralube bearings can be greatly affected by surface roughness, the use of plated or non-plated surfaces and mating materials which form the friction between two solids.

Surface Roughness

In case of solid lubricant Bearings, like Enduralube, their operational lives are determined by whether or not a lubricating film of solid lubricants can be formed on sliding surfaces of either mating materials or the Bearings. Surface roughness of mating materials within 3 ~ 12 micron meter is sufficient for proper performance of the Bearings. A mirror finish, as in the cases of oil lubricating Bearings and plastic Bearings, is not necessary.

Surface Treatment

The three main reasons for treating mating surfaces are:

1. To improve corrosion resistance.
2. To improve surface hardness.
3. To improve surface smoothness for better lubricity.



QUOTATION REQUEST FORM

CUSTOMER:

Company _____ Phone: _____

Address _____

City/State _____ Zip _____

Name _____

Date _____ Email _____

CHOOSE BEARING STYLE



Sleeve Bearing



Flanged Bearing



Thrust Washer



Wear plate

Material (Alloy) _____ Quantity _____

Dimensions:

Inner Diameter _____

Groove Style _____

Outer Diameter _____

Additional Information

Overall Length _____

Flange OD _____

Flange Thickness _____

Plate Length _____

Plate Width _____

Plate Thickness _____