Gas Seal 101 – by Alfred Low

What are Gas Seals?

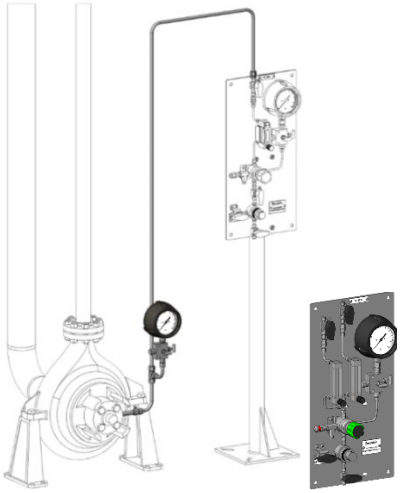
- Gas seals run in a clean, controlled fluid environment and are designed to remain non-contacting and non-wearing for the expected operating conditions. Seal faces operate on a barrier fluid film which is typically nitrogen.
- Used on light hydrocarbons or liquids with a high vapor pressure
- Typically used on Volatile Organic Compound (VOCs) where leakage control is important

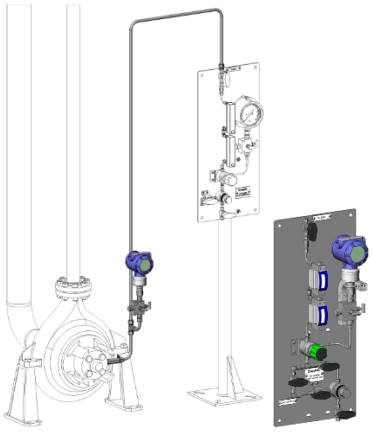
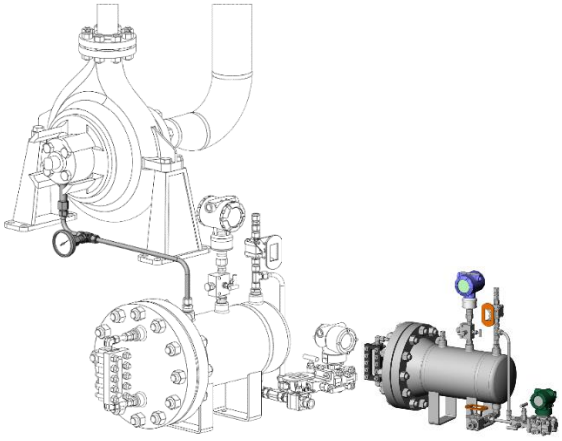
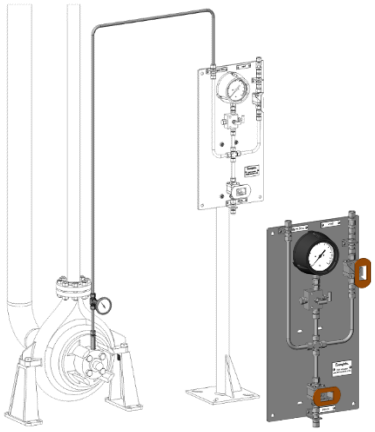
Advantages of Gas Seals

- Since they are non-contacting seals, they do not wear and provide consistent performance
- Reduce power consumption at the seal faces which results to lower cost of operation
- Seal generates little heat and any gas leakage will absorb heat away through gas expansion

Downside on Gas Seals

- When it works, it will work great, when it does not work, it can be disaster to the seal
- Quality of clean dry nitrogen is critical
- Gas seals offer little room for error. If there is a disruption in nitrogen supply, the gas seal will fail quickly and catastrophically.

Plan	Description	Design
Plan 72	❖ Unpressurized buffer gas control system ❖ Dilutes the vapor leakage in the containment seal cavity and sweeps away to vent ❖ System includes a pressure transmitter upstream of the flowmeter to indicate the buffer gas supply pressure and to trigger an alarm if supply fails ❖ Flow switch monitors the consumption of the buffer gas and triggers an alarm in the event the containment seal fails	

Plan	Description	Design
Plan 74	❖ Back to Back Seal ❖ Pressurized barrier gas, usually nitrogen (higher pressure than seal chamber) ❖ Panel removes moisture, regulates, filters gas ❖ If there is an inboard seal leak, N2 leaks into process	
Plan 75	❖ Unpressurized Dual Seal ❖ Liquid collection reservoir ❖ Orifice allows vapor to bleed to collection system ❖ Pressure measuring device detects excessive seal leakage	
Plan 76	❖ Containment Seal ❖ Divert gas seal leakage to flare or vapor recovery system ❖ Pressure measuring device detects excessive seal leakage	

Source: *Swagelok Mechanical Seal Support Systems Training Material.*