

PISTON PUMPS

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TROUBLE SHOOTING INFORMATION

Piston pumps are noted for long operation period with little maintenance required other than lubrication and inspection. They are renowned for pumping over long distances. However, like all things mechanical, these units can develop trouble. These following information may help to prevent and identify any such occurrences.

Site – The pump should be as close to the water supply as possible. Suction lift, including pipe friction, should not exceed 24 feet (7.3 metres) at sea level. For each 1200 feet (366 metres) altitude, deduct 1 foot (0.3 metres) for practical suction lift.

Flooding – Should the pump become flooded, drain the oil from the crankcase, replace the oil and check the pump generally.

Foundation – Install the pump on a firm foundation, preferably concrete. The pump should be level when installed.

Inlet/Outlet – the inlet (suction) is always lower than the outlet (discharge).

Suction line – The suction line should rise towards the pump at all times. Avoid high points so as to ensure air is not trapped in the line. Keep the suction as free from bends as is possible. The pipe diameter should be no smaller than the pump inlet. On long pipe lines where a large volume is pumped, a larger size is preferable. Make sure that all fittings are tight and try to avoid joins (or use the minimum number possible). A foot valve should always be fitted where the water level is below the pump. When the water level is higher than the pump, install a gate valve so that water may be shut off should it be necessary to work on the pump.

Discharge line – The diameter of the discharge line will depend on the work the pump has to perform, including friction in that line. The smaller the pipe is, the higher will be the friction load and the power consumption. A check valve should be fitted in the discharge line as close to the pump as possible to protect the pump from water hammer and from damage through flow back of water. This also holds back this water when maintenance is being carried out on the pump. Both the suction and discharge piping must be supported independently of the pump. Should a gate valve be installed in the delivery, this **MUST BE OPENED** before starting the pump. It is always advisable in installations where a gate valve is fitted to have a relief valve between the pump and the gate valve to protect the pump from damage in case the line is shut off or becomes blocked.

Gland packing – Packing should be renewed periodically to protect excessive leakage from the gland and prevent damage to the piston rod. When replacing, insert each ring separately, ensuring that it is seated firmly and that the joints are staggered. The last ring of packing should not protrude beyond the stuffing box. Install the gland and tighten the nuts evenly by hand. Allow a slight leakage at all times in order to cool and lubricate the packing. Wait until the pump is running before making the adjustment. Unduly tight packing increases the power consumption and causes wear on the piston rod.

Priming the pump – The pump can generally be primed by removing the plug from the top of the suction chamber and filling the chamber and suction line completely with water. Before replacing the plug, watch the water level for a short time to check that the foot valve is holding

Operating – Before starting the pump, ensure the gear case is filled with oil to a point level with the bottom of the oil return channel. SAE 140 oil is generally recommended. It is advisable to check the oil regularly and replace as necessary. A recommended habit prior to starting the pump is to check the oil and turn the pump by hand to ensure that all suction, bypass and discharge valves are open.

Pump does not discharge –

Check the suction pipe is attached to the lower fitting of the pump and the discharge pipe is attached to the higher fitting

Check the suction lift – should be a maximum of 24 feet (7.3 metres) and decrease as altitude increases

Prime the pump by filling the suction pipe above the foot valve with water (remember to open any vents on the discharge side to avoid an airlock)

Suction air bound – check suction pipe for leaks

Obstructions in suction pipe – check suction pipe, foot valve and foot valve strainer to ensure that they are free from rust, debris and other obstructions

Worn parts – check the condition of the valves, piston rod packing and buckets and replace as necessary

Pipe vibrates excessively –

Size of discharge pipe – use a larger size discharge line where possible, otherwise, install an air chamber (or additional air chamber) in the discharge line close to the pump

Size of suction pipe – increase the size of the suction pipe or reduce its length, otherwise install a suction air chamber (or additional air chamber) close to the pump to reduce pressure surge pulsations during operation

Gear end noisy –

Check the oil level and fill as needed

Crosshead, bearings or gears may be worn or loose – check and replace as may be needed

Speed too high – lower the pump speed to the recommended level (refer to website documents [Technical Specifications - Capacity](#) and [Technical Specifications - RPM calculator to convert to strokes per minute](#) to check the gearing

Excessive packing wear –

Usually caused by a worn or bent piston rod, causing the packing to wear – check also for burrs on the rod and replace as needed

Excessive power input or high discharge pressure –

Inspect piping for closed valve, increase the relief valve setting or remove the obstruction in the pipelines – where this has occurred after installing additional piping, check the friction level and add larger piping if necessary