

Custom 110mm Shaft Seal with On-Site Adaptation Capability

Designing a custom shaft seal solution for a 110mm shaft with minimal clearance and no room for error.

Introduction

A commercial fishing vessel, working with Holylight, needed a custom shaft sealing solution for a vessel with limited access and incomplete measurements. The system was built around a 110mm shaft, where space and installation constraints made a standard solution impractical.

Vessel Overview

Vessel Type:	Fishing Vessel
Year Built:	2007
Length Overall:	119 ft (36.35m)
Gross Tonnage:	235
Engines:	Three Caterpillar C32 DITA diesel inboard engines, rated at 1,342 kW at 2,300 RPM



Original shaft seal in need of replacement.

The Challenge

The vessel was equipped with an existing shaft seal and stern flange arrangement. However, the vessel remained in operation, making it impractical to dismantle the system for measurement or inspection at the outset of the project.

Several critical challenges defined the project scope.

- **Restricted installation space:** Only 11.5" of available length between the transmission coupling and flange.
- **Limited access to equipment:** The vessel's operational status restricted physical access to the shaft and flange assembly.
- **Incomplete dimensional data:** Essential flange details, such as bolt pattern, pitch circle diameter (PCD), and outside diameter (OD), were not fully available during initial design phases.
- **Installation feasibility concerns:** During planning, it was discovered that there was effectively no practical space to drill bolt holes required to secure the adapter plate to the stern flange once components were assembled.

- **Harsh operating environment:** The vessel routinely operates in dirty, silty water conditions, requiring a sealing solution capable of withstanding abrasive contaminants while maintaining long-term reliability.

The Solution

To work around these limitations, a fully customized sealing system was developed:

- Mechanical face seal designed for a 110mm shaft
- Custom adapter plate to match the existing interface
- Universal gasket system to ensure proper sealing
- Silicon Carbide (SiC/SiC) sealing faces selected to provide maximum wear resistance and durability in the vessel's dirty, silty operating environment

The design focused on flexibility. The adapter plate was built to allow on-site drilling and fitment, making installation possible even with incomplete initial measurements. The use of SiC/SiC sealing faces provides exceptional resistance to abrasive particles commonly found in silty water, helping maximize seal reliability, reduce maintenance requirements, and extend service life.



PSS / AES Seal #AZT5471923712014A with PSS Mounting Flange #07-F11-0AES.

Design & Collaboration

Due to the inability to fully inspect or measure the vessel interface at the beginning of the project, the design process emphasized flexibility and adaptability:

- Adjusting geometry to fit within tight axial space
- Providing detailed drawings and 3D views
- Advising on installation sequencing and machining
- Coordinating across engineering, production, and logistics

Results & Benefits

The final solution enabled the customer to proceed with installation planning without requiring prolonged downtime or full system disassembly. The ability to adapt the adapter plate on-site was a critical factor in maintaining project momentum.

Long Term Benefits

- Fully repairable seal design
- In place maintenance to reduce downtime
- Extended service life through refurbishment
- Superior resistance to abrasive silty-water conditions through SiC/SiC sealing faces
- Reduced material waste and improved lifecycle value

Conclusion

This project demonstrates how a flexible, application-specific approach can solve complex installation challenges. By adapting the design to real-world constraints and selecting SiC/SiC sealing faces for operation in dirty, silty water conditions, the final solution delivered both immediate performance and long-term reliability. The result is a durable sealing system designed to minimize maintenance requirements and maximize service life in a demanding commercial fishing environment.

Industry: Marine

Products: PSS / AES SiC/SiC
Part #AZT5471923712014A

PSS Mounting Flange
Part #07-F11-0AES

Application: Fishing Vessel

Benefits: Reliability and reduced
maintenance cost

