

Design Features Improving the Service Life of Mechanical Seals for Hot Water Applications

1 General

The service life of a hot-water mechanical seal is mainly influenced by the quality of the hot water (water treatment!), the pressure and the temperature at the mechanical seal. For details about the recommended water-chemical values with respect to water treatment, please see VdTÜV regulation TCh 1466, edition 2/89.

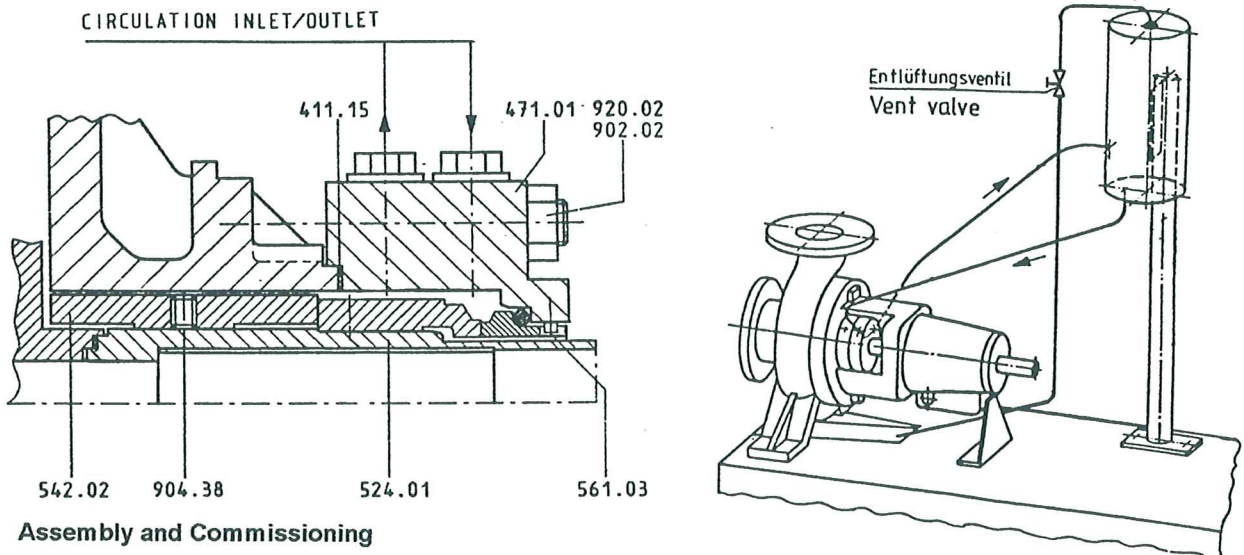
Constructional measures can be used to change pressure and temperature at the seal faces, thus attaining a substantial increase in service life by increasing the pressure and reducing the temperature at the mechanical seal.

The following explanations describe a KSB design used for hot water pumps without losing the well-known benefits of back-pullout design and standardized dimensions to DIN 24 256/ISO 2858.

2 Design

Using a casing cover open to the outside and without cooling chamber ensures heat dissipation of the seal area to the ambient air. A standardized mechanical seal is fitted at the outboard end of the seal chamber. To prevent an exchange between the hot water in the pump chamber and the water at the mechanical seal, a long rotating throttling bush 542.02 has been installed between the mechanical seal and the pump chamber. Reducing the impeller back vanes to a minimum increases the pressure at the mechanical seal during operation. The friction heat generated during operation is dissipated without any additional cooling liquid through the installed thermosiphon system.

Additionally, the special seal cover 471.01 will create a pressure differential at the circulation connections during pump operation, which causes a circulation through the air-cooled heat exchanger which helps dissipate the friction heat of the mechanical seal. This circulation is also supported by the thermosiphon effect during pump operation. The warmer liquid around the mechanical seal has a lower specific weight than the colder (and thus specifically heavier) liquid in the thermosiphon vessel. This difference in weight will generate a slow but steady circulation which will dissipate the friction heat at the thermosiphon vessel.



3 Assembly and Commissioning

To ensure a proper thermosiphon circulation, it is important to lay out the hot pipe continuously rising and the cold pipe continuously falling. Flow resistance should be reduced to a minimum, which is achieved by the special seal cover design and large pipe diameters.

The system should be filled with clean hot water from the pump chamber. Open the vent valve until a smooth jet of water without bubbles emerges from the end of the vent pipe.

Note: Make sure that the heat exchanger is completely filled with water and has been vented prior to commissioning the pump. During the start up phase, the heat exchanger should be vented approx. once a week to remove any gas that may have accumulated in the system.