



# Plunger Pump

## Case Study

FTL's CS10 crosshead seals achieve 100% success rate in reducing leaks and extending service life

# FTL's CS10 crosshead seals prevented water- coolant ingress into the crankcase

## Advantages of an optimised plunger pump include:

- Longer service life than conventional packings and chevron seals.
- Cost savings possible as a result of self-lubricating properties.
- Reduced low pressure leakage.
- Low friction, for low power loss.
- Dry running capabilities.
- Live loading allows for controlled wear loss.
- Packing materials suitable for use in abrasive media.

## The Client

A UK manufacturer of high pressure plunger pumps for use in water jetting and various other process pumping applications, including surface and subsea high pressure cleaning.



*FTL's CS10 crosshead seal for high pressure plunger pumps*

# Leaks eliminated, pump now cleaner and more environmentally friendly

## The Challenge

The customer reported the consistent underperformance of a wide range of proprietary sealing components, resulting in oil leakage when used on fast moving reciprocating shafts with zero pressure.

Failure reports indicated that only 50% of seal trials passed in house testing procedures, and when in field, seals were not reaching the industry standard of 1000 operational hours due to leakage and excessive wear — causing visible oil leakage from the crankcase, with the potential to cause significant environmental damage as well as other hazardous effects.

Other issues included material compatibility, and water from the fluid end was also passing the seal and mixing with oil in the crankcase creating a milky emulsion, which is one of the main features seen in catastrophic power-end failures.

## The Solution

FTL collaborated closely with the customer's engineering department, to develop a bespoke high wear resisting seal which not only kept oil in the crankcase end, but allowed for a hydrodynamic film of oil to enable constant lubrication of the seal at the high operational speeds of this application.

For the locations where piston speeds exceed the capabilities of elastomeric seals, or where oil media presents compatibility issues, a specially modified PTFE crosshead seal was developed by FTL and successfully tested.

This engineered solution significantly reduced the migration of media (namely water) from the fluid end into the oil-filled crankcase.

Operational service  
life extended beyond  
target of 1000  
hours and reliability  
increased by 100%

## The Benefit

The key outcome was a crosshead seal system that surpassed the required 1000 hours of reliable service in the field.

FTL's crosshead sealing solution provided the optimum pressure drop between oil case and atmosphere to facilitate correct levels of lubrication when using an all elastomer seal at elevated running speeds.

The custom design provided a fully optimised, zero leakage, seal that enabled the system to contain its media, cooling the plunger running under high pressure and preventing any further ingress of water from the fluid end mixing with crankcase oil.

Substantial cost savings were achieved for the OEM by eliminating the need to despatch engineers around the World, multiple times, to replace seals in pumps under warranty at end user locations.

Altogether, the design of the new sealing system delivered greater performance reliability at the same time as ensuring a cleaner and more environmentally friendly pumping assembly.

*"FTL's crosshead sealing solutions exceed our expectations, performing significantly better than standard sealing components, increasing our*

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Solutions** 

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