



Experience Performance

**EXPERT ANALYSIS, REPAIRS & UPGRADES
FOR BEARINGS & SEALS**

IMPROVE EQUIPMENT EFFICIENCY & SERVICE LIFE

MEETING INDUSTRY NEEDS

Bearings Plus® is committed to getting your rotating equipment back up and running, more efficiently than ever before. We diagnose problems and follow up with custom-designed solutions to address your unique challenges.

Established in 1994 to service the fast turnaround needs of the petrochemical plants along the Gulf Coast, Bearings Plus has its roots deep in the rotating machinery industry and has established itself as a leader in the design, manufacture, and servicing of fluid film bearings and seals.

FOUNDED ON TECHNICAL EXCELLENCE

Our team of highly trained designers and craftsmen applies proven technologies to improve the efficiency and service life of rotating equipment in the oil & gas, power generation, processing and general industrial markets.

We design and manufacture bearing assemblies and seals and offer expert repair and upgrades. Our precision manufacturing capabilities achieve the tight tolerances required for peak performance. As the aftermarket arm of Waukesha Bearings®, we have access to the most sophisticated testing facilities and advanced engineering expertise in the industry.

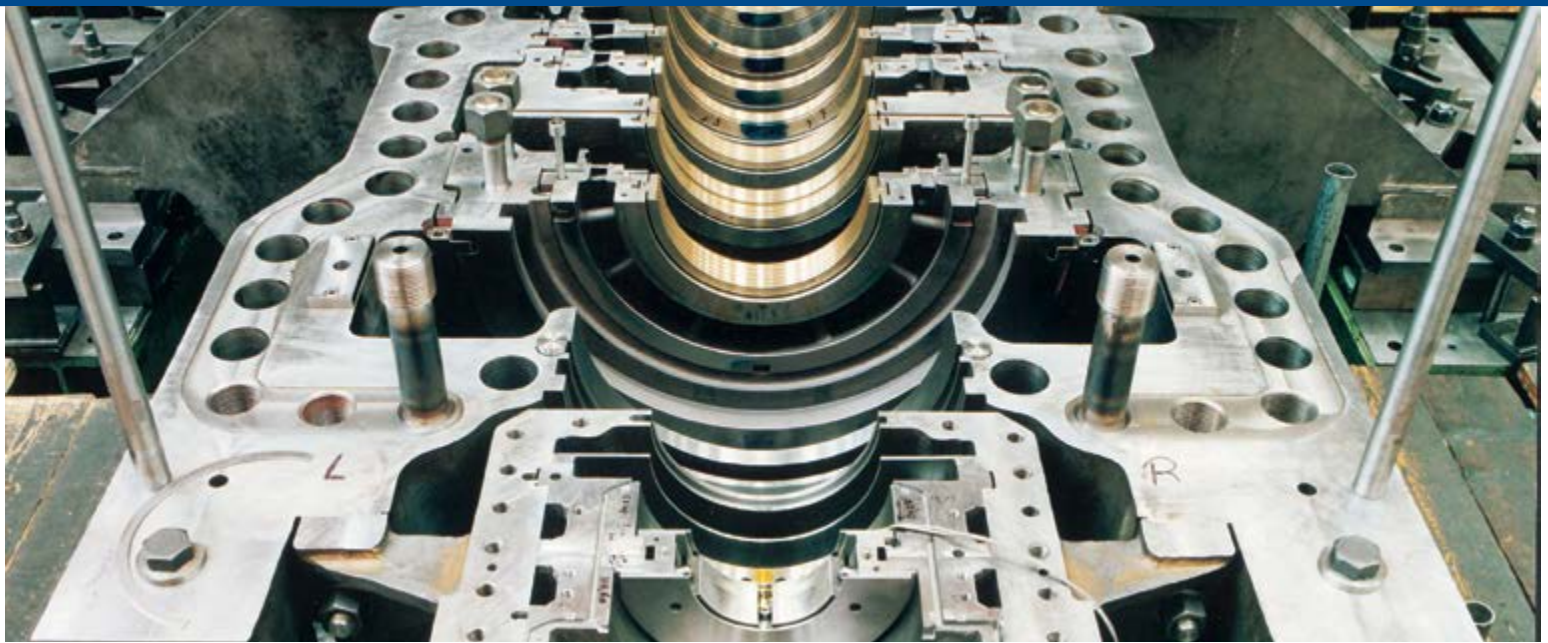
SETTING THE STANDARD WITH RESPONSIVENESS

Our experts know the importance of paying attention to detail, whether for routine maintenance or a full rotordynamic optimization and retrofit. By providing the industry with high-quality analysis, service and solutions, BPI has improved reliability and performance in countless machines.

We are proud of our long list of satisfied customers that rely on our steadfast ability to respond.



Bearings Plus holds an exclusive license for the design and manufacture of Flexure Pivot® tilt pad bearings and ISFD® technology, two leading vibration solutions for rotating equipment.



System Optimization

Bearings play a critical role in rotating equipment reliability, efficiency and life. Having the right bearing for your application and operating conditions is essential to the successful long-term operation of your equipment. Likewise, seals and dampers can significantly affect system stability and efficiency.

Bearings Plus applies 25 years of experience along with proven design codes and advanced analytical techniques to optimize bearing, damper and seal configurations and enhance the rotordynamic characteristics of your system.

ADVANCED ROTORDYNAMIC ANALYSIS

As part of our state-of-the-art analytical services, we offer full rotordynamic analysis, evaluating the bearing and seal characteristics simultaneously to better understand the independent effect of each component.

Bearings Plus can develop rotor models, simulate critical speeds and rotor modes, characterize unbalance and destabilizing forces, and recommend solutions to lower power losses, increase load capacity, lower vibration amplitudes, lessen sensitivity to imbalance, accommodate misalignment, or achieve other operating requirements for your equipment.

The end result:

GREATER OVERALL PERFORMANCE





Repairs, Replacements & Upgrades

Bearings Plus is a service-oriented shop with extensive repair capabilities for fluid film bearings from any supplier. We handle fixed profile and tilt pad designs of thrust, journal and combination bearings at diameters up to 910 mm (36").

We also manufacture complete replacements and custom designs, and offer proprietary solutions to improve stability, control vibrations, eliminate pivot wear and address a myriad of other challenges.

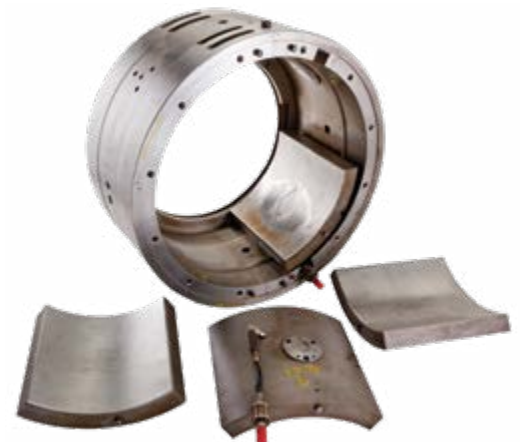
BPI has upgraded bearings on numerous integrally geared compressors, multi-stage compressors, blowers, fans, steam and gas turbines, expanders, motors, generators, pumps and gearboxes.

In addition, our service team can refurbish, replace or retrofit labyrinth seals, brush seals, damper seals and babbitted oil film floating seals.

STATE-OF-THE-ART SUPPORT

In-house babbitting, computer numerically controlled (CNC) and electrical discharge machining (EDM) machines, and manual mills and lathes, together with experienced craftspeople, mean that all of the work on a bearing or seal can take place on-site, saving customers time and money.

Our state-of-the-art equipment, specialized measurement machines and robust quality inspections ensure the work is done with precision, as well as speed.



A 419 mm (16.5") bore Frame 7FA bearing in need of repair; the completed repair is shown at the top of the page.

COMMON REPAIRS

Resurfacing worn tilt pad bearings
Grinding links and pads
Rust removal
Addition of coatings



Failure Analysis

While fluid film bearings are designed for infinite life under design conditions, they are also designed to be a sacrificial component in case of upset conditions. Therefore, issues with the machine will likely manifest at the bearings.

Bearings Plus offers analysis to help pinpoint the cause and mode of failure in order to eliminate or otherwise address it. We visually examine the damaged component, evaluate operating data, review related incidents or recent modifications, look at the sequence of events leading to the failure, and more, to identify the root cause.

Frequently, more than one factor combines to result in a failure, and a complete picture of the operating conditions and background can help identify the issue(s).

COMMON TYPES OF FAILURE ANALYZED

Babbitt fatigue, wiping, creep and thermal ratcheting

Bond failure

Brinelling and fretting wear in bearing pads and shells

Cavitation damage

Electrical shaft current damage

Scoring by foreign matter or dirt

Corrosion damage

Pad flutter



(Top to bottom) Severe wiping of thrust pad from inadequate lubrication; field analysis of bearing damage; babbitt fatigue.



Fluid Film Bearings

Bearings Plus delivers fixed profile and tilt pad bearing solutions expertly engineered to your equipment's individual operating conditions.

With a variety of proven journal, thrust and combination bearing designs, bearing sizes ranging from 7 mm (0.3") to more than 910 mm (36"), and years of experience supplying critical applications, Bearings Plus can design and manufacture a bearing solution to your exact specifications.

HIGH-PERFORMING UPGRADES

Flexure Pivot® tilt pad bearings are a leading bearing solution for high-load, high-speed, small-diameter shafts.

The Flexure Pivot tilt pad moves through flexure of the post support, eliminating pivot wear and high contact stresses. The custom design of the post support to each application ensures optimal performance, without degradation over time. On journal bearings, the Flexure Pivot tilt pad provides low cross-coupling and high stability. On thrust bearings, it can increase load capacity and reduce power loss.

Due to their compact design, Flexure Pivot journal and thrust bearings are ideal for retrofit, even in small spaces where typically only fixed profile bearings would fit.

ISFD® technology is a sophisticated integral squeeze film damper that provides an unmatched vibration solution for new and retrofit installations. The design provides precisely controlled stiffness and damping that maximizes energy dissipation at the bearing location and significantly improves system stability.



Bearings Plus ball and socket thrust bearings are a self-equalizing design that also reduces pivot wear and contact stresses.



ISFD technology can be applied to increase dynamic stability in rolling element, fixed profile and tilt pad bearing designs.



Sealing Systems

Bearings Plus sealing solutions improve efficiency and solve rotordynamic issues in gas turbines, steam turbines, compressors, pumps, turboexpanders, and electric machinery. Our state-of-the-art engineering tools and manufacturing processes ensure conformance with precise specifications and rigorous quality standards.

BRUSH SEALS

Bearings Plus compliant brush sealing systems can be applied to a wide variety of rotating equipment in air, steam, or process gas applications to reduce the leakage gap between the sealing surface and rotor.

The compliancy of a brush seal allows the bristles to deflect with minimal wear, thereby maintaining a small leakage gap over time and increasing operational efficiencies. Our flexible sizing and replaceable bristle pack provide the benefits of quick turnaround times, ease of installation, and seal repair.

DAMPER SEALS

Bearings Plus offers honeycomb, hole pattern and pocketed damper seal technologies to ensure reliable rotordynamic operation for high-performance applications. These sealing technologies not only control leakage but also generate damping at the ideal location along the shaft, improving machine stability.

LABYRINTH SEALS

Bearings Plus provides custom-engineered labyrinth seals in conventional metals or advanced thermoplastics. The abrasionable nature of thermoplastics allows a labyrinth seal to be designed to a tighter clearance, reducing leakage and improving machine efficiency. We can also fit labyrinth seals with brush seals to reduce the leakage gap.



The engineering experience and in-house analytical tools at Bearings Plus enable us to provide system-level analysis to outfit large utility steam turbines with brush seals.



Brush seals can reduce labyrinth leakage by up to 50%.

WHO WE ARE: DOVER PRECISION COMPONENTS

Bearings Plus® is part of Dover Precision Components, an integrated provider of performance-critical solutions for rotating and reciprocating machinery across the oil & gas, power generation, marine, industrial, chemical and general processing markets.



Comprising the Waukesha Bearings®, Bearings Plus®, Inpro/Seal® and Cook Compression® brands, the Dover Precision Components portfolio includes hydrodynamic bearings, active magnetic bearings, system and bearing protection, and reciprocating compressor components. Each solution is custom-engineered to provide optimum efficiency, reliability and productivity, and backed by comprehensive aftermarket services.

Dover Precision Components serves its global customer base through facilities in North America, Europe, Asia and the Middle East, as well as technical sales representatives around the world.



www.bearingsplus.com | info-bpi@doverprecision.com