ENGINEERING TOMORROW

Fact Sheet

Safety relief valves

Valves Tightness and Service needs

Tightness of safety valves with rubber O-ring sealings

Rubber O-ring sealings have excellent sealing properties in safety valves, when built in correctly. Compared to harder PTFE sealings and metal sealings, the sealing performance at system pressures close to the set pressure (low differential pressure) are better due to the softer sealing.

Danfoss backpressure dependent safety relief valves are 100% tightness tested at the end of production line according to DS/EN ISO 21922:2021. The maximum allowable leakage rate is tested in a bubble immersion test according to API 527 using air at 20 °C pressurized to 90% of the set pressure. This is equivalent to the tightness test by means of either technique C.1 or C.2 according to EN 1779:2001, whereas the minimum detectable leakage is 10^{-4} Pa m³/s. This equates the maximum leakage from a safety relief valve to be 10^{-4} Pa m³/s.

In addition, the O-ring material is permeable, meaning that ammonia will permeate by diffusion even the valve sealing is 100% mechanically tight.

Due to the requirement of a downstream piping systems according to EN 13136:2013 ammonia will be accumulated over time in the discharge piping system. Even very small amount of ammonia will be detectable by smell, litmus paper or an ammonia gas detector. However, this does not necessarily indicate the presence of a malfunctioning O-ring sealing.

Service intervals

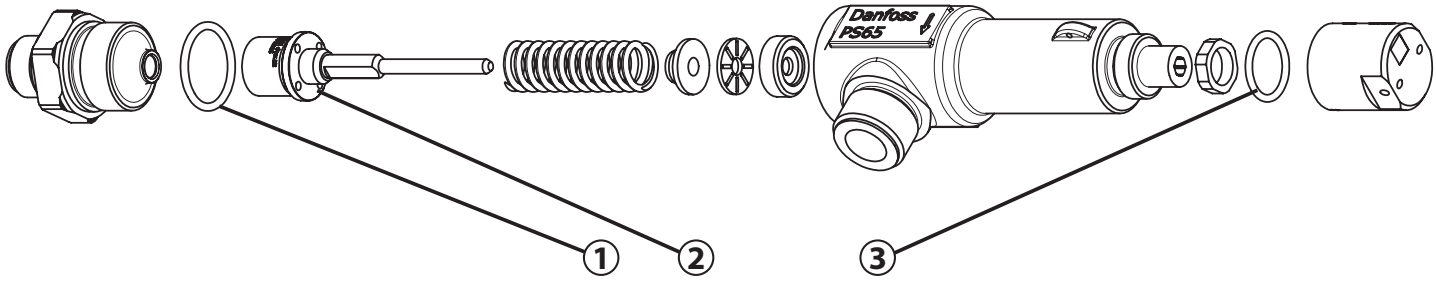
The properties of rubber O-rings are degrading over time and is highly impacted by the long-term temperature exposure.
It means O-rings are a wearing part and subject to replacement using Danfoss repair kits or by replacing the complete valve.
Danfoss recommends customers to do this when the valve is due for replacement or recalibration as required by local regulation.

Observe, the re-calibration shall be done by an authorized party before re-commissioning.

When exposed to long-term temperatures close to the limitation, the degradation of the O-ring may happen faster than the standard recalibration cycle, therefore an additional replacement of O-rings and recalibration are recommended.

The service can be performed by

- Replacement of the complete SFA/SFV valve by a new one with same set pressure OR
- Replacement of spindle with O-rings using the SFA/SFV repair kits followed by a recalibration



Example: SFA 10(H) Repair kit content pos. 1, 2 & 3

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