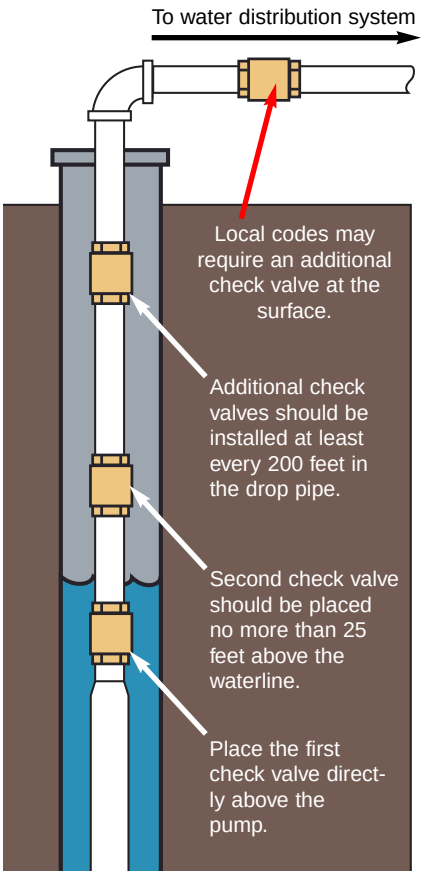
General Information on INSTALLATION of CHECK VALVES

Check valves are designed to permit water flow in one direction only, and are generally recommended for all submersible installations. Some submersible pumps and motors may be suitable for operation with a check valve. Consult with each manufacturer concerning proper application and installation of their equipment. On submersible pump installations using a pressure tank, use a check valve to keep stored water from flowing back into the well.



Spring loaded, stem or cage poppet style check valves, such as the Maass Midwest Model Numbers 529, 530, or 531 check valves, should be used with submersible pumps. These are designed to close quickly as the water flow stops and begins to move in a reverse direction. Swing type check valves should not be used. When the pump stops, there is a sudden change in the velocity of the water.

It is important to correctly choose and install a check valve to help insure a trouble free water system. Is should be properly sized to the pump's flow and pressure conditions. Prior to installing a check valve, be certain its mechanism is operating properly. Install the valve with the imprinted flow arrow in the correct direction.
The first check valve should be installed directly above the pump. A check valve should never be installed more than 25 feet (7.5 meters) above the lowest pumping level in the well. For deeper settings, it is recommended that a line check valve be installed every 200 feet. Another check valve may be installed in the horizontal piping at the surface or just below the well seal or pitless adapter, as required by local codes. There is risk of water hammer in the upper check valve if the lower check valves fails. (See diagram.)

Properly located and operating check valves hold water pressure in the system when the pump stops. They also extend the life of and assist in the smooth operation of the water system by preventing backspin, upthrust, and water hammer.

1. ***backspin*** — With no check valve or if the check valve fails, the water in the drop pipe and the water 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. If the motor is started while this is happening, a heavy strain may be placed across the pump-motor assembly. It can also cause excessive thrust bearing wear because the motor is not turning fast enough to ensure an adequate film of water in the thrust bearing.

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General Information on Installation of Check Valves

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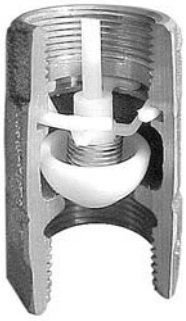
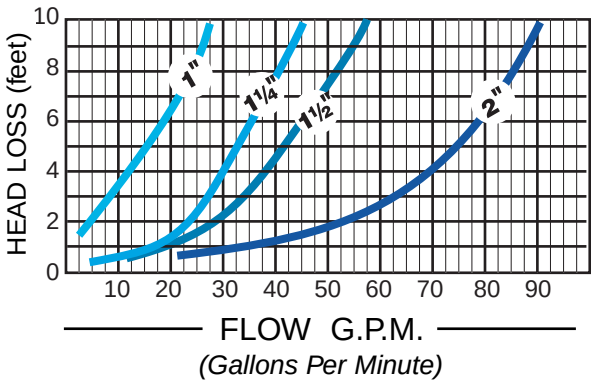
2. ***upthrus***t — With no check valve, or with a leaking check valve, the unit starts each time under zero head conditions. With most pumps, this causes an uplifting or upthrust on the impellers-shaft assembly in the pump. This upward movement carries across the pump-motor coupling and creates an upthrust condition in the motor. Repeated upthrust at each start can cause premature wear and failure of either or both the pump and the motor.

3. ***water hammer*** — Water flowing through a piping system has kinetic energy (weight and velocity). When the pumping stops, the water continues to move. Its energy must be absorbed in some way. A rapid absorption of energy can cause noise and/or damage. This is called water hammer or shock. This shock can split pipes, break joints, and damage the pump. Water hammer varies in intensity depending on the velocity with which the water is traveling when the pump shuts off. For every foot per second of velocity, 54 psi of back pressure is created. A 1" pipe having a flow of 10 gallons per minute (gpm) could generate a back pressure of 350+ psi. In a 4" pipe, a flow of 350 gpm could create a back pressure of 860 psi. This does not consider the weight of the water column, which increases shock as the length of piping increases. When water hammer occurs, shut the system down and correct the problem. Maass Midwest Model Numbers 529, 530, and 531 in line check valves are designed to lessen the damaging effects of water hammer.

Flow Chart for MAASS MIDWEST™ Model #531 Check Valve





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