ROTAN® Magnetic Driven Pumps in Molten Sulfur Service

Pumping Molten Sulfur is most challenging.

Sulfur temperatures must be controlled within a 120-155° C range. Outside this temperature sulfur solidifies.

Sulfur has a distinct odor and is highly corrosive in the presence of moisture. Where leakage from common packed style pumps was unacceptable, a ROTAN® magnetically driven pump unit was offered on a trial basis where the chemical is used in the production of soap and shampoo.

Although we were concerned with sulfur solidifying and closing the internal circulating pathways, our first fully jacketed ROTAN® model MD33EFDK-1U33 proved successful.

Additional sales followed among leading soap manufacturers.

Where others have copied; ROTAN® delivers advanced technology to be first in market.

ROTAN® DESMI

Springer Pumps, LLC
Telford, PA 18969

Tel: 866-777-6060 / Int'l: 215-949-2900
Fax: 866-777-6383 / Int'l: 215-721-1296

www.springerpumps.com
info@springerpumps.com

Following our initial success, ROTAN® pumps have been placed in more aggressive service where sulfur is delivered under higher pressures and burned in the production of Mercaptan. Mercaptan is used as an odorant within natural gas and used in the production of plastics. In this service, stainless steel materials were required along with tungsten carbide bearings and thrust washers. Following success here, the same ROTAN® model was chosen within a sister plant operation.

Molten Sulfur is burned to produce SO2 in a process that conditions flue gas in coal burning power plants. Although small diaphragm metering pumps (.19 to .42 gpm) deliver sulfur to the process, a ROTAN® model MD101EFDK-1U33 is used to transfer sulfur from trucks and rail cars.

We have recently uncovered another market where sulfur is used as a crosslink agent in the production of modified asphalt formulations and the search continues where flow ranges from 2-150 gpm. Diaphragm pumps are used in lower flows and specialized centrifugal pumps are selected when higher flows are required. Care should be taken since some sulfur products are corrosive and some include abrasive contaminants. When necessary, stainless steel and abrasive resistant tungsten carbide should be considered.

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ROTAN® Magnetic Driven Pumps in Molten Sulfur Service

by Dale Evers

Selling against established competition is most challenging in North America markets. Our goal is to uncover new processes and changing demands on pumps used within existing applications.

Although molten sulfur is commonly delivered using packed style pumps, the product that seeps through packing creates a significant housing keeping issue. Several years ago a ROTAN® magnetically driven pump was offered where zero leakage was required in the soap industry. For the first time a ROTAN® MD/ED series pump was offered.

Sulfur temperature must be controlled within a 120-155 degree C temperature range. Outside this temperature range sulfur solidifies. Although we were concerned with the sulfur closing the internal circulating pathways within the inner magnet, a ROTAN® model MD33EFDK-1U33 jacketed pump including carbon graphite bushings and high temperature magnets proved successful.

Following our initial success the process engineer agreed to serve as a reference where ROTAN® pumps were being considered in a more aggressive service where sulfur is delivered to a burner in the production of mercaptan. Mercaptan is used as an odorant within natural gas and used in the production of plastics. Our initial success in the soap industry lead to a $50,000 order within Arkema Corporation and included (5) ROTAN model MD51EFDK-3U88 units complete with gear reduction. In this case stainless steel construction was required where contaminates caused corrosion to cast iron materials. Due to higher continuous duty operating pressures, tungsten carbide bearings and thrust washers were selected. Following several years of success, a sister plant followed with another significant order in 2009.

Success continues in the soap industry resulting in a nice order within Proctor and Gamble last month. The sale of (5) MD33EFDK-3U88 units totaled $36,262.00. Another molten sulfur project is under review within P & G. Our success is shared through P & G's world wide intranet communications.

Molten Sulfur is burned to produce S02 in a process that conditions flue gas in coal burning power plants. A ROTAN® model MD101EFDK-1U33 was used as a transfer pump and another order followed in the same service. Specialized diaphragm metering style pumps deliver sulfur to the process at very low flow rates. (.19 to .42 gpm).

Most recently another market was uncovered where molten sulfur is used as a crosslink agent in the production of modified road asphalts. We are pursuing this new opportunity.

Conclusion…ROTAN® magnetic driven pumps are proven in molten sulfur service where typical flows range from 2-150 gpm. Diaphragm pumps are used in the lower flows and specialized centrifugal pumps are often used where higher flows are required. Care should be taken since some sulfur products are corrosive and some include abrasive contaminants. In these cases stainless steel materials and tungsten carbide should be considered.

We look forward to uncovering additional markets where molten sulfur is used and ROTAN® magnetically driven pumps serve as a problem solving upgrade.