

FRANKLIN AID



Franklin Electric

The Company You Trust Deep Down



Franklin Application/Installation Data (AID)... For The Professional Pump Installer and Driller

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CHECK VALVES

Check valves are important because they hold pressure in the system when the pump stops. They also prevent such conditions as back-spin, water hammer (hydraulic shock) and upthrust. Any of these or a combination of them can lead to immediate pump or motor failure, a shortened service life, or operating problems in the system.

BACK SPIN: With no check valve in place or if the check valve fails, the water in the drop pipe and in the system can flow back down the discharge pipe when the motor stops. This can cause the pump to rotate in a reverse direction as the water flows back down the pipe and can cause excessive thrust bearing wear because the motor is not turning fast enough to properly lubricate the thrust bearing. If the motor is started while back-spinning, this sudden reversal severely strains the pump and motor assembly.

UPTHRUST: With no check valve, or with a leaky check valve, the pump may start under zero or even negative head conditions. With most pumps, this causes an uplifting or upthrusting on the impeller/shaft assembly in the pump. This upward movement carries across the pump/motor coupling and creates an upthrust condition in the motor. While Franklin submersibles have upthrust bearings which allow limited upthrust without motor damage, it should be avoided to minimize wear in the pump and motor.

WATER HAMMER (HYDRAULIC SHOCK): If the lowest check valve is more than 9 metres above the standing water level or if the lower check valve leaks and an upper check valve holds, a partial vacuum is created in the discharge piping. On the next pump start, water moving at a very high velocity fills the vacuum, strikes the closed check valve and the stationary water in the pipe above it, causing hydraulic shock. This shock can split pipes, break joints and damage the pump and/or motor. Water hammer is easily detected by a banging noise. When discovered, the system should be shut down and the problem corrected. Using a "soft start" to eliminate water

hammer rather than replacing a check valve may be an option. This could also be a bandage rather than a cure. If a "soft start" is used, the ramp time must be 3 seconds maximum.

Check valves are designed to permit water flow in one direction only. It is recommended that one or more check valves always be used in submersible pump installations. If the pump does not have a built-in check valve, a line check valve should be installed in the discharge line within 7.5 metres of the pump. The lowest check valve must be below the drawdown level of the water supply. For deeper settings, it is recommended that a line check be installed every 60 metres.

Swing type check valves should not be used with submersible pumps. When the pump stops, there is a reversal of flow before the swing check closes. This causes a rapid change in the velocity of the water. Spring loaded check valves should be used since they are designed to close quickly as the water flow stops. Therefore little or no flow reversal occurs before the spring loaded valve closes. This way no hydraulic shock or water hammer is produced by the closing of the valve.

NOTE: *Only positive sealing check valves should be used in submersible installations. Drilling the check valve or using drain-back check valves, while it may prevent back-spinning, creates upthrust and water hammer problems.*

The Hotline has heard several reasons why check valves are left out or are drilled, freeze protection and pulling a dry string are two common. However, the lack of check valves and the possibility of motor/pump failure far outweighs this convenience. There are better ways to handle the freezing potential and check valves with replaceable break-off plugs will eliminate the wet pull.

TOLL FREE HELP FROM A FRIEND

Phone Franklin toll-free on **1300 FRANKLIN** for answers to your installation questions on submersible pumps and motors.

When you call, we will offer assistance in troubleshooting submersible systems and provide answers to your pump and motor application questions.

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