

Case studies

Seal-less regenerative turbine vane pump resolves volatile situation

The magnetically driven, Magnatex® MPT regenerative turbine vane pump has gained praise as a superior pump for the safe and efficient handling of liquid fluorocarbons at a DuPont monomer processing facility in Fayetteville, North Carolina, USA.

Initially, DuPont process engineer, Scot Kessler, experienced difficulty in finding a pump with the performance characteristics to successfully address the tough pumping challenges of his application. Specifications called for a pump capable of performing dual roles. Positioned under the pot of a distillation column, the pump had to be able to circulate the highly volatile, liquid fluorocarbons, as well as function to off-load the final product without cavitation. The process also required a pump capable of reliable operation under 2 ft of static NPSH while accommodating changes in line pressures up to 100 psi (6.9 bar). Additionally, the pump had to be capable of generating flow rates of only 2 - 3 gpm (0.45 - 0.68 m³/h).

Experimentation with a variety of pump types produced less than favourable results. "Canned motor pumps failed because the motor did not receive sufficient cooling," Kessler points out. "We also had to pressure-assist the column which further prolonged the off-loading process."

The decision was then made to switch to diaphragm pumps. However, they proved ineffective as well due to chronic leakage and severe discharge flow pulsation. "Finally, Freeman Taylor, a DuPont mechanical engineer from the Fayetteville facility, suggested that I investigate the Magnatex

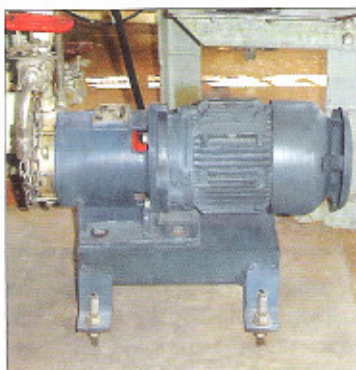
regenerative turbine vane pump concept," states Kessler. "It had a variety of features and benefits that seemed ideal for this application."

The MPT regenerative turbine vane pump from Magnatex Pumps features a steep head curve to handle system pressure fluctuations with minimal change in flow. Due to its fluted design, the MPT pump's regenerative turbine vane impeller behaves differently than traditional pump impellers by providing better pump hydraulics under low suction pressures. Unlike other centrifugal-style pumps, the MPT pump has the ability to handle high volatility fluids without cavitation.

The pump's sealless, magnetic-drive design eliminates process fluid leakage and the need for costly mechanical seals that can fail when exposed to high-temperature liquids. Its rare earth Neodymium magnets offer reliable, synchronous drive with no slippage and less internal heat build-up - a characteristic critical in this application because the liquid fluorocarbon in the pot of the column was already over 100°C.



The Magnatex® pump operates without cavitation, despite only 2 ft of NPSH.



The MPT pump handles highly volatile liquid fluorocarbon safely and efficiently.

Taylor learned of Magnatex's regenerative turbine vane technology through Fluid Solutions Inc, a Magnatex Pumps representative for the Carolinas. Approximately one year ago,

the company installed the first MPT Pump at the plant. The pump featured 316 SS wetted parts, a 1.5 HP (1.1 kW), close-coupled electric motor and optional NPT threaded pipe connections. Since that time, there has been no evidence of wear on the pump's internal components and there have been no failures.

"The MPT Pump's sealless mag-drive design, turbine vane impeller and unique performance envelope have combined to offer trouble-free operation that has exceeded all of my expectations," reports Kessler. "Consequently, this facility has purchased five additional units for similar applications."