

# Global environmental focus: hydropower



Put simply, hydropower uses the energy of moving water to produce electricity.

According to the International Hydropower Association, hydropower is currently used in about 150 countries. This energy source provides around 17 percent of the world's estimated installed electrical power capacity and 72 percent of estimated renewable energy-sourced capacity. Rising economies in Asia, specifically China, and Latin America, specifically Brazil, account for 60 percent of the world's activity. These developing nations concentrate on new hydropower infrastructure while North America and Europe focus primarily on modernizing existing facilities and new pumped storage facilities.

## Increasing activity means more demand for environmentally-friendly bearings and seals

Just as more and more hydropower projects are being planned, developed and refurbished, so too is the demand for high-quality engineered bearings and seals for these applications on the rise. Within hydroelectric turbines, applications include wicket gates and blade hubs, control linkages, servo cylinders, distributor rings, main guides and main shafts. Spillway gates and switch gears also require them.

Not only do these bearings and seals need to perform well, they also need to be reliable and long-lasting. As important, there is a growing demand for them to be environmentally-friendly. Traditional grease-lubricated bronze bearings do not accomplish this requirement, but self-lubricating composite bearings are a perfect solution.

# Specific examples of sealing and bearing solutions in applications within a hydropower station.



## Switch gear

Shatter-proof silicone insulators ensure safety while maintaining high voltage.



## Distributor ring

Orkot® wear pads on the distributor ring guarantee low friction.



## Wicket gate guide vane

Orkot® TXMM bearing and spring-energized Turcon® Variseal on the intermediate and lower assembly of the wicket gate guide prevent suspended solids in the water from damaging the wicket gate stems and bearings.



## Runner blade hub

Orkot® TXMM bearings allow for high load capabilities while custom-designed hub seals prevent ingress of water into the hub, at the same time as preventing oil from leaking out of the hub into the environment.




# Orkot® Hydro Bearings


A key component in any hydropower application is the bearing. Trelleborg Sealing Solutions is the world's leading developer and manufacturer of self-lubricating bearings for the hydropower market.

Trelleborg's proprietary Orkot® Hydro Bearings are manufactured from Orkot® TXMM, a material that


incorporates woven fabric reinforcement and solid lubricants within a thermosetting resin matrix. The bearings can run completely dry for extended periods, have excellent wear characteristics, reduce friction and are non-toxic. They can also be water-lubricated.

**Spillway gates**  
Orkot® TXMM trunnion bearings on spillway gates guarantee long life even under the harshest conditions.



**Main shaft**  
Operating in harsh conditions, Orkot® XR21 shaft seals prevent water from escaping and block particles from entering the bearing area.



**Main guide**  
A self-lubricating Orkot® TXMM bearing on the main guide prevents metal-to-metal contact and allows the turbine to run smoothly.

**Servo cylinder**

Orkot® TXMM bearings, rod and piston seals, scrapers and Slydring™ wear rings combine to make a sealing and bearing system that means long life for cylinder applications.




**Control linkages**  
Orkot® TXMM bearings guarantee long life while ensuring performance in limited-motion applications.