

SEAL COOLER

INSTALLATION AND OPERATION MANUAL

INTRODUCTION This manual covers the installation and operation of seal coolers for use with mechanical seal Piping Plans 21 and 23. The following instructions describe the appropriate system, installation, start-up, and maintenance.

SUPPORT SYSTEM DESCRIPTIONS

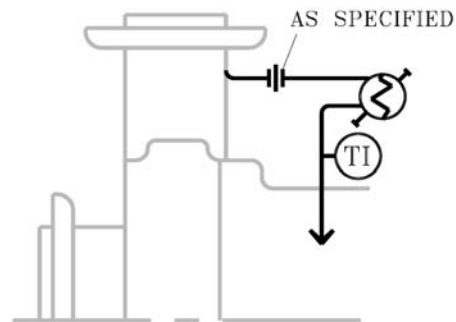
PLAN 21

Description: Plan 21 is recirculation from pump discharge through an 1/8" minimum flow control orifice (when necessary), and seal flush cooler, then into the seal chamber.

Objective: Cool the process in the seal chamber, improving lubricity and increasing the vapor margin. Reduce coking.

Advantages: Provides cooling through a seal flush cooler. When used with a close-clearance throat bushing, it can raise the pressure in the seal chamber. Recommended over Plan 23 when used in viscous applications that may clog seal flush cooler.

Note: Plan 23 is the preferred plan due to high heat loads put on the seal flush cooler when using Plan 21.



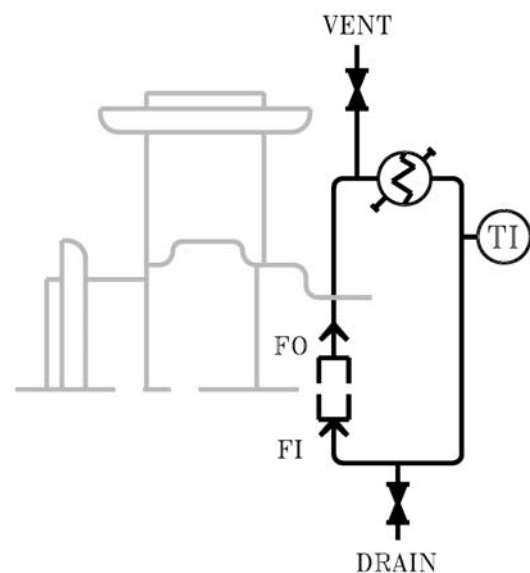
PLAN 23

Description: Plan 23 is recirculation of process fluid from the seal chamber, through a seal flush cooler, back into the seal chamber utilizing a pumping ring.

Objective: Cool process, improving lubricity and increasing the vapor margin in the seal chamber. Reduce coking.

Advantages: Has greater cooling efficiency than Plan 21 because it continuously recirculates the seal chamber fluid through the seal flush cooler. It decreases cooler duty, reduces cooler fouling and increases cooler life.

Recommendation: Vent tubing before pump start-up and use close-clearance throat bushing in seal chamber.



INSTALLATION

1. Locate the seal cooler as close to the pump and seal as possible while leaving sufficient room for operation and maintenance. It should not be located directly above the pump.

Note: For Plan 23 arrangements, the seal cooler should be located 18 to 24 inches above the gland plate centerline to promote thermal siphoning. For Plan 23 arrangements, the seal cooler should also be located no further than 3 feet from the seal gland plate.

2. Depending on seal cooler design, the cooler may be mounted in a horizontal or vertical arrangement. For specific arrangements, see accompanying seal cooler installation drawing. The cooler and piping should be mounted such that proper venting and draining of the process and cooling fluids may occur. Capability to properly vent the cooler and piping in the flush loop prior to operation can be critical to seal performance.
3. Connect process supply and return connections on the seal cooler.

Note: For Plan 23 arrangements, all lines from the seal gland to the cooler should slope upwards at all points. The upward slope should be a minimum of 1/2" per foot with all bends being large radius.

4. **(Optional)** If specified for Plan 21 arrangements, install appropriate size restriction orifice in piping line. Orifice should be located between the discharge flush connection and seal cooler. If unsure of orifice requirements, contact your local PPC seal representative.

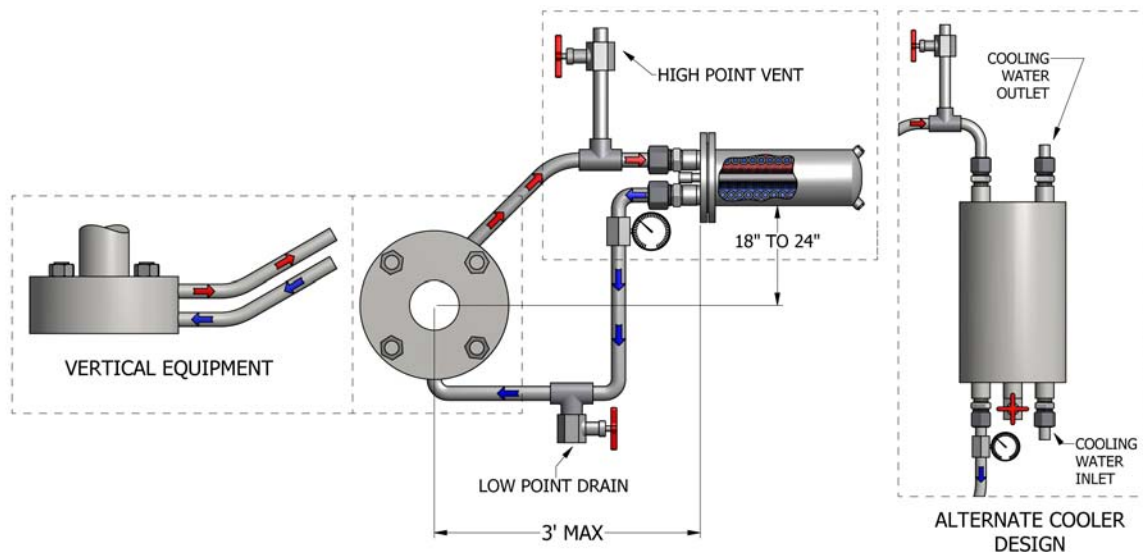
5. Connect cooling water supply and return lines to the seal cooler.

6. Before start-up, ensure that the tube-side (process) and shell-side (cooling water) of the seal cooler are properly vented.

Note: For Plan 23 arrangements, a high-point vent should be placed in the piping to allow full and proper venting of the system.

7. Before start-up, ensure that the cooler and piping allow for drainage of the tube-side (process) and shell-side (cooling water) of the system. A low-point drain valve should be placed to allow full and proper draining.

FIGURE 1: PLAN 23 TYPICAL PIPING ARRANGEMENT



PIPING RECOMMENDATIONS

- Minimize piping line losses
 - Use large radius bends
 - Minimize 90° elbows
 - Recommended 3/4" tubing for connecting lines
 - Minimum 1/2" per 1' slope upwards on all lines from seal gland to cooler
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START-UP

1. Prior to start-up, once again verify that the seal cooler and interconnecting piping are properly vented. Arrangement of seal cooler may need to be modified to prevent air entrapment in the tube-side (process) or shell-side (cooling water) of the cooler. Depending on cooler design, a vertical position may provide greater ease for venting.
 2. Verify that all piping and fittings are properly connected and that best piping practices have been followed (see recommendations above).
 3. Verify that cooling water lines to and from the seal cooler are opened.
 4. Proceed with standard procedures for equipment start-up.
 5. During start-up, verify that any seal requirements for flush flow rate are met. If unsure of flow rate requirements, contact your local PPC seal representative. If no flow is detected or flow is insufficient, shut down equipment and check for restrictions or air pockets in piping plan system.
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MAINTENANCE

- During planned plant shutdowns or maintenance, it is recommended that the seal cooler be drained, removed from service, and inspected.
- Over time, it is possible for fouling to occur on the heat exchanging surfaces. This fouling is detrimental to the efficiency and performance of the seal cooler, and may lead to decreased seal performance. To prevent shell-side (cooling water) fouling, verify that a sufficient cooling water flow rate is being supplied to the cooler and that cooling water temperature differential across the cooler does not exceed 20 °F (11 °C).
- During cooler maintenance, clean the shell and coil surfaces. After cleaning, inspect the cooler for any component damage or corrosion, and replace as necessary. Any sealing members such as gaskets or o-rings should be replaced during cooler re-assembly.
- After repair and re-assembly, it is recommended to pressure test the tube-side (process) and shell-side (cooling water) of the cooler and inspect for leaks. Standard procedures for pressure testing should be followed.

FIGURE 2: PLAN 21 DIAGRAM

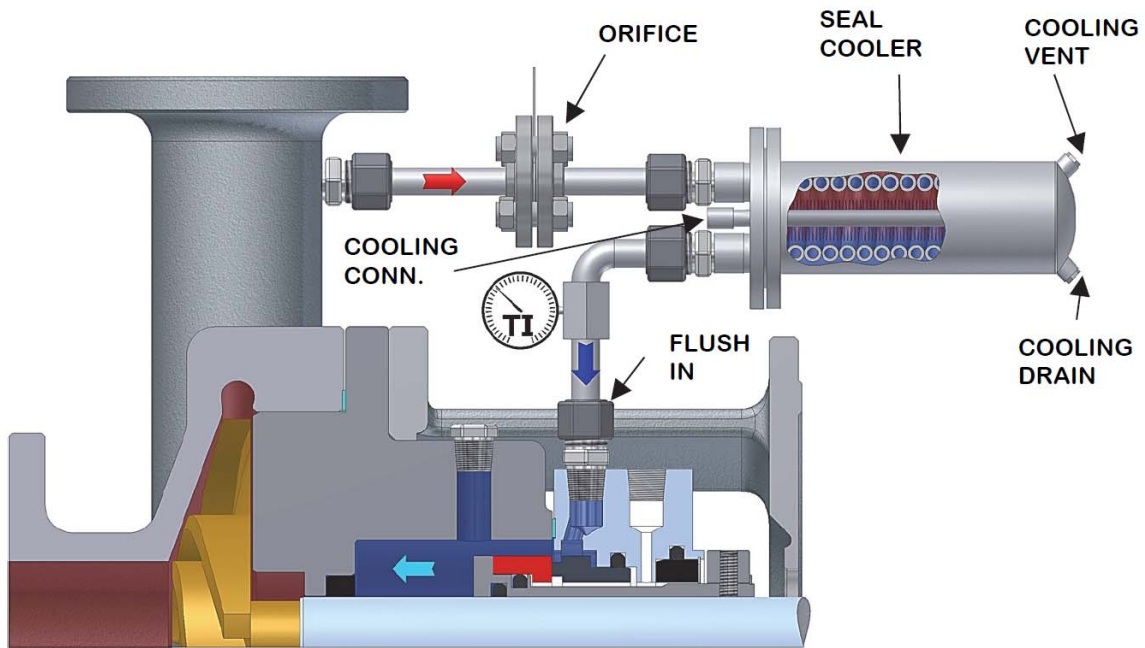


FIGURE 3: PLAN 23 DIAGRAM

