Oasis Rootcubes

Produced by Grower's Solution

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How Cycle Stop Valves

Affect Pumps and Motors

Back Pressure?

Increasing back pressure does not make pumps work harder. One horse power is the measure of power it takes to lift 33,000 pounds of weight (or 3,750 gallons) one foot in one minute. Gallons and weight are the same thing to the pump. If flow from the pump is restricted with a valve, back pressure will increase. As back pressure increases, gallons or weight decreases. As the weight or gallons of water being lifted by the pump decreases, so does power consumption, amps, or horse power. Excess back pressure is a free byproduct of horsepower. Back pressure makes pumps pull less amperage, not more. Less amperage means motors run cooler, use less electricity, and last longer.

Minimum Flow?

While Cycle Stop Valves will increase back pressure on pumps when needed, they will never let the back pressure increase to complete shut off head. The Cycle Stop Valve can never completely close. There is always water flowing through the valve even when in its fully closed position. This flow is derived from the minimum cooling requirements of the pump and motor. Large submersible pumps can operate on much smaller flows than .5 feet per second. Flow charts for motors running at FULL LOAD AMPERAGE are not relevant for motors pulling an average 60% of full load. As back pressure increases until the pump is only pumping minimum flow, amperage decreases, derating the motor. When pulling only 50 to 60% of full load, the derated motor can safely pump hot water up to 140 degrees according to the charts. If a derated motor can safely pump any amount of 140 degree water, then a tiny amount of cool water (86 degrees or less) will easily prevent the motor from overheating. Minimum cooling charts for derated motors have not been made available by the motor manufactures. Years of experience has proven many times over that motors such as a 50 HP sub will drop from 77 amps to about 40 amps when the pump is restricted to 5 gpm flow. This 5 gpm flow of 70 degree water going past the motor will increase in temperature to 78 degrees. Seventy eight degrees is not even close to 131 degree water that the charts say can safely cool a 50 HP motor when derated by 40%. Full speed turbines and centrifugal pumps can operate at even lower minimum flows as their motors are cooled by air. Motor and cooling fan are still spinning at full RPM, which will keep a motor that is only pulling 60% of full load amps very cool.

Resting Pumps and Motors?

Pumps and motors are designed for continuous operation and do not need to rest. This means they will last longer if they run continuously than if they "cycle" off and on. Motors that are coasting along at low amperage 24 hours a day will use less electricity than the same motor pulling full load and cycling on and off every 10 minutes or so. Most motor and pump failures occur during start up. Starting current can be six times normal running amperage. Start up tests every component of the pump and motor. Windings, bearings, shafts, impellers, splines, couplings, panels, even the generator at the power company are all tested each time a pump starts. All of these problems go away once the motor is up and running. Common sense would suggest that the fewer times it starts and stops, the longer a motor and pump will last.

Soft Start Equipment?

Cycle Stop Valves will completely eliminate water hammer with or without soft start equipment. The main reason to use soft start equipment is to reduce the end rush of electricity on pump start up. This will reduce the electric bill if a demand charge is included. Some electric companies require soft starts on larger horse power systems.

Cavitation?

Restricting the discharge from a pump with any valve will decrease the NPSH required. The NPSH available will increase as the flow rate decreases. Increasing the NPSHA and/or decreasing the NPSHR reduces the chance of cavitation. Recirculating water from the outlet to the inlet of an impeller can occur at low flow. The 5 GPM bypass exiting the Cycle Stop Valve will keep this recirculating from heating up the pump. Cavitation like wear can occur if the pump chosen has a recirculating problem such as with a loose-fitting wear ring. Pumps that are made of materials with a high tensile strength are more resistant to wear from cavitation. When equipped with an additional pressure sustain pilot the Cycle Stop Valve can also control cavitation at high flow rates by limiting the maximum flow from the pump.