EagleBurgmann®
Rely on excellence

Single, but twice as safe under high pressure

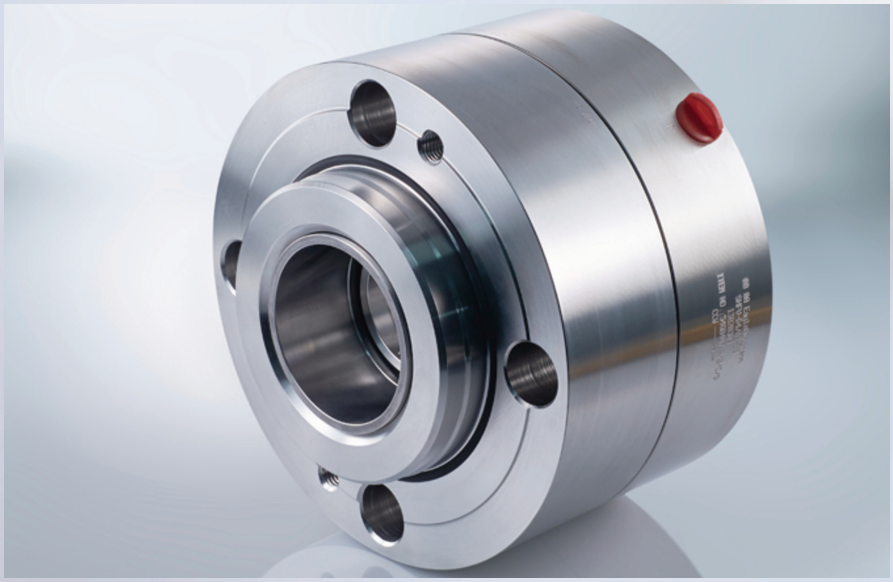
A well-known Canadian operator of an oil pipeline commissioned EagleBurgmann to develop a sealing solution for crude oil pumps. The requirement: It needed to be a single seal that was just as safe as a double seal with buffer pressure system. In addition, the sealing solution was not to be designed for only one pump type but should be installed in various pumps of one station.

EagleBurgmann develops custom tailored sealing solutions for pipelines.

The operating parameters were quite extensive: The seal needed to be suitable for a pressure range from 2.5 bar (36 PSI) to 99 bar (1,436 PSI) as well as for shaft diameters from 115 mm to 155 mm (4.53" to 6.10"). Since the pump stations are operated unmanned, the seal must operate without an additional supply system. To protect the environment and personnel, however, the seal housing must not leak if the seal fails unexpectedly.

The solution: Mechanical seal SHVI from EagleBurgmann

These requirements were best met by the SHV series which has proven itself thousands of times over in crude oil pumps and MOL pumps (MOL: Main Oil Line) of all types worldwide for many years. For the Canadian customer, EagleBurgmann developed the SHVI sealing variant with loosely inserted seal face specifically for the high-pressure range. The seal face is designed such that it always builds a parallel sealing gap with the stationary seat. The deformation behavior of the seal face was optimized for use in crude oil pumps so that the seal operates reliably even under very high pressures, sliding velocities and temperatures as well as pressure and temperature fluctuations.

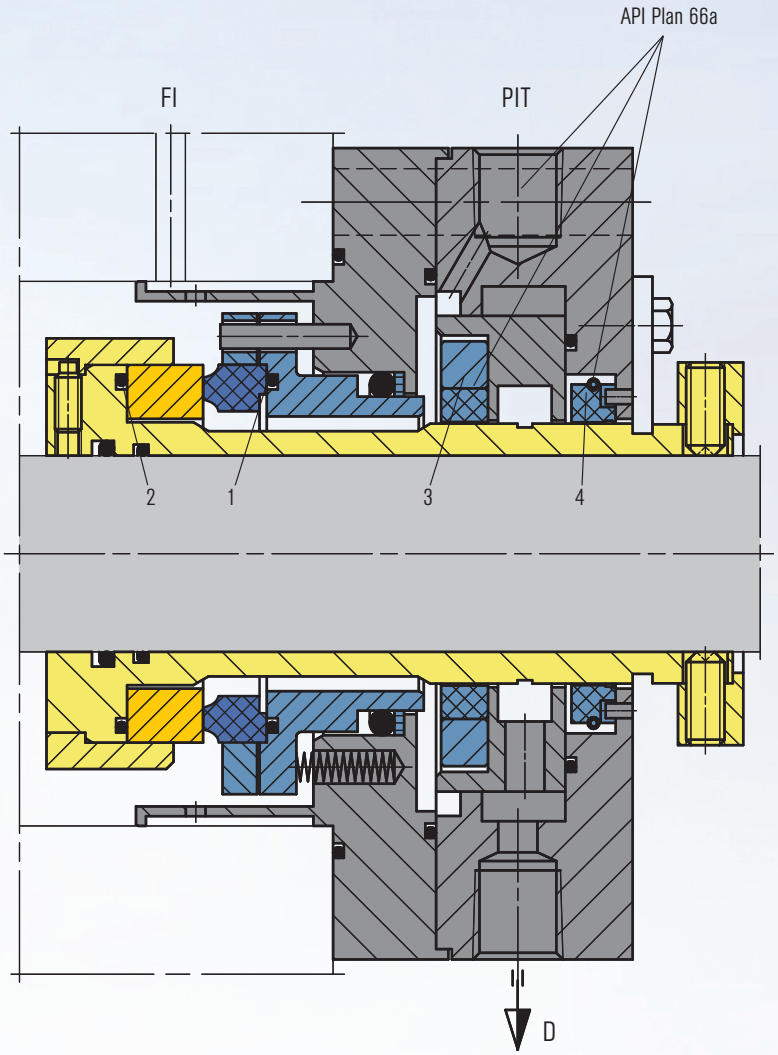


The SHVI single seal from EagleBurgmann is specifically designed for high pressures and speeds.

EagleBurgmann selected a special quality of the silicon carbide material to be used in the pumps of the pipeline operator. This provides the seal face with particularly good emergency running properties and tolerance for partial dry running. In addition, the sliding faces have extremely precisely ground grooves which allow the seal face to be lifted quickly even in the low pressure range and contribute to stable operation in a wide pressure range.

Safety: optimized API plan 66A

Plan 66A, which has been available since introduction of API 682 4th Edition, was the obvious choice for the safety concept. Accordingly, the seal housing contains two throttles, and the seal chamber is connected to a pressure transmitter.



The mechanical seal SHVI with Plan 66A on the atmosphere side: The inner throttle withstands a product pressure of 99 bar (1,436 PSI) in the event of sealing function failure. Leakage is drained through Connection D. On the product side, the seal is supplied with Plan 11 (circulation from the discharge port through an orifice into the seal chamber).

1 Seal face	FI Flow indicator	Yellow areas: rotating parts of the seal
2 Stationary seat	PIT Pressure indicator transmitter	Blue areas: stationary parts of the seal
3 High pressure throttle	D Drainage	Gray areas: Pump shaft and housing parts
4 Second throttle		

EagleBurgmann optimized the plan and uses a special inner, floating throttle. This can withstand a product pressure of 99 bar (1,440 PSI) in an emergency. The pressure transmitter detects pressure changes in the seal chamber and signals an alarm if certain values are exceeded. At the same time, the seal leakage accumulated under low pressure is discharged to a central collection system in the pump station.

Test and acceptance

The SHVI seal and the optimized Plan 66A were subjected to dynamic and static tests individually and together on EagleBurgmann test benches. The constant and reliable sealing performance in all operating states and the safe function of Plan 66A in the event of a fault provided impressive results. The required system safety was provided at all times.

There are plans to convert further pumps of the pipeline operator. The new concept of the SHVI single seal with optimized Plan 66A is economical, modular, reliable in operation and offers the safety of a double seal. For other customers as well, this type of seal has since proven itself in MOL pumps for several thousand operating hours.

Operating conditions

Shaft diameter: d = 115 ... 155 mm (4.53" ... 6.10")
Suction pressure: p = 2.5 ... 99 bar (36 ... 1,436 PSI)
Outlet pressure: max. 138 bar (2,001 PSI)
Temperature: t = +10 °C ... +70 °C (+50 °F ... +158 °F)
Speed of rotation: n = 720 ... 1,980 min^{-1}
Medium: Crude oil with diluted bitumen contents

Contact

Do you have a similar requirement? Please contact us: eagleburgmann.com/en/contact

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