

# AHLSTAR<sup>UP</sup>

## Unrivalled Stock Pumping Efficiency

HEIKKI MANNINEN |  
SULZER PUMPS

Pulp and paper making is an energy-intensive industry. Energy is the third highest cost in the paper making process and accounts for approximately 8% of turnover. Process heat and electrical energy for pumping and other purposes are the 2 main forms of energy required by pulp and paper mills. The efficiency of the process pumping system is therefore of key importance. In addition to saving energy, the optimization of these systems can help to ensure the reliability of the production process and prevent bottlenecks from occurring. In 2005, Sulzer Pumps launched its Ahlstar<sup>UP</sup> stock pump range for the pulp and paper industry. These new pumps consume a significantly lower amount of energy and require considerably less sealing water than conventional stock pumps.

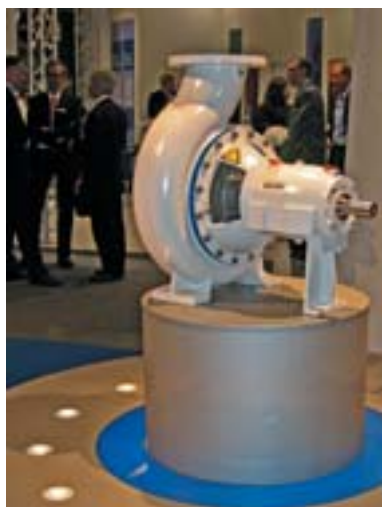
▶ The paper stock that has to be pumped during the paper making process has certain characteristics that make it more difficult to handle than water: it contains fibers or entrained air and varies in consistency. The specialized pump systems used in the pulp and paper industry consume a significant proportion of the total amount of electricity used in the mills. The choice of the right pumps and the implementation of a proper control strategy can therefore improve efficiency and generate energy savings by matching the available pumping capacity to the system requirements.

### Catering for the Full Range of Consistencies

The Ahlstar<sup>UP</sup> range covers the lower consistency applications of 0–8% in Sulzer's stock pumping concept, while the KCE<sup>TM</sup>, LCE<sup>TM</sup>, and MCE<sup>TM</sup> pumping systems are suitable for consistencies of 6–18% (see article p.21) (Fig. 1).

The hydraulic and mechanical design of the Ahlstar<sup>UP</sup> pumps is based on the proven Ahlstar stock process pumps that have been in use in the pulp and paper industry since 1987. Sulzer has combined its 25 years of experience in the field of dedicated stock pumps with modern methods of compu-

**1** The Ahlstar<sup>UP</sup> process pumps can generate energy savings of up to 10% and can save 90% of sealing water. Sulzer Pumps is a full-line supplier to the pulp and paper industry.



tational fluid dynamics (CFD) to introduce a number of innovations in the new range of machines that enhance efficiency and improve the sealing concept, bearings, and other aspects of reliable operation.

### Improved Hydraulics

The Sulzer EnerSave<sup>TM</sup> impeller was designed specifically for the needs of the pulp and paper industry (Fig. 2). It achieves a high level of efficiency over a wide performance range which can be as much as 10 percentage points higher than that of a conventional process pump. The new Ahlstar<sup>UP</sup> pumps can be installed to replace the ex-

isting pumps in the event of an increase in the capacity of an existing installation. Their improved performance allows for a 50% rise in performance without the need to change the diameter of the pipe. An externally adjustable side plate (pat. pending) makes it possible to control the runner clearance and thus maintains energy consumption at a constantly low level. The pumps can be fitted with a specially designed nonclogging impeller if liquid containing large or long solid particles needs to be pumped. In addition, Sulzer engineers have developed wear resistant hydraulics for use in the case of highly abrasive fluids such as lime milk.

### Reliable Shaft Seals

Between 60 and 70% of all process pump breakdowns are a result of shaft seal failure, which is mainly due to insufficient flow and an inadequate level of pressure in the seal chamber. The new balancing holes (pat. pending) eliminate the dry running of a single mechanical seal or the possible intake of air through the dynamic seal. The sealing concept has a significant impact on the life cycle costs of the

pumps. The shaft-sealing technology used in process pumps has changed over recent years. In the 1970s, almost all pumps were fitted with gland packings—invented by Sulzer in around 1830—but today, around half of all pumps use dynamic seals and another 30% feature integrated mechanical seals (Fig. 3). Sulzer's Ahlstar<sup>UP</sup> pumps are fitted with a dynamic seal that is practically maintenance-free—with a static seal for standstill periods—which provides a level of reliability not previously achieved with dynamic seals (pat. pending) (Fig. 4).

As they are the most widely used shaft seals in the pulp and paper industry, the Sulzer dynamic seal and single mechanical seal also generate water savings, because they do not require an external sealing flush.

In certain applications, however, double mechanical seals with external sealing water are necessary. The innovative sealing water control system for double mechanical seals reduces the sealing water requirements by as much as 90%—or from 4.0 l/min to even 0.2 l/min for one machine—compared with conventional designs.



**2** Pumping is an essential part of the paper making process. A paper machine that requires 8000 kW of installed pumping power can reduce its power needs by 600 kW by using Sulzer's new Ahlstar<sup>UP</sup> process pumps.

