

Magnetically coupled pump reduces maintenance costs

Huntsman Holland produces raw materials for the polyurethanes industry. Due to pump problems, the company was looking for a better solution.

Of course, no company will accept the risk of leaks when buying a pump, but that even applies more strongly in the chemical industry. Because they are working with substances which can pollute the environment or which can adversely affect the health of humans and animals, leaks in this industry are unacceptable. In addition, the cost of raw materials in the chemical industry are often high and a possible maintenance stop has a relatively long duration. In respect to that, leaks are also undesirable from a cost perspective.



Huntsman Holland has a 180 hectares area with 5 facilities. (Photo: Huntsman Holland)

CASE STORY



HARDENING AND HIGH MAINTENANCE COSTS

Huntsman Holland is one of the chemical companies that pay great attention to the protection of employees and preserving the environment. This major chemical chain started in the 60s as ICI in the Botlek area and now produces with five facilities, spread over an area of 180 hectares, raw materials for the polyurethanes industry. In this production process, substances such as sorbitol, amines and sucrose are used to make polyols. MDI is made with another process. They are all products and semi-finished products which are used in the insulation market, the automotive industry, the adhesive industry and as raw material for footwear, furniture, and a wide variety of plastics.

LARGE NUMBER OF PUMPS

Within the five facilities there are many pumps for the transport of the various raw materials. Previously pumps with mechanical seals were used, but which in practice were problematic, says Mechanical Maintenance Engineer, René van de Vlugt. "In this



One of the magnetically coupled pumps which are used in the polyurethanes production industry.

case, when these pumps exhibit leakage, it is not a particularly big problem for the environment and man. The spilled material hardens immediately when it comes in contact with the atmosphere, especially if it is wet, and will not spread in the area. However,

this hardening creates relatively much work for the maintenance department. The material must literally be chipped away and then the pump and the surroundings must be cleaned. Then, of course, the leak must be fixed. In short: the maintenance costs of these pumps were (too) high. For this reason it was decided to employ a 'zero-drip' policy, in which we don't tolerate any leakage."

MAGNETICALLY COUPLED

A solution for this problem was found in magnetically coupled pumps from the ROTAN® ED Series. One of the properties of these pumps is that the pumped medium in the system is hermetically sealed by the application of a magnetic coupling. As a result, it does not require a shaft and mechanical seal to be applied, which may allow gaseous exchange between the medium and the atmosphere. The quantity of magnets is dependent upon the capacity to be transferred. They are made of rare earth materials, which are magnetised up to ten times more than iron. There the choice is from neodymium - iron - boron magnets for operating temperatures up to 150 °C, or samarium cobalt for higher temperatures.

MONO-BLOCK UNIT

Other positive characteristics lie in the fact that liquid to be treated is handled relatively carefully in this pump, the high suction vacuum, and the possibility for pumping high-viscosity fluids. The ROTAN® ED pump is designed as a mono-block unit, meaning that it is directly linked to an IEC motor, gear motor or gearbox with IEC motor. Alternatively, a pump with a free shaft end is assembled with a drive via a flexible coupling. When the application requires the presence or removal of heat it is also possible to provision the pump head and magnets with an external casing.



LOWER MAINTENANCE COSTS

"The reason we contacted DESMI was that we already had a number of ROTAN® pumps and we were generally satisfied with them." said Van der Vlugt. "In fact, the first pumps which we purchased in 2004, still operate without problems. Based on this experience, it was decided to replace all pumps in the process concerned with a mechanical seal by a magnetically coupled construction. Our policy with respect to maintenance and procurement of materials is simply clear: we go for the best materials to minimise maintenance costs and maximize process reliability. That does mean that the investments are higher, but these higher costs certainly weigh up against the maintenance costs which you incur, or in the worst case, disruption or downtime of your process due to spills arising from the use of pumps with a mechanical seal." The replacement of existing pumps is in full swing and it is a continuous process that will take a number of years. When constructing new installations magnetically coupled pumps are included as standard in the specification.

TECHNICAL SPECIFICATIONS - ROTAN® ED SERIES

Materials: cast iron, carbon steel or stainless steel
Capacity: maximum 90 m³/hr
Speed: maximum 1750 min⁻¹
Differential Pressure: maximum 16 Bar/232 psi
Suction head: maximum 0.5 bar vacuum during suction
Maximum 0.8 bar vacuum during pumping
Viscosity: maximum 10,000 cSt
Temperature: maximum 250°C