INSTALLATION, OPERATION & MAINTENANCE GUIDE

flexaseal
ENGINEERED SEALS AND SYSTEMS, LLC

PLAN 52 & PLAN 53A
SEAL SUPPORT SYSTEMS



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Installation, Operation, & Maintenance Guide

Plan 52 & Plan 53A Seal Support Systems

OVERVIEW

This guide outlines the installation, operation, and maintenance of Flexaseal Plan 52 & Plan 53A Seal Support Systems for dual mechanical seals. This guide, in addition to the manuals provided by the pump manufacturer and the manufacturer of any auxiliary equipment, should be read in their entirety prior to installation.

NOTICE

Flexaseal does not assume responsibility for misuse, or any damages incurred as a result of the misuse of the supplied sealing system. Contact a Flexaseal representative before making any changes to the provided system or design.

WARRANTY

Flexaseal's limited warranty covers material defects and workmanship for its goods and/or services for a period of six (6) months for new items, or three (3) months for repaired items, from the date of their initial use/installation or delivery, whichever occurs first.

SAFETY

1. Read all instructions thoroughly prior to beginning installation.
2. Installation, operation, and maintenance must only be carried out by qualified personnel who have thoroughly read all instructions.
3. The support system must only be used for its intended application. Flexaseal cannot be held liable for use outside the scope of recommended application.
4. Follow plant safety regulations and procedures throughout the disassembly/installation process including, but not limited to, the following:
   - Lockout/tagout procedures
   - SDS consultation for any hazardous materials involved
   - Use of proper personal protective equipment
   - Relief of any system pressure and mechanical energy
5. The following symbols have been used throughout the document to highlight important information:

ATTENTION — Instructions intended to prevent damage to seal or equipment



Mandatory instructions intended to prevent personal injury or extensive damage to equipment

NOTE: Information to note while installing, or for later use

Rated Limits

System	ANSI Lite	ANSI Plus	Other
Temperature	-20–200 °F [-29–93 °C]	-20–200 °F [-29–93 °C]	See engineering print
Pressure	219 psig [15.1 barg]	350 psig [24.1 barg]	See engineering print
Size	3/4 gal. [11/15 L]	3/5 gal. [11/19 L]	See engineering print

Always review and refer to the engineering print supplied with your sealing system for detailed ratings and specifications.

PLAN 52 ARRANGEMENT

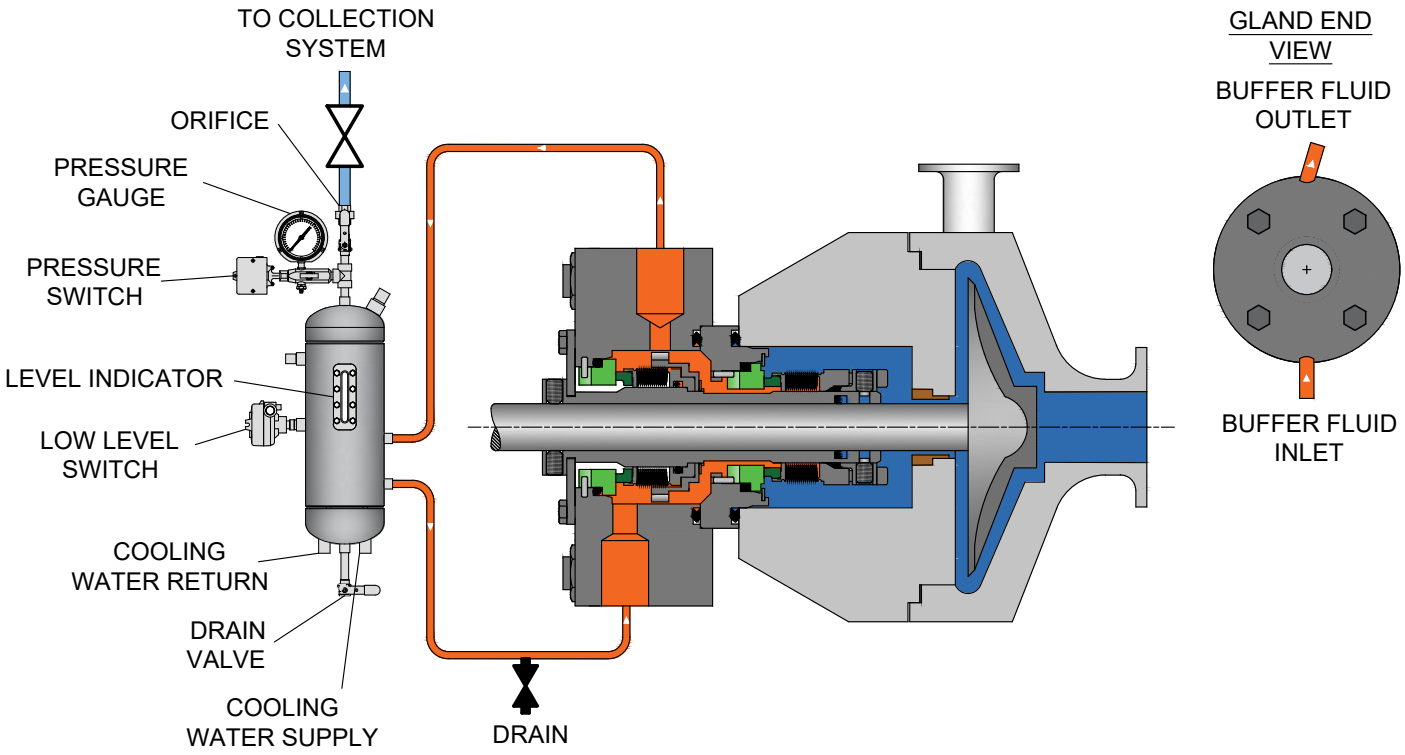

Figure 1: External reservoir providing buffer liquid to outer seal.

PLAN 53A ARRANGEMENT

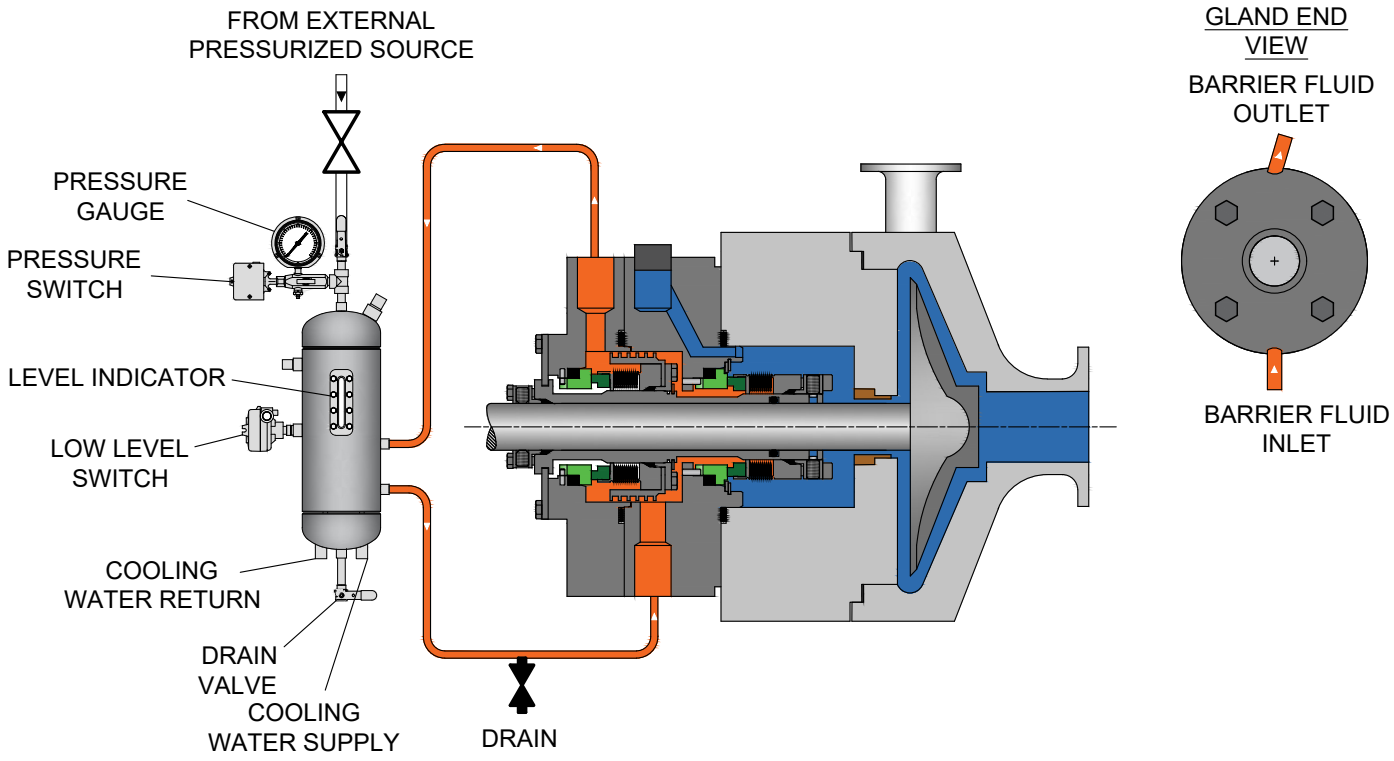

Figure 2: Pressurized external reservoir providing barrier fluid to inner and outer seals.

INSTALLATION LAYOUT

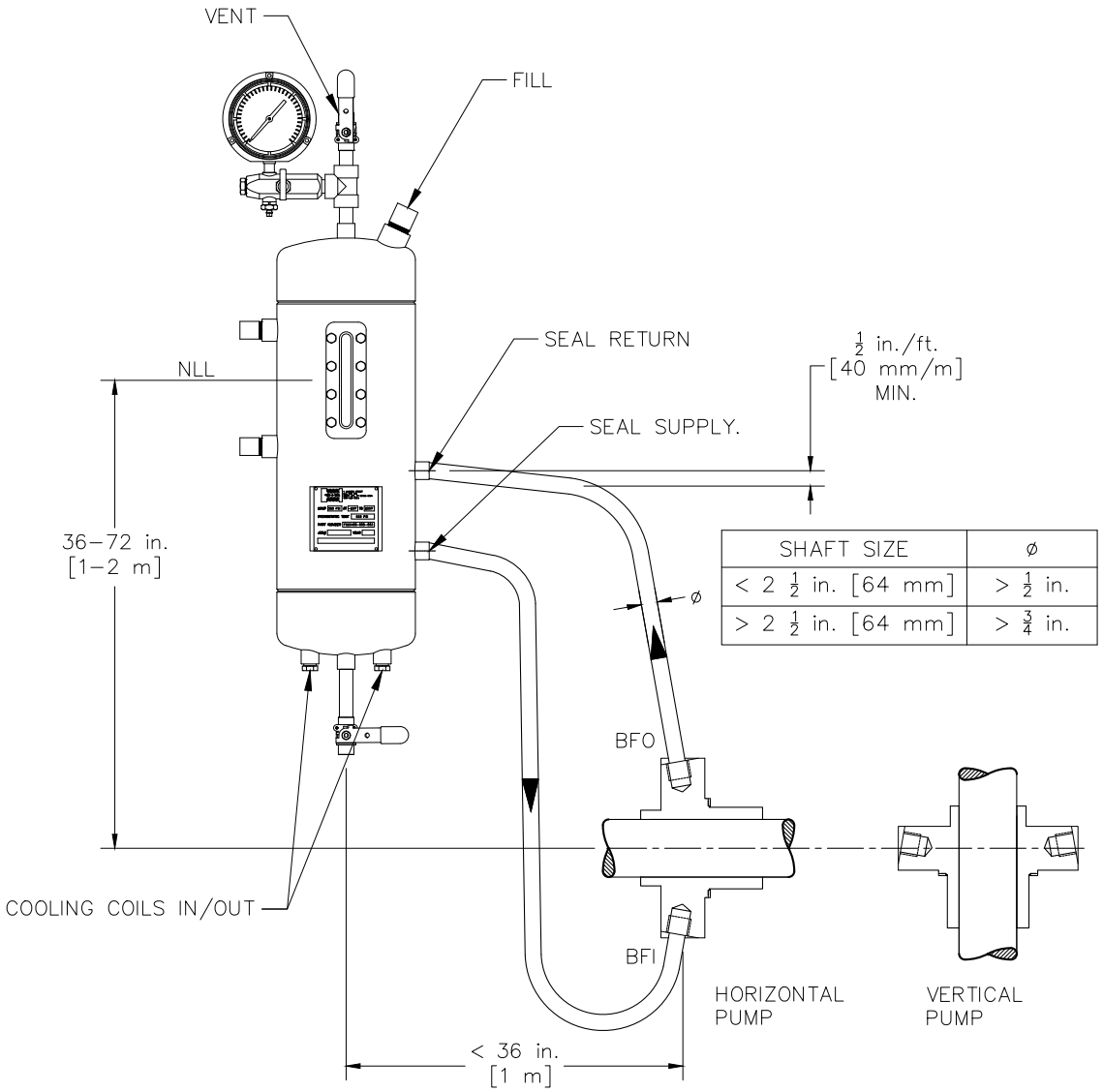

Figure 3: Typical installation of a buffer/barrier fluid reservoir.

INSTALLATION AND START-UP

Please consult our Applications Engineering team for a recommended system, and buffer (Plan 52) or barrier (Plan 53A) fluid for your sealing needs.

1. Install the mechanical seal on the pump. Refer to the seal OEM installation instructions for details.

2. Mount buffer/barrier fluid reservoir within a 36 in. [1 m] radius of the seal location and such that the normal liquid level (NLL, midpoint of the sight glass) is 36–72 in. [1–2 m] above the centerline of the seal gland (Figure 3). The reservoir should be as close as possible to the mechanical seal while allowing enough room for operation and maintenance.

NOTE: Circulation of barrier fluid through the system is dependent on thermal siphoning and/or a pumping ring inside the seal. For best performance, head loss and friction should be minimized as much as possible by maintaining short tubing distances.

3. Remove plastic shipping plugs.

4. If supplied, connect reservoir cooling coils to the water supply lines.

5. Correctly make connections between the barrier fluid reservoir and the mechanical seal according to the connection labels on the prints. The SEAL SUPPLY connection (lower port) on the reservoir must lead to the buffer/barrier fluid in (BFI) connection on the seal gland; the SEAL RETURN connection (upper port) on the reservoir must lead to the buffer/barrier fluid out (BFO) connection on the seal gland (Figure 3).

   - Piping should slope continuously upwards (½ in./ft. [40 mm/m] minimum) with no relative high points that would result in trapped air in the tubing.
   - For shafts smaller than 2 ½ in. [64 mm] use at least ½ in. diameter tubing and at least ¾ in. tubing for larger shafts.
   - Use smooth, long radius bends in the piping, minimize 90° elbows, and use 45° bends wherever possible.

ATTENTION Use thread sealant instead of thread tape. Thread tape has been known to break apart and enter the buffer/barrier fluid stream, resulting in damage to and premature failure of the mechanical seal.

ATTENTION Ensure that all tubing/piping is free of pipe strain, which can adversely affect the seal.

6. Insulate hot lines as necessary for safety.

7. Ensure all unused ports and connections are adequately plugged.

8. Properly connect wiring for switches, transmitters, or other instrumentation. For wiring diagrams and detailed setup information, consult the instrumentation OEM manual supplied with the system.

9. Use the FILL connection to fill the reservoir with a suitable buffer/barrier fluid to the midpoint of the sight glass. Check for leaks.

10. For Plan 52 configurations (Figure 1), connect the reservoir VENT connection to plant flare or a vapor recovery system.

11. For Plan 53A configurations (Figure 2), connect plant or bottled nitrogen to the reservoir VENT connection.

NOTE: It is recommended that the user purge as much oxygen/air from the system as possible. This can be accomplished by pressurizing the reservoir to 30 psig [2.1 barg], venting the pressure down to 2–5 psig [0.1–0.3 barg], and repeating at least 8 times.

12. Slowly pressurize the system to the recommended set pressure. Allow at least 15 minutes for gas pressure and temperature to stabilize.

- For Plan 53A systems, the barrier fluid pressure should be 20–30 psig [1.4–2.1 barg] higher than the highest pressure expected in the seal chamber.
- A pressure regulator and a check valve are recommended to maintain the minimum set pressure and ensure safety. A self-relieving pressure regulator is not recommended; the release of volatile leakage and other gasses may pose a hazard to health and safety.
- Check for leaks in the tubing, connections, and at the seal.

Using oxygen or air to pressurize your system can be dangerous—this could cause an explosion! Use dry nitrogen or other recommended inert gasses and always understand the risks associated with pressurized gasses.

13. Flood the pump, vent all air from the seal chamber, and again check seal for leakage. Ensure the product is not leaking into the reservoir by noting changes in liquid level and buffer/barrier fluid pressure.
14. Start the pump per pump manufacturer's recommendations, observe for proper operation, and check for excessive heat at the seal gland.

Do not run the seal dry—dry running can result in immediate seal failure.

OPERATION

Monitor the buffer/barrier fluid pressure, liquid level, and temperature in the first few hours after start-up, then every 2-3 days until stable operation is confirmed. Note any rapid or abrupt changes in the system vitals and consult Flex-A-Seal if problems persist.

Since mechanical seals leak minimally by design, refill of the buffer/barrier fluid will eventually be necessary.

- Plan 52 (unpressurized) systems may be refilled periodically without needing to shut down the pump and depressurize the system.
- Plan 53A (pressurized) systems will require a foot or hand pump to refill without first shutting down the process pump and depressurizing the sealing system.

MAINTENANCE

Buffer/barrier fluids will break down over time or become contaminated with process leakage. Fluids should be drained from the system as often as possible or during scheduled pump shutdowns. The reservoir and tubing/piping should be flushed and filled with new, clean buffer/barrier fluid. It is important to clean the seal support system after a seal failure; the cleaning fluid and procedure required will depend on the contamination in the reservoir. Never re-use barrier fluid after a seal failure.

For systems with an armored weld-pad level-gauge, it is recommended that the bolts be checked and re-torqued to 20 ft-lb [27 N-m] (starting with the middle two bolts and working outwards in a criss-cross pattern) while the reservoir is empty to ensure long-term reliability.