

# Wärtsilä composite bearings, stern tube and rudder solutions



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As global specialists in shaft line solutions, Wärtsilä support you with products and services that maximise efficiency and minimise operational risks, all at the lowest lifecycle cost. We have a long history and a proven track record of developing, manufacturing and supplying bearings for the marine market.

## An unmatched portfolio

Our portfolio of bearings has been designed to ensure smooth and continuous operation of all types of vessels, even in the most challenging environments. We also provide retrofits and upgrades of any seal or bearing, regardless of vessel type and location. Whatever the requirement, we can provide a solution.

## Products, packages and services

- Seals, bearings, stern tubes and couplings.
- Shaft line monitoring and filtration systems.
- Integrated shaft line packages.
- Wärtsilä Shaft Line Repair Services, offering you fully project managed investigations and repair services for your vessel's shaft line.
- Field services.
- Underwater inspection, repair and maintenance services.





**Supporting both commercial and defence industries, we empower the marine market, including:**

- Merchant
- Naval
- Cruise and ferry
- Special vessels.

# Wärtsilä Envirosafe

Propeller shaft bearings are some of the most critical components on a vessel that can affect performance.

That's why after years of research and development and collaborating with yards and owners around the world, we developed a superior composite bearing material for the marine industry – the Wärtsilä Envirosafe.

The Wärtsilä 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 tube or brackets. This allows easy bearing replacement or system inspection with the shaft remaining in-situ, enabling cost-efficient servicing.

The Wärtsilä Envirosafe water lubricated composite propeller shaft bearings offer class-leading longevity due to its extremely low comparative wear rates. This has been ensured by extensive validation testing by our expert composite tribologists at our in-house research and testing facility.

- Environmentally friendly and pollution free.
- Created from advanced resin with synthetic fibre composition.
- Low speed hydrodynamic operation.
- Low friction, giving low wear and long life.
- Low swell rate and thermally stable.
- Suitable for extreme hot or cold environments.
- Suitable for both blue and brown water applications.
- Fully compliant with the 2013 US EPA Vessel General Permit rules.
- Approved by all major classification societies.



Fig 1: Wärtsilä Envirosafe non-split bearing assembly

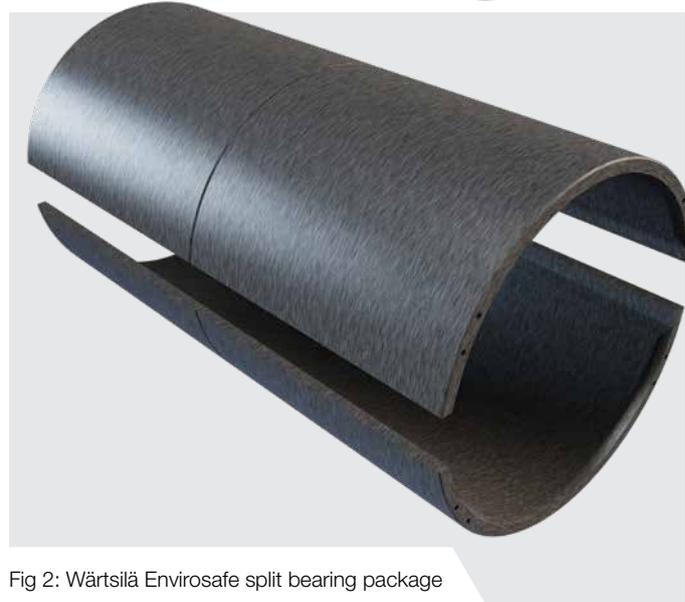


Fig 2: Wärtsilä Envirosafe split bearing package



## Technical specifications\*

Material properties	Wärtsilä Envirosafe
Compressive strength	80 MPa
Swell in water	0.2%
Thermal expansion	$6 \times 10^{-5} / ^\circ\text{C}$ ( $6 \times 50^{-41} / ^\circ\text{F}$ )
Density	1.34 g/cm <sup>3</sup> (0.048 lb/in <sup>3</sup> )
Co-efficient of friction - wet	0.2
Co-efficient of friction - dry	0.1

\*Refer to manual for specific information.

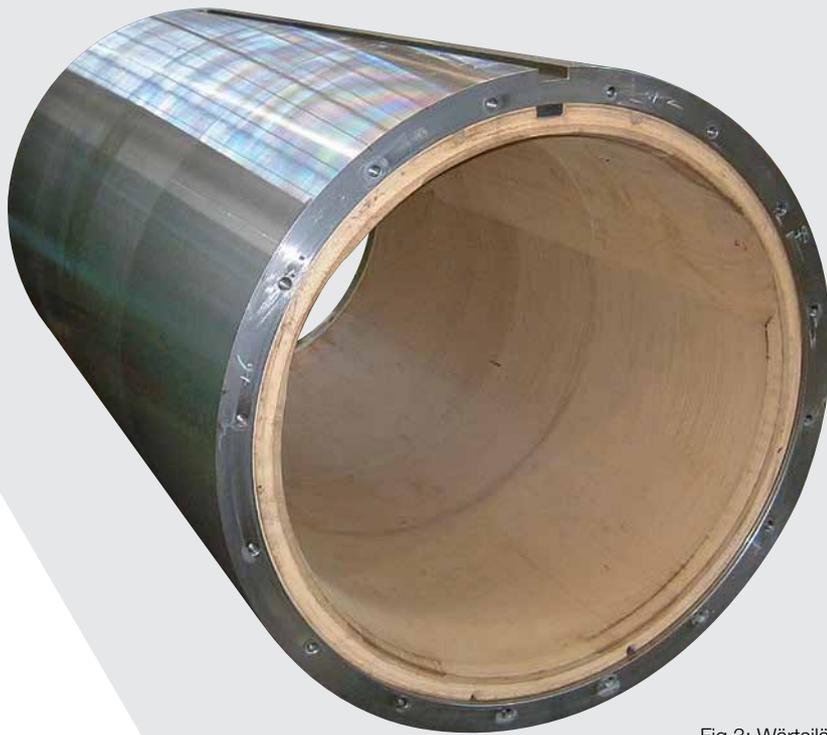


Fig 3: Wärtsilä Sternsafe bearing



# Wärtsilä Sternsafe

In conjunction with one of the world's biggest ship owners, we developed the Wärtsilä Sternsafe, an advanced composite bearing specifically for oil lubricated stern tube applications and brackets.

The Wärtsilä Sternsafe range offers excellent performance, covering both standard and high load requirements. A variety of supply options are available to suit specific applications.

- Reduced friction and low wear rate.
- Long bearing life - reduced lifecycle cost.
- Stable, low swelling backing material.
- Material does not seize.
- Bio-oil compatible.
- In emergency conditions, can run on oil and water emulsion.
- Increased elasticity than traditional oil lubricated bearing materials.
- Available in standard grade OCS-N and higher load grade OCS-NX.
- White metal bearings available.

## Technical specifications

Material properties	Wärtsilä Sternsafe OCS-N	Wärtsilä Sternsafe OCS-NX
Compressive strength	117 MPa	120 MPa
Swell in water	1%	0.2%
Continuous operating capability	100 °C (212 °F)	160 °C (320 °F)
Density	1.6 kg/m <sup>3</sup> (0.01 lb/ft <sup>3</sup> )	1.6 kg/m <sup>3</sup> (0.01 lb/ft <sup>3</sup> )
Maximum bearing load*	6 bar (87 psi)	8 bar (116 psi)

\*Subject to Classification Society conditions.

# Wärtsilä Steersafe

Years of research and testing has shown that there is an extensive use of Wärtsilä bearings in rudder and steering gears on vessels of all classes. That is why we specifically developed the Wärtsilä Steersafe for rudder and stabiliser applications.

The bearing wear of the Wärtsilä Steersafe is considerably less than other rudder bearing materials when running wet or dry. The risk of failure during service is reduced, since extreme hot or cold environments will not affect operation. Additionally, design and machining is simplified, as it is not necessary for calculations to compensate for varying workshop temperatures.

- Can run on water, grease, oil and dry.
- Operates at pressures up to 10 MPa (100 bar).
- Low friction.
- Long life expectancy.
- Thermally stable.
- Low swell and friction rate in water.
- Billets for retrofits held in stock with short delivery time.
- Fully compliant with the 2013 US EPA Vessel General Permit rules.
- Approved by all major classification societies.

## Technical specifications

Material properties	Wärtsilä Steersafe
Compressive strength	80 MPa
Swell in water	0.2%
Thermal expansion	$6 \times 10^{-5} / ^\circ\text{C}$ ( $6 \times 10^{-41} / ^\circ\text{F}$ )
Density	1.34 kg/m <sup>3</sup> (0.084 lb/ft <sup>3</sup> )



Fig 4: Wärtsilä Steersafe rudder bearing

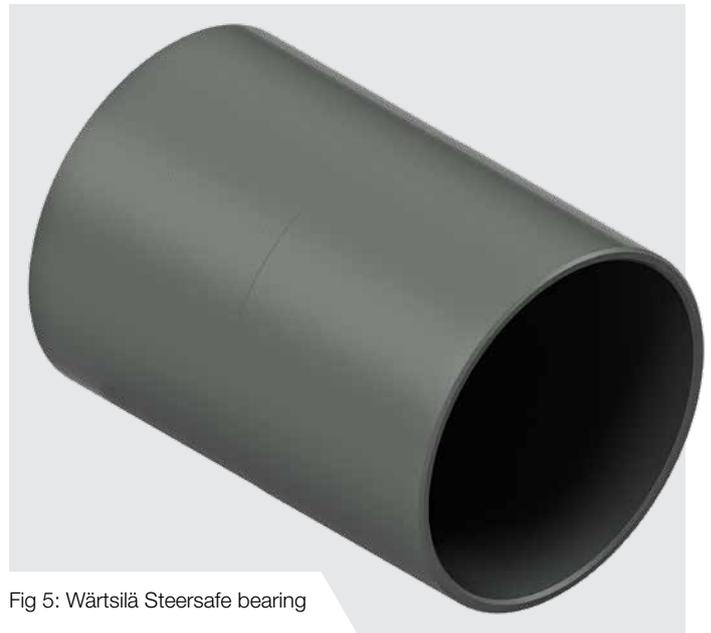


Fig 5: Wärtsilä Steersafe bearing

## Installation and machining

All of Wärtsilä composite materials are easy to machine on standard vertical borer, lathe and milling machines.

Our composite bearings can be supplied in several forms, including rough turned tubes, semi-finished or finish machined. If the rough turned tubes or semi-finished options are chosen, bearing machining can be undertaken locally to the vessel.

### Bearing packages for complete stern tubes

Wärtsilä composite bearings can be supplied in bearing housing or complete stern tubes for resin bonding or pressing directly into stern tubes and brackets. The Wärtsilä Envirosafe bearings can be split, allowing replacement without removing the tail shaft, reducing docking time and costs. Packages are supplied ready to fit. Ordering a bearing package for a new build vessel saves time and money during installation.

### Other products and services available

- Wärtsilä Sternsafe white metal bearing
- Wärtsilä Linesafe bearing
- Wärtsilä thrust bearing.

## Unrivalled support

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 shaft line installations, including seals, bearings, stern tubes and repairs.

We provide integrated systems, packages and products that offer you complete lifecycle efficiency, reduce risks and are environmentally sustainable. Our global service network responds quickly to provide expertise where and when needed.





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 vessel's shaft line will be compliant with the regulations of this governing body. This guarantees that your vessel qualifies for all the benefits of being a part of the Green Award organisation.

## Wärtsilä's total lifecycle solutions

An industry leader in shaft line components Wärtsilä Shaft Line Solutions delivers a portfolio of end-to-end services and integrated solutions for the marine markets that builds on our core values: lifecycle efficiency, risk reduction, environmental leadership and design excellence. As an original equipment manufacturer operating in 75 countries, we have the capabilities to support customers on a global scale, and remain committed to providing in-country and round-the-clock expertise.

[wartsila.com/shaft-line-solutions](https://www.wartsila.com/shaft-line-solutions)

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