

TENMAT

ADVANCED MATERIALS



ADVANCED COMPOSITE BEARINGS & WEAR PARTS FOR HYDRO POWER



TENMAT

ADVANCED MATERIALS

INNOVATION

SAFETY

TENMAT is a leading manufacturer of specialised, high performance engineering materials and components with over 100 years of experience.

SERVICE

TENMAT stands for innovation, safety, commitment to our customers and the latest quality standards worldwide.

QUALITY

A World of Materials

The diversified product range includes composite wear parts and bearings, engineering ceramics, high temperature resistant materials, and passive fire protection solutions.

Commitment to Quality

TENMAT operates an ISO 9001:2008 Quality Management System for the design, development and manufacture of specialised high performance engineering materials and components.

TENMAT HYDRO POWER

Key Benefits of TENMAT Bearings:

- Long Life
- Improved Performance
- Reduced Stick Slip
- High Resistance to Abrasive Environments
- Corrosion Free
- Self-Lubricating
- Low Noise



The ability of **TENMAT** bearings to work in both dry and wet conditions without grease or lubrication makes them the ideal choice for the hydropower industry.

Both FEROFORM T814 and FEROGLIDE bearings have extensive references and are used around the world in bearing and wear strip applications. **TENMAT** works with some of the biggest names in hydro. **TENMAT** has provided solutions for new hydro plants and refurbished thousands of plants worldwide.

Hydro Bearing Applications for TENMAT Materials:

- Control Linkage Bearings
- Main Shaft Guide Bearings
- Operating Ring Bearings
- Segmental Shaft Seals
- Kaplan Hub Bearings
- Guide Vane Bearings



FEROFORM T814

TENMAT FEROFORM T814 is a composite made of a woven synthetic fibre and phenolic resin, with PTFE uniformly impregnated as a friction reducing modifier.

FEROFORM T814 was designed specifically for the hydro power industry as a self-lubricating, high strength bearing material to replace greased bronze. PTFE as an additive enables FEROFORM T814 to operate both wet and dry.

Key Features:

- Self lubricating & thus will operate without external lubrication
- Free from stick slip, giving easy movement & operation
- High wear resistance
- Low water swell, allowing the possibility for tight design tolerances
- High resistance to abrasive environments
- Low friction coefficient due to PTFE impregnation
- Lightweight compared to bronze which allows easy installation

Key Benefits:

- Increased Bearing Life
- Large Application Range
- Reduced Maintenance
- No need for grease or oil
- Improved Performance
- Customized, Bespoke Solutions
- Proven Performance Over Decades
- Can be used in dirty, sandy waters
- Can be used in misaligned systems



FEROGLIDE

TENMAT FEROGLIDE bearings are a proprietary self-lubricating material of woven PTFE fibres applied to a metal backing. Also available is our innovative fabric-free lining with a unique low friction coating.

FEROGLIDE bearings are ideally suited for turbine guide vane assemblies and actuators accommodating the high surface pressures involved.

Key Features:

- Self lubricating & thus will operate without external lubrication
- Free from stick slip, giving easy movement & operation
- High wear resistance
- Large operating temperature range -200°C to +300°C
- Corrosion resistant & can be used with aggressive liquids such as Sea Water, Gasoline, Acids, Detergent Solutions, Hydraulic Oils, Ammonium Hydroxide, Oils
- High strength, capable of carrying high loads

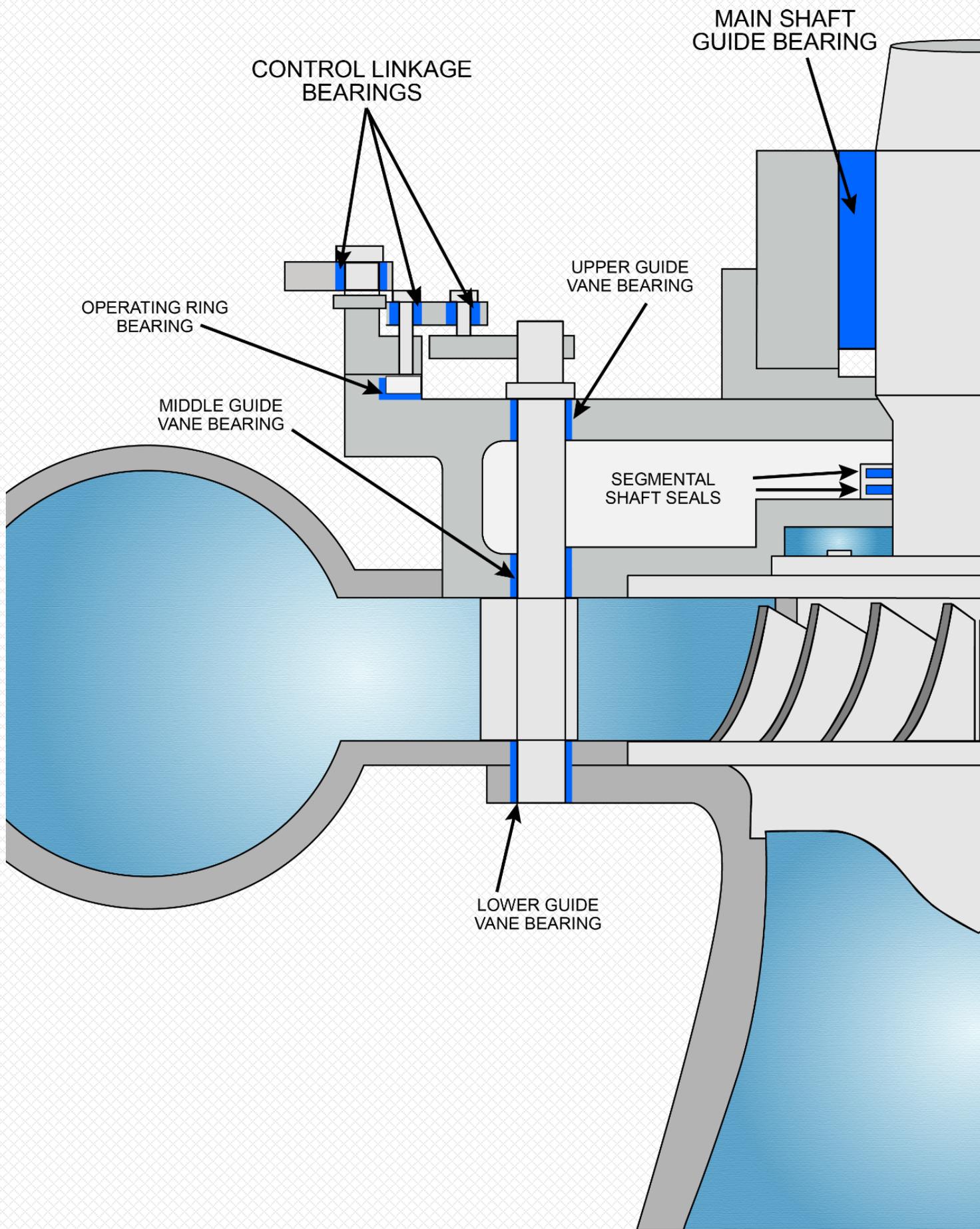
Key Benefits:

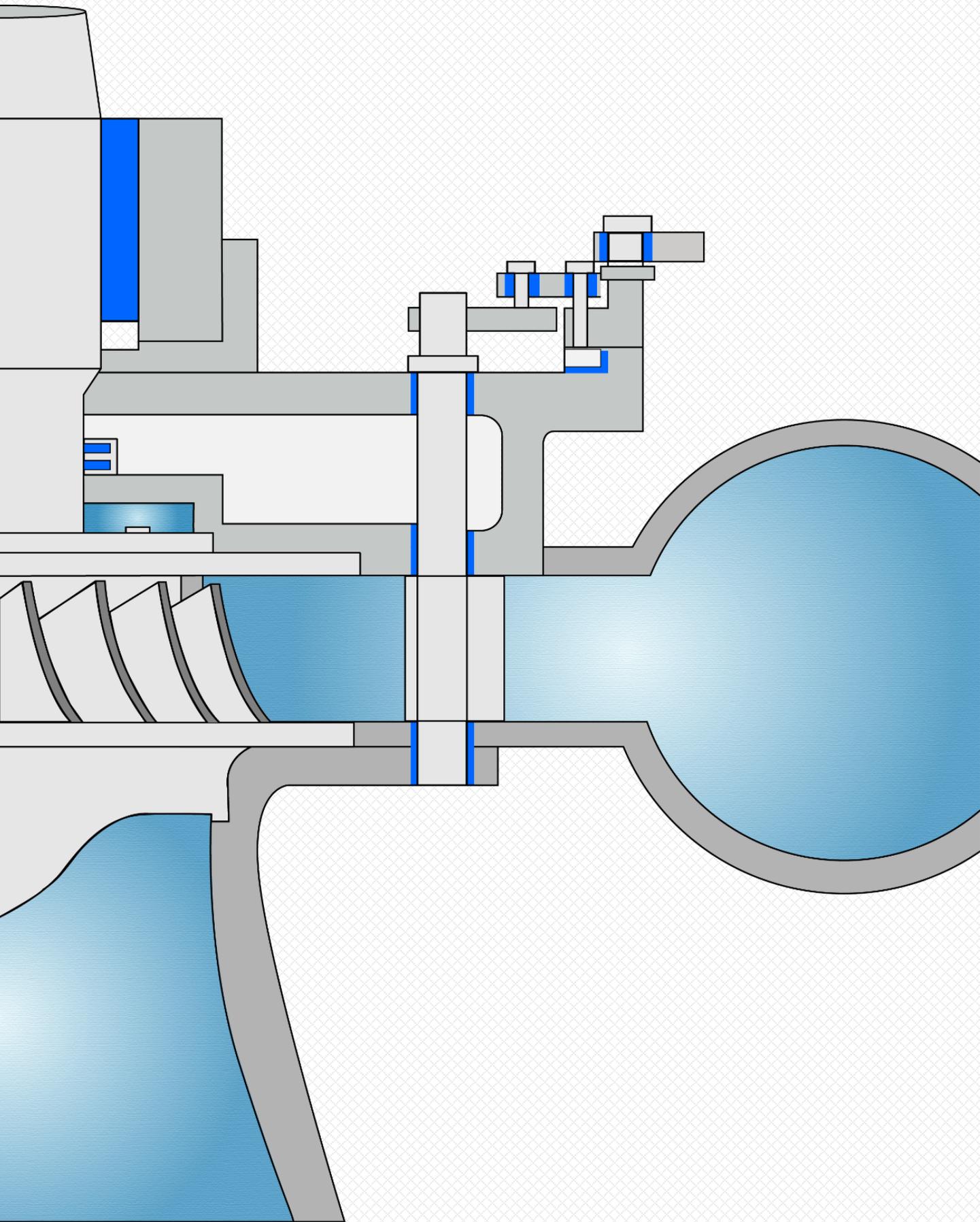
- Increased Bearing Life
- Large Application Range
- Reduced Maintenance
- Significantly Reduced Downtime
- Improved Performance
- Customized, Bespoke Solutions
- Proven Performance Over Decades
- Excellent Chemical Resistance
- Worldwide Distribution



FRANCIS TURBINE APPLICATIONS

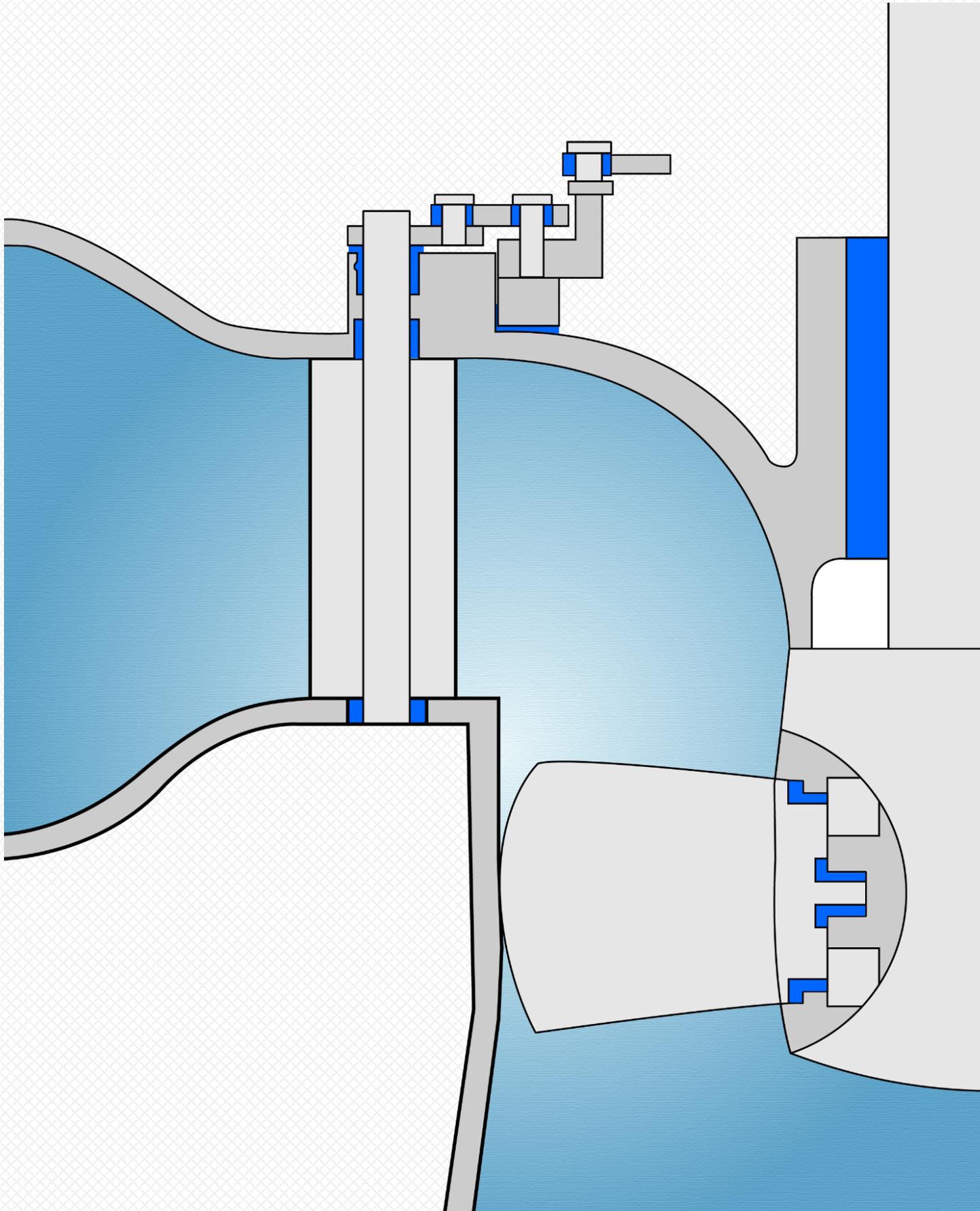
Shown below are bearing and wear strip applications in Francis turbines, for FEROFORM T814 and FEROGlide.

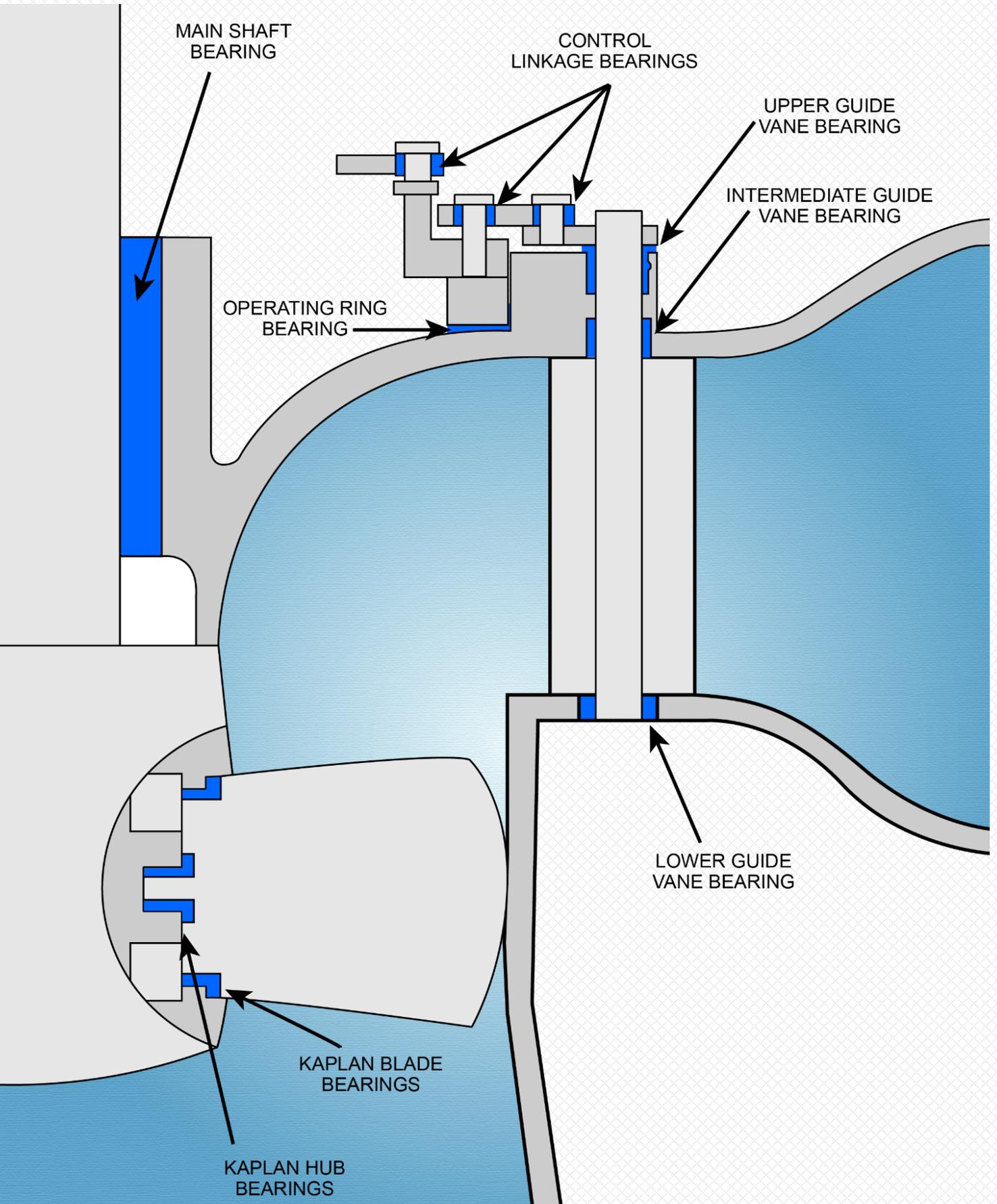




KAPLAN TURBINE APPLICATIONS

Shown below are bearing and wear strip applications in Kaplan turbines, for FEROFORM T814 and FEROGlide.

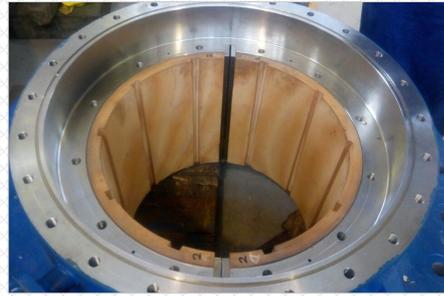




HYDRO APPLICATIONS

Main Shaft Bearings

FEROFORM T814 bearings provide long life and high strength in water lubricated main shafts. They can be supplied as 2-piece split bearings.



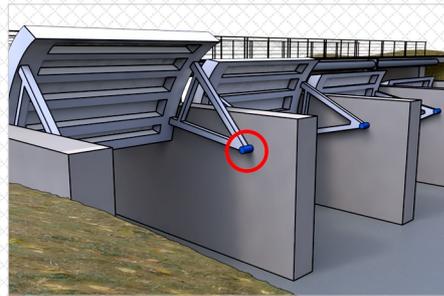
Lock Gate Bearings

FEROFORM T814 bearings and wear strips provide low friction, high wear and long life in pintles and hinges of lock gates.



Radial Gate Bearings

FEROFORM T814 bearings are supplied as trunnion bearings due to their high compressive strength, self-lubrication and resistance to stick-slip.



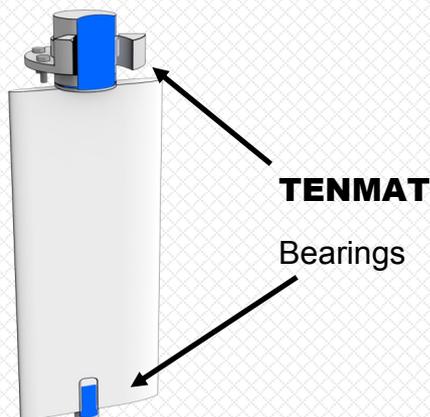
Vertical Gate Bearings

FEROFORM T814 wheel roller bearings and sliding pads are used due to their low friction, high compressive strength and ability to work both wet and dry



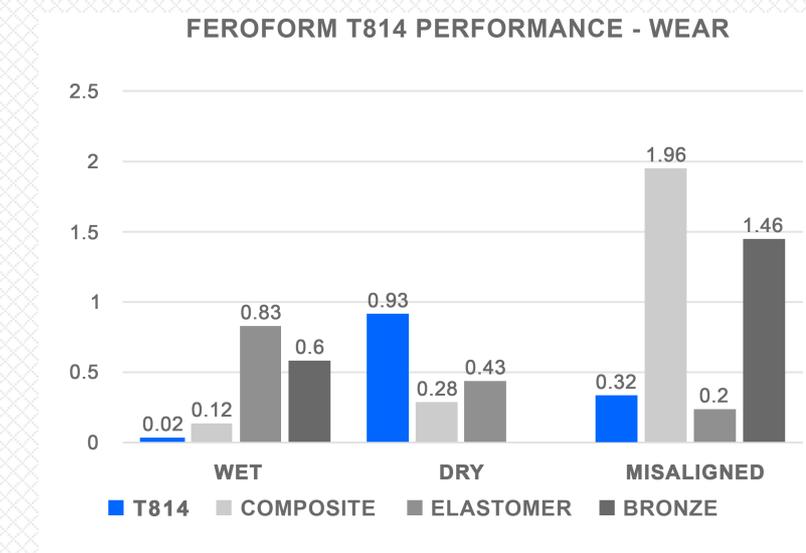
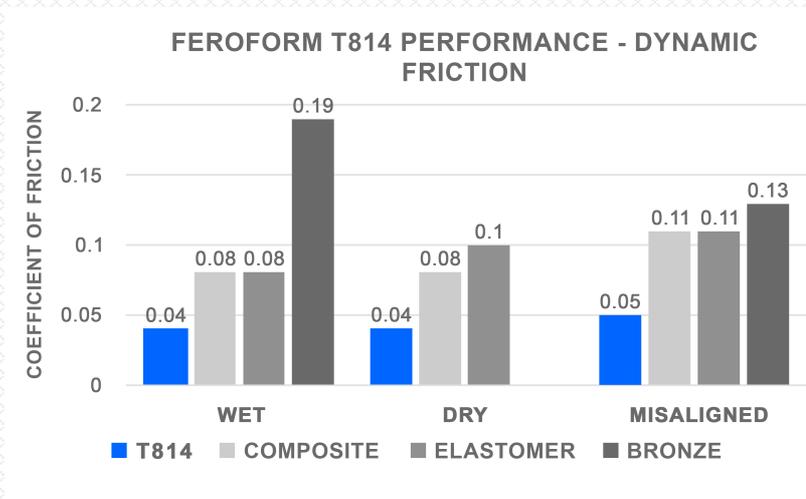
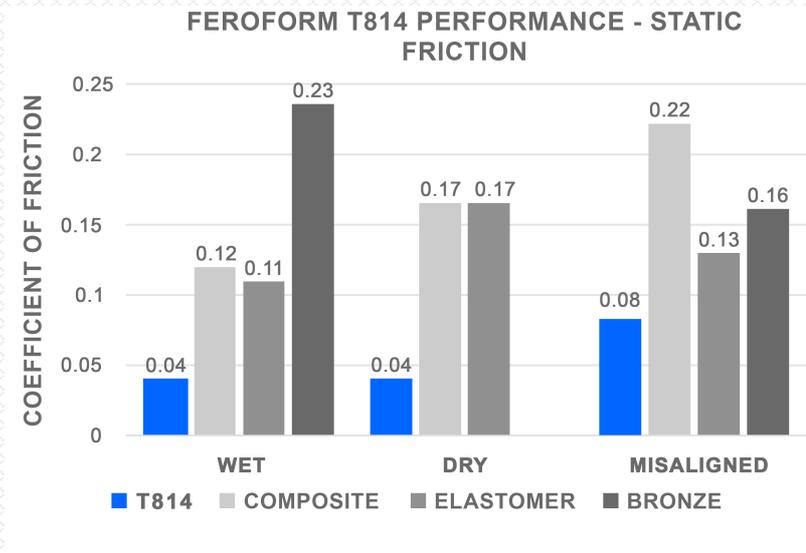
Wicket Gate Bearings

FEROGLIDE and FEROFORM T814 bearings provide self-lubrication, long life and the ability to work wet and dry as wicket gate bearings.



FEROFORM T814 TEST DATA

The US Army Corps of Engineers tested self-lubricating bearing materials for hydro power turbines, with the objective of replacing greased bronze bearings. FEROFORM T814 was tested against an elastomeric plastic, an alternative composite and bronze. The results below show that FEROFORM T814 maintains lower wear rates and lower friction coefficients that the alternative materials tested.





FEROFORM **RAILKO** *FEROGLIDE* *FEROBIDE*

REFRAVER **REFEL** **ARCLEX**

FIREFLY **NITRASIL** **SINDANYO**

TENMAT is committed to the highest standards in customer service and our international staff is looking forward to assist you.

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