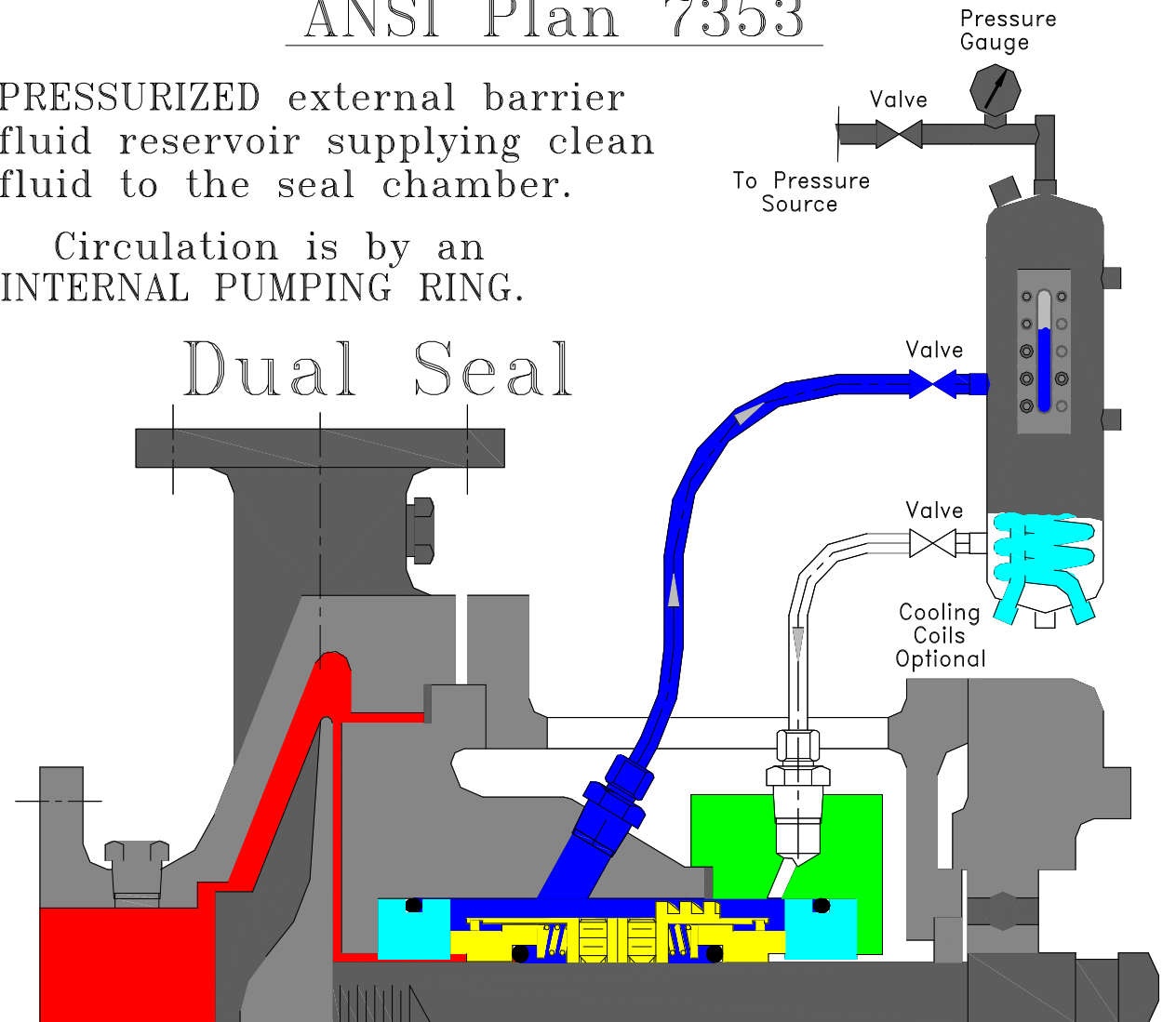


API Plan 53 ANSI Plan 7353

PRESSURIZED external barrier fluid reservoir supplying clean fluid to the seal chamber.

Circulation is by an INTERNAL PUMPING RING.

Dual Seal



In this plan the reservoir pressure is greater than the process being sealed.



API PLAN 53 ANSI PLAN 7353

DESCRIPTION: PRESSURIZED external BARRIER fluid reservoir supplying clean fluid to a pressurized dual mechanical seal with forced circulation.

PRIMARY PURPOSE: To isolate the product being pumped from the atmosphere or to extend seal life by providing a favorable environment for the seal.
(Example: abrasive or non-lubricating liquids)

When the API PLAN 53 is used, **the pressurized barrier fluid lubricates both inner and outer seal faces.** A very small amount of barrier fluid will migrate across the faces and into the product. The **barrier fluid must be maintained at pressure 25 to 30 psi above seal chamber pressure** to insure barrier and not product lubrication of the inboard seal faces.

This plan guarantees virtually zero emissions to atmosphere. The barrier fluid can eventually become contaminated due to a mixing at the inner seal faces primarily with metal bellows type designs. Standard double balanced pusher cartridge seals are much less susceptible to this mixing.

As in PLAN 52, a forced circulation is preferred over thermal siphon and cooling coils can be utilized in the seal reservoir to prevent flashing of the product or barrier fluid. As with PLAN 52, the installation and piping are critical to system performance. Guidelines are as follows:

- 1) **The distance from the bottom of the reservoir to the centerline of the shaft should be approximately 12 to 18 inches.**
- 2) **Keep the seal pot as close to the pump** as possible. Preferably under 4 feet.
- 3) Reservoir size is the same as with PLAN 52. Volume of the seal pot is generally **one gallon per inch of shaft size** with a minimum of 2 gallons.
- 4) **Avoid sharp elbows or bends in the tubing to reduce friction loss.** A smoother sweeping approach performs more efficiently.
- 5) The fluid level in the reservoir should be **maintained at least one inch above the return line connection.** This will insure a fluid packed system and prevent head pressures from slowing circulation or stopping it all together.
- 6) Use a minimum **.500" to .750"** tubing size for circulation.
- 7) The tubing should **always have an upward slope to the horizontal runs** in the return line to prevent air traps in low spots (1-5 degree slope).
- 8) Use free flowing type valves to isolate reservoir from tubing lines. This aids the venting process insuring a fluid packed system.
- 9) If possible, locate circulating ring in gland where clearances can be more tightly controlled and tangential connection can be used.

With this system, a loss of barrier fluid with no dripping from the outboard seal indicates an inner seal leak. A low level alarm will indicate this failure and allow for a convenient seal change out.