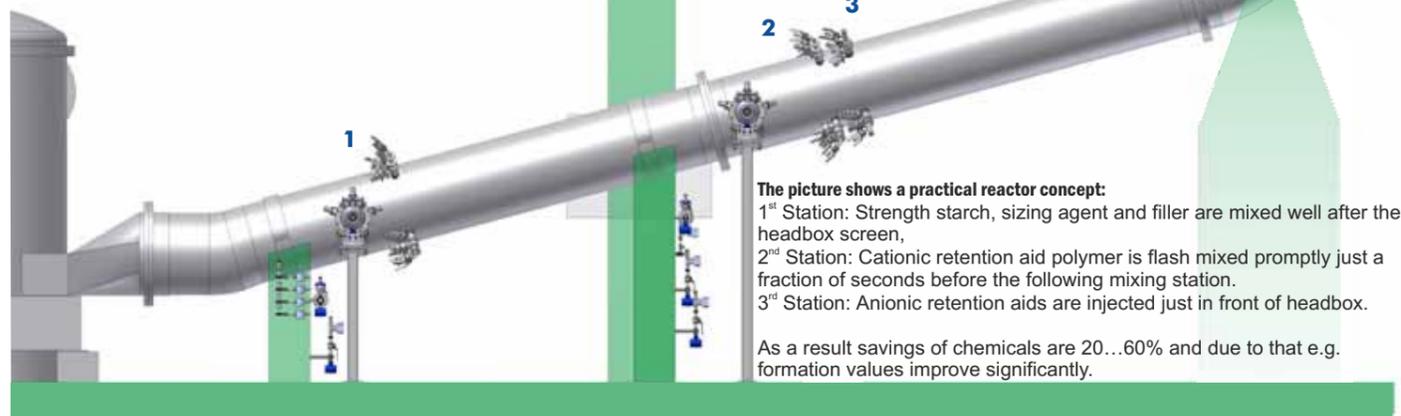


## Wetend renews the process and questions old practices The New TrumpJet® Flash Mixing Reactor

**TrumpJet® Flash Mixing Reactor before paper or board machine headbox leads a way towards more efficient process. Recent development of Wetend has shown that with Flash Mixing technology mixing process has been significantly improved giving high efficiency and very short impact time.**

This result is exploited in development of a chemical reactor that questions conventional wet end process chemistry and develops additive concepts where hydraulic mixing process and chemical reactions can be combined with a novel chaos type of manner with efficient results. Wetend has developed a new concept where opposite charge chemicals or pairs of chemicals can be mixed in a single reactor zone.

The technology provides an opportunity to maintain generated filler fiber composite and flock structures intact before forming and dewatering and use aggressive additives as well as develop composite structures for the web. This is also a novel way to add new type of additives and materials e.g. nano- and microfibers. The smart resource effective concept will improve economics of production or change and develop sheet characteristics even radically. The new TrumpJet Injection Pump and compactness of the mixing stations makes it possible to run the production in very clean and stable conditions.



### Customer Benefits

- Reduction of chemical consumption 20...60% (even 100%)
- Improvement of i.e. paper or board quality, formation and profiles
- Improvement of net efficiency of production
- Eliminated use of fresh water
- Considerable energy saving
- Reduction of CO<sub>2</sub> emission
- Opportunity to develop composite-type characteristics of paper or board

### The picture shows a practical reactor concept:

- 1<sup>st</sup> Station: Strength starch, sizing agent and filler are mixed well after the headbox screen,
- 2<sup>nd</sup> Station: Cationic retention aid polymer is flash mixed promptly just a fraction of seconds before the following mixing station.
- 3<sup>rd</sup> Station: Anionic retention aids are injected just in front of headbox.

As a result savings of chemicals are 20...60% and due to that e.g. formation values improve significantly.

## Close co-operation with Sulzer pays off New Hygienic Injection Pump from Wetend

**TrumpJet Flash Mixing installations are today located very close to headbox of a paper or board machine. The location is in the heart of the production line and high reliability and cleanliness is required.**

For the application Wetend Technologies and Sulzer Pumps have developed a new innovative hygienic injection pump series with several patent pending features. The new injection pump is an integral part of the Chemical Reactor development of Wetend for paper and board mill additives.

The pump has a hygienic, smooth and low pulse wet end design. The heavy duty pump case of Wetend divides the flow in up to seven equal flows, eliminating the conventional piping arrangement. The pump meets demanding standards of process reliability that supports the performance of fast and efficient injection mixing applications. The design provides internal parts with high level of hygiene and cleanliness. The compact and very light pump improves operational efficiency and sustainability.

It is possible to install the pump freely into the process area e.g. very next to the process pipe. Thus the pump can be installed on top of a rigid steel column. All this results simplicity and to high runnability of the production line and flawless end product.

The technology of the pump is based on a joint development project of Wetend Technologies, Sulzer, Randax and John Crane – Sulzer is a global leader with demanding process pumps and Wetend is a global leader in injection flash mixing technology, Randax – a developer of modern drive solutions with integrable permanent magnet motors, and John Crane – a leading supplier of mechanical seals.

Wetend is the primary sales organization of the new injection pump, which is an integral part of the TrumpJet® system. Sulzer is the supplier of core part – the heart of the pump.

The efficient permanent magnet motor developed by Randax® in Finland enables the most integrated and compact pump design. The lightweight motor is optimized for the hygienic injection process pump and is ready-to-use for fast commissioning. The pump drive is supported with a smart frequency control system that provides the operation with process flow information without a conventional flow measurement unit.

The new low pulse, hygienic and polished pump series with unique design features is developed for demanding injection mixing applications especially for the pulp, board and paper industry. It is also suitable for the general industry, chemical process industry, mining, water and wastewater, oil and gas and hydrocarbon processing industries

### Features and benefits:

- distribution of injection flows from pump case, maximum seven outlets
- easy to install to optimal locations
- piping length minimized - < 1m or 3 ft
- clean, hygienic low pulse design
- very light weight, integrated, self-rigid and compact pump
- high speed permanent magnet motor
- smart flow control and measurement
- advanced, efficient pump hydraulics



Sulzer Hygienic TrumpJet® Injection Pump with multi-outlet case ensures high efficiency and cleanliness of process.

### News from CEO's desk



## Smart, resource efficient technology and Cleantech - Wetend is onboard

European Union writes; The growth of the world economy is putting unsustainable pressure on Earth's resources. More competition for limited resources will mean higher prices and instability – global trends that will have huge impacts on the European economy.

Europe 2020, the EU's growth strategy, aims to make the EU a smart, sustainable and inclusive economy. It shows the way to a more sustainable economy, with policy initiatives that aim to stimulate greater innovation for short-term and long-term economic and environmental benefits.

Resource efficiency means using of resources in a more sustainable way. Energy and raw materials like water, minerals, chemicals and timber need to be managed more efficiently throughout their life-cycle, from when they are first extracted to when they are finally disposed of. Depending less on limited resources will make us less vulnerable to supply shortages and volatile market prices. Cleantech, and smart resource efficient technologies can help.

Everything Wetend Technologies Ltd develops and supplies supports the above listed positive development. TrumpJet® Flash Mixing and In-Line PCC™ sub-processes are smart, resource efficient technologies, true Cleantech products for the paper, board and tissue production. Significant savings of chemicals and energy with complete elimination of fresh water in additive mixing applications guarantee short payback time and flawless production.

The new In-Line PCC™ process provides a board or paper mill with cost competitive new filler material, composite type of fiber & filler structure. It cuts down chemical consumption, cleans the process and gives a tool to replace fiber with filler for better economics.

The newest development is TrumpJet® Chemical Reactor. The reactor concept flash-mixes numerous additives in a chaos type of pattern efficiently very close to the machine. The system will maximize efficiency of the used additives. In practice it means even better results with very low chemical consumption.

A new key component for the Reactor is a new TrumpJet® Injection Pump. The pump is a result of close and open cooperation between Wetend, Sulzer, Randax and John Crane and some paper manufacturers.

Working together, open communication and sharing the results paid off again, building a new, efficient, sustainable and compact part of the process for customers to benefit...

Jouni Matula  
CEO

# Finnish papermaker produces high quality SC grades utilizing In-Line PCC™ technology

**In-Line PCC™ developed by Wetend Technologies Ltd is a new straight forward filler manufacturing process consisting of TrumpJet Flash Mixing Reactor integrated into PM headbox approach flow system, lime slaking and grit removal unit, carbon dioxide storage and dosing system.**

In-Line PCC™ Reactor was installed at SC-paper production line (750 tons/day) in Finland to produce precipitated calcium carbonate (PCC) loaded directly into papermaking stock generating filler-fiber composite. The investment was completed around year ago after thorough mill trials since 2009. The system has been in continuous use since 2013 and is running according the expectations.

## Key features of the In-Line PCC™ Process

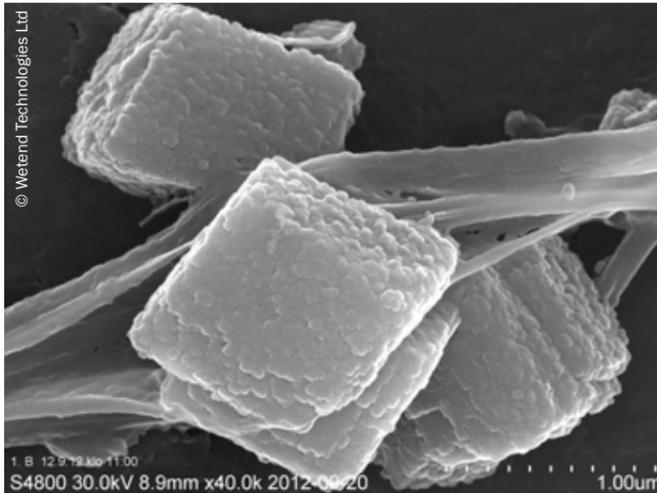
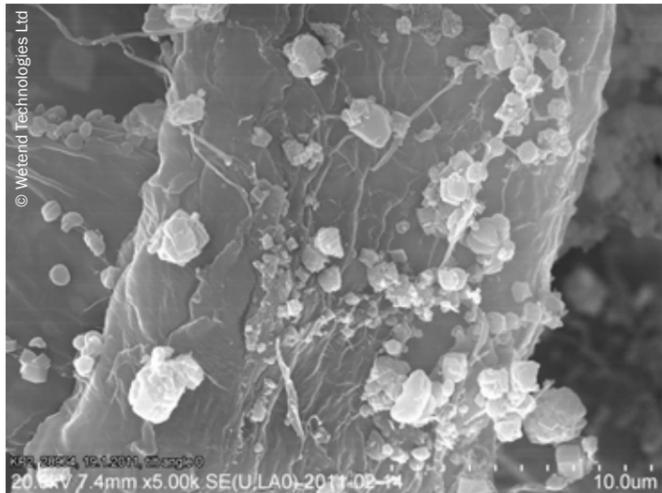
The main benefits of the In-Line PCC™ process are: powerful fiber loading effect, good sheet and optical characteristics and high retention of filler and fines. Even filler distribution in paper web results better formation and good strength properties of the paper web. These factors open opportunities to increase filler content in the paper. Thus the saving po-

tential is significant. Better retention also means that less filler penetrates through wires, resulting to less wear and longer lifetime of machine clothing.

In-Line PCC™ process binds and eliminates interfering colloidal substances resulting to cleaner PM approach flow system, e.g. reduced solids content and COD of white water. The cleaner process improves paper machine runnability and efficiency of other wet end additives.

In-Line PCC™ concept creates opportunities to develop quality of paper, increase the sheet filler content and improve the cost structure of printing paper production with a modest investment cost. In-Line PCC™ filler – fiber composite is a new type of filler raw material. It is competitive in quality, price and in technology. The concept exploits today commercial liquid carbon dioxide but it can also use carbon dioxide recovered from fumes of boiler plant or lime kiln. The technology is protected with several patents and patent applications.

Below: In-Line PCC™ generates strong mechanical composite filler-fiber structures.



# TrumpJet® family of mixers supports operation in changing conditions

**Versatile process industry includes a wide range of processes where different chemicals and additives are used. In paper and board industry the scope is also very wide. The conditions and requirements for the process, chemicals and expectations differ from each other and may also change in course of time.**

In wet end area of paper or board making line the biggest differences are e.g. scale and range of chemical flow volumes, viscosity, tolerance of shear stress, charge: anionic/cationic, aggressiveness, scaling and dirt build up sensitivity and trouble free tolerance in changing conditions. Hydraulic stability of the chemical distribution system with pulse free operation of the pressurized set up close to the headbox area is also a necessity for a trouble free operation. This is all taken care by TrumpJet Flash mixing system. This is also a reason why there is a series of different TrumpJet models engineered into modulated family of mixers.

## The series covers:

- **mixing of hydraulic liquids** from very tiny flows to high volume capacities in various pressures and temperatures
- **mixing of gases** like air, oxygen, carbon dioxide, etc.
- a mixer to mix gently **shear sensitive additives** and a model for aggressive mixing for **shear tolerant additives**
- chemicals mixed in groups premixed together just 0,1 seconds before initial mixing or mixing of additives simultaneously but through separate, isolated channels
- Chemicals **mixed in groups** with the **same charge** or chemicals **mixed separately** with **opposite charge**
- A special mixer for injection media that may have accidental **large size impurities**

The basic TrumpJet mixer for shear sensitive additives is the original "grandpa" of the mixers. Additional TrumpJet innovations like Chord,

Fuga, Forte, Poco and Trombone make the mixing family series complete to cover wide range of applications and chemicals with the same base body. If conditions or type of chemicals are changed during the course of operation it is easy to update TrumpJet with a new model or upgrade parts that fit to the new conditions with a perfect match.



TrumpJet®



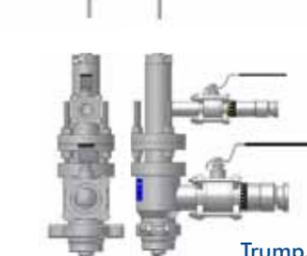
TrumpJet® Fuga



TrumpJet® Poco



TrumpJet® Chord



TrumpJet® Forte



TrumpJet® Trombone

# Resource efficient technology for a liquid packaging board machine in China



Wetend provides paper and board mills with smart and resource efficient technology:

A large three ply liquid packaging board machine in China installed six (6) TrumpJet Flash Mixing stations for sizing agent and retention aid chemicals. As a result total chemical consumption went down by 20%. In addition retention was improved 10% with good and uniform sizing results.

Sustainability was developed further as the use of fresh water was eliminated by 100% in the application. That also granted the mill with respective energy savings.

# Randax – Wetend's partner for efficient, permanent magnet motors

As part of joint development project for new TrumpJet® Injection Pump, Wetend has engaged Randax Ltd from Oulu, Finland to the work. Randax Ltd develops modern drive solutions. The product range consists of integrable permanent magnet motors and generators.

Randax also designs entire electric drive systems with all the necessary power electronics and control systems, including the mechanical integration of Randax® electrical machines into customer devices. This advanced technology is utilized in e.g. air handling, process pumping, the pulp and paper industry, and in hybrid or electric vehicles. As a new solution Randax provides Wetend and its customers with an advanced, efficient and low weight reliable drive for TrumpJet Injection Pump applications.



# Welcome to meet us in exhibitions and seminars in USA, Finland and China

In 2014 Wetend Technologies will be present in:

**Tappi PaperCon 2014**, April 28–30 in Nashville, TN, USA. The theme of the Exhibition and pulp&paper technical program is "In Tune for Sustainability, Agility & Profitability".  
 • On April 30th, CEO Jouni Matula will be taking part to a *Panel Discussion about Chemical Injections Systems*. We will also be introducing our newest technology and results. During the exhibition you can find us at booth 607.

**PulPaper 2014**, June 2–5, in Helsinki, Finland. The main Pulp&Paper event this year is PulPaper 2014 where the Finnish Paper Engineers' association celebrates its 100th anniversary. You can find us at booth 6c38.

**2014 China International Paper Technology Exhibition**, Shanghai, September 3–5.

Looking forward to meeting you!



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