

Reducing water and energy consumption with FlowControl's SZ8 SealCooler™

Closed-Loop Seal Water Technology helps pulp and paper mills improve sustainability and reliability

Robert Clayhills, CEO, Nipman Paper Technology

INTRODUCTION:

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Although mechanical seals are essential for ensuring reliable pump operation, conventional seal water systems consume vast quantities of clean water every day. The result is unnecessary water usage, increased wastewater generation, higher treatment costs and additional energy consumption.

FlowControl's SZ8 SealCooler™ addresses these challenges with an innovative closed-loop thermosiphon system that virtually eliminates continuous seal water consumption while improving seal reliability and reducing maintenance requirements.



Rethinking an Established Practice

Across a typical paper mill, hundreds of process pumps operate continuously throughout production. Most rely on double mechanical seals cooled and lubricated by a constant flow of fresh water.

In traditional open-loop arrangements, this water passes through the seal only once before being discharged to drain. Although simple and reliable, the system is inherently wasteful.

A single paper machine may operate around 100 pumps, each requiring approximately four litres of seal water every minute. Over the course of a year, this represents well over 200 million litres of treated water dedicated solely to seal cooling.

Image 1: (Left) SZ8 SealCooler system installation.



Figure 2: SZ8 SealCooler Line Paper Mill.

Beyond the direct water consumption, every litre entering the process ultimately increases wastewater treatment requirements, placing further demands on plant utilities and operating budgets.

Finnish Engineering Focused on Process Efficiency

Developed by Finnish engineering specialist FlowControl, the SZ8 SealCooler™ replaces conventional flow-through arrangements with a completely self-contained thermosiphon circulation system.

Instead of continuously consuming fresh water, the SZ8 circulates a small volume of sealing fluid within a closed loop. Natural thermosiphon circulation transfers heat away from the mechanical seal while maintaining stable lubrication conditions, eliminating the need for continuous water supply.

The closed-loop design not only conserves water but also provides more consistent operating conditions for the seal itself.

According to Timo Huhtala, inventor of the SZ8 SealCooler™:

“Water consumption can now be radically reduced. This benefits both the environment and the mill’s overall energy footprint. It’s a relatively simple change that delivers substantial results.”

Reliability Improvements That Extend Beyond Water Savings

While water conservation is often the headline benefit, the operational advantages extend considerably further.

Maintaining stable lubrication conditions reduces thermal shock and seal wear, helping extend mechanical seal life and increasing Mean Time Between Failures (MTBF). Improved seal reliability leads directly to fewer maintenance interventions, reduced unplanned shutdowns and greater process stability.

Because the system operates independently of continuous plant water supplies, it also removes a common source of seal failure associated with interruptions or variations in flushing water.

The technology has already demonstrated its reliability in demanding industrial environments, with more than 4,000 installations operating across the pulp and paper industry as well as chemical processing, mining and other heavy industrial sectors.

Each unit is supplied fully assembled from FlowControl’s manufacturing facility in Muurame, Finland, allowing rapid installation during planned maintenance shutdowns. In many applications, installation can be completed by the mill’s own maintenance personnel without specialist support.

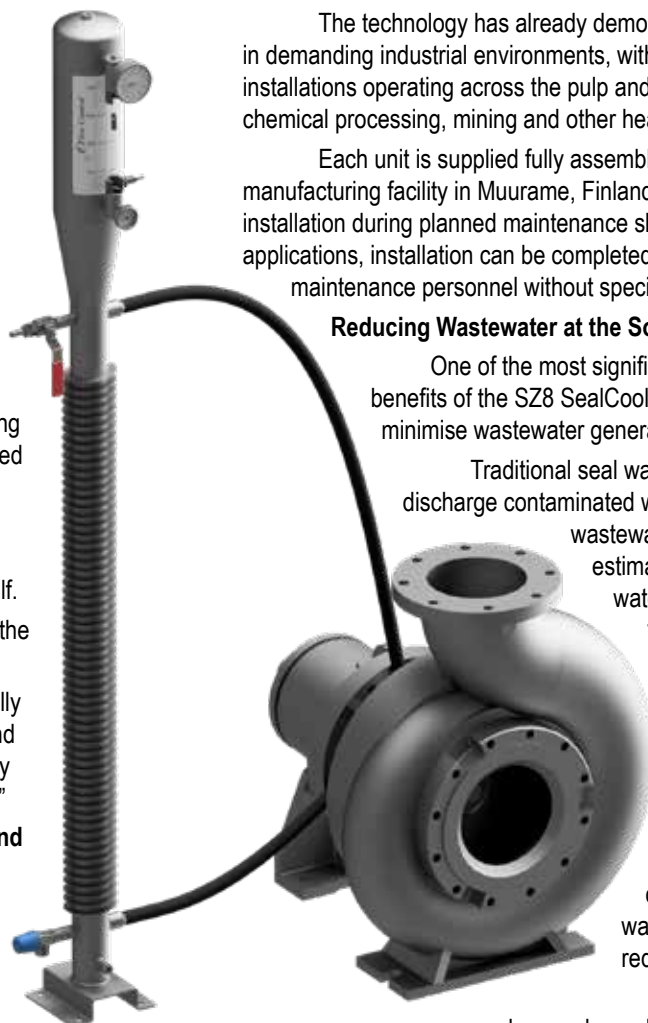
Reducing Wastewater at the Source

One of the most significant environmental benefits of the SZ8 SealCooler™ is its ability to minimise wastewater generation.

Traditional seal water systems continuously discharge contaminated water into the mill’s wastewater stream. Industry estimates indicate that seal water may account for up to 10% of total wastewater volumes in some facilities.

By virtually eliminating this continuous discharge, the SZ8 significantly reduces both water consumption and wastewater treatment requirements.

Lower wastewater volumes also reduce pumping, treatment and energy costs, creating operational savings that extend well beyond water usage alone.



Robert Clayhills, CEO of Nipman Paper Technology, believes the technology represents a wider opportunity for process improvement:

"This is about more than simply saving water. The SZ8 SealCooler demonstrates how process efficiency and sustainability improvements can be achieved quickly and measurably."

Delivering Measurable Operational Benefits

For mills seeking practical improvements that deliver both environmental and financial returns, the SZ8 offers multiple advantages:

- Dramatically reduced seal water consumption
- Lower wastewater generation and treatment costs
- Improved mechanical seal reliability
- Extended seal operating life
- Increased Mean Time Between Failures (MTBF)
- Reduced maintenance requirements
- Lower unplanned downtime
- Reduced operating costs
- Proven performance with thousands of industrial installations
- Straightforward installation and rapid commissioning
- Immediate contribution towards sustainability and ESG objectives

Supporting Long-Term Sustainability

The SZ8 SealCooler™ represents more than a replacement component—it reflects a broader change in how auxiliary process systems can contribute to mill performance.

Its modular design enables straightforward integration across a wide variety of pumping applications while delivering measurable improvements in water efficiency, process reliability and operational cost.

As environmental regulations become more demanding and water resources increasingly valuable, relatively simple engineering improvements such as closed-loop seal water systems can provide significant long-term competitive advantages.

About FlowControl

FlowControl is a Finnish engineering company specialising in flow measurement, lubrication circulation systems and advanced sealing technologies for demanding industrial applications.

Led by Teuvo Huhtala, inventor of the SZ8 SealCooler™, the company combines decades of engineering expertise with practical experience helping industry reduce water consumption, improve equipment reliability and lower operating costs.

Nipman Paper Technology represents FlowControl throughout Scandinavia, Europe, Turkey and the Middle East.

A Small Change with Significant Impact

Reducing environmental impact does not always require major capital investment. In many cases, meaningful improvements can be achieved by optimising existing process systems.

With more than 4,000 successful installations worldwide, the SZ8 SealCooler™ has demonstrated that closed-loop seal water technology can substantially reduce water consumption, minimise wastewater generation and improve equipment reliability—without compromising performance. For pulp and paper producers seeking practical solutions that support both operational excellence and sustainability, the SZ8 SealCooler™ offers a proven pathway towards more efficient production.



Flow Control
Muurame Finland



Nipman Paper Technology, are FlowControls exclusive representative of the product on the Scandinavian and European market. Including also Turkey and Middle East.

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