

**Runtech Systems offers high quality availability and energy saving components and improves your paper machine productivity.**

Runtech Systems Oy, a highly innovative company, was founded in 1997. The company's products and services aim to significantly improve the production,

quality and efficiency of pulp and paper machines. Up to now, the company Runtech Systems Oy has conducted more than 200 studies within the field of the

pulp and paper industry. As a result, the company has created high technology products that are able to improve the production results, but also to reduce the operating costs.

Runtech's product portfolio consists of vacuum systems (**RunEco**), ropeless tail threading products (**RunPro**) and doctoring products (**RunDry**). In combination with their innovative products, the Runtech consulting service has achieved energy savings by six-digit sums per year for a large number of customers.

**RunEco Vacuum Systems**

Numerous references show significant savings in energy and / or water due to installed Runtech products.

**Ecopump Turbo™ Vacuum Blower**

Compact high-speed electric drive and high efficiency turbo blower for energy and water savings. This innovative system is driven completely without the use of any water. Compared to standard water ring pump systems, this system reaches an energy saving level of up to 60%.

The Turbo Blower with titanium or carbon impellers does not need a gear box and clutches, what ends up in higher efficiency and less number of components. The installation can be done on comparatively very simple foundations.



**Ecoflow™ On-line Dewatering Measurement**

On-line dewatering rate measurements in vacuum systems. For a better understanding and traceability of dewatering processes in the wire and press section, Runtech has already installed thousands of Ecoflows ("on-line" dewatering measurements) at technology leading pulp and paper mills. Due to the installation of these products, the companies have an additional analysis tool for data recording and production-monitoring up to the evaluation of the function of a press section and felts.



**EcoSep™ Water Separator**

The EcoSep™ water separator with integrated EcoFlow™ meter is ideal for installations with limited space or limited drop leg height. The flow speed of the media entering the water separator diminishes due to the cross sectional flow expansion. EcoSep™ is available in vertical and horizontal versions.



## **EcoDrop™ Drop Separator**

The EcoDrop™ drop water separator with an integrated drop separator unit is ideal for all blower positions. The units are robust and easy to maintain and clean due to complete stainless steel construction.



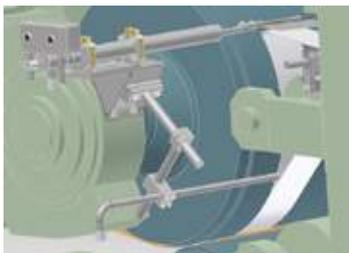
## **Vacuum System Engineering And Audits**

- The vacuum levels are studied to identify the real vacuum connections
- The paper machine vacuum levels are measured at the vacuum pumps and blowers to identify problem areas
- Pressure and bleed losses are studied to analyze the energy consumption and evaluate if the vacuum levels are too high
- Energy savings are calculated and recommendations and proposals for energy saving are made
- New pipeline connection diagrams can be designed and engineering drawings provided
- Specifications of new vacuum pumps if necessary
- Dewatering analysis
- ROI calculations and reporting



## **RunPro Ropeless Tail Threading**

Runtech Systems Oy has developed a tail threading technology and devices for the most efficient machines in the world. Runtech's tail threading equipment is used at numerous pulp and paper mills worldwide. The abolition of feeding ropes significantly improves the occupational safety.



### **Press RunShooter™**

The Runtech Press RunShooter™ is designed for center roll and separate press tail threading. Quick installation and start-up is possible. Manual, semi-automatic as well as automatic models are available.



### **Single Blow™**

Runtech SingleBlow™ is an easy and trouble free solution for ropeless tail threading for the slalom area. The stainless steel construction of the SingleBlow™ tail threading pipes can be fitted to all types of doctor holders, are easily adjustable and use only the necessary amount of air.



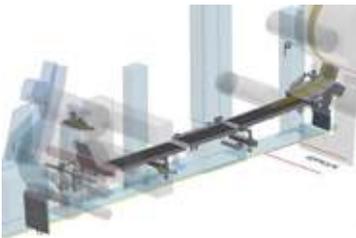
### **TailBlade M™**

TailBlade is a fast and reliable solution for ropeless tail threading. Release from the cylinder surface is guaranteed due to mechanical contact and efficient release blow. The minimal compressed air consumption and the light composite construction are two of the key features of Runtech TailBlade.



**RunShooter D™**

The Runtech RunShooter D™ is a tail threading mini doctor for double tier dryer groups with full machine doctors. The "Release Blow" technology enables very efficient release from the dryer cylinder surface.



**RunShooter F™**

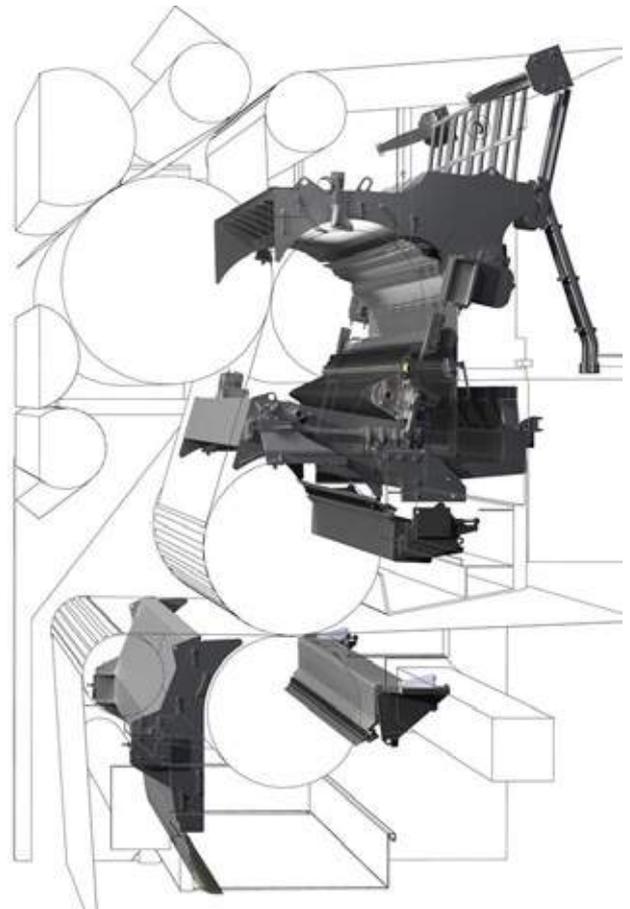
The Runtech RunShooter F™ is a cost efficient tail threading system for long open draws. The system is characterized by minimized compressed air consumption and the minimized break time and amount of broke. It is easy and safe to use.

**RunDry Doctoring Systems**

High performance doctoring products for demanding customers and challenging positions. Improvements through state of the art equipment and consulting by well experienced specialists.

RunDry products:

- AirBlade™ doctors for grooved and suction rolls
- CompoAdapt™ retractable blade holder
- CompoFit™ blade holder
- CompoDoc™ doctor beams made of Carbon
- Double doctors
- Ecoflow™ family
- Save-alls
- WingBlade™ shaped doctor blades for suction rolls

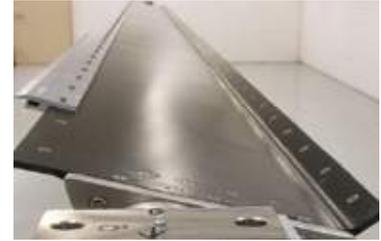


**Air Blade™ - Advanced Doctoring**

AirBlade™ is an optimal solution for doctoring on the grooved and suction rolls. The technology improves runnability, sheet dryness and sheet profiles. Energy savings can be achieved as well.

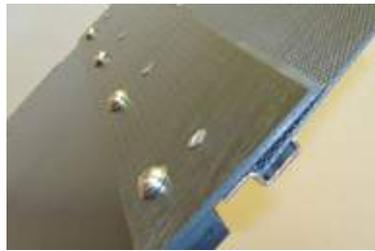
## **CompoDoc™ - Composite Doctor Beam**

Runtech CompoDoc™ doctor beams are applicable for particularly challenging doctoring positions. The doctor beam is available in carbon and glass fiber construction and convinces with minimal space requirements, due to its small size and light-weight construction. Excellent doctoring up to 12 m is possible.



## **CompoAdapt™ - Retractable Blade Holder**

The tube loaded carbon composite blade holder is also suitable for sheet knock down positions, due to its robust design. The blade holder has been specially designed for composite doctor beams, but can also be used with conventional steel doctors.



## **CompoFit™ - Carbon-/Glass Fiber Composite Blade Holder**

The cost effective CompoFit™ blade holder is easier, more flexible and light-weight compared to conventional systems.

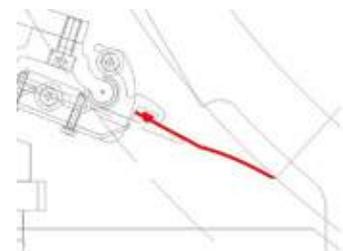


## **Double Doctors**

Double doctors are solutions for optimal doctoring for suction couch and press rolls and can be used with Air Blades, WingBlade or conventional doctors. The robust AISI316 construction is maintenance friendly and easy to clean.

## **WingBlade**

The patented curved shape generated maximum vacuum behind the blade without air. It is specially designed for high speed machines with very efficient water removal due to the foil effect and good mechanical contact to the roll surface.



## **Save-Alls**

The Runtech Save-alls are specially designed to be used with the AirBlade™ and the EcoFlow™. The 316L stainless steel construction has low maintenance requirements and enables easy roll changes.



## Sheet Stability Systems

### Air Curtain™

The Air Curtain™ neutralizes the pressure difference between the top and bottom surfaces of the paper sheet after the center roll by creating an air curtain under the sheet. This relieves sheet tension at the center roll, and allows potential for speed increases.

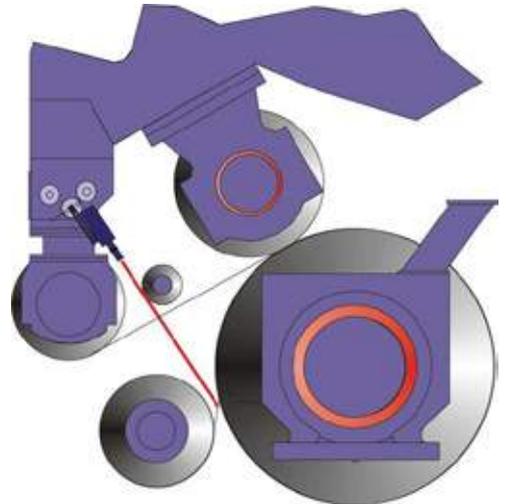
#### Benefits:

- Less draw
- Less breaks
- Less porosity
- Wider sheet
- Better bonding strength
- Better tensile strength



### Laser

For better control of the press section speed differences. The laser is a release point measuring device that uses a laser beam to locate the paper web release from the center roll in the press section. With this information, the number of breaks in the press section can be reduced by adjusting the release point to the correct position.



## Service and Consulting

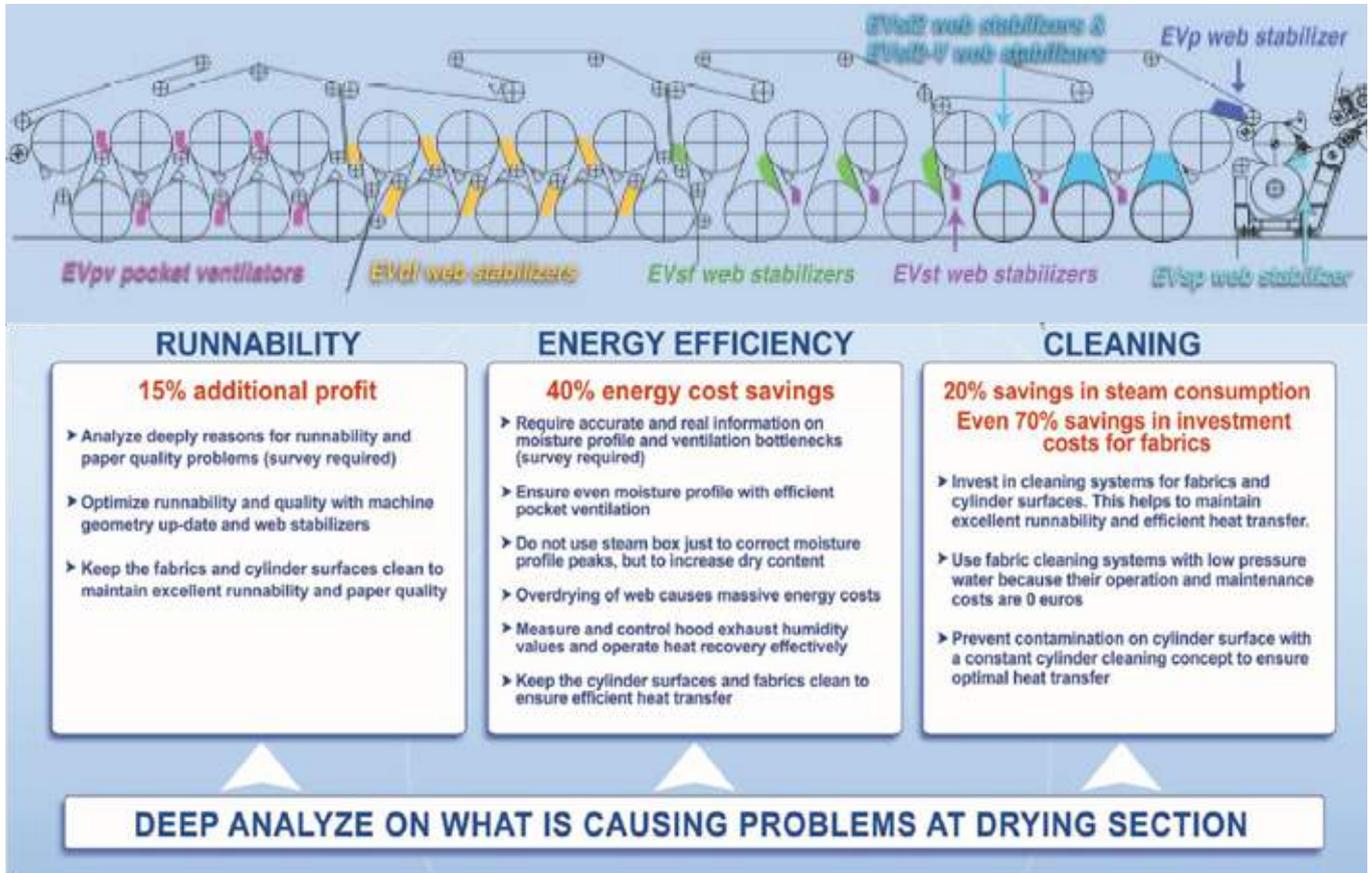
Runtech Systems Oy offers consulting and service in all areas of paper production, in order to realise energy savings and quality improvements.

Runtech is particularly specialized on vacuum systems, doctoring and save-all optimizations in wire, press and dryer sections, as well as tail threading systems of press up to pope reel / winder.

There is also the possibility to significantly contribute to optimizations of entire systems.

## Drying Section Optimization

### PM drying section optimization improves process



### EV Web Stabilizers - for press section

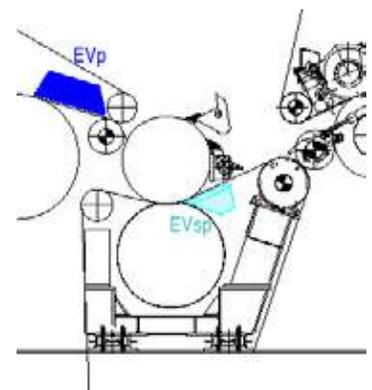
EVp and EVsp web stabilizers ensure fluent runnability at PM press section.

#### EVp web stabilizer

- supports the sheet from the press to the dryer section

#### EVsp web stabilizer

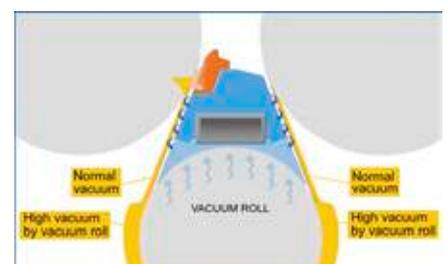
- eliminates blowing problems in free-standing presses



### EV EasyOne™ - supports web release with a high vacuum area at single felted section

EV EasyOne™ optimizes the web release between upper cylinder and vacuum roll. It eliminates runnability problems that are caused when the sensitive wet web tends to follow the upper cylinder surface.

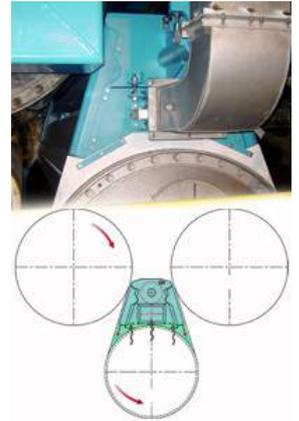
- Excellent runnability of the first single felted drying groups
- Eliminates sheet flutter and paper defects
- Additional PM speed
- More tolerance to process fluctuations
- Reduction of raw material costs



**EV EasyGo™ - for superior runnability and ropeless tail threading at single felted section**

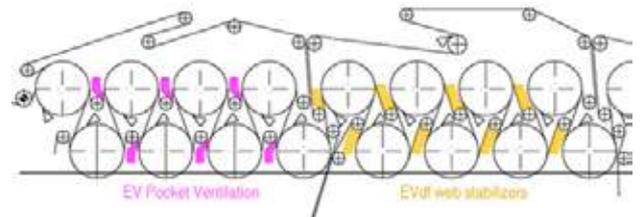
An excellent runnability concept for the PM single felted drying section. It combines the web stabilizing and the vacuum roll technologies to ensure best possible runnability, drying efficiency, and paper quality.

Installed on top of the vacuum rolls to support the sheet and create a vacuum inside of the vacuum roll. EV EasyGo™ concept exhausts air through the holes of the vacuum roll and blows air through the nozzles of the web stabilizer creating vacuum from the opening nip to the closing nip.



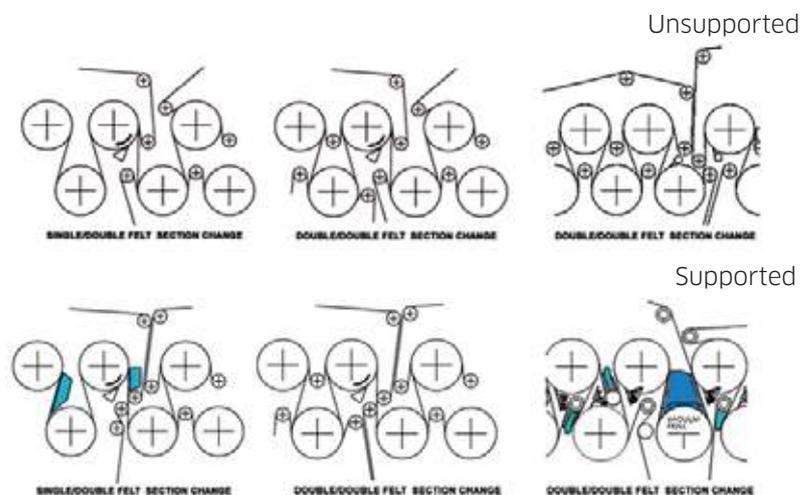
**EV Web Stabilizers - for double felted drying section**

In double felting, the drying capacity is greater than in single felting. Though, runnability problems are more common. EVdf web stabilizers and EV Pocket Ventilators are the cure for runnability bottlenecks at double felted drying sections.



**Machine geometry modification**

Machine geometry changes are improving PM runnability and speed. Already a small change can make a big difference on sheet run. Runnability problems at the section change can be a bottleneck also after the single felt has been equipped with web stabilizers. These problems are a result of moving surfaces, and mainly caused by pressure differences and axial air flows caused by pumping effect of dryer fabrics. Runnability problems in the group caps are solved by minimizing the open free draw.

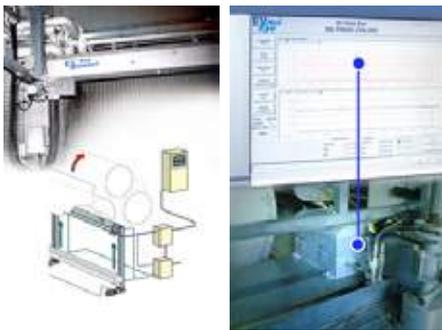
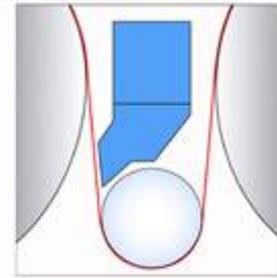


## **EVpv Pocket Ventilation™ - results in even moisture profile and energy savings**

PM drying section is a major steam consumer: 75% of paper machine steam consumption is used in the drying process. Energy waste, uneven sheet moisture profile and runnability problems are the result if cylinder pockets are not well ventilated.

Underpressure in the unventilated cylinder pocket creates dry air flows into the drying pocket causing high pocket humidity in the centre of the pocket and sheet fluttering. Poor pocket ventilation causes uneven final moisture profiles at the reel and over-drying at both edges of the sheet. This means poor paper quality and more paper breaks. Decreased evaporation capacity and uneconomic steam consumption are also results of poor pocket ventilation.

EVpv Pocket Ventilation is installed in the cylinder pockets of dryer sections to blow dry supply air into the pockets. This decreases the pocket humidity level and allows moisture profile correction. In addition, the system decreases steam consumption and it also prevents over-drying and edge flutter.



## **Online Measuring™ - reliable tools that enable accurate process adjustments for economical drying.**

EV Web Eye™ and EV Web Scanner™ provide you with reliable information of sheet moisture and temperature profiles or trends already at the beginning of the drying section. This helps you to control the drying process correctly right from the start.

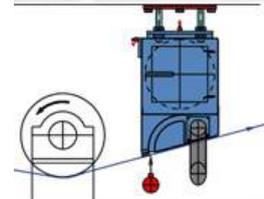
## **Cleaning Systems**

### **EV MRS™ - Forming section optimization**

EV MRS™ technology is a part of an environmentally friendlier, energy saving forming section. It provides effective mist removal in combination with additional aid for fabric cleaning. This results in improved paper quality, process efficiency and energy savings. Machine hall without spreading mist is more comfortable to work at.

EV MRS™ includes a mist suction box, an exhaust duct, a preseparator, and the EV Blower separator fan, which is a special construction combining a centrifugal fan and an efficient water drop separator.

The residual water from the evacuated mist / air is separated with an EV Blower fan. The EV Blower is equipped with a self cleaning system and a teflon cover to prevent clogging.

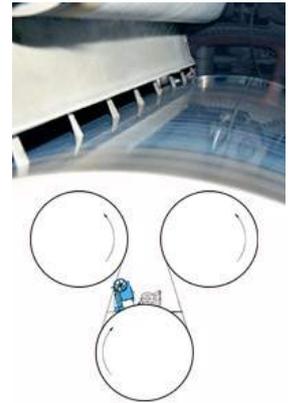


**EV ReDoc® - For continuous reconditioning for rotating surfaces**

EV ReDoc® is a continuous reconditioning system for paper machine cylinder and roll surfaces.

The EV ReDoc® system eliminates dirt like stickies, fibres and coating colour from cylinder surfaces by using steel brushes. Even old and worn out cylinders can be cleaned effectively with the help of EV ReDoc®. Conventional doctoring systems are not able to keep cylinders clean. The EV ReDoc® system can be used with an existing doctoring system.

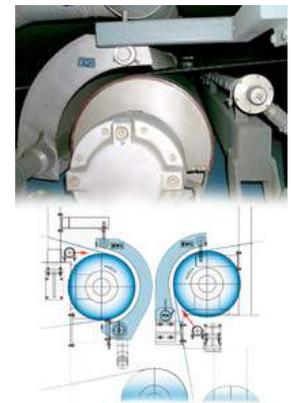
Continuous reconditioning improves the heat transfer from cylinder to paper, which increases the drying capacity. Results can also be seen in better paper quality, as defects in paper are minimal. It is also possible to increase the PM speed as a result of an improved drying process and runnability.



**EV Cleaner™ - for effective dryer fabric cleaning and longer fabric life**

The EV Cleaner™ technology keeps the fabric clean and open across the entire fabric width. The EV Cleaner™ enables reliable and maintenance-free cleaning: it does not require any moving parts, high pressure water, compressed air, or power supply.

The EV Cleaner™ improves PM runnability and paper quality, as the high permeability of fabric keeps the cylinder pockets well ventilated. Customer experience shows that the EV Cleaner™ can increase the fabric life time to even 300%.



**EV Online Cleaning System™**

With online cleaning, your mill has remarkably less need for washing stops and chemicals. Constantly high wet end hygiene means better process efficiency and quality.

The EV Online Cleaning System™ keeps all wet end areas clean: Channels, towers, tanks, bow screens, disc filters, water plates, surface of opean areas, thickeners.

**Energy Efficiency Optimization**

**EV Heat Recovery™**

Significant energy savings for paper machine

Paper industry is a big energy consumer. Energy costs are high, and they will rise as energy will be more and more expensive in the future. To decrease emissions of greenhouse gases, paper industry must limit the use of fossil fuels. For these reasons, paper industry must reduce energy consumption and find new ideas for more efficient energy usage.

EV Heat Recovery™ is a highly effective system to update existing heat recovery systems and to modernize a paper machine, in order to meet the requirements of today. The EV Heat Recovery™ technology reuses heat to replace primary energy sources, therefore savings in energy costs are evident.

EV Heat Recovery™ recovers drying section heat energy and takes it back to production. The exhaust air is processed through air to air or air to water heat exchangers that are durable and always tailor-made to customers' needs.

A typical heat recovery system includes supply air preheating, process water heating and machine hall heating.



## EV Survey™ Services

„EV Group helps you to eliminate process bottlenecks and optimize production.“

You may see the PM process bottlenecks and problems, but often it is difficult to know what exactly causes them. The EV Survey team has the know-how, the experience and the modern measuring technology to tell you what is going on with your paper machine.

### Dryer Section Survey Tool

Solutions to decrease energy consumption and improve drying capacity and runnability

- Pocket humidity and temperature
- Hood air systems
- Cylinder surface temperature measurements
- Calculation of drying parameters
- Mechanical checking
- Sheet temperature measurements
- Other measurements

### Ventilation Survey Tool

The machine hall ventilation survey tool for better working conditions and less energy consumption

- Exhaust and supply air measurements
- Machine hall air balance
- Temperature and humidity measurements
- Airflow direction and air velocity measurements
- Machine ventilation

### Sheet Moisture Profile Survey Tool

A sheet moisture profile survey tool to find out where the moisture profile problems are generated

Common measurement places:

- Against the pick-up felt
- After the press section
- End of the slalom section
- Before / After the sizer
- Before / After the coater
- At the reel



The EV Survey entails extensive research. We analyze the reasons for your PM problems and after measurements, we provide you with detailed information on how to eliminate them.