

ENGINEERING DATA SHEET

<i>Pumping Volatile Fluids</i>		
Date	Supersedes	No.
03/25/99	06/25/93	14E

When pumping volatile liquids under conditions of low NPSH, the pump must be modified to permit circulation through the motor section without vaporizing the liquid in the bearings. These modifications are:

- A. Reverse Circulation
- B. Pressurized Circulation
- C. Sub-Cooling the Recirculated Field

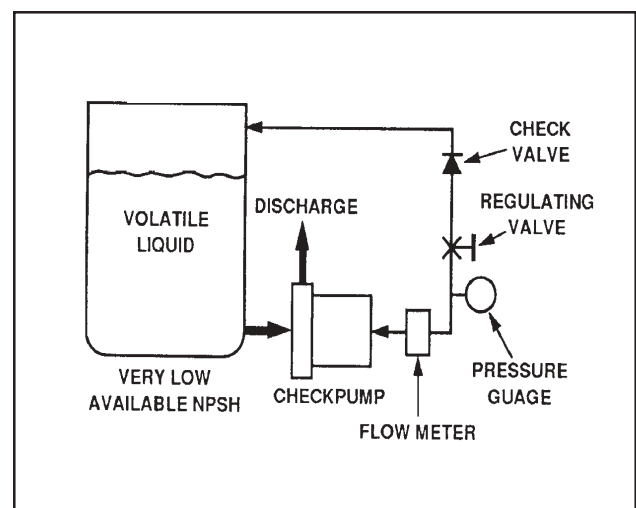
A. Reverse Circulation

1. The standard circulation tube is removed and the circulation discharge port in the pump chamber is plugged.
2. The inboard bearing housing or pump casing adapter is modified to allow passage of the pumped fluid from the discharge area of the pump casing through the motor section.
3. Pipe or tubing is installed (by the customer) from the port in the outboard bearing housing to the system tank at a point above the liquid level. Fluid circulation through the motor section is from the impeller, through the rotor chamber, out the outboard bearing housing, and back to the tank. This optional arrangement is illustrated below.
4. Installation of valves and controls may be required to control flow and to prevent back flow from the supply tank.

Do not pipe the reverse circulated fluid directly back to the suction pipe. Overheating or vaporizing the fluid may result in suction problems.

B. Pressurized Circulation

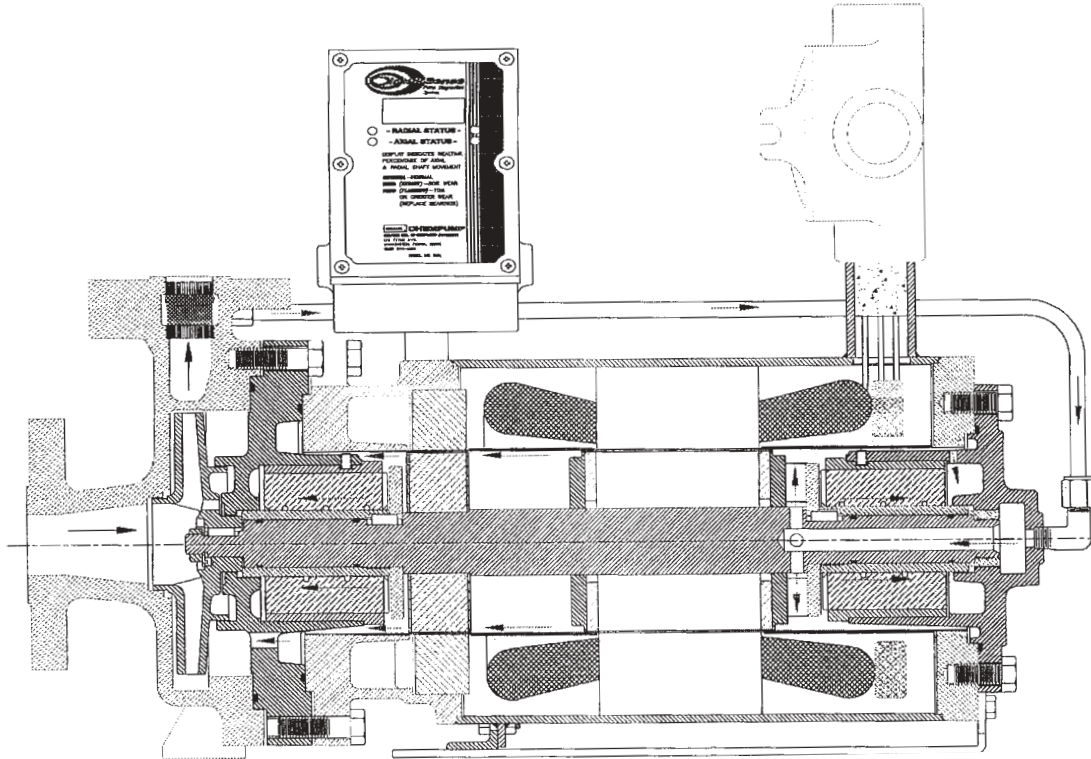
1. A standard pump is modified by installing an auxiliary impeller on the rear of the motor shaft to increase the pressure in the motor section while it passes over the bearings and rotor assembly.
2. A circulation tube is used with a discharge filter located in the pump casing as standard.



Reverse Circulation System

3. As the circulated fluid leaves the motor section, it is directed to the area behind the impeller where the fluid is close to discharge pressure. This is accomplished by putting a closure at the shaft clearance hole and using ports to direct the fluid behind the impeller. The approach keeps the circulated fluid at an elevated pressure and prevents the fluid from boiling even though it picks up motor heat.

Pressurize Circulation design eliminates the need for piping, valves and controls for directing the fluid back to the suction tank and also allows for this recirculating fluid to be filtered prior to entering the motor cavity.



C. Sub-Cooling

A wraparound or auxiliary heat exchanger can also be used to pump volatile fluids by sub-cooling the fluid prior to it entering the motor cavity. A large temperature difference must exist between the pumped fluid and the cooling liquid in order for sub-cooling to work effectively. See EDS 15E.

The use of auxiliary cooling should be approved by Chempump's Application Engineering Department. The information required to perform a thermal analysis of the application is: pump fluid, pumping temperature, specific gravity, specific heat and vapor pressure curve along with the temperature and flow rate of the cooling fluid.