

How bearingless pumps reduce maintenance

Carbon steel pumps in a cooling tower in Texas were suffering from a range of problems including corrosion and dry running. Stainless steel was ruled out mainly on grounds of cost. Instead, the solution was found in a thermoplastic pump with cantilevered shaft from Vanton Pumps.

Every cooling tower installation has its own unique pumping problems induced by the specific characteristics of the fluid being circulated and the atmospheric conditions under which it operates. Maintenance costs at the Longview, Texas facility of Eastman Chemical Company were inordinately high due to repeated pump failures in the cooling tower water return system located in an industrial out-of-doors setting.

The pumps in service, which were made of carbon steel, suffered extensive rusting which required significant maintenance to keep them operational. These pumps were installed in ground level sumps used to collect tower water for return to the tower system. In addition to the corrosion problems, the fluid in the sumps would occasionally fall below the pump suction port and result in dry running conditions that damaged the pumps. The design of these vertical

sump pumps utilised bearings near the impeller at the end of the pump shaft so that dry running could not be tolerated.

A capital project was instigated to review the problem and recommend a cost-effective solution. Consideration was given to substituting stainless steel pumps of similar design. This would eliminate the corrosion problem, but not overcome pump damage during dry running periods. In addition, the change from carbon steel to stainless steel, with the same pump designs, would greatly increase the cost of the project. A stainless steel pump with a cantilevered shaft was considered but rejected due to its high cost. The suggestion was made to investigate the use of a thermoplastic pump designed with a cantilevered shaft so that there would be no immersed bearings in contact with the fluid.

The following specifications

were established for the three pumps in this service which required circulating cooling tower water with a pH of 8.4-8.6 at 135 gpm against a 100 ft/tdh:

- Vanton SGK 4x3x10 vertical cantilever pumps.
- All fluid contact parts, including the casing, impeller, column and other immersed parts to be solid, homogeneous polypropylene.
- The heavy-duty steel shaft to be completely isolated from the fluid with a thick sectioned polypropylene sleeve.
- The steel mounting plate/manhole cover to have a full polypropylene underlay to isolate it from the fluid.
- The polypropylene strainer basket to be attached to the pump casing using thermoplastic hardware.
- Heavy duty external ball bearings above the cover plate to be housed in an epoxycoated cast iron motor bracket and be designed to accommodate a 10hp, 1750 rpm TEFC explosion proof motor.

Vanton SGK full cantilever thermoplastic pump with run dry capabilities. The rugged steel shaft is isolated from fluid by a thick-sectioned thermoplastic sleeve. These pumps are specifically designed for corrosive, abrasive and ultrapure fluids where immersed bearings cannot be tolerated, and where it may be necessary to run dry for extended periods. Motor bracket accommodates commercially available NEMA standard motors. Flows to 1000 gpm, heads to 220 feet, temperatures to 275°F.



According to Jon Barth, Principal Chemical Engineer at the Eastman Chemical facility, the cantilever design provides safe pumping under run dry conditions. In addition, the new installation incorporates radar type level controls to automatically initiate instant start and stopping of the pumps at preset fluid levels. Since the project completion in July 2000, the system has provided reliable pumping and related instrumentation, and has eliminated the excessive maintenance and high repair costs.