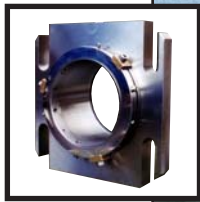
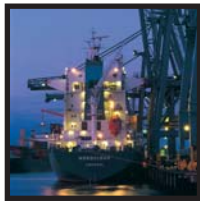




ENVIRONMENTAL TECHNOLOGY

A Guide to Sealing **CARGO PUMPS**



- **AESSEAL CPCSTM RANGE**
- **OCIMF COMPLIANCE**
- **SEALING ARRANGEMENT**
- **PUMP CONVERSION LIST**

Guide to Sealing Cargo Pumps & Cargo Oil Wash Pumps

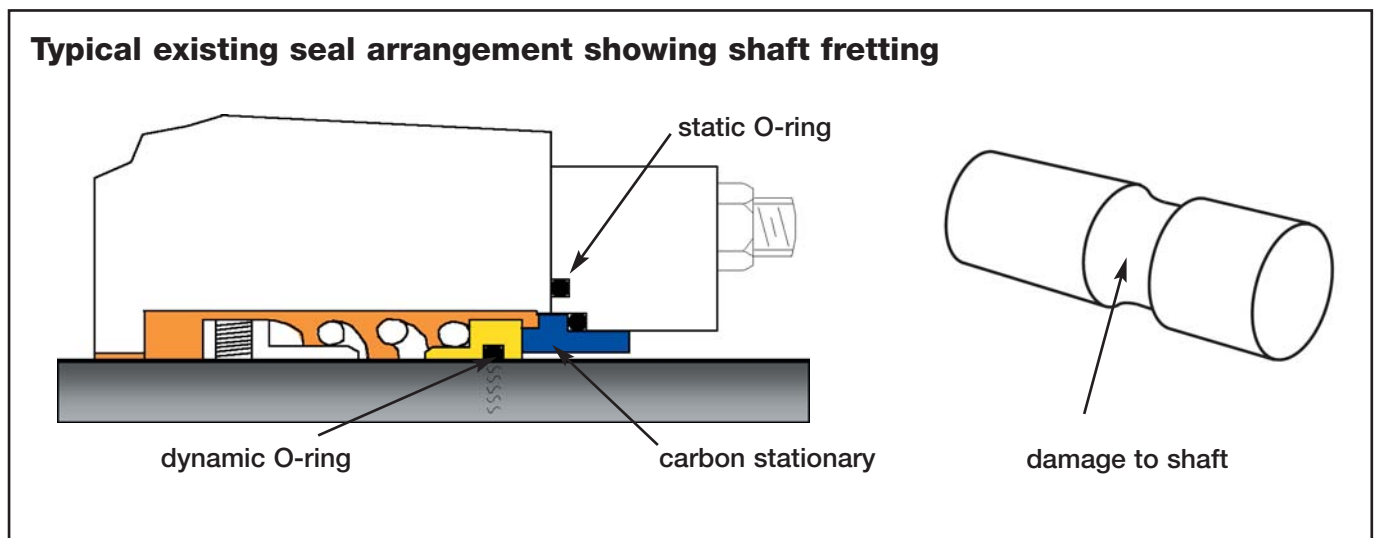
Retrofitting Double Mechanical seals to Cargo pumps on Crude & Product Tankers

In 1994 a document on pump room safety was produced by OCIMF1. This paper recommended the fitment of double mechanical seals and seal leakage monitoring equipment to cargo pumps on both existing and new vessels.

Typically on existing vessels, cargo pumps are used for off-loading cargo and ballasting. The pumps are split case centrifugal either horizontal or vertical. With the proliferation of Japanese built vessels in the 1970s and 80s one pump supplier emerged as the dominant market leader. Shinko pumps are prevalent on many of the pumps fitted to operational crude and product carriers, FPSO2 and FSO3 operational today. Earlier design Shinko pumps are typically fitted with single spring mechanical seals.

These seals do not meet OCIMF recommendations because:

- 1) They do not contain any leakage in the event of a primary seal failure. They may have many problems whilst in service.
- 2) No provision can be made for leakage detection.



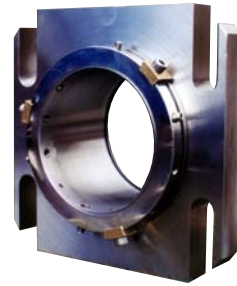
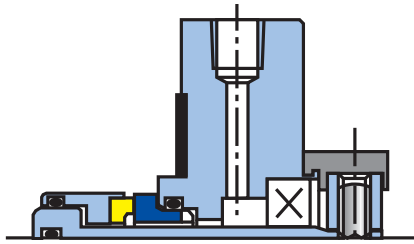
Additionally these single seals have drawbacks in that:-

- 1) The Stationary carbon is prone to damage on installation.
 - 2) Gland plate O ring frequently does not seal on worn pump casing face
 - 3) They tend to fret the shaft under the dynamic O ring
 - 4) They do not contain emissions
 - 5) Premature seal failure can occur due to dry running whilst stripping.
 - 6) Rapid seal wear occurs due to unbalanced seal design.
- 1 The oil company's international forum (OCIMF) is a voluntary association of oil companies having an interest in the shipment and the terminating of crude oil and oil products. The OCIMF mission is to be recognised internationally as the foremost authority on the safe and environmentally responsible operation of oil tankers and terminals.
 - 2 FPSO Floating Production and Storage Operation
 - 3 FSO Floating Vessel Storage Operation

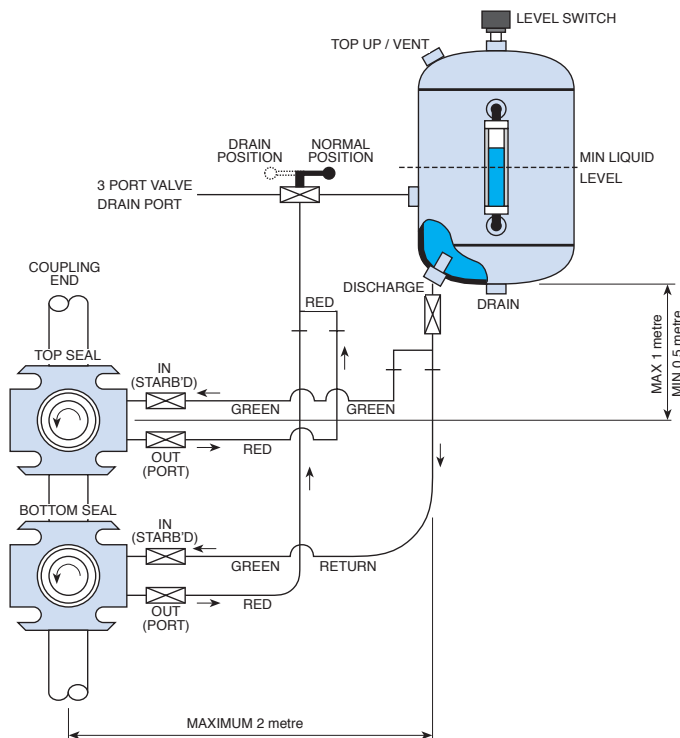
In 1995 AESSEAL® developed the CPCST™ Double Cartridge Mechanical seal to be fully compliant with the OCIMF recommendations. This range of seals was primarily aimed at the Shinko KVD & KHD pump ranges which are typically found on Crude Carriers. The CPCST™ also overcomes the operational difficulties associated with the existing seal types.

Guide to Sealing Cargo Pumps & Cargo Oil Wash Pumps

CPCS™ - Double Cartridge Mechanical Seal

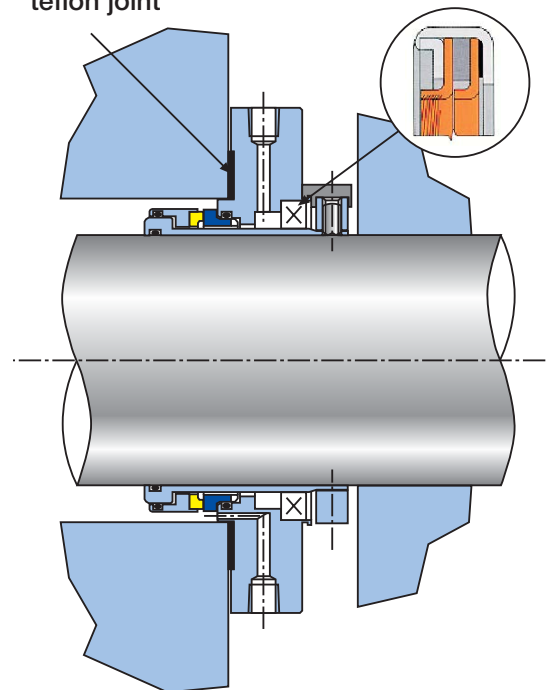


AESSEAL® CPCS™ Sealing Arrangement



Expanded teflon joint

Secondary containment seal



OCIMF Compliant

The CPCS™ seal is in effect a double mechanical seal, secondary containment being by a high pressure teflon based lip seal. This allows for a very compact design suited to the tight housing constraints of the Shinko pumps. The lip seal is capable of containing the pumped fluid in the event of primary seal failure.

The seal is connected to an AESSEAL® P type thermosyphon system. This unit is partially filled with water, any change in liquid level within the tank will give early warning of primary seal face failure. When fitted with a level switch remote indication is possible.

Improved Reliability

- 1) The AESSEAL® CPCS™ is a Cartridge Seal, fully assembled and pressure tested at the factory, therefore eliminating fitting errors. The face joint is an expanded Teflon joint, eliminating leakage on worn pump faces.
- 2) The CPCS™ has an integral sleeve eliminating shaft damage.
- 3) Emissions eliminated by utilisation of double seal and barrier fluid.
- 4) Barrier fluid eliminates dry running seal faces whilst stripping.
- 5) Fully Hydraulically balanced design reducing seal face loading and wear.

Pump Conversion List

Manufacturer	Model	AESSEAL® part No
Shinko	KVD-450/4	AZA 2005/2004
Shinko	KHD-450/3	AZA 3416
Shinko	KVD-450	AZA 2074
Shinko	KVD-500	AZA 1624
Shinko	KVD-400	AZA 3003/3004
Shinko	CVN-302	AZA 2080
Naniwa	C22BA12-16	AZA 7646
Naniwa	C62BC20-28	AZA 7736

The AESSEAL® CPCS™ cartridge mechanical seal can be designed to fit most other manufacturers models of cargo pumps.

THIS DOCUMENT IS DESIGNED TO PROVIDE DIMENSIONAL INFORMATION AND AN INDICATION OF AVAILABILITY.
FOR FURTHER INFORMATION AND SAFE OPERATING LIMITS CONTACT OUR TECHNICAL SPECIALISTS AT THE LOCATIONS BELOW.



USE DOUBLE MECHANICAL SEALS WITH HAZARDOUS PRODUCTS. ALWAYS TAKE SAFETY PRECAUTIONS:

- GUARD YOUR EQUIPMENT
- WEAR PROTECTIVE CLOTHING



WARNING

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