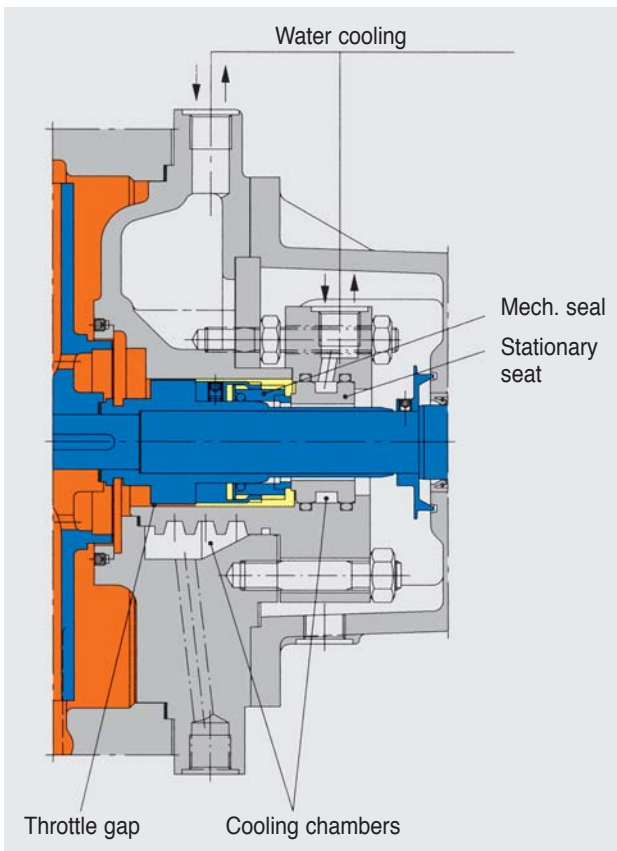


SHAFT SEALING

Due to high vapour pressures of hot water, standard mechanical seals can not be used for high temperatures.



Mechanical seal "Re" with water cooled stationary seat and cooling jacket - NHL

The "Re" design requires cooling water for the stationary seat and the cooling chamber.

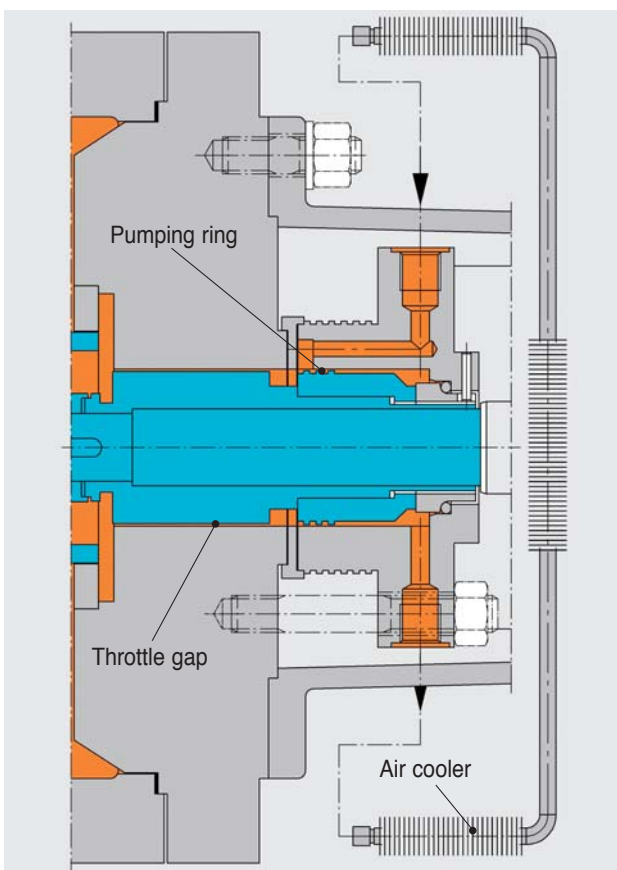
There is no circulation available (dead end). A throttle separates the hot pumped liquid from the cooled liquid in the seal chamber.

Cooling water consumption 300-700 l/h.

Allowable operating temperature :

NHL s max. 205°C (401°F)

NHL huh max. 238°C (464°F)



Mechanical seal "Gef" with air cooled cooling loop - NHL

A balanced single mechanical seal is provided with a pumping ring. Circulation is from the pumping ring at the seal through an external air cooler and back to the seal chamber. A pump with this cooler is also shown on the cover page.

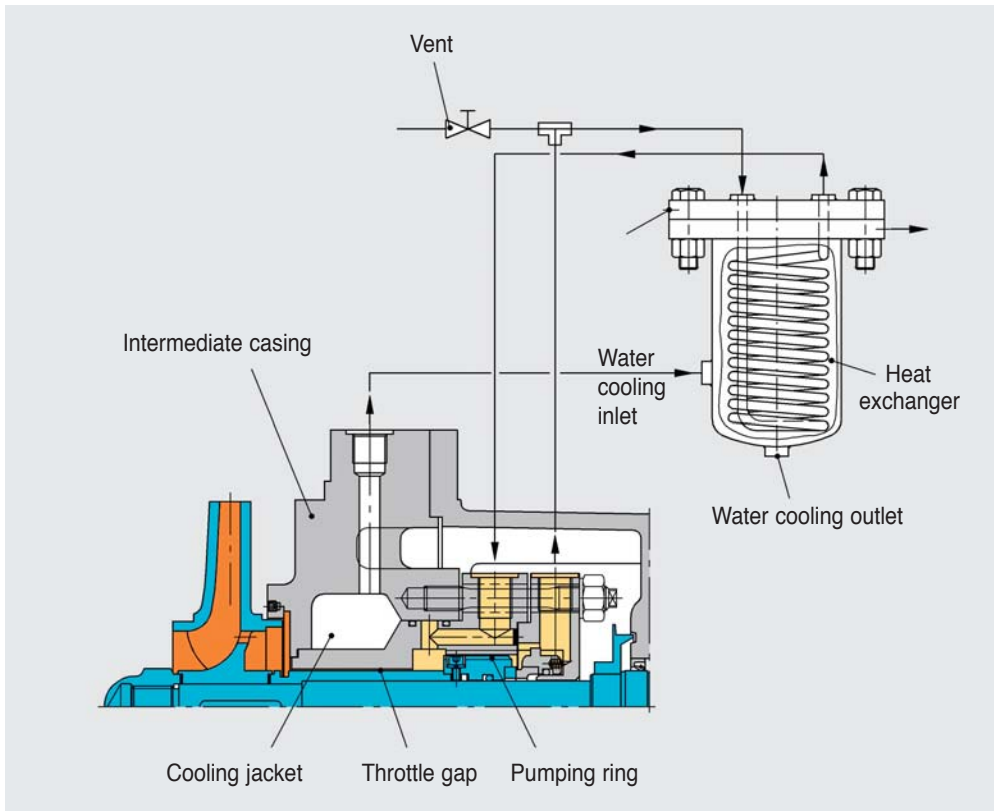
A throttle between impeller and seal chamber separates the pumped hot water from the cooled fluid in the seal chamber. This circulation minimizes heat load on the cooling loop by cooling only the small amount of liquid that is recirculated. The arrangement is self-venting.

Allowable operating temperature :

NHL s max. 205°C (401°F)

NHL huh max. 210°C (410°F)

Mechanical seal “Ref” with circulation through water cooled heat exchanger (API-plan 23) – NHL / HPL



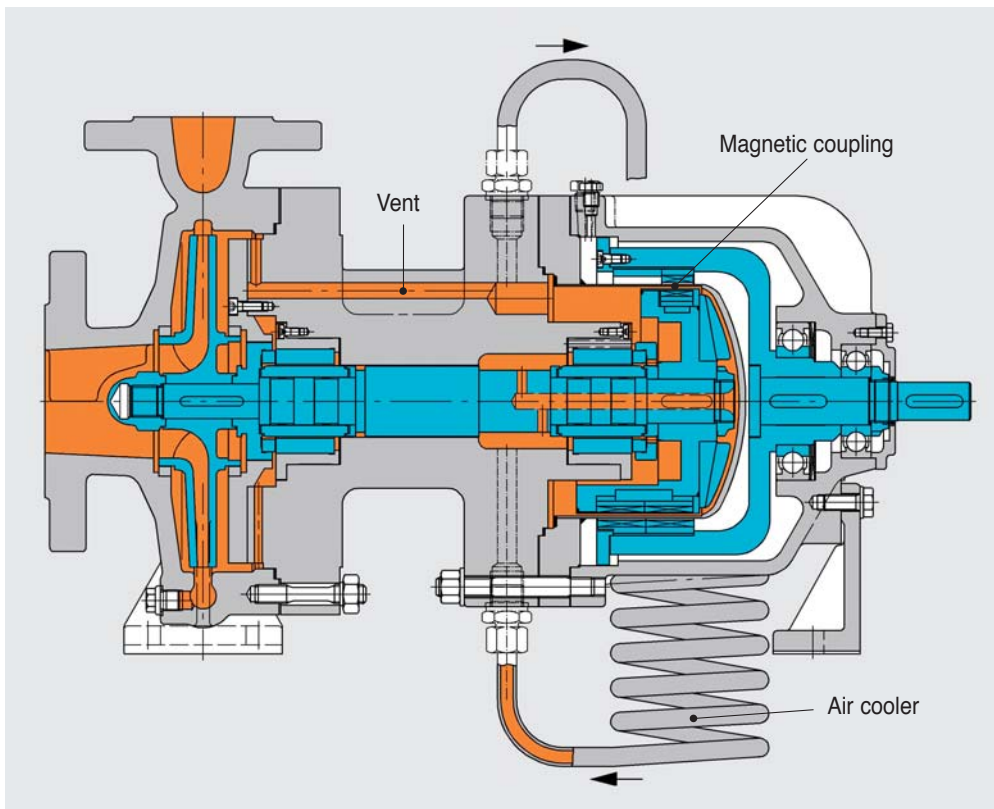
Circulation leads from a pumping ring over the seal, through a water cooled heat exchanger and back to the seal chamber. The cooling water goes through a cooling jacket in the intermediate casing and through the heat exchanger.

Cooling water consumption:
300-700 l/h.

Allowable operating temperature:

| | |
|-----------|--------------------|
| HPL / HPR | max. 280°C (536°F) |
| NHL huh | max. 238°C (464°F) |

Pump with magnetic coupling – NHM



Besides common sealed pumps also sealless pumps with magnetic coupling can be used for hot water. The termination of the main wear part (the mechanical seal) lead to considerably longer “mean time between failure“ and therefore higher availability. Hot water spill through seal failure is also excluded. The pump design is self-venting and does not require water cooling.