

Auxiliary Seal Support Reservoirs

Liquid lubricated, dual mechanical seals require an external source of fluid. A properly selected supply tank system eliminates the need to connect to a distant and sometimes unreliable barrier fluid source. Flowserve offers a complete line of standard API reservoirs for a wide range of sealing applications.

For plan 52 and 53a Piping Arrangements



Design:

- Compliance with API 682 2nd edition
- Design code: ASME VIII div 1 in compliance with P.E.D.
- Non destructive testing according ASME: spot radiographic examination, full dye penetrant examination
- P.E.D. classification: Category IV

Design pressure:

- Reservoir: 77 barG @ 38°C; 65 barG @ 94°C; 58 barG @ 149°C
- Cooling coil: 15 barG

Note: Maximum allowable working pressure is limited by the instrumentation

Hydrostatic test:

- Reservoir: 96,2 barG
- Cooling coil: 24,6 barG

Volume:

- Normal level: 20 liter
- Low level: 15,2 liter
- High level: 21,6 liter
- Working volume: 6,4 liter
- Total volume of reservoir: 27 liter

Cooling capacity:

~ 8 kW with buffer/barrier fluid water @ 80°C and cooling water 25°C
~ 2 kW with buffer/barrier fluid oil @ 80°C and cooling water 25°C

Weight: 75 kg (empty)

Material: Seamless stainless steel pipe, ASME B36.19
ASME SA-312 Grade TP 316L

Studs/nuts: stainless steel

Gaskets: asbestos free material

Instrumentation

Level gauge:

Weld on reflex type, stainless steel 316, borosilicate glass

Pressure indicator:

Dial 100 mm, stainless steel metal parts, dry, blow out disc, safety glass window
Available ranges:

- | | |
|----------------------------------|----------------------------------|
| <input type="checkbox"/> 6 barG | <input type="checkbox"/> 40 barG |
| <input type="checkbox"/> 16 barG | <input type="checkbox"/> 60 barG |

Instrument valve:

- ☐ Multi-port gauge valve + bleed plug

Gate valve:

- ☐ Bolted bonnet, 800 lbs, flanged
☐ Drain ☐ Fill ☐ Vent

Pressure switch:

- ☐ API 682, Exd, DPDT switch
☐ Non API 682, Exi, SPDT switch

Available ranges:

- ☐ For plan 52, range 3.5 barG
☐ For plan 53a, range 20 barG
☐ For plan 53a, range 117 barG

Electrical connections: M20 x 1,5

Orifice:

- ☐ Plate type; clamped between flanges
Hole dia: ☐ 0,8 mm ☐ 3,2 mm

Optional features:

- ☐ Hand pump
☐ Funnel for buffer/barrier fluid filling connection

Level switch:

Ultrasonic type:

- ☐ API 682, Exd, DPDT switch
☐ Non API 682, Exi, 2 wire 24 VDC electronics with 8 or 16 mA output

Float type (non API 682):

- ☐ Exd, DPDT switch
☐ Exi, SPDT switch

- ☐ High level switch

Electrical connections: M20 x 1,5

Non return valve:

- ☐ Disc type, clamped between flanges

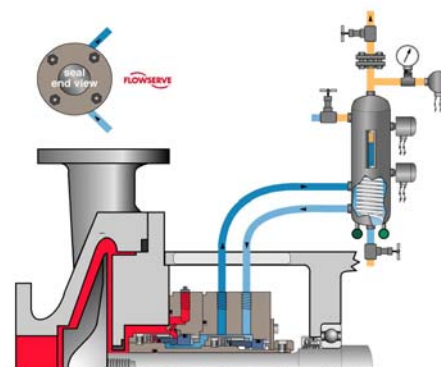
API plan 52

Plan 52 or Arrangement 2, un-pressurized dual seal systems, are used in services where no leakage to atmosphere can be tolerated. A Plan 52 system consists of dual mechanical seals with a buffer fluid between them. The buffer fluid is contained in a seal pot, which is vented to a vent system, thus maintaining the buffer fluid pressure close to atmospheric. Inner seal leakage will be product leakage into the buffer fluid. There will always be some leakage.

Plan 52 works best with clean, non-polymerizing products, which have a vapor pressure higher than the buffer fluid pressure. These products will flash in the seal pot and the vapor can escape to the vent system. If the product has a vapor pressure lower than the buffer fluid or seal pot pressure, the leakage will remain a liquid and will contaminate the buffer fluid.

Should an inner seal leak not be detected early, the heavier process fluid will displace the buffer fluid and can result in the area between the two seals being completely filled with product. In that case, an outer seal leak can result in product being released to the atmosphere. Plan 52 should not be used for dirty or polymerizing products as well.

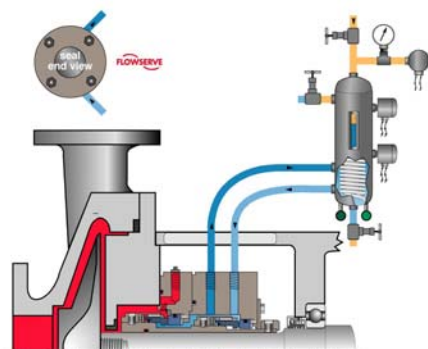
Plan 53a should be considered as an alternative for these situations.



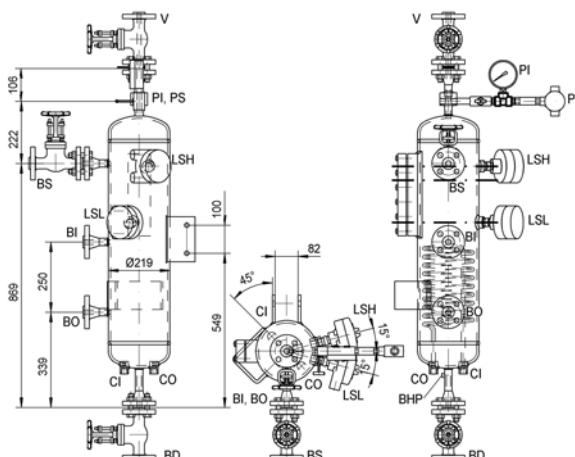
API plan 53a

Plan 53a or Arrangement 3 pressurized dual seal systems are used in services where no leakage to atmosphere can be tolerated. A Plan 53a system consists of dual mechanical seals with a barrier fluid between them. The barrier fluid is contained in a seal pot which is pressurized to a pressure of approximately 1,5 bar (23 psi) greater than the pump seal chamber. Inner seal leakage will be barrier fluid leakage into the product. There will always be some leakage. If seal chamber pressures vary significantly plan 53c should be considered or if barrier pressures are above 20 barG, plan 53b or 53c should be considered.

Plan 53a is usually chosen over Plan 52 for dirty, abrasive, or polymerizing products which would either damage the seal faces or cause problems with the buffer fluid system if Plan 52 were used. There are two disadvantages to Plan 53a, which shall be considered. There will always be some leakage of barrier fluid into the product. The leakage rate can be monitored by monitoring the seal pot level. However, the product must be able to accommodate a small amount of contamination from the barrier fluid. Second, a Plan 53a system is dependent on having the seal pot pressure maintained at the proper level. If the seal pot pressure drops, the system will begin to operate like a Plan 52, or un-pressurized dual seal, which does not offer the same level of sealing integrity. Specifically, the inner seal leakage direction will be reversed and the barrier fluid will, over time, become contaminated with the process fluid with the problems that result, including possible seal failure.



BI	Product inlet	¾"-600# RF Smooth Finish
BO	Product outlet	¾"-600# RF Smooth Finish
BD	Product drain connection	¾"-600# RF Smooth Finish
V	Vent connection (plan 52)	¾"-600# RF Smooth Finish
N	Pressure source (plan 53a)	¾"-600# RF Smooth Finish
BS	Product filling connection	¾"-600# RF Smooth Finish
LSL	Low level alarm	2" NPT
LSH	High level alarm	2" NPT
CI	Cooling water inlet	½" NPT
CO	Cooling water outlet	½" NPT
PI	Pressure indicator	½" NPT
PS	Pressure switch	½" NPT
BHP	Hand fill unit	½" NPT



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