GE
Oil & Gas

Sealing System in Compliance with API 682 II Edition

Benefits

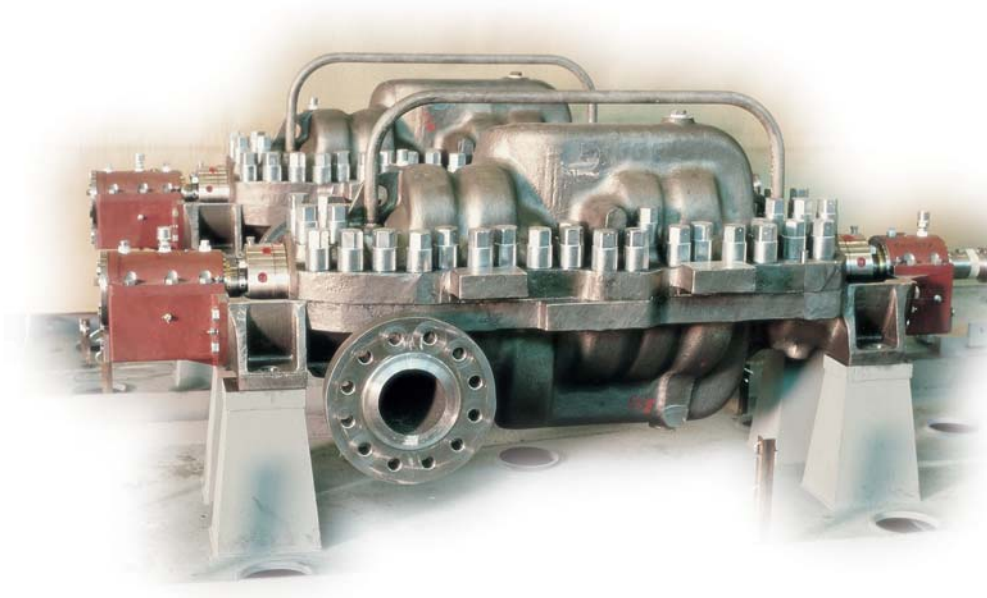
- Increased production
- Higher efficiency
- **Compliance with environmental regulations**
- **Availability and Reliability**
- **Life extension**

Customer benefits include:

- Increased reliability and maintainability of the equipment
- Compliance with emission legislation
- Lower cost
- Improved safety

What it is

The API 682 standard provides a set of design criteria with the mission to give a "high probability of operating for three years of uninterrupted service while meeting or exceeding environmental emission regulations". The implementation of the new standards provides a sealing system that improves reliability, maintainability and standardization, strongly increasing interchangeability of the components, and resulting in a consistent reduction in life cycle costs. Furthermore, safety is improved by using mechanical seals which have been fully tested and proven under real service conditions in accordance with broad Original Equipment Manufacturer (OEM) field experience. The qualification testing is designed to simulate normal operation as well as failure of the inner seal. Leakages and pressure drops are monitored and recorded at key points during the testing which includes starts and stops along with variations in pressure and temperature of the process fluid.



How it works

The API 682 task force created a methodology for selecting seals based on specific process fluids and operating conditions. Seals have been divided and grouped by category (the pump, operating window, design features and documentation required), arrangement (single, dual unpressurized, dual pressurized), type (basic design and materials of construction) and flushing plans.
The standard contains a great number of requirements covering everything from O-ring sealing surfaces to drive collars.
Process connection sizes, orientations and construction are specified for the three main standard arrangements:

- **Single mechanical seals**

The standard single mechanical seal has one rotating face per seal chamber and is internally balanced (*Figure 1*)

- **Unpressurized dual mechanical seals**

The standard unpressurized dual mechanical seal has two rotating flexible elements and two mating rings in series.
It is an internally balanced mechanical seal. A buffer fluid separates the seals (*Figure 2*).
The buffer fluid cavity between the two seals is maintained at a lower pressure than that of the seal chamber. When the inner seal fails, the containment seal prevents or minimizes fluid leakage to the atmosphere.

- **Pressurized dual mechanical seals**

The standard pressurized dual mechanical seal has two rotating flexible elements and two rotating mating rings in series.
It is an internally balanced mechanical seal. A barrier fluid separates the seals (*Figure 3*).
The barrier fluid pressure is grater than the seal chamber pressure. This type of seal is designed to completely prevent the passage of the process fluid into the seal cavity and eventually into the atmosphere
The API 682 standards also outline some of the construction details for seal coolers and the requirements for the dimensions, materials and instrumentation for reservoirs and vessels (*Figure 4*).
Application of a standard mechanical seal can require modification of some of the centrifugal pump components. This could include:

- Re-design of the shaft sleeve
- Machining or redesign of the stuffing box in order to meet API 682
- Machining or redesign of the throat bushing
- Machining of the bearing housing to introduce new standard flush planes to meet API 682

The supply includes:

- Technical studies
- The sealing system
- All necessary parts required to modify the existing pump (including bearing bracket, stuffing box, throat bushing, shaft sleeve and seal, and gaskets)
- Field installation and testing

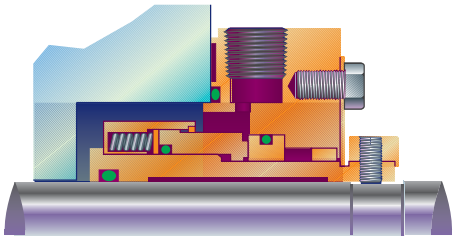


Figure 1: Single mechanical seal

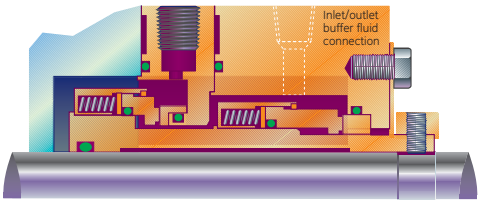


Figure 2: Unpressurized dual mechanical seal

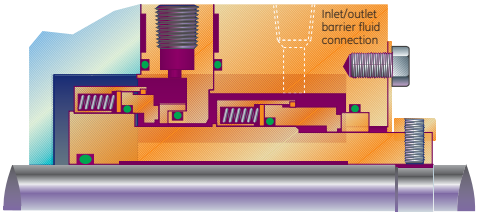
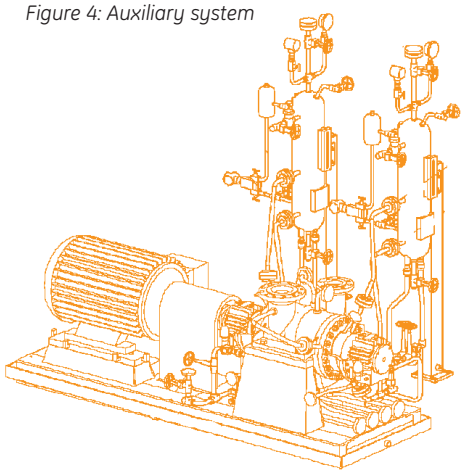


Figure 3: Pressurized dual mechanical seal

Figure 4: Auxiliary system



GE imagination at work

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