

## The Bearing Solutions to Alleviate Critical Pain Points in Hydropower Applications

Hydroelectricity presents several advantages over most other sources of electrical power, including a high level of reliability and environmental sustainability, proven technology, high efficiency, flexibility and a large storage capacity. As a consequence, hydropower is a leading source of renewable clean energy worldwide and it is poised to remain so, especially in areas with undeveloped hydropower potential.

In order to harness the power of hydropower to reduce global reliance on electric power from carbon intensive fossil fuels, hydropower must find solutions to critical problems facing the industry, including an ongoing need to improve production while reducing operating costs and maintaining reliability, and those problems imposed by environmental and mechanical demands.

### Reduce Operations & Maintenance Costs

In [hydropower applications](#), there is an ongoing cost/benefit analysis that balances the operations, maintenance and fuel costs with the amount of electricity produced. Therefore, it is critical that applications of this nature use quality, low -maintenance parts in an effort to improve production and keep operating costs to a minimum.



GGB offers high performance bearing solutions that meet the global demands of the hydropower industry. In fact, GGB's [HPM composite bearings](#) – specially designed for hydropower water turbines, gates and valves – were subjected to U.S.

Army Corps of Engineers (USACE) tests modified to simulate 30 years of operation rather than the standard eight years. Based on test results, the bearings were selected for extended wicket gate service at the [Belo Monte hydroelectric power plant](#).

Self-lubricating bearings require little to no maintenance, eliminating the need for customers to apply additional lubricants. GGB's corrosion-resistant, greaseless HPM, [HPF](#) and [HPMB™ composite bearings](#) combine the self-lubricating properties of PTFE with the high strength and stability of an oriented, glass-fiber-filled epoxy resin backing.

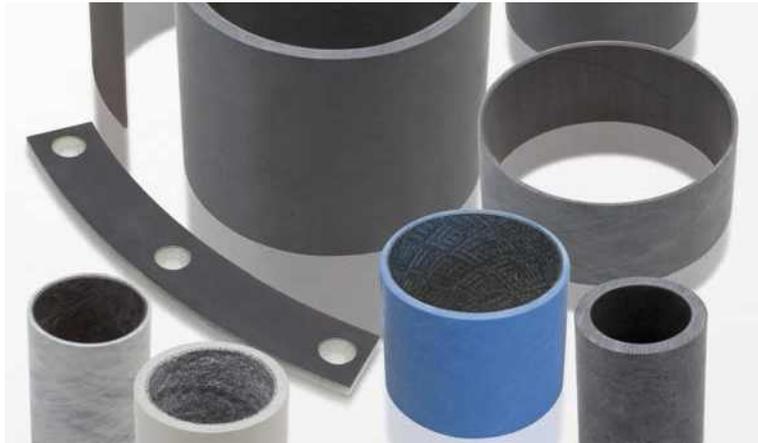
The reliability of GGB bearings improve the mechanical efficiency of the systems in which they are installed, reduce long-term maintenance, minimize corrosion and eliminate the need for constant lubrication. With low wear rates and exhibiting excellent performance under dithering conditions, the HPMB™ bearing also features a very low coefficient of friction. The benefit of less wear reduces energy consumption that in turn benefits turbine design and provides extended service life.

Today's hydropower plants are under intense financial scrutiny. A reduced operational staff is expected to operate and maintain more equipment at a lower cost, while also delivering higher output. GGB addresses these pressures head-on and works with each individual customer to deliver cost-efficient customized solutions.

### **Reduced Pollution Caused by Lubricants**

There's no question hydropower is one of the most attractive renewable sources of energy, considering its many benefits. However, the industry is not void of environmental consequences, such as impacts to land use and natural habitats in the dam area.

Along with developing hydropower bearing solutions that make sense economically, GGB is dedicated to environmental stewardship. GGB's environmentally friendly HPM, HPF and HPMB™ fiber reinforced composite bearings are self-lubricating, eliminating the need for additional lubricants that can contaminate rivers. This is especially important considering in most instances bearings that require lubrication are injected every 15 minutes. GGB's [self-lubricating bearings](#) do not require those injections and subsequently grease doesn't end up in the rivers.



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Additionally, these fiber reinforced composite bearings are developed for corrosive environments such as seawater and acidic environments, and do not break down and contaminate waterways.

GGB's commitment to responsible environmental stewardship extends throughout its business. Its line of lead-free plain bearings comply with the European Union End of Life Vehicles (ELV) and the Restriction of Hazardous Substances (RoHS) directives, and GGB is continually working to generate technologically superior products and processes that are respectful of the environment. Additionally, GGB is fully aware of its responsibility to safeguard the environment through sound business practices, and by preventing pollution and minimizing waste through recycling.

### **Technological Leadership**

For more than 100 years, GGB bearing experts have been providing knowledge and solutions for critical applications in the hydropower industry. GGB's engineers work with customers to develop innovative approaches to designing, installing, retrofitting and operating bearing components that ultimately save facility owners time and money.

GGB also actively pursues research and development (R&D) programs to improve the operating efficiency and performance of their bearing materials in hydropower facilities. For example, validation tests of GGB's new HPMB™ material, performed by Powertech Labs in



British Columbia, Canada per USACE test protocol, demonstrated dry coefficient of friction 0.068 and minimal stick slip effect, contributing to a smooth operation of the adjusting mechanism. The knowledge gained from this testing helps assure consistent high-quality bearing performance, superior new product development, and appropriate and validated bearing selection and design.

GGB responds to each application's specific needs with a vast range of standard or custom bearings to offer high load capacities, low friction and wear, [long life](#), reliability, low water absorption for dimensional stability and [excellent corrosion resistance](#).

For more information, please contact [hydro@ggbearings.com](mailto:hydro@ggbearings.com) or visit [www.ggbearings.com](http://www.ggbearings.com).

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