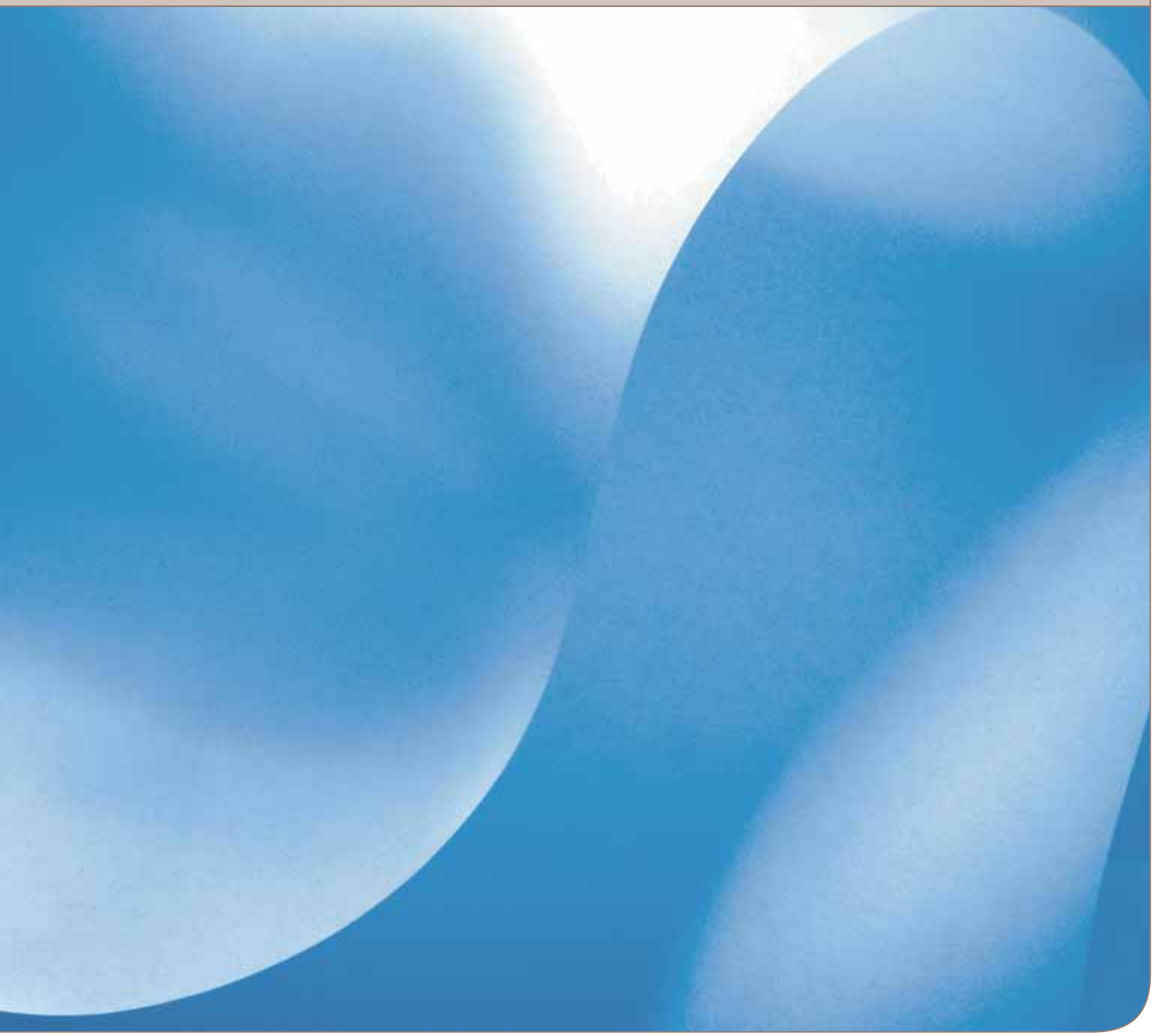
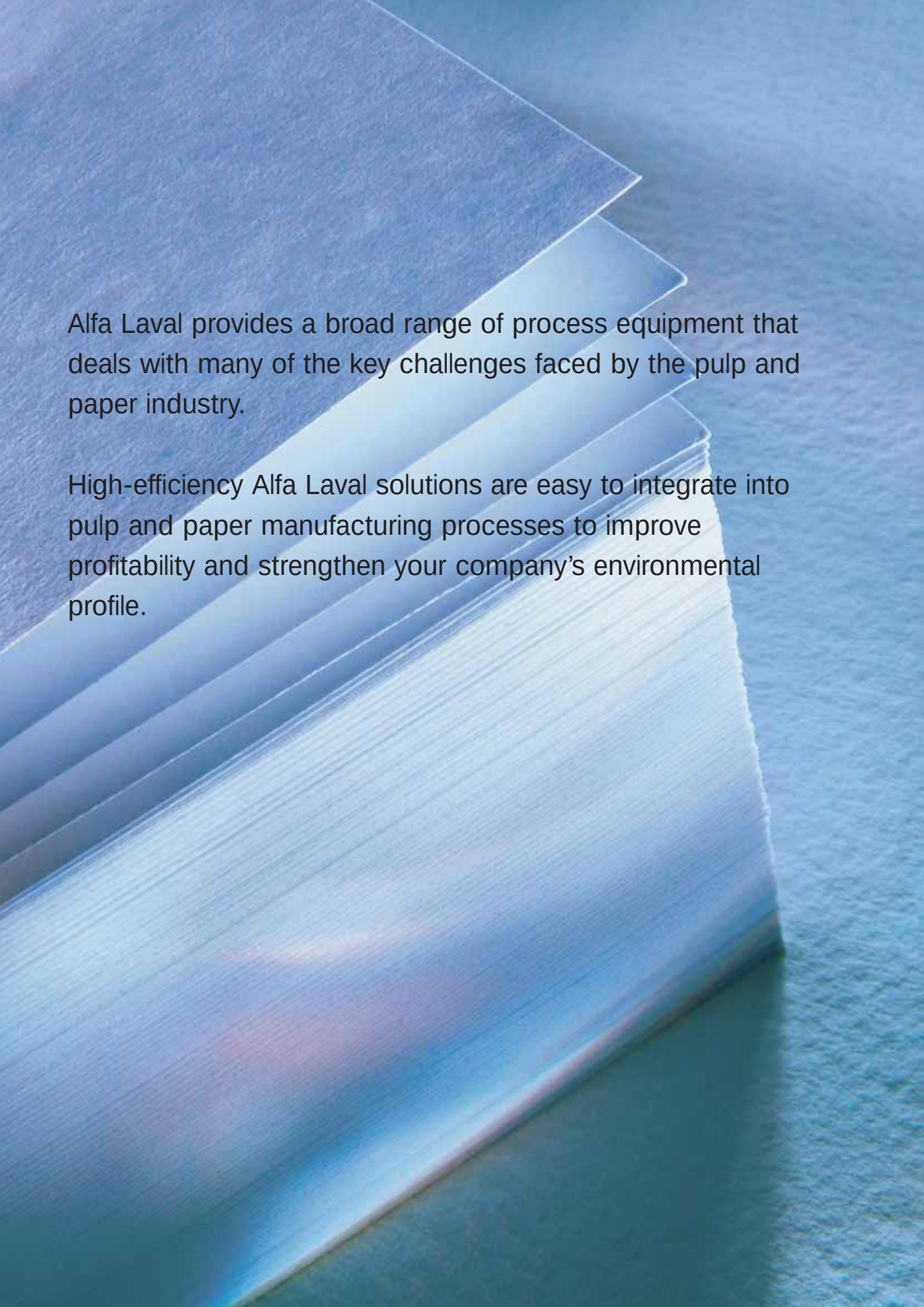
Closing the loops

Alfa Laval solutions for the pulp and paper industry





Alfa Laval provides a broad range of process equipment that deals with many of the key challenges faced by the pulp and paper industry.

High-efficiency Alfa Laval solutions are easy to integrate into pulp and paper manufacturing processes to improve profitability and strengthen your company’s environmental profile.

Paper forever

Paper – the multifunctional solution

Paper and paper products are used for countless purposes – with new specialty products constantly under development. Examples include

- the boom in packaging innovation as a key feature of branding and marketing activities
- the resurgence of paper bags because paper is generally more environmentally acceptable than plastic
- the proliferation of giveaway dailies and new-format freebie newspapers and magazines.

Companies are therefore eager to ensure that their pulp and paper operations are kept efficient enough to seize the new business opportunities that arise.

Environmental profile

Paper products provide a more environmentally acceptable solution than any of the obvious alternatives.

However, this also means that the industry has to tackle the fact that its basic production processes involve the use of extremely large quantities of both energy and water.

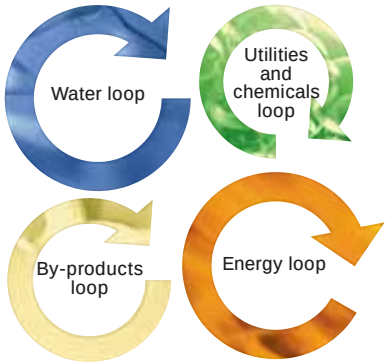
Cutting down these quantities is one of the keys to reducing costs, improving profitability and maintaining a positive environmental profile.

Alfa Laval solutions make the difference

Alfa Laval solutions make a huge difference to

- your environmental profile
- your bottom line

by providing technologies that enable you to close the loops in your pulp and paper manufacturing processes.



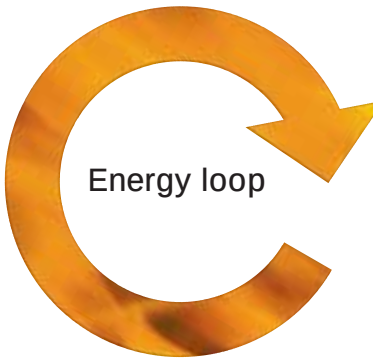
Alfa Laval solutions make the difference

- boost energy recovery
- reduce wastewater treatment costs
- reduce water consumption
- separate and purify by-products cost-effectively
- improve utilities management
- reduce chemicals costs.

Optimizing energy recovery

Alfa Laval equipment for the pulp and paper industry enables you to recover as much energy as possible - and thus reduce your energy costs.

Heat transfer efficiency



Energy is the key

Large amounts of energy, in the form of heat and electricity, are required for all the processes involved in pulp and paper manufacturing.

Reducing the overall consumption of energy is therefore a prime focus, leading to careful consideration of heat recovery solutions.

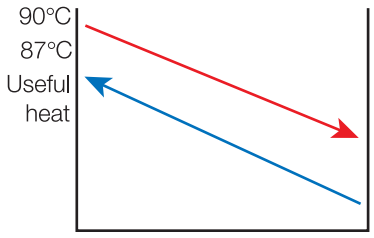
Alfa Laval heat transfer equipment enables you to recover maximum heat energy from most process fluids – fibrous or not – with low installation, operating and maintenance costs.

Uniquely efficient

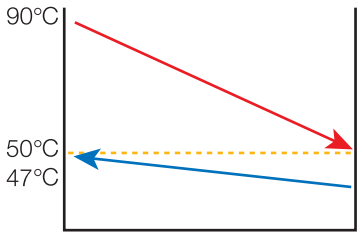
The closer the temperature approach between two fluids in a plate heat exchanger, the more heat is recovered. As illustrated below, Alfa Laval heat transfer equipment enables you to achieve as close a temperature approach as possible.

Alfa Laval heat exchangers feature a special plate design that provides maximum thermal efficiency. Along with the fully counter-current flow, this enables you to achieve maximum heat recovery.

This means a much smaller heat transfer surface area is needed to achieve any given capacity. Alfa Laval heat exchangers are therefore much smaller than traditional shell-and-tube heat exchangers. This space-saving footprint also cuts back on installation costs.



Heat recovery using Alfa Laval wide-gap plate heat exchangers



Heat recovery using traditional shell-and-tube heat exchangers

Cut energy costs by one third

The Mississippi River Corporation (MRC) – an American recycle pulp mill – is a major energy consumer. With energy costs at an all-time high, the company needed substantial reductions.

Part of the solution was heat exchangers to recover heat from a hot white water stream. But shell-and-tube heat exchangers were ruled out because of fouling and cleaning issues.

“We selected three Alfa Laval spiral heat exchangers because of their high thermal efficiency and ability to handle fluids containing fibres and particles. This heat recovery system has reduced our energy costs by one third,” says Tanya Richardson, MRC’s process manager.

UPM relies on wide-gap technology

UPM is one of the world leaders in forest products, and has installed more than 30 Alfa Laval wide-gap plate heat exchangers in its many plants – both chemical and mechanical pulp mills, and paper mills. These heat exchangers are used to improve heat recovery from process streams such as bleaching filtrates, PGW filtrates, white water and wastewater.

“Energy is expensive, and rising energy prices mean that any investments in energy efficiency are easily recouped. We particularly appreciate the wide selection of heat exchanger products from Alfa Laval – they meet all our needs,” says Mikko Saarela, responsible for process development and related investments at the UPM mill in Kaipola, Finland.

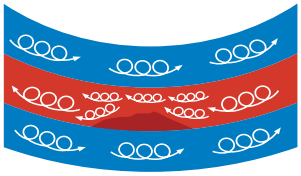
Dealing with fibrous fluids

Fibrous fluids no problem

Operators of pulp and paper mills often have to deal with the fact that one or both process fluids contain fibres and solid matter.

With Alfa Laval equipment, this is no hindrance. You benefit from a full range of heat exchangers fully capable of handling fibrous fluids while still providing high thermal efficiency and thus maximum heat recovery. Full access on both sides also ensures easy cleaning, should this prove necessary.

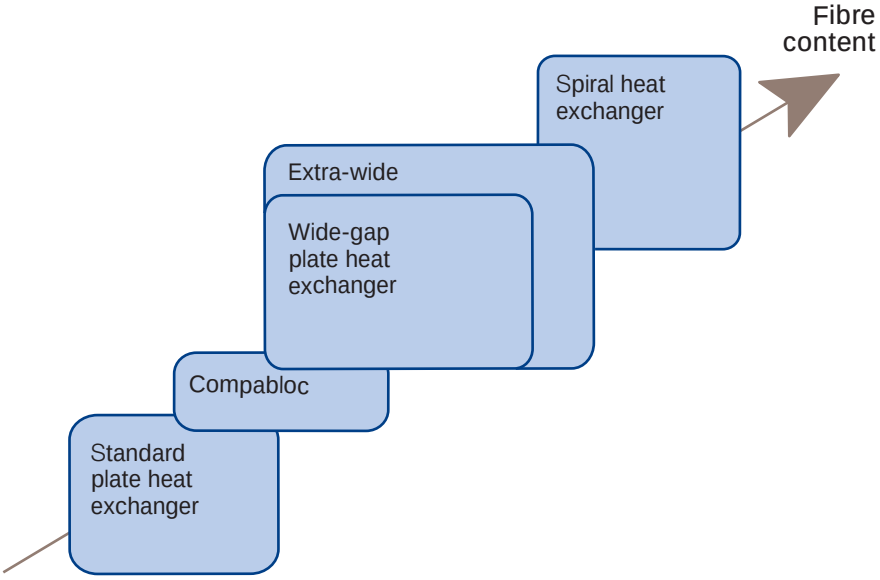
- Standard Alfa Laval plate heat exchangers are ideal for extracting heat from fluids with limited fibre content.
- Alfa Laval Compabloc heat exchangers feature a unique wholly welded design, and are thus gasket-free. This is a major advantage with aggressive fluids.
- Alfa Laval wide-gap plate heat exchangers are specifically developed for operating with fibrous fluids.
- Alfa Laval spiral heat exchangers feature a single-channel flow. Any deposits or tendency to clogging are simply flushed out.



Self-cleaning effect: any deposits that restrict the channel cross-section increase the fluid velocity at that exact point. The deposits are therefore immediately flushed away.

Close your energy loop

- Maximize heat recovery
- Prolong operating efficiency
- Reduce maintenance costs
- Reduce installation costs
- Add processing flexibility.



A wide spectrum of efficient heat exchangers to cope with different levels of fibre content.

Efficient water management

Alfa Laval equipment paves the way for better wastewater management and enables you to reduce water consumption in pulp and paper processing.

Reduced wastewater treatment costs

The production of pulp and paper demands water in large quantities for virtually all the processes involved. Even with some recycling, pulp processing and paper making still require large quantities of fresh water.

Alfa Laval provides both the process equipment and the know-how to help you minimize water consumption and optimize the economics of your wastewater treatment.

Reduced wastewater treatment cost

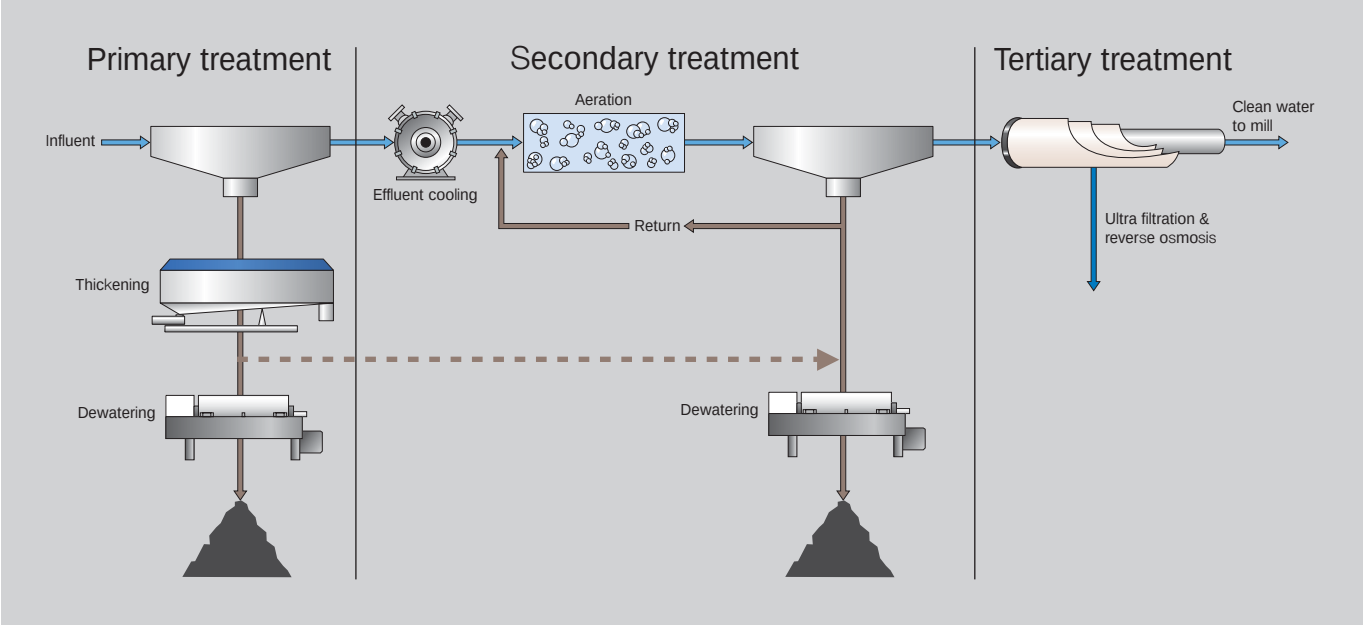
Alfa Laval drum thickeners and decanter centrifuges are ideal for both thickening (reducing sludge volume by up to 90%) and dewatering (using centrifugal force to remove even more liquid from the solids).

Alfa Laval sludge treatment equipment and solutions add up to

- lower operating costs due to reduced polymer consumption, no filter aids and fully automated operation
- reduced installation costs due to compact size
- minimum disposal costs and maximum water recovery due to higher cake dryness and clearer effluent
- prolonged service life with the help of on-the-spot local service, backed by comprehensive Alfa Laval maintenance and spare parts services.

In addition to enabling you to treat and recycle wastewater with the utmost efficiency, Alfa Laval also provides the equipment that makes it possible to reduce water consumption at your plant.

Typical example of Alfa Laval equipment in a pulp and paper wastewater treatment plant.



Meeting the requirements

In 2004, a new biological effluent treatment plant was taken into use at M-real Sverige AB, Husum Mill, Sweden. The new plant treats all process effluents from this pulp and paper mill, which produces uncoated and coated fine paper from high-quality, bleached market pulp.
M-real was looking for the most efficient, economical way to handle sludge from the biological treatment and therefore ordered a hydrolyzing system from Kvaerner Power AB, Environmental System.
Part of this system involves increasing the dry content of the biological sludge before hydrolyzation. To meet these demands, an Alfa Laval ALDEC G2 90 decanter centrifuge was chosen.

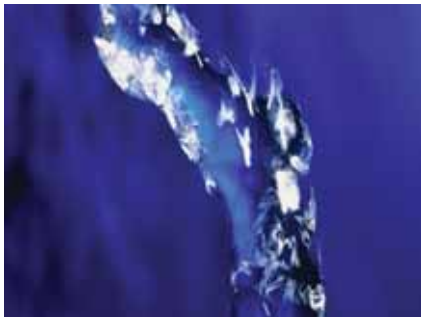
Reduced water consumption

Less cleaning water, improved product quality

In the pulp and paper industry, all tanks and process systems need regular cleaning. The traditional solution is to do this manually, using large quantities of cleaning water and disrupting production for long periods.

The more modern, highly efficient alternative is to install Alfa Laval rotary jet heads inside the vessels and tanks. This means there is no need for staff to enter tanks, and efficient cleaning takes minutes rather than days, with no disruption of production. This rapid, automated cleaning method also reduces biocide use and results in a better environmental profile.

And because the cleaning is more effective, you can maintain higher product quality levels.



Closed-circuit cooling water

A considerable volume of cooling water is normally required for the many cooling and condensing duties in pulp and paper plants.

This consumption can be drastically reduced using closed-circuit cooling. You can do this with

- indirect cooling using standard Alfa Laval heat exchangers
- indirect condensing using AlfaCond, Compabloc or spiral heat exchangers.

Fresh water and air can both be used as the cooling medium, depending on whether Alfa Laval plate heat exchangers or air coolers are used.

Close your water loop

- Reduce wastewater treatment costs
- Improve water balance
- Reduce cleaning water consumption
- Reduce cooling water consumption.

Closed-circuit cooling loop – Stora Enso Corbehem Mill

Rebuilding the PM5 magazine at the Stora Enso Corbehem Mill in France has now gone into the third stage. The project manager for this stage is Mr Dehay, PM5 line manager, who says, “We appreciate the solution that Alfa Laval designed. Combining five air liquid coolers with one plate heat exchanger met our requirement for a completely closed cooling water loop.
It also enables us to use river water when needed during the hot season. This provides very good operating economics as well as high flexibility, reliability and safety.”

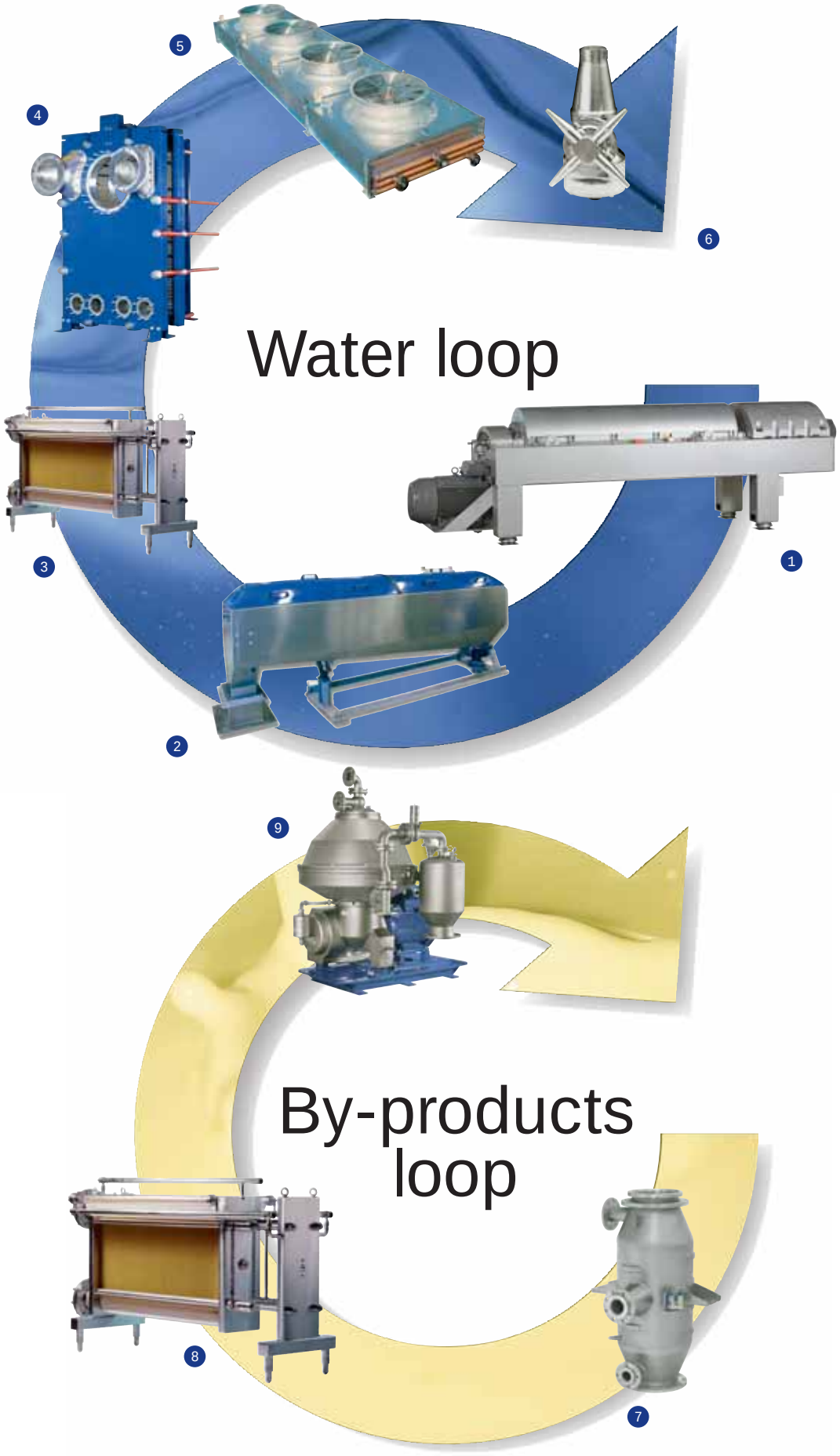
Closing the loops in pulp

Water loop

1. Decanter centrifuge – for sludge dewatering, etc.
2. Drum thickener – for sludge thickening, etc.
3. Membrane filtration – for condensate polishing, etc.
4. AlfaVap – for effluent concentration, as steam converter, etc.
5. Air liquid cooler – for closed-circuit cooling water, engine cooling, etc.
6. Rotary jet head – for cleaning pulp storage towers, wire pit cleaning, pigment tank cleaning, etc.

By-products loop

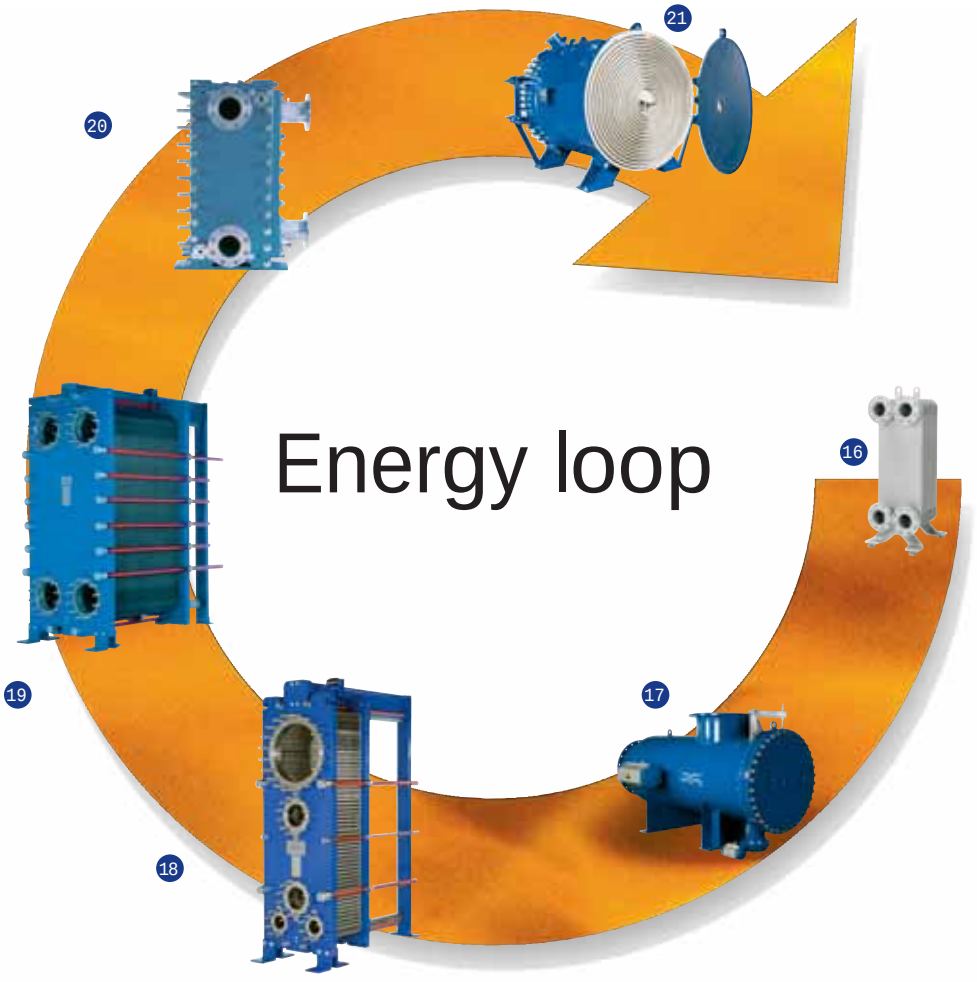
7. Spiral heat exchanger – as turpentine condenser, etc.
8. Membrane filtration – for lignin extraction, lignosulphonate extraction, etc.
9. Disc stack centrifuge – for tall oil separation, lignosulphonate extraction, etc.



and paper manufacturing

Utilities and chemicals loop

10 Gasketed plate heat exchanger – as oil cooler, etc.
11 Decanter centrifuge – for green liquor dregs dewatering, etc.
12 Disc stack centrifuge – for lube oil purification, turbine oil purification, etc.
13 Compabloc plate heat exchanger – as chlorine dioxide heater, gas cooler, etc.
14 Membrane filtration – for pigment recovery, etc.
15 AlfaNova – for steam and condensate systems, etc.



Energy loop

16 AlfaNova – for steam and condensate systems, etc.
17 Automatic filter – for particle removal prior to plate heat exchanger, etc.
18 AlfaCond – as condenser in spent liquor evaporation plant, etc.
19 Gasketed and wide-gap plate heat exchanger – as filtrate cooler, for shower water heat recovery, etc.
20 Compabloc heat exchanger – as steam condenser, etc.
21 Spiral heat exchanger – as effluent cooler, for white water heat recovery, etc.

Boost the value of your by-products

Special Alfa Laval equipment for the pulp and paper industry enables you to fine-tune your extraction of key by-products, ensuring better quality and greater value.

A focus on recovering high-value pulp and paper by-products can improve the overall economics of your plant.

Alfa Laval expertise and experience, covering the complete spectrum of different separation technologies, mean that we can help you determine the most efficient equipment configuration for your by-products.

Alfa Laval has developed and implemented unique solutions for by-products such as

- turpentine – using the Alfa Laval spiral condenser
- tall oil – using a specially developed type of Alfa Laval disc stack centrifuge integrated into continuous acidulation plants
- lignosulphonate – extracted and purified using Alfa Laval membrane filtration technology.

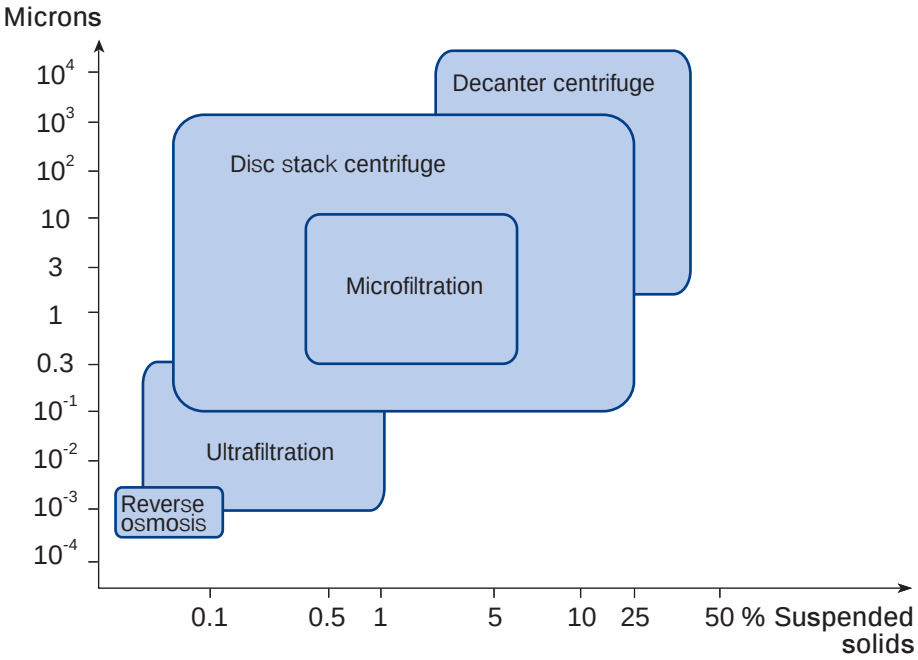
Boost your by-product value

- Make by-product extraction more efficient
- Reduce operating costs
- Minimize downtime and maintenance.

Unique lignosulphonate solution

BIOTECH Paskov in the Czech Republic produces lignosulphonate extracted from the spent sulphite liquor supplied by the nearby mill owned by Biocel Paskov. The plant uses Alfa Laval plate-and-frame ultrafiltration modules to extract and concentrate the lignosulphonate. To improve the water balance, the permeate is recycled back to the pulp mill.

The installation at BIOTECH Paskov is fully automated and requires no detailed supervision. Furthermore, the installation is scalable. After four years of fully satisfactory operation, capacity has been expanded by as much as 32%, simply by adding extra plates.



A consistent combination of separation technologies to match your process requirements.

Utilities and chemicals

Utilities and chemicals play a critical role in pulp and paper operating costs. Alfa Laval equipment helps reduce your consumption of both.

Power plant systems

Pulp and paper processing plants need constant energy inputs. The power plants providing these must therefore operate with zero downtime.
To meet this need, Alfa Laval provides exceptionally efficient, reliable equipment for use in power plants. Examples include coolers for generator oil and turbine oil, preheaters for condensate and steam condensers for turbines.

Steam and condensate systems

Because of their compactness, efficiency and reliability, Alfa Laval heat exchangers are widely used in steam and condensate systems.
To cope with your requirements in these high-temperature and/or high-pressure applications, Alfa Laval provides a wide range of heavy-duty heat exchangers, including both gasketed and semi-welded designs, in addition to fully welded plate heat exchangers.

Oil treatment systems

Alfa Laval separation equipment is used to remove any particles or impurities, including water, from lube oils used for the paper rolls.
Similar Alfa Laval separation equipment is used to clean many other fluids used in paper plants, including turbine oil, diesel fuel oil and hydraulic oils.

Chemical and pigment recovery systems

Alfa Laval separation technologies are also used to help reduce your chemicals costs.
One common application is the dewatering of the green liquor dregs in a chemical pulping process.
Dewatering the dregs enables you to cut back significantly on sulphate consumption.
Customized solutions that combine different Alfa Laval core technologies are also frequently used to improve pigment recovery.

Reduce your utilities and chemicals consumption

- Use Alfa Laval equipment specially designed for high-temperature and/or high-pressure duties
- Boost lube oil quality
- Cut back on consumption of sulphates

Smooth running at Italian paper mill

In 2001, Cartiere Burgo SpA purchased a PM9 lightweight-coated paper line for its Verzuolo paper mill in Italy. Several different Alfa Laval technologies were integrated into this Metso Paper installation, including two SU 300 separation units for purifying both wet-end and dry-end oil, and several gasketed heat exchangers for oil cooling.

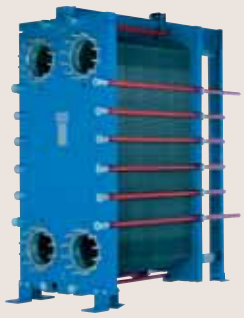
“Lube oil treatment is a serious issue in a modern paper mill,” says Mr Martina, maintenance supervisor. “Our Alfa Laval equipment has enabled us to reach a high level of purification, while keeping maintenance costs to a minimum,” he adds.

The best tools for the job

Alfa Laval provides an exceptionally comprehensive range of high-efficiency equipment for the pulp and paper industry.

Standard plate heat exchangers

Alfa Laval provides a complete range of plate heat exchangers with fully counter-current flow and high turbulence. These units provide maximum heat recovery with a minimum of investment and installation costs. Full access to the heat transfer surfaces also keeps service and maintenance costs to a minimum.

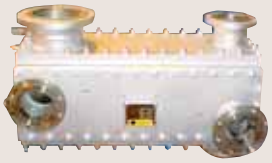


Wide-gap plate heat exchangers

Alfa Laval wide-gap plate heat exchangers are specially designed to handle fibrous fluids. The design combines the benefits of compact, efficient plate heat exchangers with a special plate pattern that helps prevent clogging.

Fully welded plate heat exchangers

Alfa Laval Compabloc heat exchangers are fully welded, which means no gaskets between the plates.
Compablocs are ideal for use with chemically aggressive fluids or for duties featuring high pressures and/or high temperatures, such as condensers, reboilers and steam heaters.



Fusion-bonded plate heat exchangers

AlfaNova fusion-bonded plate heat exchangers have no gaskets in contact with the process media. This makes these 100%-stainless steel units ideal for high-pressure, high-temperature duties.

Spiral heat exchangers

Alfa Laval compact spiral heat exchangers feature a single-channel design that results in a self-cleaning effect. This makes them particularly suitable in fouling applications.
Spiral heat exchangers are also ideal for condensing duties.

Air coolers

Alfa Laval compact air coolers enable you to cool cooling water and process fluids with high heat transfer efficiency, extremely low power consumption, low risk of corrosion, no bacteriological problems, low noise levels and with a minimum of maintenance.

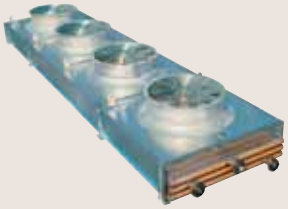


Plate condensers and evaporators

AlfaCond plate condensers and AlfaVap plate evaporators are specially designed for condensing and evaporation.
They combine the benefits of compact, efficient plate heat exchangers with the low pressure drop required for these duties.

Disc stack centrifuges

Alfa Laval disc stack centrifuges are highly efficient centrifugal separation units ideal for separation involving small particles and droplets and with medium concentrations of solids. They are often supplied as fully automated integrated modules.

Decanter centrifuges

Alfa Laval decanter centrifuges combine high separation efficiency with the ability to handle greater concentrations of solids for dewatering. These units are available fully automated, and require very little supervision.

Membrane filtration systems

Alfa Laval provides a complete spectrum of cross-flow membrane filtration technologies, from microfiltration to reverse osmosis.
Alfa Laval membrane filtration modules are available in both plate-and-frame and spiral configurations.

Drum thickeners

Alfa Laval drum thickener equipment reduces the water content of large process flows prior to dewatering.
Use of an Alfa Laval drum thickener before any specialized dewatering equipment also improves the operating economics of the dewatering installation.

Automatic filters

Alfa Laval back-flushing filters give your heat exchangers extra protection against clogging and fouling. Automatic self-cleaning by back-flushing takes place with no interruption to your process operations.

Tank cleaning jet heads

Rotary jet heads clean tanks or process equipment by casting jets of cleaning media against the walls. The nozzles rotate in both vertical and horizontal axes, providing a criss-cross spray pattern.

Worldwide commitment to Nonstop Performance

Success in the highly competitive pulp and paper industry depends on your operations performing exactly as required – no matter what.

Performance partners

To be a front runner in your part of the pulp and paper industry, you need strong support from your service provider. Not just to solve problems as they arise, but also to help you optimize the performance of your particular industrial processes.

At Alfa Laval, we are 100% committed to the total service concept that we call Nonstop Performance. This encompasses everything from supplying a single spare part to all the many aspects of our role as long-term "performance partner", worldwide.

The cornerstones of our Alfa Laval Nonstop Performance concept are

- outstanding service
- unique expertise
- being easy to do business with.

This means Alfa Laval tailors a Performance Agreement to meet your specific service needs, to minimize your maintenance costs and maximize your plant uptime.

Everywhere you need them

Alfa Laval Performance Agreements are global in scope. This means that no matter where in the world your plant is situated, the service you receive from Alfa Laval service engineers or Alfa Laval service centres will be of the same high standard.

Alfa Laval has sales offices or other sales representatives in over 100 countries.

We employ a staff of about 2,000 people in our Parts and Service division and operate approximately 50 certified service centres, located worldwide.

Alfa Laval Performance Agreements

- Maximum operating safety
- Maximum plant uptime
- Optimized plant operation
- Premium Partnership
- 2,000 technicians positioned worldwide to meet your service requirements.

Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineered solutions.

Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals. Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com/pulpandpaper

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