

# Seal-less pump brings payback in 6 months

*The Kristenehamn mill of Backhämmar started to make annual energy savings of € 7000 seven years ago, when an innovative pump was installed on a filter cleaning system.*

*The seal-less Hydra-Cell pump reduced energy consumption by 90% compared with the conventional, multi-stage centrifugal pump.*

*In addition, the new pump has enabled mill engineers to raise system pressure to an ideal 50 bar - from the 30 bar of the previous pump.*

*In a Czech tissue plant, where a Hydra-Cell replaced a piston pump on a felt cleaning system, payback was achieved in 6 months by energy savings alone.*

*The mill is also benefiting from increased productivity since the seals of the piston pump - worn out by fibre and mineral particles in the water - had to be renewed several times a year.*

*For a full study of the performance of the Hydra-Cell, see: **A Comparative Study of Pump Life Cycle Costs** on pages xx-xx.*

Specifying pumps for applications in the pulp and paper industry has not become easier. Energy prices continue to rise. Maintenance skills and time are at a premium. Production is concentrated in fewer mills operating on a bigger scale - which means equipment failure is likely to be more expensive in terms of production efficiency or actual downtime.

But pump technology does not stand still, and over a widening range of applications mill engineers are looking beyond traditional pumping options and finding new solutions in, for example, a type of pump that is far from conventional - the Hydra-Cell pump.

The Hydra-Cell - the name refers to the hydraulic cells at the heart of the pumping mechanism - present a real alternative to traditional pump types for any application in the flow ranges up to 138 l/min (8.3m<sup>3</sup>/hr) for a single pump. They are characterised by:

- low energy consumption
- high pressure capability
- minimal maintenance requirements and a reputation for reliable long-term operation, even when handling 'difficult' liquids in unpromising conditions.

Hydra-Cell pumps are manufactured in the USA by Wanner, whose founder produced the original concept and built the first pumps some 30 years ago.

Notwithstanding massive ongoing investment in design, development and sophisticated manufacturing technology, the basic concept still holds good - in fact, it has provided the platform for one of the company's most significant recent advances, the Kel-Cell.

## Advantages of seal-less design

A fundamental feature of the Hydra-Cell pump is its seal-less design, *figure 1*. It uses the principle of hydraulically balanced diaphragms, which not only flex to provide pumping action but also totally isolate the (hydraulic) drive end of the pump from the

liquid that is being pumped. No stress is placed on the diaphragms at any operating pressure.

Moreover, Wanner's patented Kel-Cell technology allows the diaphragms to operate even under adverse inlet conditions - when, for example, a vacuum might result from a blocked suction filter or accidental closure of a valve. The pump can run dry without damage.

## Advantages on a board making line

Because there are no dynamic seals in the Hydra-Cell pump it avoids all the familiar problems associated with seal wear

- frequent replacement
- internal leaks
- possible pump failure

A pump specialist in Finland, estimating that 90% of maintenance work on process pumps involves the shaft seal, cites the following typical example from a board mill:

Most of the chemicals used in board manufacture dry out or crystallise when exposed to air. Seal wear allows air ingress which dries out the liquid which is always present between seal faces. This in turn, leads to further wear and leaks. When the pump stops, air may penetrate other internal seals, causing the pump to seize.

Seal-less design and the variety of materials options for pump body and elastomers, enable the Hydra-Cell to handle virtually any medium - including corrosives, abrasives, non-lubricating liquids, recycled liquids and those carrying solids in suspension. In addition, most pumps in the range can operate at up to 70 bar pressure (some models up to 170 bar).

In metering applications the Hydra-Cell offers a lower cost and less bulky alternative to the traditional - piston diaphragm - metering pump. It is also easier to control and automate, offers a bigger turndown ratio and has much lower pulsation. Extensive tests, as well as field experience, have shown that the

pump easily meets standards of accuracy demanded by API 675.

A Swedish chemical producer supplying product and dispensing equipment to end-users in the paper industry switched to Hydra-Cell pumps in place of diaphragm metering pumps in his system, and at the same time was able to leave out the pulsation dampener previously included.

To handle big variations in flow and pressure, pumps of different sizes, had been needed by the mill. By standardising on a single Hydra-Cell model the chemical company was able to reduce prices and offer a more flexible system.

#### Handling coating latex

Often a product that is not easy to handle presents no problem for a Hydra-Cell pump. Latex (for paper coating) and raw turpentine (a non-lubricating by-product of black liquor) are random examples. A more common application, and one of the major uses for Hydra-Cell pumps in the industry, is handling recycled water.

Several mills have reported spectacular savings in this area. Backh mmar's Kristene-

hamn mill in Sweden installed a Hydra-Cell G25 with 3 kW motor on a filter cleaning system in place of a multi-stage centrifugal pump which had been drawing 30 kW of power. Energy consumption was cut by 90%, with annual cost savings equivalent to €7000.

Moreover, mill engineers were able to raise system pressure to an ideal 50 bar, where the previous pump had managed only 30 bar. Repair costs were also reduced.

A similar story came from the Czech Republic, where energy savings alone enabled a converting plant producing toilet tissue to recover the cost of a Hydra-Cell G35 pump within six months.

The Hydra-Cell was installed on a felt cleaning system where it replaced a piston pump whose seals had to be renewed several times a year - worn out by fibre and mineral particles in the water. This caused days of lost production were each year.

The converting plan found that the annual maintenance on the Hydra-Cell amounted to less than 4 hours, including four 10-minute oil changes and 2-3 hours for an annual check/replacement in-situ of valves and diaphragms. [www.wannerint.com](http://www.wannerint.com)

The seal-less design of the Hydra-Cell pump avoids the problems associated with seal wear - frequent replacement, internal leaks, possible pump failure. The shaft seal accounts for an estimated 90% of maintenance work on process pumps. For metering, the Hydra-Cell offers a lower cost and less bulky alternative to the piston diaphragm pump. It is also easier to control and automate, offers a bigger turndown ratio and has much lower pulsation.

