Wärtsilä composite bearings, stern tube and rudder solutions
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As global specialists in shaft line equipment, 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. All Wärtsilä composites are manufactured in our dedicated UK facility. 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, couplings and stern tubes.
- Shaft line monitoring systems.
- Water quality system.
- Integrated shaft line packages.
- Oil-to-water conversions.
- A full package of shaft line services, including upgrades, maintenance and repair.
- Alignment and measurement services.
- Field services.
- Underwater inspection, repair and maintenance services.

We supply to all major markets, including:

- Merchant
- Naval
- Cruise and ferry
- Offshore
- Inland waterway and coastal vessels
- Workboats and superyachts
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.

— Market leading wear resistance.
— 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.
— High abrasion resistance and low noise generation.
— 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.

Technical specifications

<table>
<thead>
<tr>
<th>Material properties</th>
<th>Wärtsilä Envirosafe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressive strength</td>
<td>80 MPa</td>
</tr>
<tr>
<td>Swell in water</td>
<td>0.2%</td>
</tr>
<tr>
<td>Thermal expansion</td>
<td>6 x 10^{-5}/°C (6 x 50^{-4}/°F)</td>
</tr>
<tr>
<td>Density</td>
<td>1.34 g/cm³ (0.048 lb/in³)</td>
</tr>
<tr>
<td>Co-efficient of friction - wet</td>
<td>0.2</td>
</tr>
<tr>
<td>Co-efficient of friction - dry</td>
<td>0.1</td>
</tr>
</tbody>
</table>

*Refer to manual for specific information.

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.

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

Technical specifications

<table>
<thead>
<tr>
<th>Material properties</th>
<th>Wärtsilä Sternsafe OCS-N</th>
<th>Wärtsilä Sternsafe OCS-NX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressive strength</td>
<td>117 MPa</td>
<td>120 MPa</td>
</tr>
<tr>
<td>Swell in water</td>
<td>1%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Continuous operating capability</td>
<td>100 °C (212 °F)</td>
<td>160 °C (320 °F)</td>
</tr>
<tr>
<td>Density</td>
<td>1.6 kg/m³ (0.01 lb/ft³)</td>
<td>1.6 kg/m³ (0.01 lb/ft³)</td>
</tr>
<tr>
<td>Maximum bearing load*</td>
<td>6 bar (87 psi)</td>
<td>8 bar (116 psi)</td>
</tr>
</tbody>
</table>

*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.

<table>
<thead>
<tr>
<th>Technical specifications</th>
<th>Wärtsilä Steersafe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressive strength</td>
<td>80 MPa</td>
</tr>
<tr>
<td>Swell in water</td>
<td>0.2%</td>
</tr>
<tr>
<td>Thermal expansion</td>
<td>$6 \times 10^{14} \text{ / } ^{1/2}$ $/ ^{\circ}C (6 \times 50^{14} / ^{\circ}F)$</td>
</tr>
<tr>
<td>Density</td>
<td>1.34 kg/m$^3$ (0.084 lb/ft$^3$)</td>
</tr>
</tbody>
</table>

Installation and machining

All of Wärtsilä composite materials are easy to machine on standard vertical boring, 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.

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 seals and bearings installations, including 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.

Unrivalled support

Other products and services available

- Wärtsilä Sternsafe white metal bearing
- Wärtsilä intermediate shaft line bearing
- Wärtsilä thrust bearing
- Wärtsilä generator bearing
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

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 and power plants of its customers.