CAVITATION

Cavitation is a condition that occurs internally within the pump. It is caused by the pump trying to deliver more water than is being supplied. Cavitation can occur when trying to draft more water than can be lifted for the particular circumstances, when the strainer becomes clogged, when the hard suction liner collapses, or when the water supply decreases.

As the flow of water to the intake decreases and the impeller rpm remains constant, pressure at the impeller eye decreases. As the pressure decreases the boiling point of the water lowers. For example, at 14.7 psi water boils at 212 degrees F, but at 10 psi it boils at 193.22 degrees F and at 1 psi it boils at 101.83 degrees F.

As water entering the eye of the impeller encounters the lower pressure conditions it flashes into steam or water vapor. These bubbles of water vapor flow into the impeller where there is an almost instantaneous change from vacuum to pressure. The water vapor condenses because the increased pressure raises the boiling point. As the water rushes in to fill the void left by the water vapor, there is a tremendous shock. The shock of the water filling the empty space at a high velocity causes damage to the metal of the impeller, and pump could be made inoperative.

Cavitation can be recognized as the point where an attempt to increase engine rpm does not produce an increase in discharge pressure. If cavitation does occur, the operator can decrease engine rpm, increase the size of the hard suction hose, locate an additional source of water, or reduce the height of the lift.

CAVITATION AT HYDRANTS

When pumping from a hydrant, a soft suction hose has an advantage over a hard suction hose. If a hydrant supply is poor, the pump may attempt to pump more water than the hydrant can deliver. Under these conditions, the pump will cavitate and the soft hose will collapse under the partial vacuum, even though the intake gauge might still indicate a positive pressure. If a hard hose were used, the only indicator would be the intake gauge, which is very inaccurate close to the zero reading.