

Basics of Buffer and Barrier Seal Support Plans

by Alfred Low

What is a Buffer Fluid Plan?

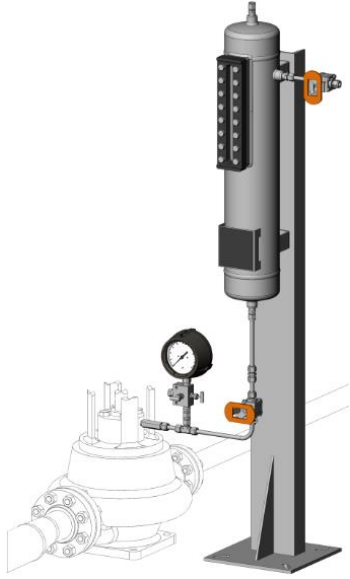
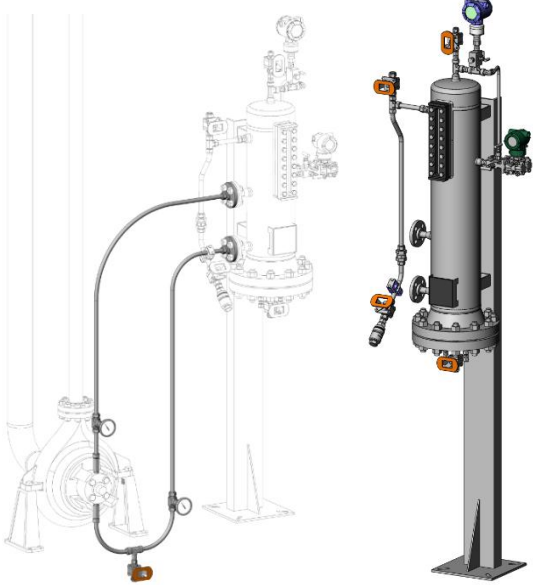
- An unpressurized fluid system with a reservoir (seal pot) that is used to provide cooling or lubrication to fluids with poor lubricating characteristics, such as light hydrocarbons
- Buffer fluids should have a lower vapor pressure than the sealed fluid
- Allows the process fluid leakage to bubble through the buffer fluid and be vented to flare

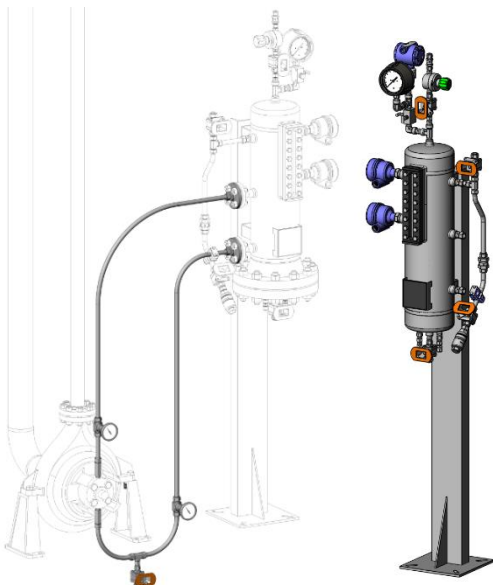
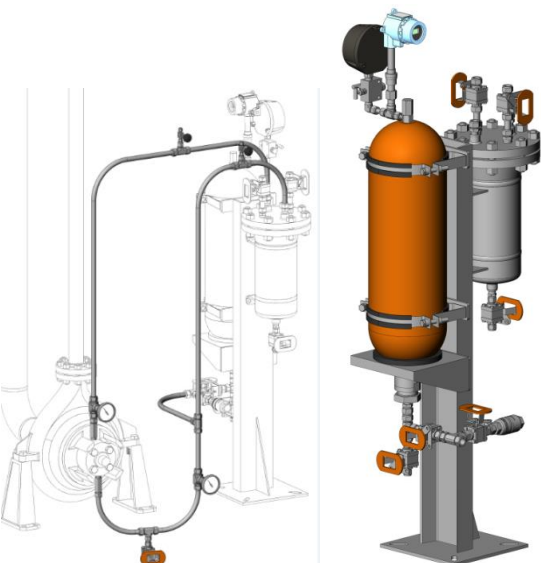
What is Barrier Fluid Plan?

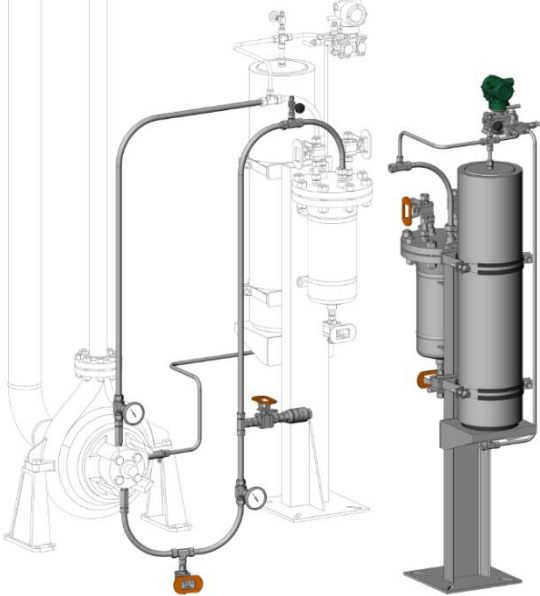
- It is a pressurized fluid system with a reservoir (seal pot) that is used when the process fluid must be isolated from the environment to prevent flashing, crystallization, polymerization, or when the pumped fluid is toxic/hazardous
- Barrier fluids are usually pressurized 15-30 psi above the seal chamber pressure

Typical Reservoir (Seal Pot) Requirements

- 2 types of configurations
 - Fully welded
 - Flanged end (for cleanout)
- ISO 15649 or ASME B31.3 compliant
- Typical volumes
 - 12L (≤ 60 mm pump shaft)
 - 20L (> 60 mm pump shaft)

Plan	Description	Design
Plan 51	❖ Dead-ended to quench connection ❖ Used with auxiliary sealing device ❖ Valve closed before startup <i>Note : Per API 682, this plan is only recommended for vertical pumps, but in practice it has also been used on horizontal pumps.</i>	
Plan 52	❖ Unpressurized buffer fluid circulated with pumping ring ❖ Cooling coils in reservoir (optional) ❖ Typically coupled with a flush plan <i>Note : A buffer fluid drain is to be located on the lower point of the buffer inlet.</i>	

Plan	Description	Design
Plan 53A	❖ Pressurized barrier fluid ❖ Cooling coils in reservoir <i>Note : A barrier fluid drain is to be located on the lower point of the barrier inlet.</i>	
Plan 53B	❖ Bladder accumulator isolates pressurizing gas from barrier fluid ❖ Prevents gas entrainment in barrier fluid <i>Note : A barrier fluid drain is to be located on the lower point of the barrier inlet.</i>	

Plan	Description	Design
Plan 53C	❖ Piston Accumulator (intensifier) references seal chamber pressure and provides positive differential to barrier fluid ❖ No external pressure source	

Source: Swagelok Mechanical Seal Support Systems Training