

ENGINEERING DATA SHEET

<i>Solids Handling</i>		
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04/01/99	06/25/93	13E

The Chempump can be used on applications where solid particles are present by several modifications.

- A. Back flushing.
- B. Hard bearings and hardened journals.
- C. Use of a modified "GT" Series pump.
- D. Filters in the circulation line (discharge filter in the discharge is not sufficient for use in solids handling applications).

Back Flushing

Modifications required to adapt a Chempump for back flushing are:

1. Remove the circulation tube assembly.
2. Plug the circulation port in the pump casing.
3. At installation, connect the circulation port to a clear fluid source from outside the pump.

The fluid pressure at the circulation port must be greater than the first stage pressure for two stage pumps and greater than the pump suction pressure for single stage pumps to permit a flow of clear fluid into the pump motor section. Laboratory tests indicate that, with the pump in operation, the back flush pressure should be equal to the suction pressure plus 25% of the differential pressure developed by the pump.

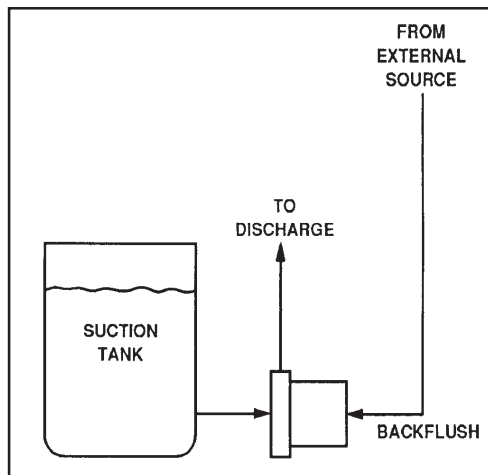


Fig. 1: Back Flush System

The backflush flow rate depends on the application. Refer to the table for required backflush pressure and flow rates.

The size of the backflush piping should be of sufficient diameter to permit the necessary pressure required at the pump connection.

Normally, the backflush fluid should be cool and clear, not objectionable as a dilutant, and not more than 30 cps. Specifications may require a hot fluid for backflushing which might, in turn, require auxiliary cooling.

The recommended pressure (suction press 25% of total systems head), must be followed, or otherwise, too much pressure will result in forward thrust and ultimate damage to the pump components.

Chempump Model	Backflush Flow Rate	Backflush Pressure
GA, GB, GC	1-2 GPM	$P_{BF} = P_S + (0.25 \times P_D - P_S)$
GVBS, W2B, W2C GVD, GVE, GVHS, GG	2-4 GPM	
GVM	4-6 GPM	Suction pressure plus 25% of pressure developed by the pump.
GK/GKS	4-6 GPM	
GP, GPS, GRS	8-10 GPM	
"NC" SERIES	5-7 GPM	
TWO STAGE		$P_{BF} = P_S + (0.7 \times P_D - P_S)$ Suction pressure plus 70% of pressure developed by the pump.
GLD	1-2 GPM	
N2S	4-6 GPM	

Hard Bearings and Hardened Shaft

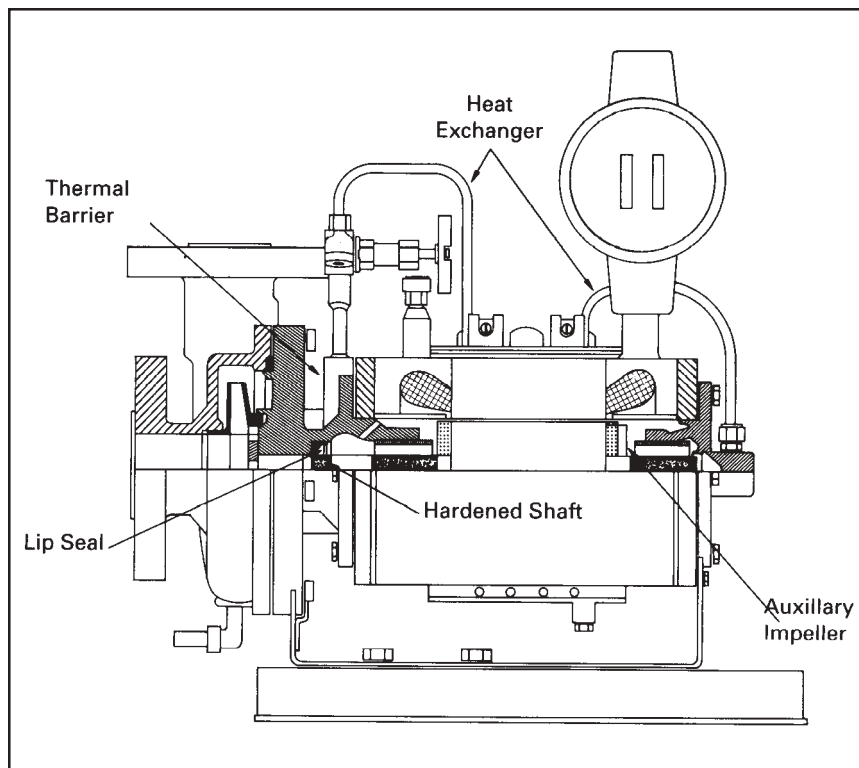
Refer to Engineering Data Sheets #22E and #24E which describe the bearing materials and shaft coating available.

Particle size, quantity, consistency and abrasive characteristics must be reviewed by Application Engineering when selecting this method for solids handling.

Modified "GT" Series

When handling a fluid containing solids which cannot tolerate the above dilution rates, the Model "GT" (high temperature, water cooled pump) can be modified as follows:

- a. The rear bearing housing is drilled and tapped so that a clear fluid can be injected into the motor section.



- b. A closure seal is installed on the shaft between the pump and motor section. This may be a lip seal, packing, mechanical seal or throttle bushing, depending upon the type of fluid, solid particles and the degree of dilution which can be tolerated.

The rate of back flush may be as low as 10cc per minute. Back flash may be fed into the pump by a pressurized vessel, metering pump (must have steady flow) or a metered source from the process stream. The backflush flow rate must be at a pressure above the suction pressure of the pump.

Fig. 2: Backflushing with a Lip Seal

Since the motor cooling fluid will be continually recirculated by the auxiliary impeller, the stator will have a heat exchanger installed which must be cooled by water or other fluids.

Filters in the Circulation Line

Canned Motor Pumps that are designed for external circulation can be modified to have filters installed on the recirculation line.

The flow that lubricates the bearings is filtered prior to entering the pump. Cartridge-type filters are installed in the circulation line to trap particles as small as 1 μm , depending on the type of cartridge selected.

A differential pressure switch is placed across the filter to detect when the cartridge is becoming clogged to a point that may affect the flow into the motor section. When there is a significant pressure differential between the inlet and outlet of the filter, the differential pressure switch can either activate an alarm or shut down the pump. Block valves installed across the filter are used so the cartridge can be changed without isolating the pump from the process. If a large quantity of particles are anticipated or if the process cannot be shut down to change cartridges, duplex filters installed in parallel should be used.

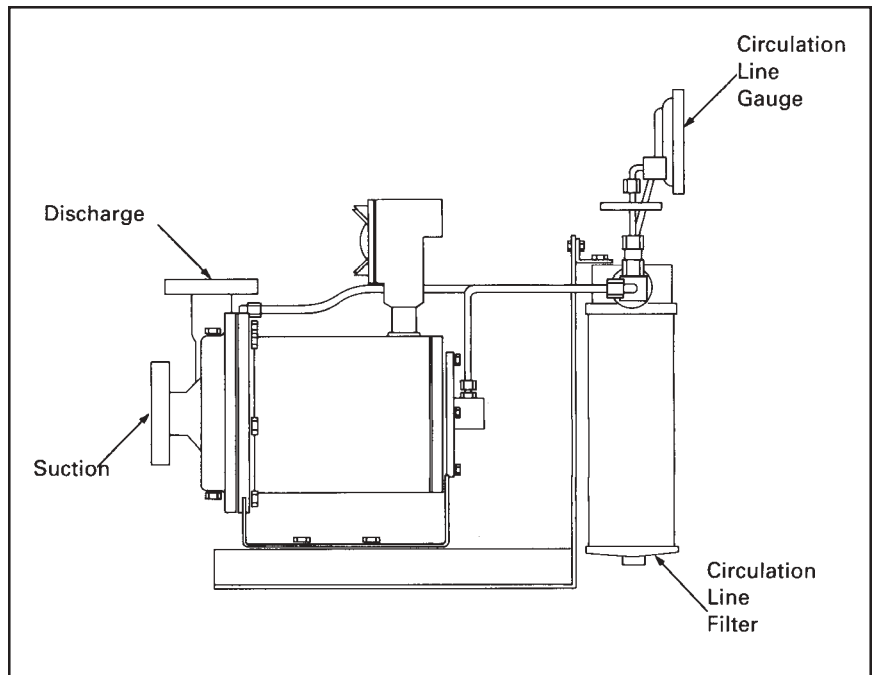


Fig. 3: Clean, filtered bearing lubrication.