Inlet Condition Check-List

Preventive Maintenance

The Pumps with Nine Lives

Poorly designed inlet conditions can cause serious malfunctions in the best designed pump. Surprisingly, the simplest of things can cause the most severe problems or go unnoticed to the unfamiliar or untrained eye. REVIEW THIS CHECK-LIST BEFORE THE OPERATION OF ANY SYSTEM. Remember, no two systems are alike so there can be no **ONE** best way to set-up a system. All factors must be carefully considered.

INLET SUPPLY should exceed the maximum flow being delivered by the pump for best performance.

- Open inlet shut-off valve and turn on water supply to avoid starving pump. **DO NOT RUN PUMP DRY.**
- Temperatures above 130°F are permissible. Add 1/2 psi inlet pressure per each degree F over 130°F. Elastomer or RPM changes may be required. See Tech Bulletin 002 or call Cat Pumps for recommendations.
- Avoid closed loop systems especially with high temperature, ultra-high pressure or large volumes. Conditions vary with regulating/unloading valve.
- Low vapor pressure liquids require a booster pump and an inlet stabilizer to maintain adequate inlet supply. Contact Cat Pumps for recommendations.
- Higher viscosity liquids require a pressurized inlet and an inlet stabilizer to provide adequate inlet supply.
- Higher temperature liquids tend to vaporize and require a pressurized inlet and inlet stabilizer to provide adequate inlet supply.
- When using an inlet supply reservoir, size it to provide adequate liquid to accommodate the maximum output of the pump, generally a minimum of 6 to 10 times the GPM (however, a combination of system factors can change this requirement); provide adequate baffling in the tank to eliminate air bubbles and turbulence; install diffusers on all return lines to the tank.

INLET LINE SIZE should be adequate to avoid starving the pump.

- Line size must be a minimum of one size larger than the pump inlet fitting. Avoid tees, 90 degree elbows or valves in the inlet line of the pump to reduce the risk of flow restriction and cavitation.
- The line MUST be a FLEXIBLE hose, NOT a rigid pipe, and reinforced on SUCTION systems to avoid collapsing.
- The simpler the inlet plumbing the less the potential for problems. Keep the length to a minimum, the number of elbows and joints to a minimum (ideally no elbows) and the inlet accessories to a minimum.
- Use pipe sealant to assure air-tight, positive sealing pipe joints.

INLET PRESSURE should fall within the specifications of the pump.

- Acceleration loss of liquids may be increased by high rpm, high temperatures, long feed lines, low vapor pressures or high viscosity and may require a pressurized inlet and an inlet stabilizer to maintain adequate inlet supply. DO NOT USE AN INLET STABILIZER WITH NEGATIVE INLET.
- Optimum pump performance is obtained with +20 psi (1.4 bar) inlet pressure and an inlet stabilizer for certain applications. With adequate inlet plumbing, most pumps will perform with flooded suction. Piston pump maximum inlet pressure 40 psi (2.8 bar). Plunger pump maximum inlet pressure range 50 to 75 psi (3.5 to 5.2 bar). See individual pump specifications.
- After prolonged storage, pump should be rotated by hand and purged of air to facilitate priming. Disconnect the discharge port and allow liquid to pass through pump.

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INLET ACCESSORIES are designed to protect against over pressurization, control inlet flow, contamination or temperature and provide ease of servicing.

- A shut-off valve is recommended to facilitate maintenance.
- Installation of an inlet stabilizer is essential in applications with stressful conditions such as high temperatures, booster pump feed or long inlet lines. **Do not use an inlet stabilizer with negative inlet pressure.**
- A standpipe can be used in some applications to help maintain a stable pressure at the pump inlet.
- Inspect and clean inlet filters on a regular schedule to avoid flow restriction.
- **Short term, intermittent cavitation will not register on a standard gauge.** A pressure transducer is necessary to accurately read inlet pressure.
- All accessories should be sized to avoid restricting the inlet flow.
- All accessories should be compatible with the solution being pumped to prevent premature failure or malfunction.
- Optional inlet protection can be achieved by installing a pressure cutoff switch between the inlet filter and the pump to shut off pump when there is no positive inlet pressure.

BYPASS TO INLET Care should be exercised when deciding the method of bypass from control valves.

- It is recommended the bypass be directed to a baffled reservoir tank, with at least one baffle between the bypass line and the inlet line to the pump.
- Although not recommended, bypass liquid may be returned to the inlet line of the pump if the system is properly designed to protect your pump. When a pulsation dampener is used, A PRESSURE REDUCING VALVE must be installed on the inlet line (**BETWEEN** THE BYPASS CONNECTION AND THE INLET TO THE PUMP) to avoid excessive pressure to the inlet of the pump. It is also recommended that a THERMAL VALVE be used in the bypass line to monitor the temperature build-up in the bypass loop to avoid premature seal failure.
- A low-pressure, flexible cloth braid (not metal braid) hose should be used from the bypass connection to the inlet of the pump.
- Caution should be exercised not to undersize the bypass hose diameter and length. Refer to Tech Bulletin 064 for additional information on the size and length of the bypass line.
- Check the pressure in the bypass line to avoid over pressurizing the inlet.
- The bypass line should be connected to the pump inlet line at a gentle angle of 45° or less and no closer than 10 times the pump inlet port diameter e.g., 1-1/2" port size = 15" distance from pump inlet port.

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