Water Lubricated Stern Tube Solutions
A history of engineering excellence

Seawater is the oldest lubrication for propeller shaft stern tube systems and has been a core part of the marine industry for over a hundred years. Water lubrication was first challenged by oil systems in 1886 and by the 1940s, oil lubrication became the standard. The only exception to this were naval vessels.

The sole reason behind selecting oil instead of water as a lubrication solution was discovered in the late 1880s, as it was noted that oil had better capability of protecting the bearings and the shaft from breaking, as well as shielding the shaft from corrosion with the use of an oil bath.

However, Wärtsilä has provided an innovative solution with its current water lubrication systems. These offer equal, or better-quality services, for protecting the shaft when compared to oil lubrication options. At the same time, they answer the need for an environmentally sound, reliable solution for lubrication.

With over 100 years’ experience in our seals and bearings business and over 60 years in the water lubrication market, Wärtsilä has a long marine engineering history with a global customer base. When it comes to water lubricated solutions, Wärtsilä has a proven track record, along with a portfolio of high-quality products and a global support network, enabling us to provide reliable, flexible and excellent solutions to customers worldwide.

Our oil-free offering is fully compliant with the requirements of the 2013 US EPA Vessel General Permit. The installation of Wärtsilä’s open water package removes all risk of pollution, particularly for vessels operating in environmentally sensitive areas. It reduces lifecycle cost by extending the operational life of the seals and bearings. Whatever the environment, our water lubricated solutions ensure consistent operation of all vessel types.

Wärtsilä offers a 25 year extended warranty on new build Wärtsilä Envirosafe composite stern tube bearings in Class Approved vessels.*

*Applicable when sold as part of a package. Terms and conditions apply.

The right choice for the environment

A single barrier oil lip seal can potentially leak. And with stern tube leaks easily monitored, this could lead to sanctions by port authorities, significant costs to the vessel operators and damage to the environment. Water lubrications solves these problems.

Simply put, legislators prefer water lubrication and steer towards it due to its complete elimination of potential oil contamination into the sea.

Wärtsilä water lubricated package solutions

We have two package solutions available. These include the CAPEX Solution which offers durability and high-quality with a standard scope of products including stern tube assembly and forward seal. Our OPEX Solution offers high-quality, reliability, fluid control and supports extended propeller shaft withdrawal periods with optional enhanced monitoring.

Why go water lubricated?

Wärtsilä water lubricated solutions provide a zero risk of operational oil leakage, meaning vessels are compliant with all environmental regulations. There is no need to buy oil for oil lubricated stern tubes, enabling you to invest in an environmentally sound solution which complements legislation.

Water lubrication offers a wide range of benefits and is set to be the future of stern tube solutions.

KEY BENEFITS

- Zero risk of operational oil leakage
- No need to buy oil lubricants
- Compliance with future and current legislation
- Reduced complexity – no lube oil, no lube oil testing.
**Who should consider a conversion?**

A conversion can be the right choice for any size of vessel, from superyacht to cruise ship. We can provide a costed proposal for conversion and assist with a lifecycle cost analysis for your vessel.

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**An unmatched portfolio**

**Your global partners in engineering lifecycle solutions**

Wärtsilä’s products and services support you by maximising efficiency and minimising operational risks at the lowest lifecycle cost. Our water lubricated solution portfolio is designed to ensure smooth and continuous operation of all types of vessels, even in the most challenging environments. Whatever the requirement, Wärtsilä can provide a solution.

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**PRODUCTS, SERVICES AND PACKAGES**

- Complete water lubricated packages
- Oil to water stern tube conversions
- Measurement and alignment services
- Underwater engineering seal repair maintenance
- Stem tubes and stern tube seals and bearings
- Water quality system (WQS)
- Ropeguard and a cutter system
- Fully split construction for seal
- Hydraulic couplings

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**Wärtsilä Enviroguard**

The Wärtsilä Enviroguard range are environmentally friendly, low maintenance, high performance face type seals, which have an extensive fitted history spanning many years and numerous different vessel types. These seals can accommodate large and repeated axial and radial shaft movements, as well as vibrations. The Wärtsilä Enviroguard range has a pressure balance configuration that optimises wear across interfaces. In addition, maintenance can be completed without shaft removal due to a static inflatable seal.

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**Wärtsilä Enviroguard MG4**

To ensure low lifecycle costs for larger vessel types, Wärtsilä has specially developed the next range of the Wärtsilä Enviroguard series – the Wärtsilä Enviroguard MG4. The seal incorporates high wear resistant interface materials, corrosion resistant metal components and flexible rubber bellows. The excellent design and the use of high build quality ensures that your vessel runs smoothly even in the most challenging environments.

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**Wärtsilä Enviroguard PSE**

The Wärtsilä Enviroguard PSE is a water lubricated, environmentally friendly inboard sealing solution which is suitable for both blue-water and abrasive water conditions. The product is available in both metallic and composite material options. The seal increases reliability for smaller vessel types such as: workboats, fishing vessels, motorised barges and super yachts, regardless of where you operate.

The Wärtsilä Enviroguard PSE has a long track record of outstanding performance in all water conditions. Partially and fully split options are available for ease of maintenance and seal replacement. Composite materials also offer easy maintenance and benefit from reduced weight for ease of handling and durability.

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**Wärtsilä water lubricated AFT seal for closed loop systems**

Wärtsilä can provide the complete shaftline package for a closed loop water lubricated system. A closed loop system requires an outboard aft seal to keep the water solution inside the stern tube. We can provide a range of water lubricated seals for closed loop systems suitable for all vessel types and sizes.

The Wärtsilä Iceguard range is an environmentally friendly, water lubricated stern tube sealing solution. The Wärtsilä Iceguard face type seals are suitable for stern tubes operating in vessels with enclosed water lubricated stern tube systems. Typical applications include vessels operating in Arctic conditions or in environmentally sensitive areas. The seal is able to accommodate large axial and radial movements, while performance is unaffected by high frequency vibration.

Different solutions for closed loop systems can be supplied dependent to your requirements. Our engineering team will find a solution which fits for your vessel.

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**Wärtsilä Worksafe**

The Wärtsilä Worksafe is suitable for slightly smaller shaft sizes, Ø70 to Ø320 mm. The Wärtsilä Worksafe is an outboard seal for closed loop water lubricated systems.

- Supports FPP and CPP systems
- Vibration-tolerant
- High resistance to abrasive conditions
- Partially split outboard seal.

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Wärtsilä JetGuard

The Wärtsilä Jetguard range consists of water lubricated face type sealing solutions, specifically designed for waterjet input shafts. Available in both metallic and composite materials. This seal has been developed for demanding operating conditions, such as the high speeds and varying pressures typically seen on waterjets.

Wärtsilä Floodguard

The Wärtsilä Floodguard is a water lubricated face type seal suitable for both standard and high speed vessel solutions. If the vessel experiences a flooded compartment, the self-activating Floodguard seal ensures that vessel integrity is maintained, allowing continued passage to dock. The seal has a long track record of performance in both military and commercial applications.

Water lubricated stern tube solutions

Wärtsilä stern tube solutions are packaged and ready to install. They can be custom designed to fit specific vessels, meeting individual customer requirements and specifications. The installation and alignment is a simple procedure when compared to older traditional methods, allowing for significant reduction in installation time and resources.

Wärtsilä Floodguard

Wärtsilä offers full stern tube assemblies for direct resin chocking into the vessel. The stern tube is complete with composite bearings and the necessary stern tube corrosion protection applied, ready for direct installation. Alternatively, bearings can be supplied in housings, or separately, for final installation into the stern boss.

Wärtsilä Envirosafe

The Wärtsilä Envirosafe bearing is the culmination of years of research, development and collaboration with yards and owners around the world to develop a superior composite bearing material for the marine industry.

The Wärtsilä Envirosafe range can be supplied for all water lubricated propeller shaft bearing applications, from open brackets to stern tubes. Split bearings can be supplied in a housing, or fitted directly into the stern tubes or brackets. This allows easy bearing replacement or system inspection with the shaft remaining in-situ, providing cost efficient servicing.

Tail shafts, shaft journals and shaft coatings

Wärtsilä can supply complete tail shafts with shaft journals and industry leading shaft corrosion protection. Alternatively, shaft journals and coatings are available separately, along with on-site installation support.

Wärtsilä water quality systems

Wärtsilä water quality systems provide conditioned water for both open and closed lubricated stern tube systems. Our systems increase the life of seals and bearings products by filtering the water supply to required standards. A range of filtered supply systems are available. A control panel oversees the safe operation and full monitoring of the system.

- Dual pumps for redundancy in the event of duty pump failure
- Full monitoring control panel
- Cyclonic system automatically discharges particulate debris
- Increased longevity of seals and bearings.
**Wärtsilä thrust bearings**

Wärtsilä thrust bearings are single collar, self-aligning thrust bearings. They are designed with two faces of titling pads on pivots. The standard is for axial loads only, but axial and radial loading options are available on request. The oil circulating and cooling system is available either as a self-lubricating system with integrated cooler, or as an external pump and cooler unit. Fitted with complete remote monitoring of the temperature and oil flow, the thrust veering solutions enable easy management of the product.

- **Wide range of sizes**
- **Self-aligned thrust pads**
- **Split bearing allows easy serviceability.**

**Intermediate shaftline bearings**

The Wärtsilä LineSafe bearing is an evolutionary design, which has been developed to combine the fundamentals from the existing shaftline bearing range into one simple design that meets the market needs of today and the future. The Wärtsilä LineSafe bearing offers a simplified design with a reduced number of stock parts. It can flexibly meet the demands of any customer with improved response times.

- **Easier installation and alignment**
- **Higher radial load capacity**
- **Global spares and service availability**
- **Flexibility within the standard configuration**
- **Ability to compensate against higher angular misalignments.**

**High friction couplings**

The new generation of hydraulic couplings have been created to provide solutions in areas where previously it has been impossible to ensure the maximum propulsion efficiency. This has been achieved without changing the simplicity of the shaft connection method.

Wärtsilä high friction hydraulic couplings provide a simple and quick method to connect shafts, eliminating the need for keyways, tapers or thrust rings. This can increase the torque transmission capacity, which can produce substantial shaft-line cost savings.

- **Allows installations between and to a cylindrical shaft end**
- **Reduced coupling dimensions with higher torque transmission capacity**
- **Equipped with a sealing system**
- **No supporting ring required between connected shafts in coupling installation**
- **Clean, quick and trouble free process**
- **Hydraulic pressure avoids any damage between the contacting surfaces, resulting in reduced surface contact pressure.**
Wärtsilä has an unequalled network of sales and engineering offices around the world, offering technical support 24 hours a day, 7 days a week. Our team of service engineers are available to assist on-site with all Seals & Bearings installations and repairs.

With its R&D activities, Wärtsilä Seals & Bearings continues to strengthen our position as a technology leader. In delivering advanced new products and services with an emphasis on reliability, flexibility and lifecycle efficiency, our competitive edge in the global marine and energy markets is constantly being enhanced. Product excellence is supported by high quality to ISO9001:2015, efficient manufacturing practices to OHSAS 18001, as well as adhering to the ISO14001:2015 environmental standard. Testing of all products is extensive and exceeds the required stipulations. Our strong track record in producing innovative, efficient, and environmentally sound solutions is backed by a focus on digitalisation to create maximum customer value.

Wärtsilä bearing wear down gauge system

The Wärtsilä bearing wear down gauge system remotely indicates the wear of stern tube or bracket bearings in water lubricated shaft lines, by measuring the drop of the propeller shaft.

The measurements are taken by a proximity sensor located in a fully potted submersive enclosure, which is mounted on the stern tube or bracket bearing keeper ring. The bearing wear down system can be fitted to both new build vessels and retrofitted to existing vessels with water lubricated shaft lines.

Wärtsilä Sea-Master system

The Wärtsilä Sea-Master system is a platform that is transforming tail shaft asset management. With on-board and remote digital monitoring of tail shaft system performance, it delivers unprecedented levels of data. This all comes with a range of support and consultancy services that help you make informed decisions to optimise operations.

This revolutionary platform also enables you to meet the environmental legislations of today and tomorrow, extending the maintenance intervals for water lubricated systems. This results in a lower cost of ownership, enhanced performance and greater control. Combinations are available for installed, new build and retrofit applications.

Delivering above expectations

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Wärtsilä alignment and measurement services

Wärtsilä underwater services
Green Award certifies ships that are ultra-clean and ultra-safe. Ships with a Green Award certificate secure various fiscal and non-fiscal advantages. By fulfilling high safety and environmental standards in shipping, the Green Award makes the highest standards of ship operation economically more attractive. Wärtsilä is an incentive provider for the Green Award. Our water lubricated offering has the Green Award stamp of approval and ensures your vessels shaftline will be compliant with the regulations of this governing body. Guaranteeing that your vessel qualifies for all of the benefits of being a part of the Green Award organisation.

Wärtsilä’s total lifecycle solutions

Wärtsilä is a global leader in complete lifecycle power solutions for the marine and energy markets. By emphasising technological innovation and total efficiency, Wärtsilä maximises the environmental and economic performance of the vessels and power plants of its customers.

www.wartsila.com