

Wärtsilä Sternguard E seals

Integral quality and dependability

PRODUCT DATASHEET



Wärtsilä's seals are designed to maximise efficiency and minimise operational risk at the lowest lifecycle cost. Our Wärtsilä Sternguard E seals have been developed from many years of research and experience. We provide three main variants that cover a wide range of needs: Wärtsilä Sternguard EK, EJ and EL seals.

PROVEN DEPENDABILITY

The Wärtsilä Sternguard E seals are known for their dependability, having been used in thousands of applications for over 25 years. The inboard and outboard variants are designed for use in medium-sized vessels, including tugs, trawlers and coasters. All of the seals comply with classification society requirements for wear and corrosion protection and can be used in vessels that might have to operate in silty or abrasive water.

DESIGN RELIABILITY

Design reliability is at the heart of all our seals and the Wärtsilä Sternguard E seals are no exception. They have been designed to significantly limit any leakage, and accommodate any vibration and moderate axial and high radial movements. The seals can be applied in oil and water lubricated systems (bearings) and grease applications.

A VERSATILE SOLUTION

There are three Wärtsilä Sternguard E seal variants: the EJ and EK (non-split versions) and the EL (a semi-split version of the EJ). These provide great versatility, as they can be used in both shaft and rudderstock seal applications and with all stern shaft bearing lubrication systems, with or without inflatable seals. The inflatable seals are actuated by air or fluid pressure and are only used for inboard (FWD) versions (EJ/EL). They allow checking without having to dry dock. This reduces maintenance downtime and gives operators more time to focus on other operational aspects of their vessel.

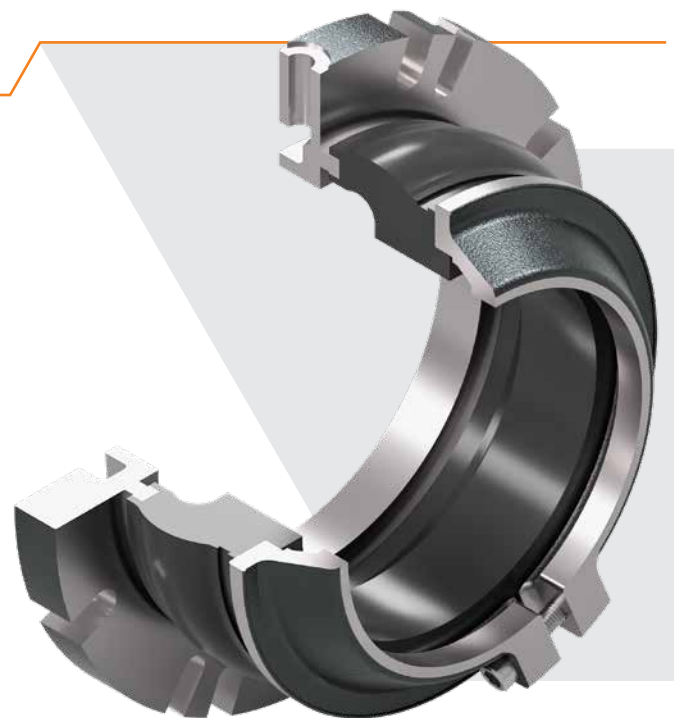


Fig.1 Wärtsilä Sternguard EJ seal cross-section.

SIMPLE INSTALLATION

The seals are designed with a rotatory part attached to the shaft and a fixed one attached to the stern tube. The sealing process is achieved by the dynamic contact of the rotatory interface (face) and the static interface (seat). This ensures the necessary compression length of the rubber body with the propeller hub installation in AFT solutions and with the clamp in FWD solutions.

The installation process involves reaching the working length by compressing the rubber body. No special tooling is needed for this process, but a compression tool can be supplied to make this process easier in FWD solutions.

Impressive reliability and a range of applications

Different seals for different needs

We manufacture and supply several variants of the Wärtsilä Sternguard E seals.

AFT solutions: the Wärtsilä Sternguard EK and the Wärtsilä Sternguard EJ outboard version. Both are designed for use with oil, grease and water lubricated bearings. The seal is compressed between the propeller and stern frame and can be easily installed with suitable compression tooling. It ensures that there is no shaft or liner wear and reduces the risk of shaft removal and refurbishment. Both are suitable for use with seawater, freshwater or oil lubricated bearings. The seal is clamped to and rotates with the shaft, eliminating shaft wear. As there is no surface friction against the shaft or a liner, these components won't need costly maintenance or refurbishment.

FWD solutions: the Wärtsilä Sternguard EJ and the Wärtsilä Sternguard EL. The EL face can be split and is a separate assembly from the seal body. An inflatable seal can be used on both FWD versions.



Fig.2 Wärtsilä Sternguard EL seal.

Seal features and benefits

All Wärtsilä Sternguard E seal variants are equipped with the same performance and design features. They include strong but flexible elastomer bodies with integral face inserts (EJ/EK) or a rubber-supported face. These support radial and axial movements in order to maintain the integrity of the seal.

Rapid running-in of the seal is achieved through the seat insert, supported with O-rings, which can orientate the

seal against the face during operation. This enables the seal to adapt rapidly to changing operating conditions. It also ensures negligible leakage and seat wear, due to the strong mechanical properties of the seat and face materials combined with the seal's orientation. The rubber seal component also ensures that there is no possibility of galvanic corrosion.

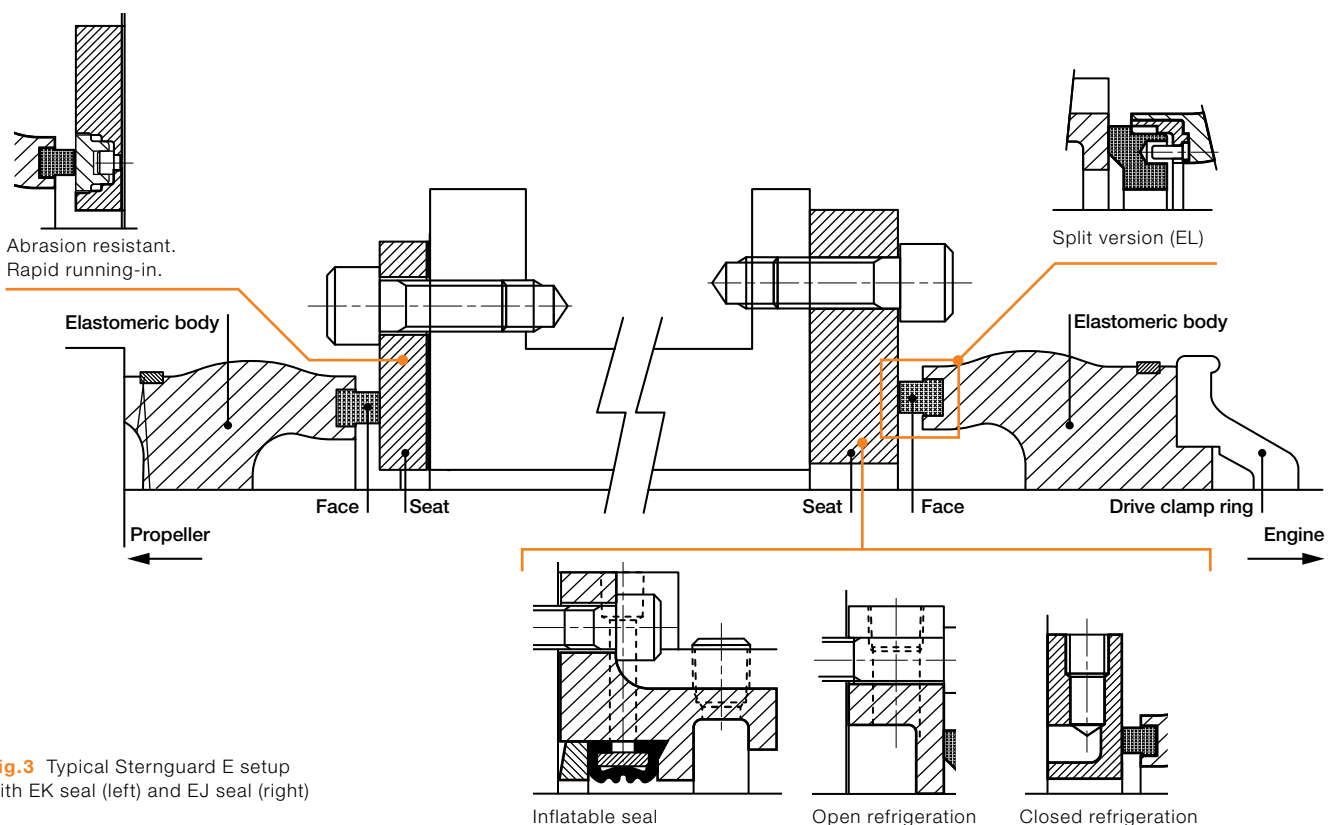


Fig.3 Typical Sternguard E setup with EK seal (left) and EJ seal (right)

Wärtsilä Sternguard E seals

| FEATURES | ADVANTAGES | BENEFITS |
|---|---|---|
| Simple and robust seal design. | Reduces the number of components. | Makes installation quick and easy and provides enhanced seal reliability. |
| | Eliminates shaft and liner wear. | Avoids costly shaft removal and component refurbishment. |
| Multiple designs and applications. | Provides a choice of applications for shaft lines, thrusters and rudderstock. | |
| | Can be used with various lubricants – water, oil or grease lubrication. | Supports a wide range of customer needs. |
| | Design adapts to open and closed systems. | |
| Rubber elastomer body design. | Absorbs axial and radial movements. | Eliminates build errors and operational shaft movements. |
| | Absorbs high and low vibrations. | Ensures reliable operation against fatigue stresses. |
| Split face option. | Avoids the need for shaft removal when the FWD EL seal has to be replaced. | Makes seal replacement quick and easy. |

Seal components

Body – This is the loading component that imparts sufficient axial loading to the face to form a seal. It has to accommodate the axial, radial and angular motions of the shaft.

Face – In the EJ and EK variants, this is an integral part of the seal body. In the EL variant, the split faces are held within a phosphor bronze face carrier and sealing strip. These seal the face insert into the carrier and apply radial compressive load to the insert.

Seat – This is a simple design flange. For the EK variant, the flange thickness can be adapted to fit the installation. A seat insert can be used for highly abrasive environments. The EL and EK variants can be adapted to the refrigeration system (opened/closed) and can feature an inflatable seal.

Drive clamp ring – This can be used for both oil and water lubricated seals. It clamps the body to the shaft and keeps the design compression length on FWD seals (EJ/EL). It can be used on AFT seals when the propeller hub is not close enough.



Fig.4 Wärtsilä Sternguard EJ seal.

Technical specifications

| | EJ | EK | EL |
|--|--|-------------------------------------|------------------------------|
| MATERIALS OF CONSTRUCTION | | | |
| Seat | Cast iron | Cast iron | Cast iron |
| Optional seat insert (abrasive ambient) | | SiC | |
| Optional inflatable seal | Neoprene | | Neoprene |
| Body | Neoprene | Neoprene | Neoprene |
| Shroud ring (if required) | Bronze | Bronze | Bronze |
| Drive clamp ring | Bronze/Cast iron | | Bronze/Cast iron |
| Face | Carbon/Composite (incorporated in body) | Composite (incorporated in body) | Composite (face assembly) |

| STANDARD OPERATING CONDITIONS | | | |
|--------------------------------------|--------------------------------|----------------------------------|--------------------------------|
| External pressure | | 0.5bar | |
| Internal pressure | up to 0.8bar max | up to 0.8bar max | up to 0.8bar max |
| Temperature | -5 to 40°C | -5 to 40°C | -5 to 40°C |
| Shaft diameter | 50-330mm | 50-330mm | 70-330mm |
| Axial movement | 3.0mm max | 2mm (inboard)/ 1mm (outboard) | 3.0mm max |
| Cooling water flush | 1 l/hr/mm of shaft diameter | | 1 l/hr/mm of shaft diameter |
| Lubrication | Oil/water/grease | Oil/water/grease | Oil/water |

Wärtsilä Shaft Line Solutions is an industry leader in shaft line components. We deliver a portfolio of end-to-end services and integrated solutions for the marine markets. This 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.

Fig.5 Wärtsilä Sternguard EK seal cross-section view.



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