Kennedy INDUSTRIES
PUMPS | VALVES | REPAIRS | CONTROLS

TECHNICAL PAPER
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FLYGT SUPER HIGH HEAD PUMPS SAVE COST, MAINTENANCE AND ENERGY

Existing Pump Clogged with Rags

Problem: The Village was experiencing major problems with their existing 47 hp pumps at the West River Lift Station. The pumps were constantly clogging which led to higher energy costs and increased maintenance and repair. The increased maintenance and repair caused excessive overtime and unsafe work conditions for their employees.

Solution: Kennedy Industries offered to visit the station, evaluate the condition of each pump, and perform an energy audit. During the field test, Kennedy found that all three pumps had very high specific energy ratings and two of the three pumps were not producing the original design flow. Specific energy directly relates to the operating cost of the pump, high specific energy is the result of not operating near the pumps best efficiency point (BEP). Not producing the rated flow is the direct result of worn or clogged impellers due to abrasives or heavy rags found in wastewater. After field testing, evaluation and working with the Village, it was determined that upgrading the three existing 47 hp pumps with 23 hp Flygt 3153 SH (super high head) pumps with high chrome impellers and insert rings would be the best solution to address the Village's needs.

The Flygt SH model pumps are 3500 RPM and are specifically designed for lower flow, high head applications. The benefit of these pumps is to operate closer to the best efficiency point (BEP) and provide ample margin to shut-off. In this instance, the existing pumps were 47 HP, rated 350 GPM @ 125' TDH and were operating at only 47% of BEP. This is well outside the allowable operating range (AOR) set by the Hydraulic Institute (HI) and can lead to vibration and wear on bearings and mechanical seals. The new Flygt SH pumps supplied by Kennedy met the same design requirements and were only 23 HP. The new pumps operated at 90% of BEP when tested, which is well within the preferred operating range (POR) set forth by HI. This will lead to longer service intervals and a longer overall pump life. Since the Flygt 3153 SH pumps are dramatically less HP and more efficient, they in turn are more cost effective to operate and maintain. Drawdown testing concluded that the new Flygt SH pumps average flow rate was 73 gallon per minute more and proved to use less energy, with pumps that are half the horsepower.

Minimum liquid level:
Old pumps 18" New pumps 12"

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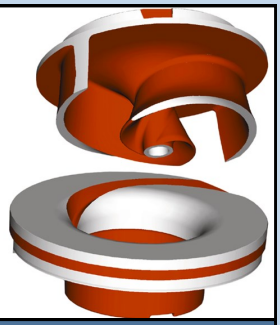
FLYGT SUPER HIGH HEAD PUMPS CAN SAVE CONSTRUCTION COST TOO

In addition to energy savings each pump was supplied with Flygt's non-clog "N" impeller for superior clog prevention. Both the impeller and insert ring were supplied in hi-chrome material. The impeller & insert ring lifetime of hi-chrome is 10 times longer than gray cast iron and 3 times longer than hardened gray cast iron. This material upgrade is now standard on all Flygt pumps and provides a much harder material capable of handling solids, fibrous materials, heavy sludge and other abrasive materials normally found in wastewater.

TRIPLEX PUMP STATION	NEW FLYGT SH MODEL, 23 HP	EXISTING CONVENTIONAL MODEL, 47 HP	DIFFERENCE	TOTAL EST. SAVINGS
PUMPS	$46,300.00	$88,000.00	$41,700.00	
CONTROLS	$34,900.00	$40,200.00	$5,300.00	**$65,750.00**
GENERATOR	$37,750.00	$56,500.00	$18,750.00	



"N" Impeller & Insert Ring

Old Pump Weight 1,135 lbs.
New Pump Weight 560 lbs.

As mentioned, we were able to replace 47 HP pumps with 23 HP pumps for this customer. There is a substantial savings in purchase price for smaller HP pumps. If this was a new station in design, other major costs to consider would be the controls and generator size. The chart above details the initial purchase price for the equipment if the West River station was to be constructed new, comparing the conventional 47 HP pumps to the Flygt 3153 SH, 23 HP pumps. The initial cost savings of the super high head pumps is significant in all three areas.

Other savings that are not included in the above are: main disconnect size, transfer switch, generator fuel cost and wet well footprint. In this application the new pumps allow for more working volume in the existing wet well due to the lower minimum liquid level required. This will allow the pumps to run for longer durations which is more efficient and will result in less wear and tear on the pumps.

The weight of the Flygt SH pumps is another benefit. The new pumps were 1/2 the weight of the old pumps which allows the Village to pull the pumps with their own equipment versus hiring a contractor to pull the pumps. This will save the Village money long term as routine maintenance checks can now be handled in house without the need to schedule a large crane.

The long term cost benefits of the Flygt super high head pumps will be quite significant. They will save in initial installation costs and will operate closer to BEP proving to save electricity, maintenance and repair costs over the life of the pumps. This project upgrade provided the Village with great value initially and long term.