

# Eccentric Disc Pump ROI

Tom Stone, Blackmer

**Looking for a time- and cost-saving solution to a constantly leaking lobe pump, Rock-Tenn Company found the answer in eccentric disc pumps.**

With more than 9,500 employees from 92 facilities spread across 26 states, as well as Canada, Mexico, Chile and Argentina, Rock-Tenn Company (Norcross, Ga.) is a global manufacturer of packaging products, merchandising displays and bleached and 100 percent recycled paperboard.

Rock-Tenn's Recycled Fiber Division collects, processes and markets more than one million tons of recycled fiber every year at 12 locations from Vermont to Georgia and Minnesota to Texas. At these sites, Rock-Tenn collects waste paper from commercial printers, retail and grocery stores, office complexes, manufacturing facilities, document-destruction providers and waste haulers. When the various feedstocks arrive at these plants, a proprietary process takes the raw product, breaks it down, stretches it out and, after starch and other additives are introduced, forms it into the recycled paperboard that Rock-Tenn will use to make folding cartons, interior packaging and corrugated packaging for innumerable industrial and consumer-product applications.

Tim Kreitz is a project engineer at Rock-Tenn's St. Paul Paper Mill in St. Paul, Minn. He is responsible for pumps and systems at Rock-Tenn's third largest paper mill. Three years ago, he began to notice that the mill would have been even more profitable if he was not having nagging maintenance problems with one lobe-type pump whose sole task was to incorporate a starch-based compound into the recycling process by moving it from a 5-ft by 5-ft tank through a series of pipes.

"It was an older pump and the seals would start to leak, then the pump would start to go," said Kreitz. "It cost us \$3,500 to rebuild it each time, and it would go out at least once a month."

Tired of dealing with the vicious cycle of breakdown followed by expensive repair for this particular pump—the only glitch in what is a typically smooth-running operation—Kreitz was forced to look for alternatives.

## Pump Technology Considerations

The pumping action of a rotary lobe pump, like the older pump at Rock-Tenn, is achieved by two rotors counter-rotating within a stationary casing. To avoid disaster, clearances must be maintained between the two rotors and between



Once waste paper is broken down and properly processed, Rock-Tenn's St. Paul Paper Mill produces recycled paperboard that will be used to make numerous industrial and consumer-product applications.

the rotors and the casing. These necessary clearances result in performance and efficiency robbing slip. When rotary lobe pumps are operated at elevated temperatures and/or pressures, the clearances must be increased to compensate, making them even less efficient. As rotary lobe pumps wear, the clearances increase, resulting in reduced flow and efficiency.

Rock-Tenn began to consider eccentric disc positive

displacement pumps as an alternative pump technology to rotary lobe pumps. The pumping action of the eccentric disc pump is achieved by means of a single disc moving eccentrically within a stationary cylinder. The disc is in contact with the cylinder throughout the eccentric motion. The action of the pumping element forms pumping chambers that expand in size at the inlet, draw the pump fluid in and contract in size at the discharge, displacing the fluid into the discharge piping.

One of the biggest differences between eccentric disc and rotary lobe technology is the use of mechanical seals. The eccentric disc pump has one shaft that is isolated from the pump fluid by a stationary bellows that flexes to take up the eccentric motion of the disc, so no mechanical seals are needed in its design. Lobe pumps, however, have a second shaft with each shaft requiring a mechanical seal. Since lobe pumps are designed with two seals, it is a pump that is more prone to leakage, which was the case at the Rock-Tenn facility.

Knowing that a solution was needed, Kreitz turned to his distributor, Power Process Equipment, Inc., of Chanhassen, Minn., for some suggestions. Working with his PPE representative Paul Pade, Kreitz decided that the best answer to the problem would be an eccentric disc pump.

After reviewing the Rock-Tenn application, which included continuous-process operation at flow rates of 20-gpm, temperatures up to 160-deg F and differential pressures of as much as 40-psi, Pade suggested a stainless-steel eccentric disc pump with FKM elastomers, 2-in port openings, speeds up to 394-rpm and clean-in-place (CIP) capabilities. That was in March 2006. Since the installation of the eccentric disc pump, Kreitz has experienced none of the problems that dogged the old lobe pump.

“The mechanical seals were the reason why the original pump would keep breaking down, so we eliminated the seal part of it and we eliminated the problem,” said Kreitz. “Now, my mechanics have time to move onto other issues instead of spending so much time on this one area.”

Since they are designed without mechanical seals, packing or magnets, the eccentric disc pumps eliminate leakage and issues surrounding this particular application within the Rock-Tenn facility. The pump’s construction also makes it capable of clearing intake and discharge lines of residual material. It is also designed for self-priming and limited dry-run capability, while its automatic piston/cylinder wear adjustment ensures high volumetric efficiency over the life of the pump.

Even more important than the leak-free operation and peace of mind Kreitz and Rock-Tenn have experienced since the pump has been installed is the return on investment that the company has realized since purchasing and installing the new pump. With the old lobe pump failing at least once a month, that meant a dozen or more times a year that it would be out of service and have to be repaired for \$3,500 per breakdown.

Considering the new pump has not been out of service once since its installation, it paid for itself after the first six to eight weeks of operation, and has paid for itself many times since early 2006.



Tim Kreitz, project engineer at Rock-Tenn's St. Paul Paper Mill, kneels next to a new eccentric disc pump.

## Out Of Sight, Out Of Mind

Since incorporating the pump into St. Paul Mill's recycling process, Kreitz rarely finds himself even thinking about the pump.

“It paid for itself in the first two months after we installed it,” Kreitz said. “It's been in there for so long now, and it's never been touched, that I can't even remember when I installed it. I put it in and forgot about it.”

Another testament to the pump's reliability: When Kreitz placed the initial pump order, he bought two, in case he needed to replace the first one at some point. That second pump currently sits in a storage room at the St. Paul Mill in its original packaging.

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