

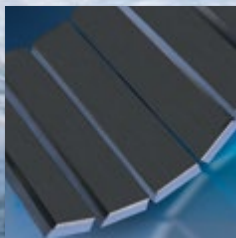
The World Leader
In Water-Lubricated
Bearing Technology.



Setting Industry Standards With Innovative Engineered Bearing Solutions
For Hydro-Turbines



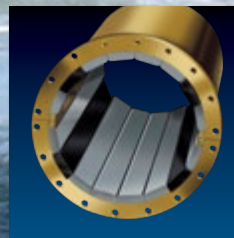
Cutless® Industrial Sleeve
and Flange Bearings



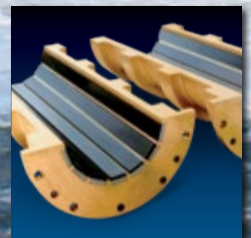
ROMOR-I Bearings



Demountable
Stave Bearings



DMX® Polymer
Alloy Bearings



Segmental Housings

Duramax® Water-Lubricated Bearing Technology Has Earned the Trust of Marine and Pump Professionals Around the World.

On more vessels at sea than any other bearing.

For over 60 years we have continuously lead the industry with our engineered water-lubricated rubber bearing solutions. Our Cutless® Bearing is the original, only true Cutless® Bearing. It has become the most recognized bearing in the industry, and the bearing that has set the performance standards for other manufacturers to meet. Cutless® has become standard equipment on more vessels, oem pumps and hydro turbines than any other bearing.



The Workboat Industry trusts our advanced bearing technology to keep their vessels on the job, in the harshest environments.



The Fishing Industry relies on our trustworthy bearing solutions to fight the seas while bringing in their catch, then return to their families safe.



Over 90% of the ships and submarines in the U.S. Navy operate with Duramax® Rubber Bearing Technology.



The U.S. Navy depends on our innovative bearing solutions to keep trillions of dollars worth of operating equipment at sea.

OEM part on leading pump brands for over 40 years.

Duramax® Industrial water-lubricated rubber bearings are the environmentally friendly answer to meeting the requirements of a more ecologically friendly world. Unlike hard surface bearings that will damage and score the shaft in abrasive environments, the elasticity of the rubber and hydrodynamic design of the Cutless® Industrial bearing causes abrasives to be flushed away - greatly reducing the chance of scoring the shaft. The result is long bearing and shaft life, increased production, and reduced maintenance cost.

Cutless® Industrial Bearings are found in a variety of industries.

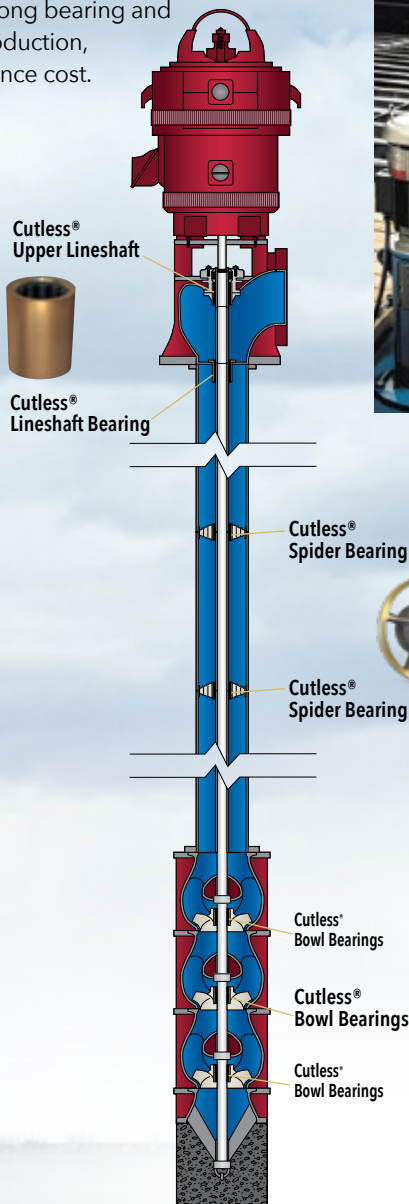
Nuclear power plants, utilities, mining operations, off-shore drilling, manufacturing plants, sewage and water treatment plants, and agricultural operations.

Cutless® Industrial Bearings rotating shaft applications.

Aerators, classifiers, vertical sump pumps, irrigation, mining equipment, custom pumps, vertical bowl, vertical turbine pumps.

Other applications where lubricating water and similar fluid is available:

- Dredging and other horizontal pumps including sand, cement slurry and other abrasives.
- Cutter suction dredges.
- Drainage Pumps.
- Industrial processing equipment including agitators, industrial washers, water treatment, sewage treatment, elevator boot pulleys, thickeners and classifiers.



We are constantly researching and developing new innovations, advancing technology, and custom designing new solutions to address our customers' toughest bearing challenges, while reducing their maintenance costs.

Duramax® rubber bearings have proven themselves to be the best in the world, under the toughest conditions. Our bearings are designed with a low coefficient of friction that results in long wear life, and protects the shaft from damage and wear.

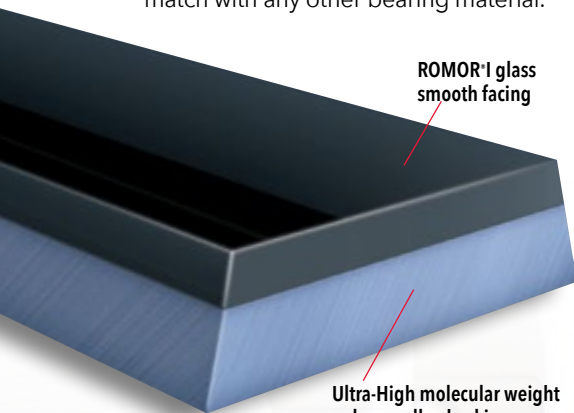
Marine, Pump and Hydro industry professionals trust Duramax® bearing products, because of their high quality and unmatched performance. It's why our competition constantly tries to compare their new materials and designs to our bearings that have proven themselves for decades, in the harshest working environments.

Trust us, if there was a better water-lubricated bearing solution, we would have developed it.

The Same Duramax® Water-Lubricated Bearing Technology Delivers 20 Years Performance and 40 Year Liner Life At The Holtwood Dam.



Pennsylvania Power and Light's Holtwood Dam's site has experienced the remarkable performance of Duramax® guide bearings with ROMOR® I Staves operating on split welded sst shaft liners. It is a unique record that will be hard to match with any other bearing material.



ROMOR® I glass smooth facing

Ultra-High molecular weight polymer alloy backing

ROMOR® I Glass Smooth Facing.

Specially formulated proprietary nitrile rubber is engineered with a controlled thickness, a 15 to 20 micro-inch glass-smooth finish and 80 Durometer, Shore A, hardness. The glass-smooth surface greatly reduces initial friction, eliminating stick-slip at extremely low journal velocity. It reduces the occurrence of low speed noise, and reduces total system wear even in the harshest of environments.

Ultra-High Molecular Weight Polymer Alloy Backing.

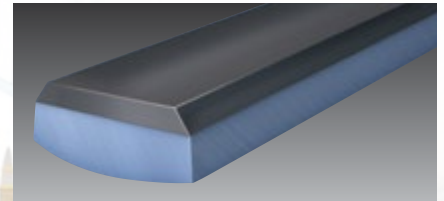
The backing is lightweight, unbreakable, and corrosion resistant. The nitrile rubber layer is integrally bonded to this revolutionary high impact backing. Bond is not a parting line, and has never failed in an adhesion pull test. Together, these integral layers of nitrile rubber and polymer alloy dampens vibrations and absorbs shock.

Romor® I All-Polymer Construction and Low-Friction result in long life.

ROMOR® I outlasts brittle stave materials such as Lignum Vitae, hard rubber and polyurethane alloys. And it outlasts phenolic laminates 18 to 1. ROMOR® I staves' low friction characteristics resulted in unmatched high performance and extended bearing and liner life - translating to a reduction in maintenance costs.

Romor® I is available in Radius-Backed Locking Staves.

Staves are made to fit specified radius. They are placed directly into bored housing along with all-rubber "locking" staves. When compression head bolts are tightened, "locking" staves are compressed forming a rigid compression fit with adjacent ROMOR® I staves.

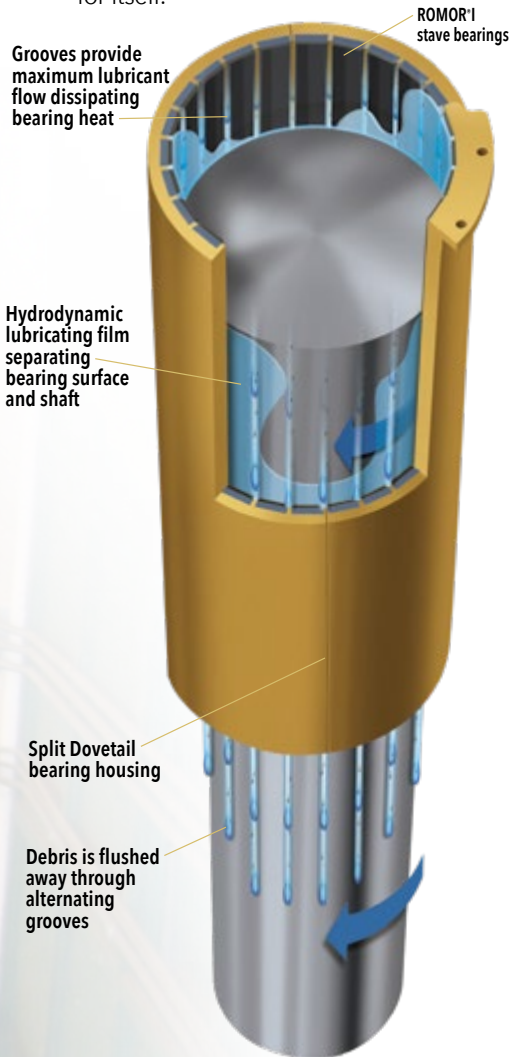


Main guide shaft bearing with Romor® I Rubber Staves

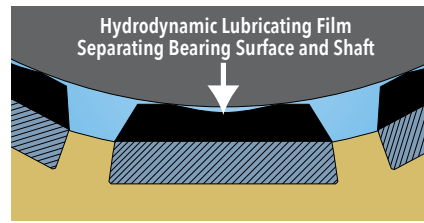
Engineered Rubber Bearings Still Setting Performance Standards.

Since its discovery, the use of rubber as a water-lubricated bearing has baffled scientists, engineers and tribology experts. Duramax® has been involved with the research and development of this product since the beginning. Since the acquisition of the BF Goodrich bearing division in 1996, we have invested millions of dollars in research & development. Our goal is the understanding of tribological forces which occur in water-lubricated shaft bearings and designing the best solutions possible.

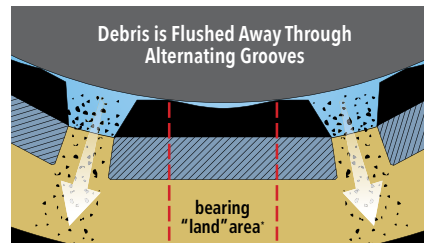
Our competition would have you believe that rubber is an antiquated and inferior technology. This is simply untrue. We are continually updating and improving our rubber polymers and our bearings' superior performance speaks for itself.



Water Wedge Principle Minimizes Liner Wear.



The elastic characteristic of the ROMOR®I Bearing Stave allows it to deform and create a natural pocket allowing a hydrodynamic lubricating film to develop between the bearing surface and shaft. At high journal velocities the shaft is riding on a thin film of water, totally separated from the bearing, decreasing friction significantly. At this stage the **coefficient of friction is well under 0.001**, reducing "system wear" to a negligible amount.



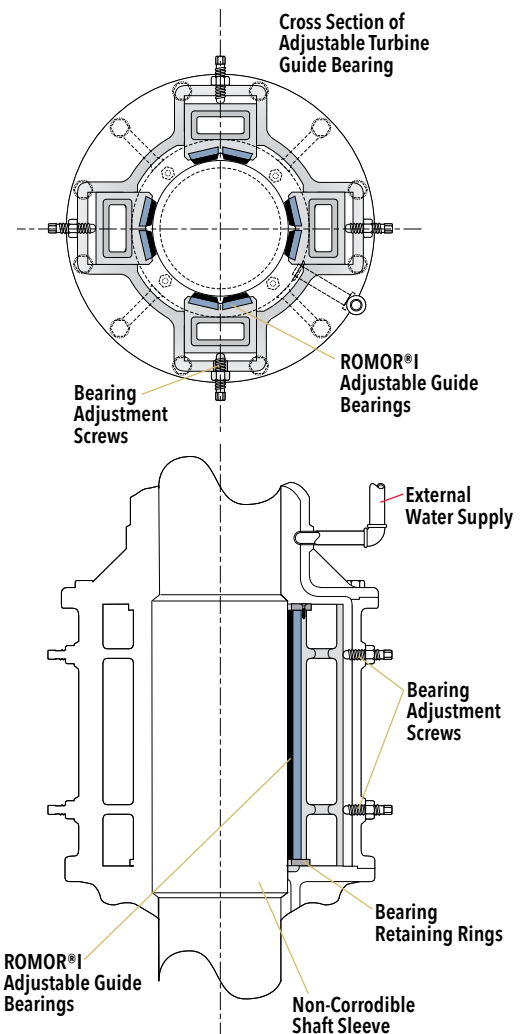
A seal is also created on both the leading and trailing edges, as well as the ends of the bearing "land" areas. This action provides superior hydrodynamic grit rejection. The abrasive grit is flushed into the alternating grooves away from shaft. After a short break-in period (approximately 24 hours of operation) the rubber reaches an equilibrium and a permanent hydrodynamic pocket is formed for continued ultra-low friction operation.

Focused on "Total System Wear."

Duramax® has a fully equipped in-house test facility certified by the U.S. Navy for conducting Mil-Spec qualification testing. We have multiple test rigs that are operated on a full time basis. We perform screening and advanced testing in both clean and abrasive water conditions. Our testing focus is on "System Wear"- which takes into account both bearing and shaft liner wear. This gives you the true measure of bearing performance. Competitors claim their bearings "last forever"- but if it wears the liner at an accelerated rate, the effects of long bearing life are negated.

ROMOR®I Bearing Housings.

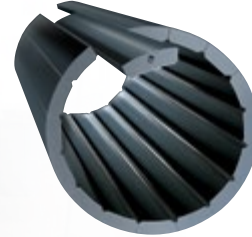
Bearing shoes can be designed to house a series of Romor®I Staves. Shoes are assembled to form the bearing housing. When needed, each bearing shoe may be moved radially to easily adjust bearing clearances. It allows for the greatest length of service without renewal of the bearing or sleeve.



High Performance Bearing Solutions That Extend Both Bearing And Liner Life.

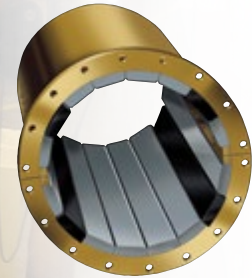
For 75 years Duramax® Industrial hydrodynamic bearing technology has helped the hydro industry increase performance to meet the demands of the country's power needs.

We recommend the latest in bearing technology that will best serve your operation, then custom design a system that best serves your needs.



Duramax® Stave Bearings.

- Stave bearings can be designed for sizes as small as 2-1/2" to 35-1/2" and larger if needed
- They allow for easy change-out without removing shaft
- Can be manufactured to custom thicknesses to compensate for shaft and liner wear (*Available from 0.600" to 1.5" stave thickness*)
- Staves can be custom manufactured in various rubber compounds to meet specific requirements



Duramax® DMX.

DMX is a revolutionary polymer alloy bearing and can be manufactured in stave or partial arc designs. It has a low coefficient of friction from 0.14 at breakaway to an unmatched 0.0036 at most operational shaft speeds.

- Operates with near-zero shaft/sleeve wear
- Excellent in abrasive applications
- Operates with water or oil lubrication
- Dry-run capable up to 10 minutes in event of water shutdown
- Can be used in a 1:1 or less LD configuration
- Runs extremely well at low shaft speeds without noise or vibration
- Runs extremely well with tight shaft clearances
- Load Capacity: Typical max load 240 npsi





Duramax® Cutless® Sleeve and Flanged Bearings.

It is the water-lubricated bearing that has set the highest standards in marine and industrial applications. They are sold around the world and the most recognized bearing on the market today. Cutless® features translate to key benefits for variety of hydro-turbine applications:

- Hydrodynamic at approximately 1 m/sec
- Can operate in excess of 12,000 rpm
- Operates in fluids up to 150° F (65.5 C)
- Load Capacity: Typical max load 40 psi (0.28 N/mm²)
- Operating coefficient of friction 0.010 to 0.0001

Cutless® is designed with a molded, engineered nitrile rubber lining inside a naval brass shell. They are available in sizes from 3/4" to over 36". They come in solid and split shell design.

Custom engineered molded rubber liner compounds for specific applications:

- Nitrile (of varying Durometer)
- Viton®
- Saturated Nitrile
- SBR
- Hypalon
- EPDM
- Food grade
- Neoprene

Shells can be manufactured in various alloys to match your operating requirements:

- Stainless steel
- Naval brass
- Bronze
- Carbon steel
- Aluminum
- Titanium
- Phenolic (non-metallic)



Duramax® Industrial engineered bearing installed

Duramax® Industrial Relining Service is a Cost-Saving Option.

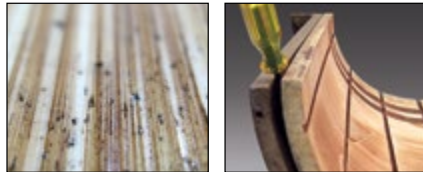
Duramax® relined customer's competitive bearing that experienced complete failure.

This is an example of a competitor's polyurethane elastomeric bearing that a customer tested in a hydro installation. The manufacturer promised "twice the life" of rubber bearings and resistance to abrasives. It was a complete failure. Abrasives embedded in the bearing's surface scored and wore the stainless steel liners on the main guide shaft. The polyurethane material also de-bonded from the housing and cracked. The customer came to us for help. We were able to reline the bearing shell with a NEW Duramax® engineered rubber compound specifically designed for use in highly abrasive applications.

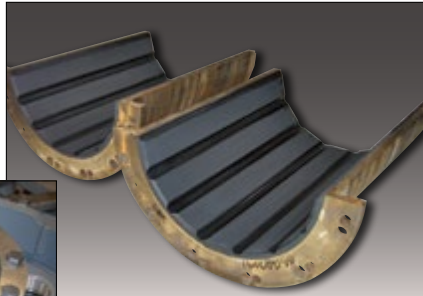
BEFORE: Competitor's polyurethane failed and separated from shell.



Bearing's surface embedded with abrasives. Polyurethane material de-bonded from housing.



AFTER: Reline with Duramax® engineered polymer compound.



Duramax® Cutless® Bearings can be restored after more than a decade of use.

A full-molded Duramax® bearing with shells in good condition can be relined and returned to service. The relined bearing will deliver the same superior performance as the original. Cutless® features translate to key benefits for a variety of hydro-turbine applications:

- Your bearing is inspected to make sure it can be relined.
- The old lining will be completely removed.
- A new lining will be permanently bonded to the shell. The restored bearing will be identical in all respects to our new bearings.

BEFORE: Duramax® Cutless® bearing after 16 years in service.



AFTER: Reline, with same superior performance of a new Cutless® bearing.



For more information contact
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The World Leader In Water-Lubricated Bearing Technology.

Setting Industry Standards
With Innovative Engineered Bearing Solutions
For Hydro-Turbines



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