Reaktiiviset märkäosan lisäaineet Ja tehokasta prosessikemiaa TrumpJet Flash Mixing Reactor -tekniikalla

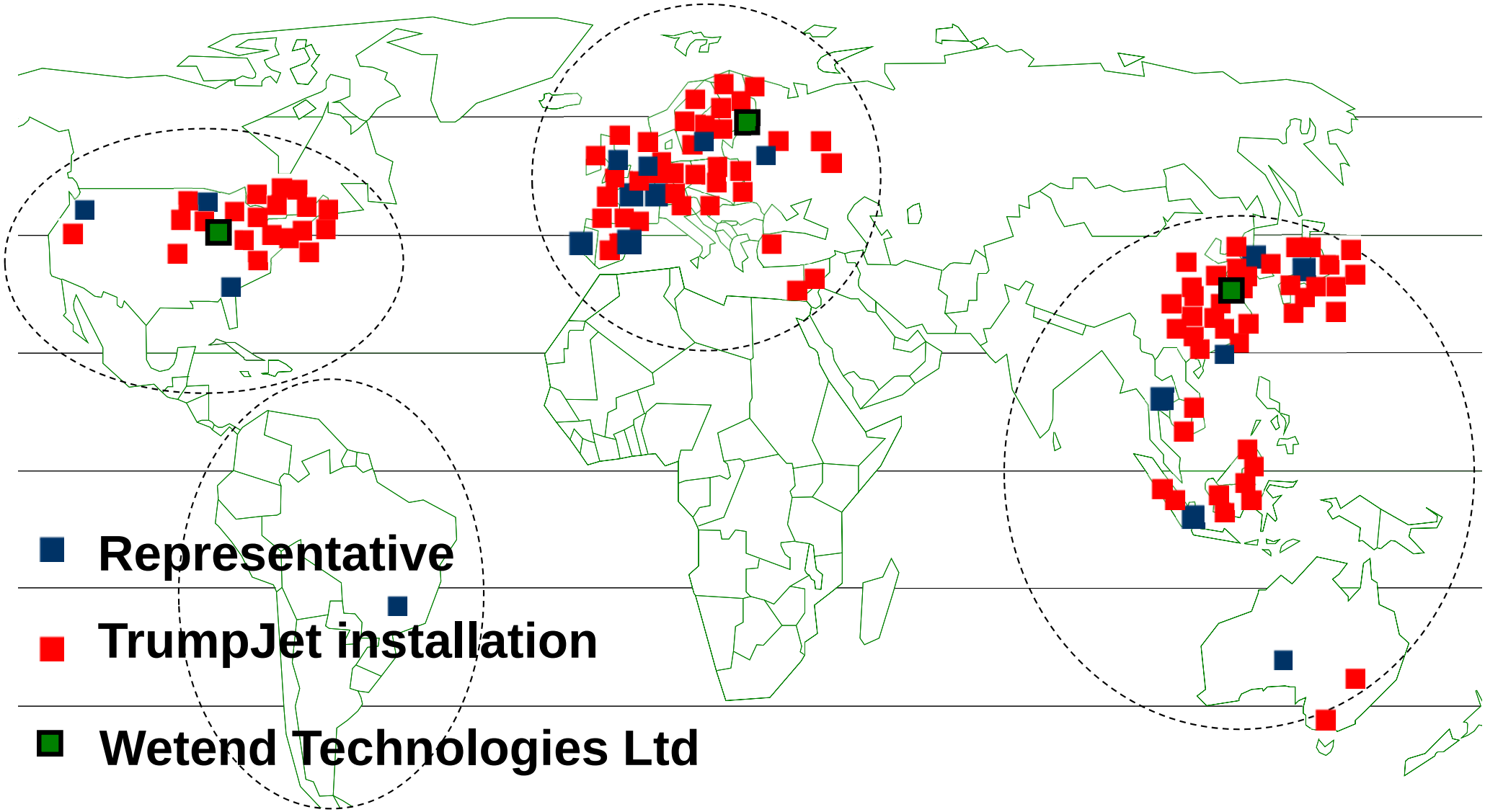
Fibertech 2018

Jussi Matula

Superior Cleantech
technology from Wetend

TrumpJet® BEST FOR PAPER

WETEND Technologies



Wetend customers world wide – over 500 installations

玖龍紙業(控股)有限公司
NINE DRAGONS PAPER (HOLDINGS) LIMITED

OJI PAPER

SCA

rethink.
storaenso

NewPage

UPM
The Biofore Company

Valmet

VERSO

mondi

APP

APRIL

ARJOWIGGINS
creative papers

NIPPON PAPER GROUP

sappi

Kruger

INTERNATIONAL PAPER

MetsäBoard

大陽紙業
SUN PAPER

正隆股份有限公司
CHENG LOONG CORP.

MITSUBISHI PAPER MILLS LIMITED

Australian Paper

SCG PAPER

Valmet and Wetend Technologies have cooperation in technology

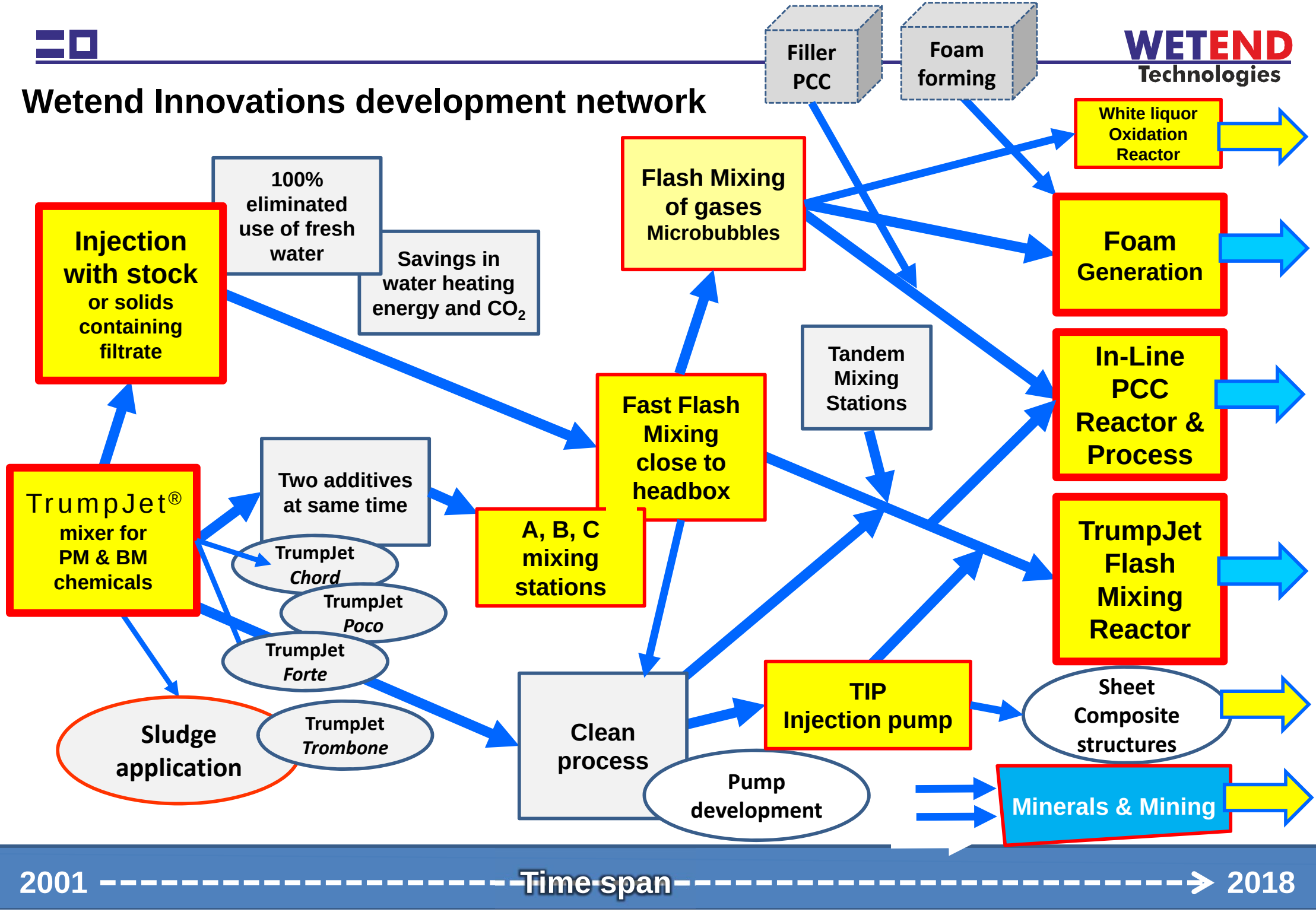
Valmet and Wetend Technologies have a cooperation agreement for project deliveries where Wetend Technologies acts as Valmet's exclusive technology contract supplier in mixing of chemicals close to headbox.

WETEND Technologies

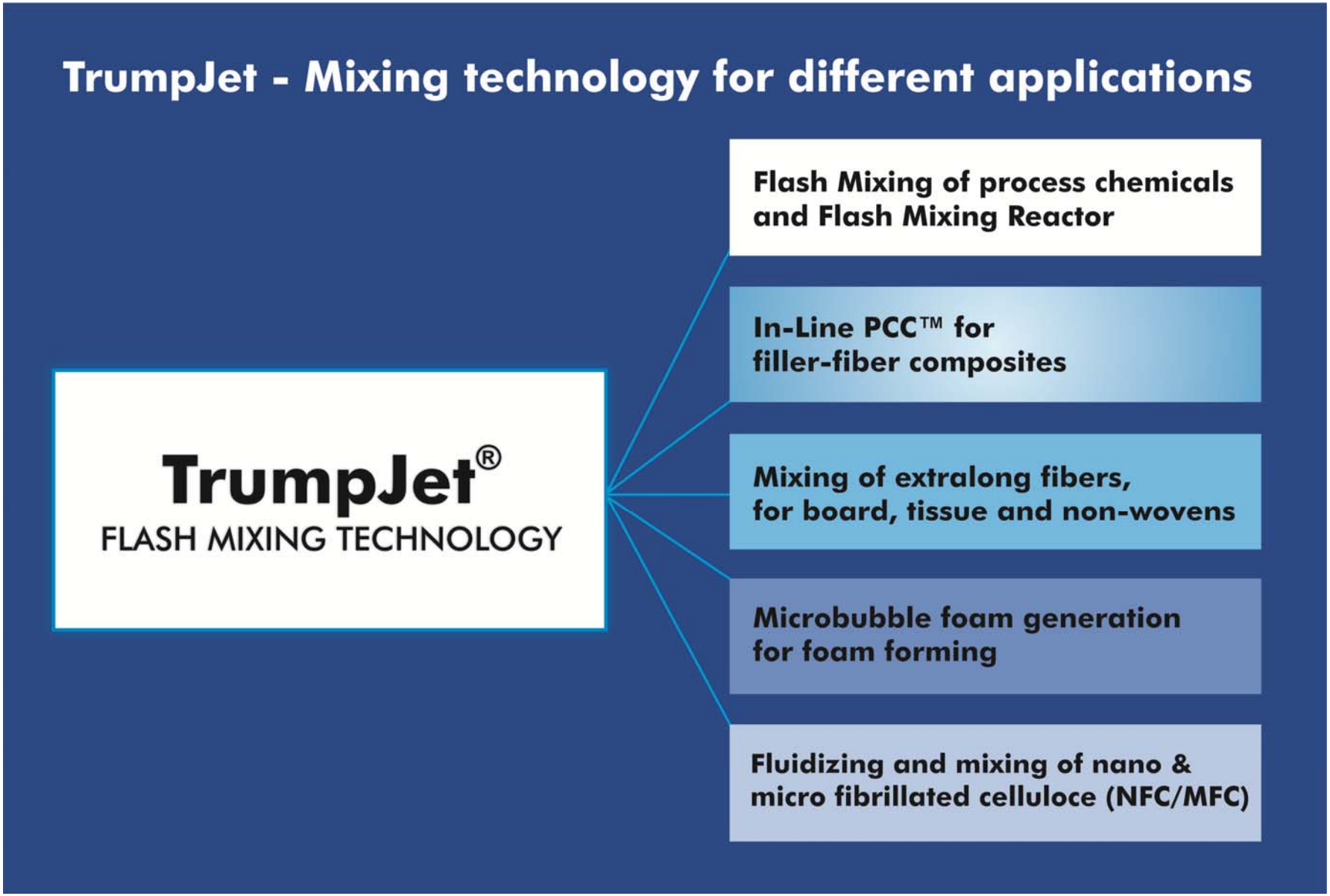
 © Valmet |

Valmet

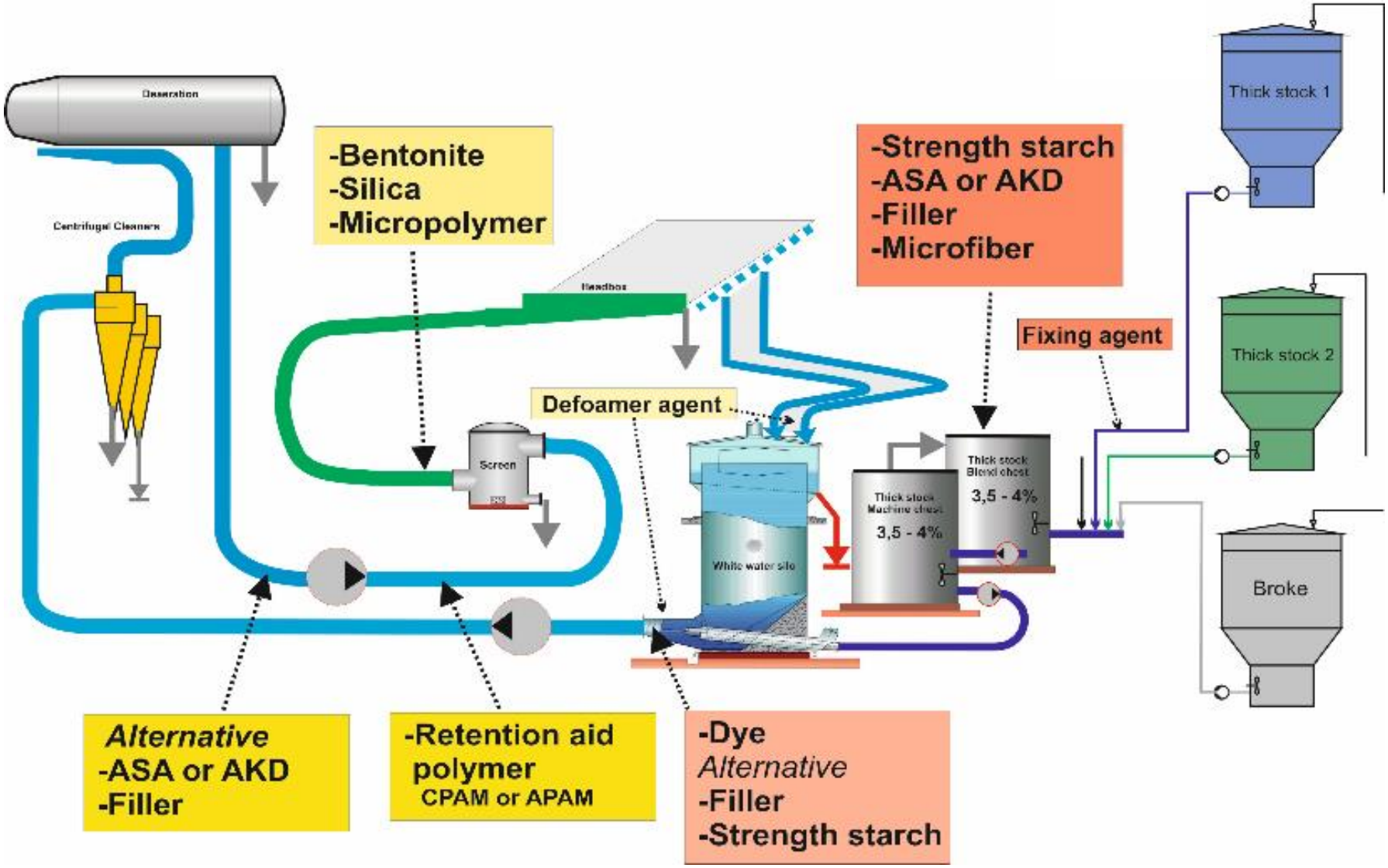
Wetend Innovations development network



Wetend – Global Technology Leader



Conventional chemical and additive mixing for a paper making process



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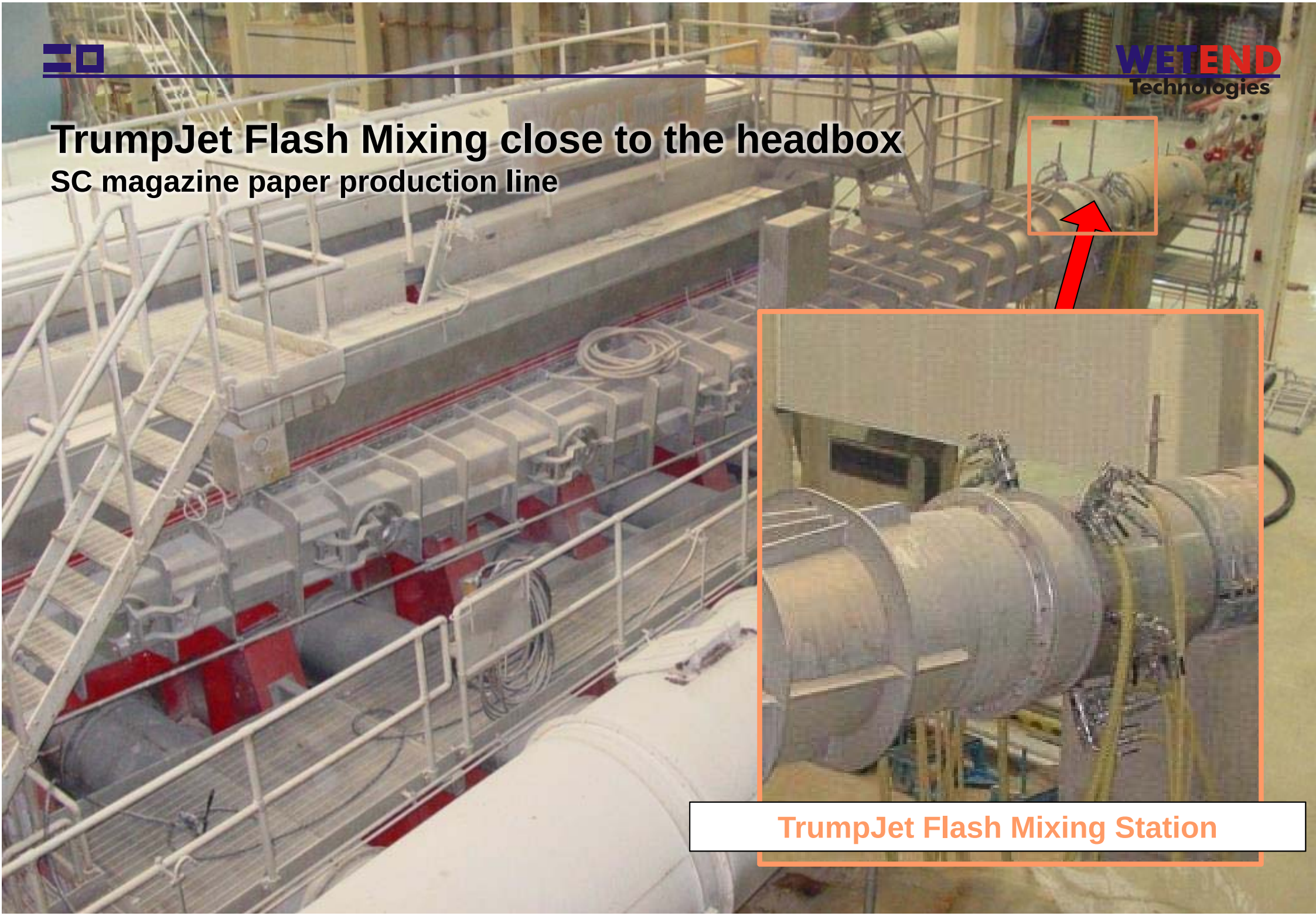
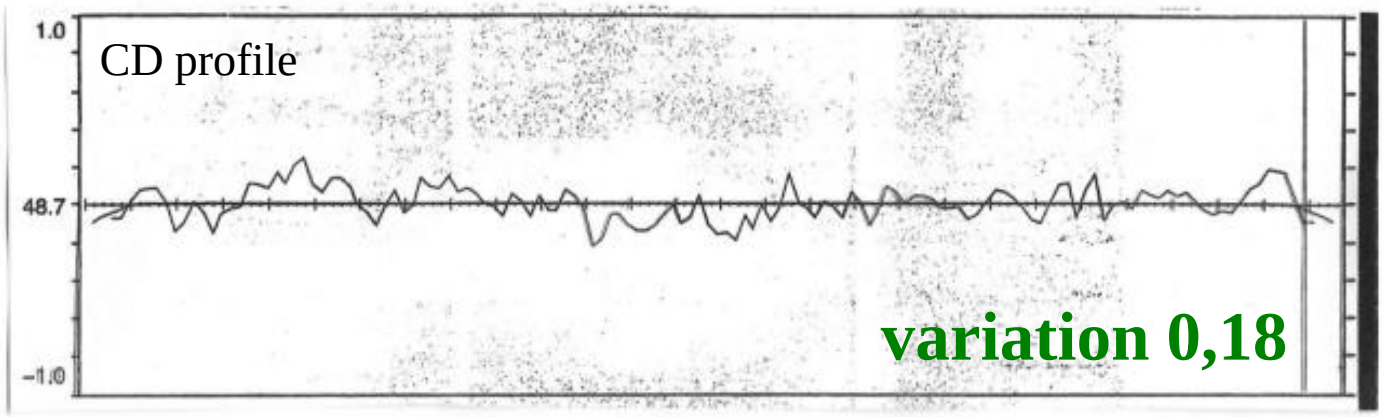
TrumpJet Flash Mixing close to the headbox

SC magazine paper production line



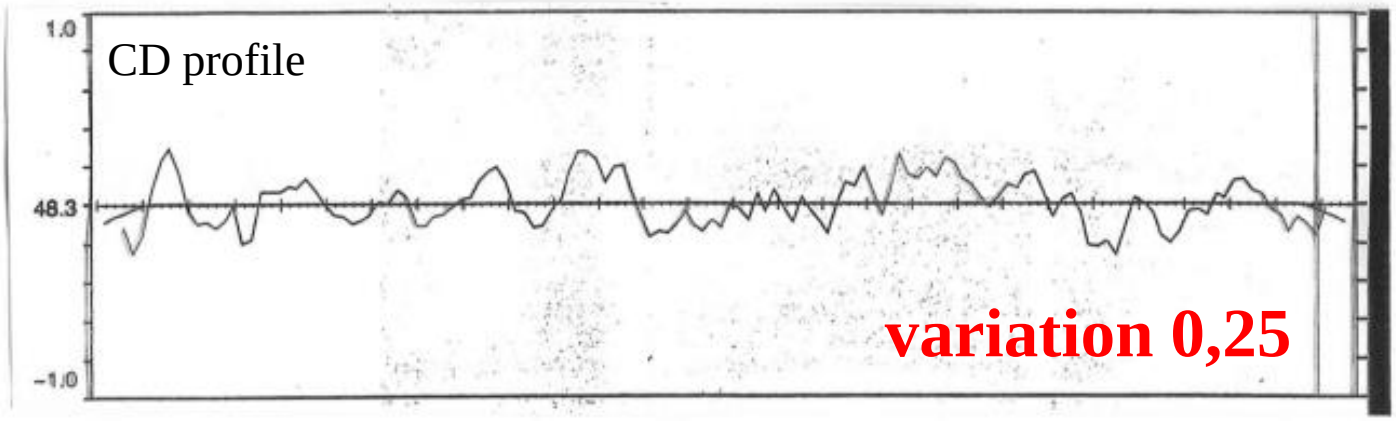
SC papermachine, Europe

CD profile improvement with TrumpJet system



TrumpJet

- improved efficiency
- better runnability



Before

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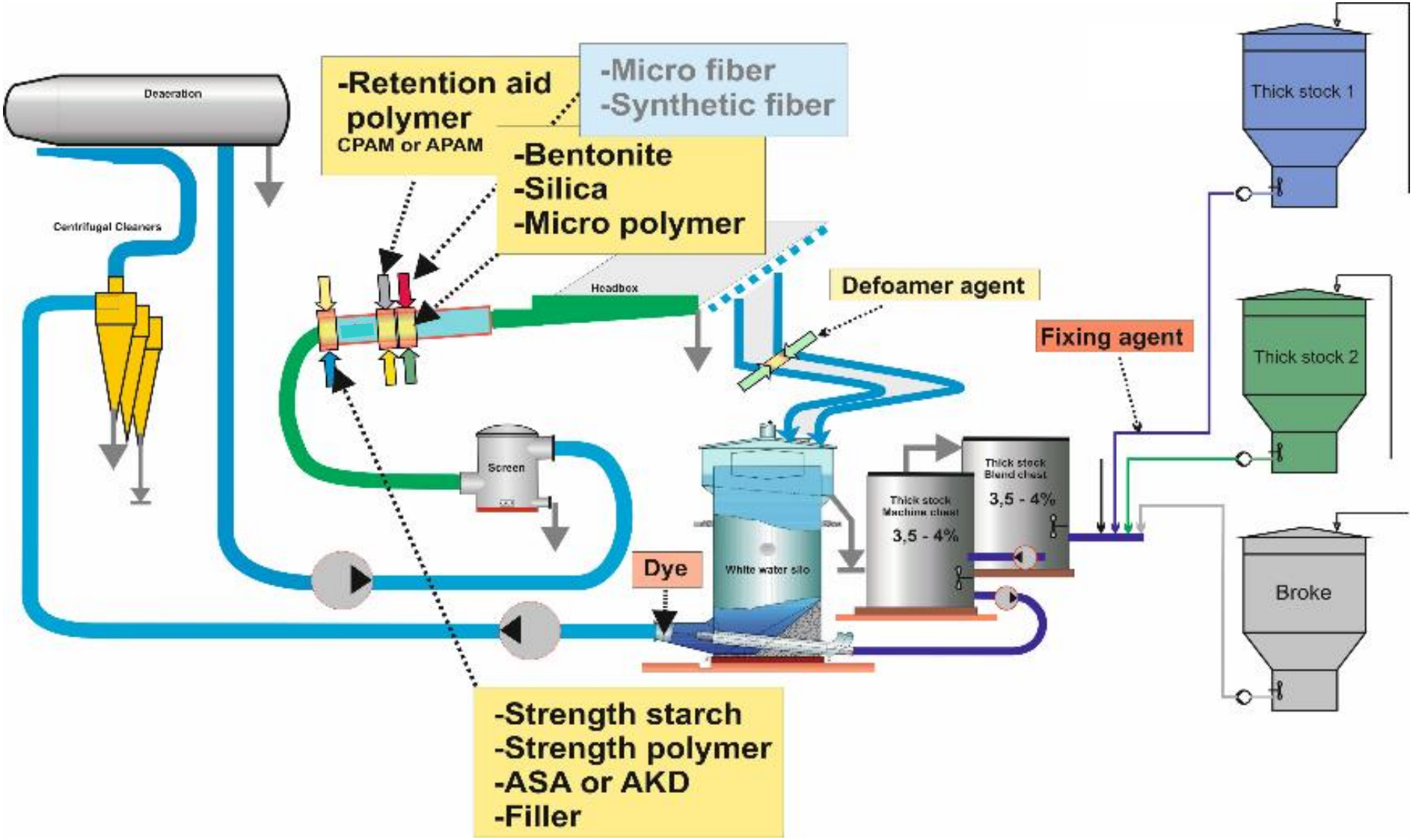
TrumpJet® Flash Mixing Reactor

Chemical and additive mixing for paper making process



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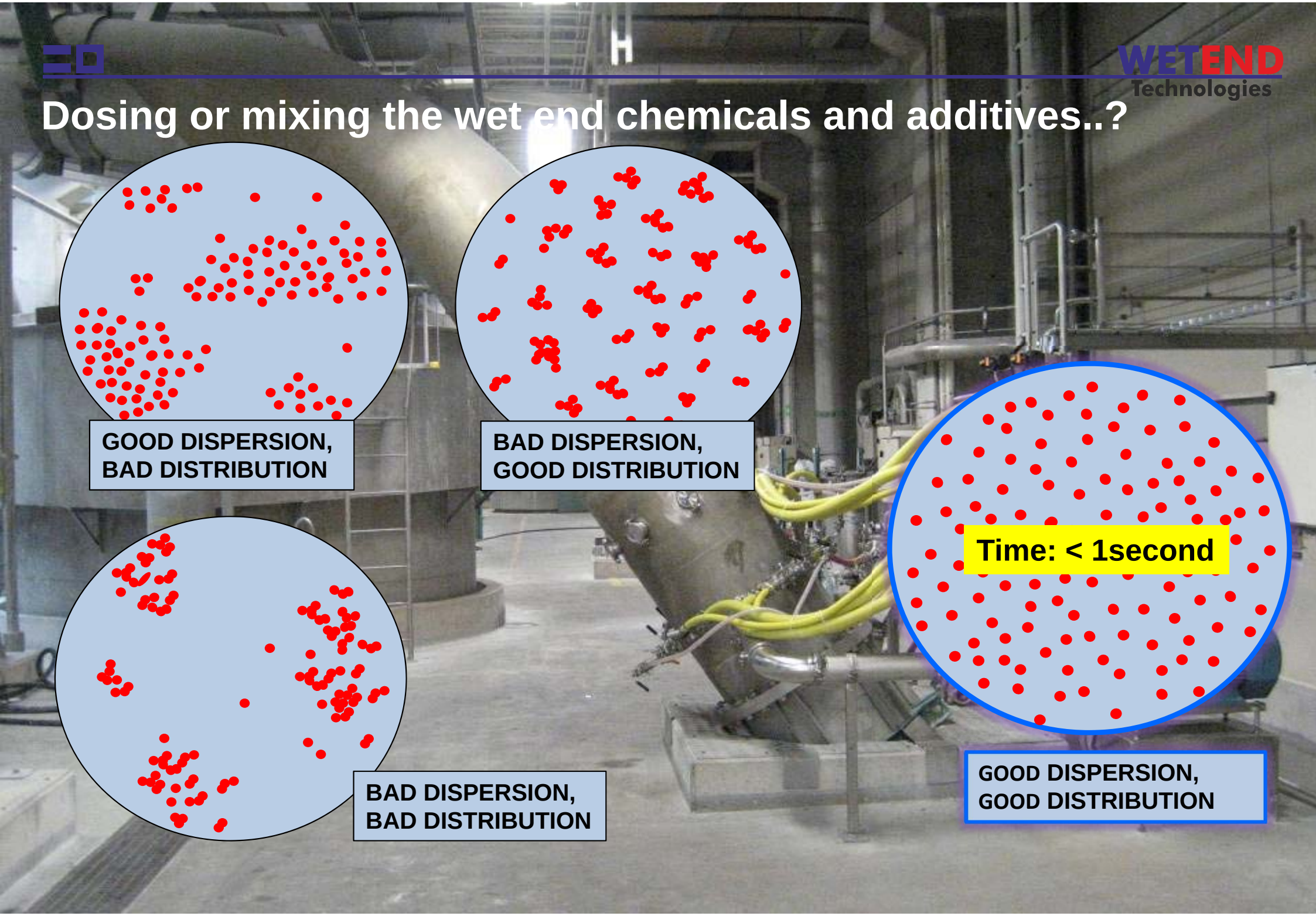
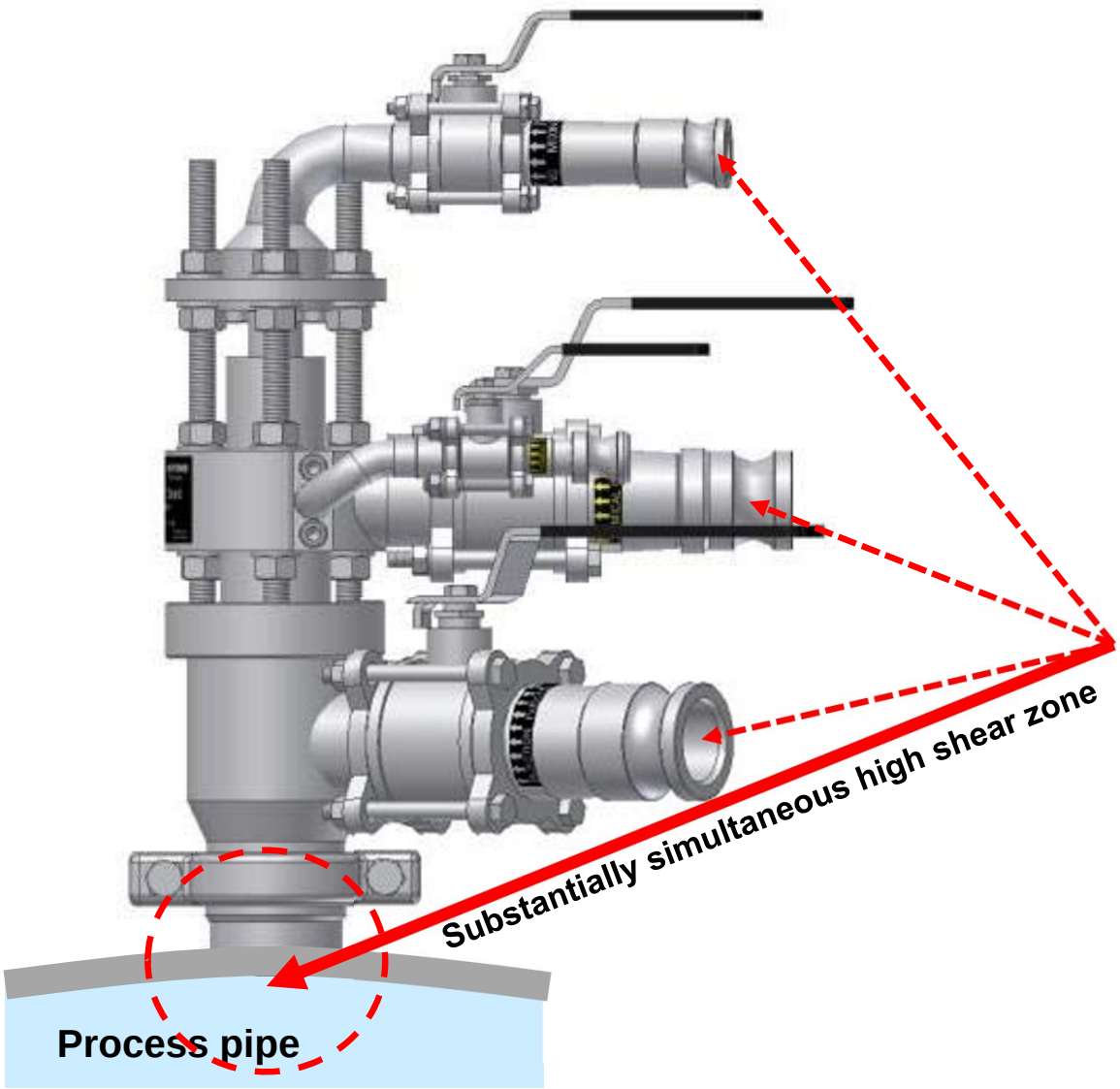
Dosing or mixing the wet end chemicals and additives..?



TrumpJet® Flash Mixer

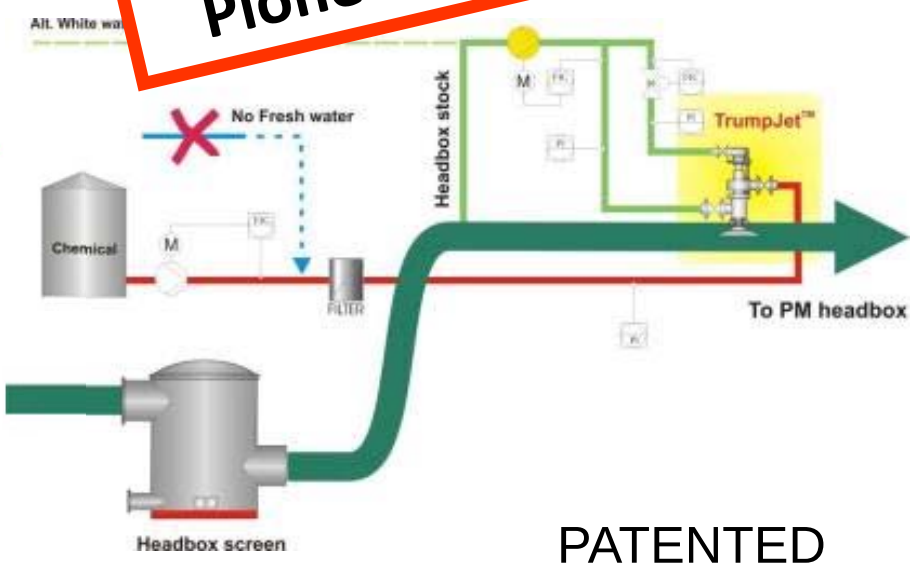
<u>"Injection mixing without a delay"</u> – can use solids containing liquids fast – substantially simultaneous



TrumpJet can use solids containing liquids like:

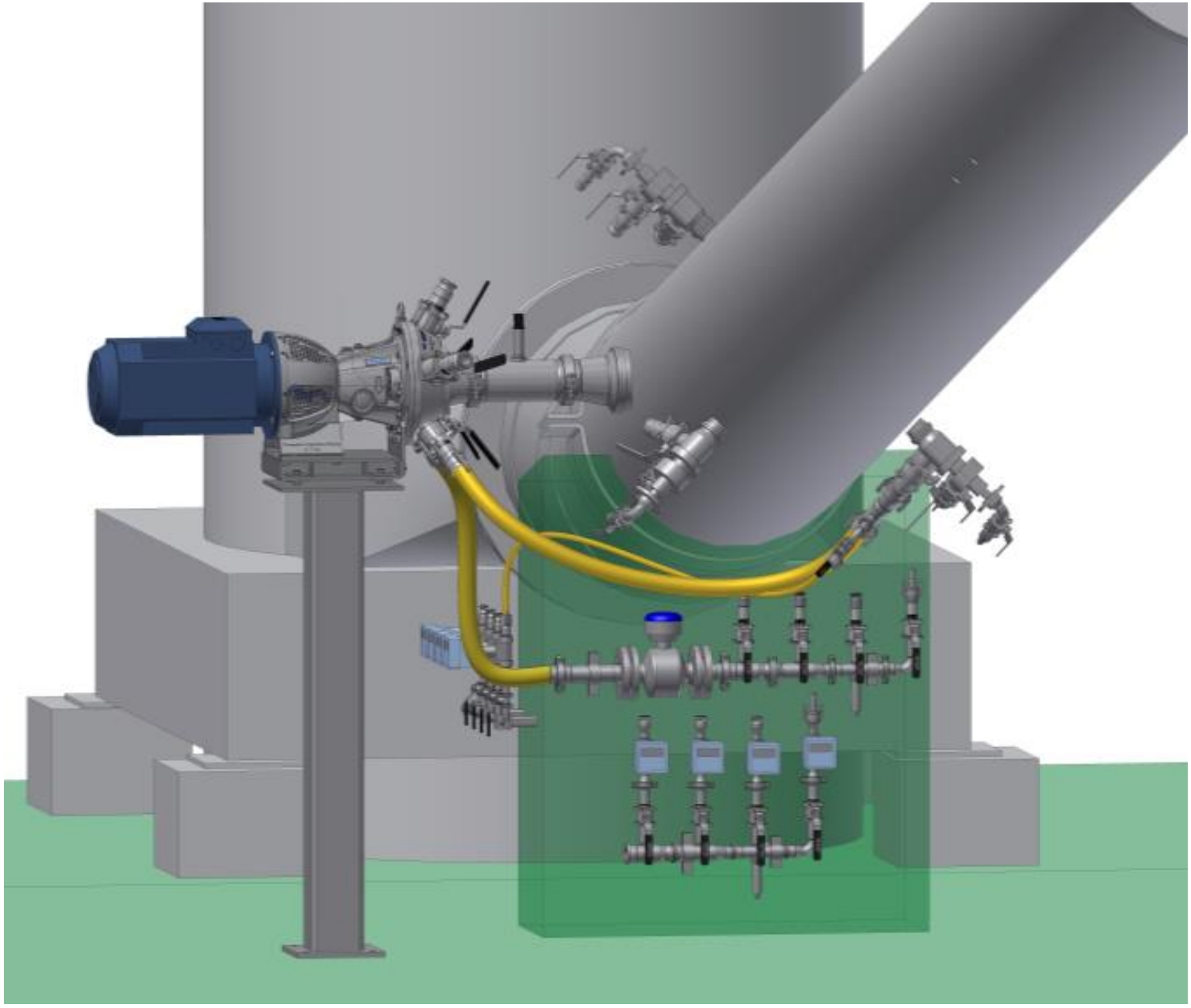
- **Filtrates**
- **White water**
- **Thin stock**
- **Thick stock**
- **Sludge**

Pioneer INNOVATION #1



PATENTED

TrumpJet® Flash Mixing Station



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TrumpJet® Injection Pump (TIP)

Wetend – Sulzer – ABB

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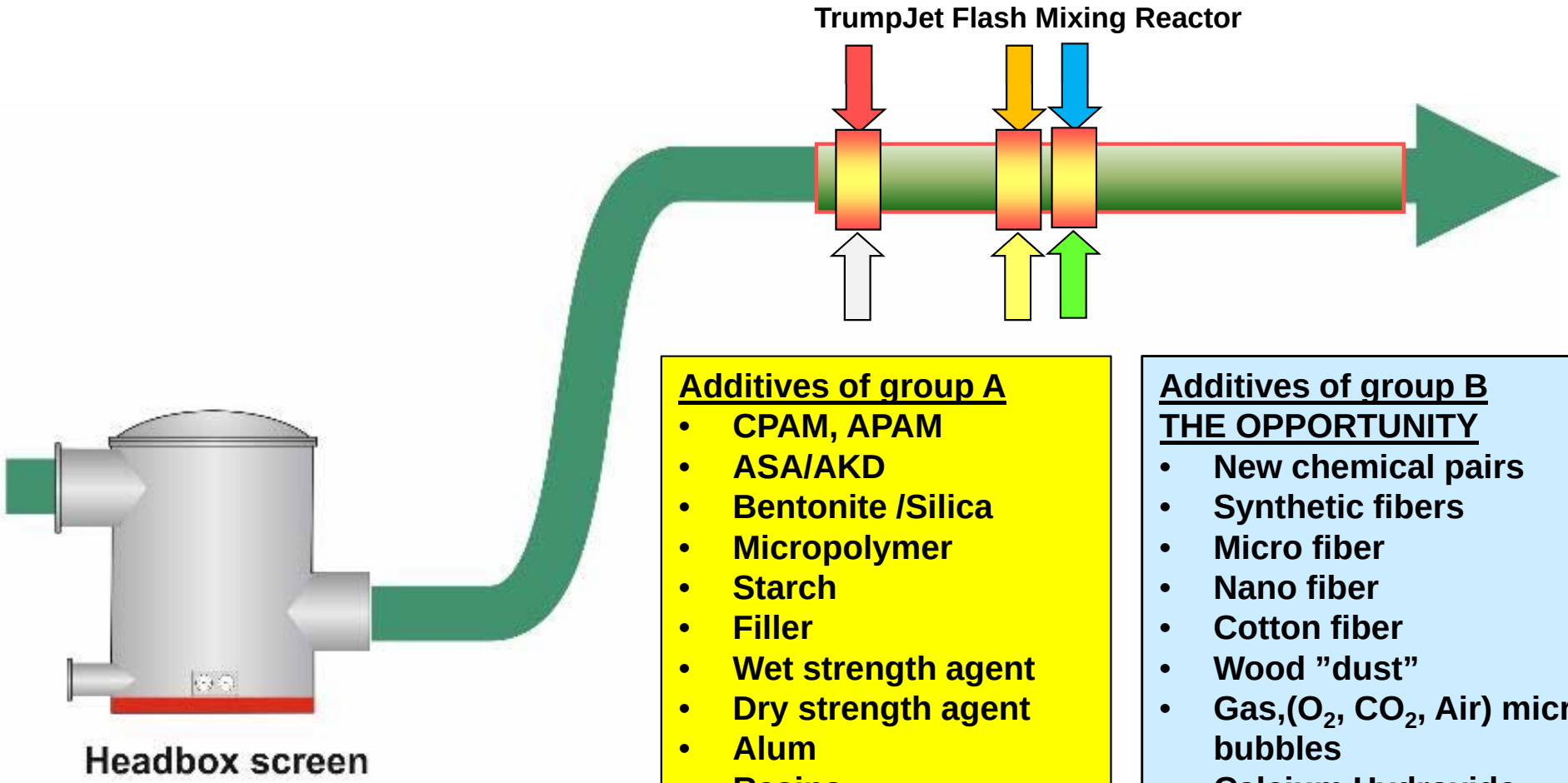
TrumpJet® Flash Mixing Reactor for multiple additives



Additives of group A

- CPAM, APAM
- ASA/AKD
- Bentonite /Silica
- Micropolymer
- Starch
- Filler
- Wet strength agent
- Dry strength agent
- Alum
- Resins
- Dye
- Pigment
- Strength polymer
- Defoaming agent

Additives of group B
THE OPPORTUNITY

- New chemical pairs
- Synthetic fibers
- Micro fiber
- Nano fiber
- Cotton fiber
- Wood ”dust”
- Gas,(O_2, CO_2, Air) micro bubbles
- Calcium Hydroxide
- Plastic
- “Cells”
- Other…

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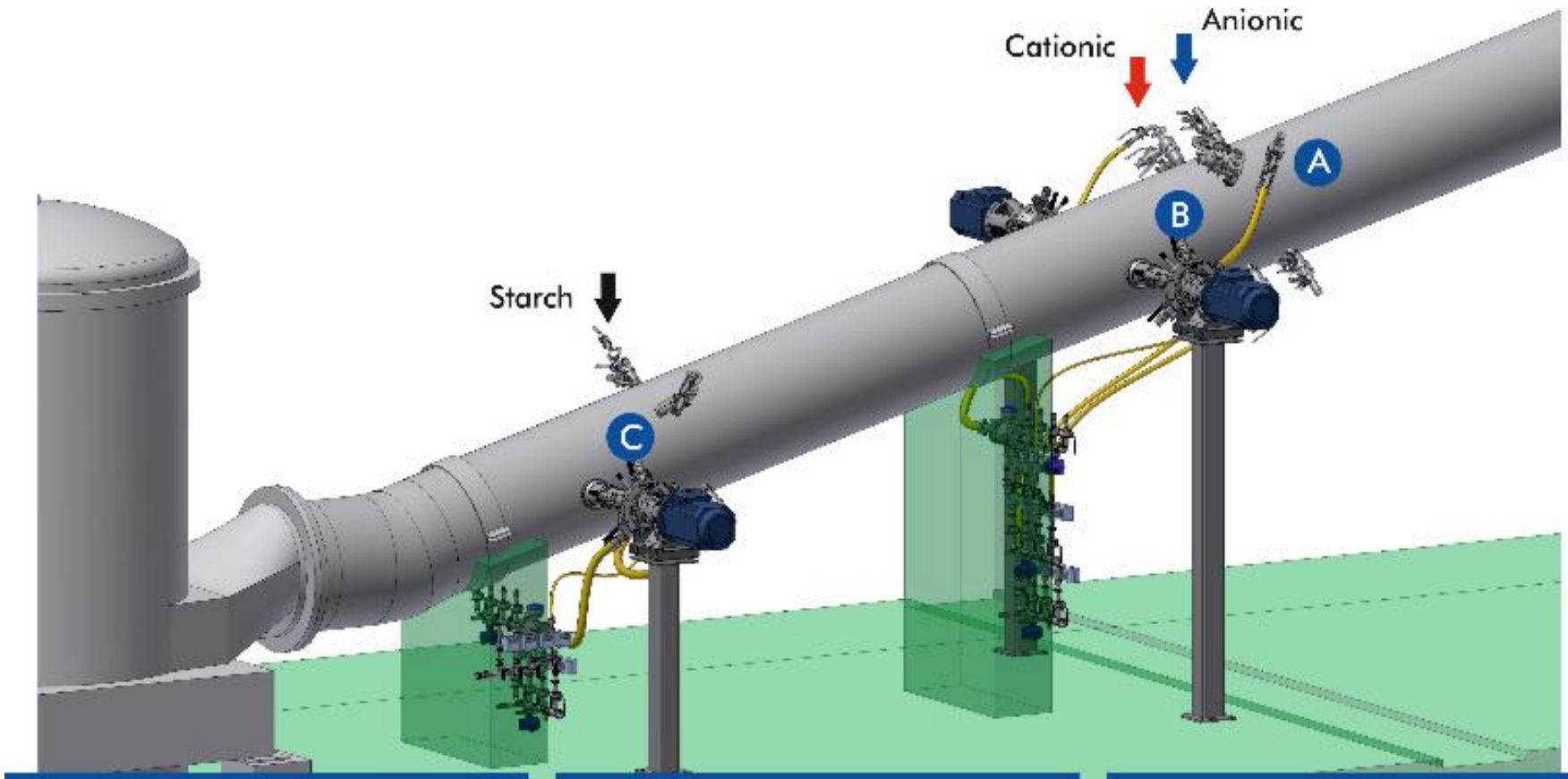
TrumpJet® Flash Mixing Reactor

Pioneering innovation challenges old process rules how to use chemicals



TrumpJet station C
- Strength starch
- Strength polymer
- ASA or AKD
- Filler

TrumpJet station B
- Retention aid polymer

TrumpJet station A
- Bentonite
- Silica
- Micro polymer

ALSO Micro and synthetic fiber!

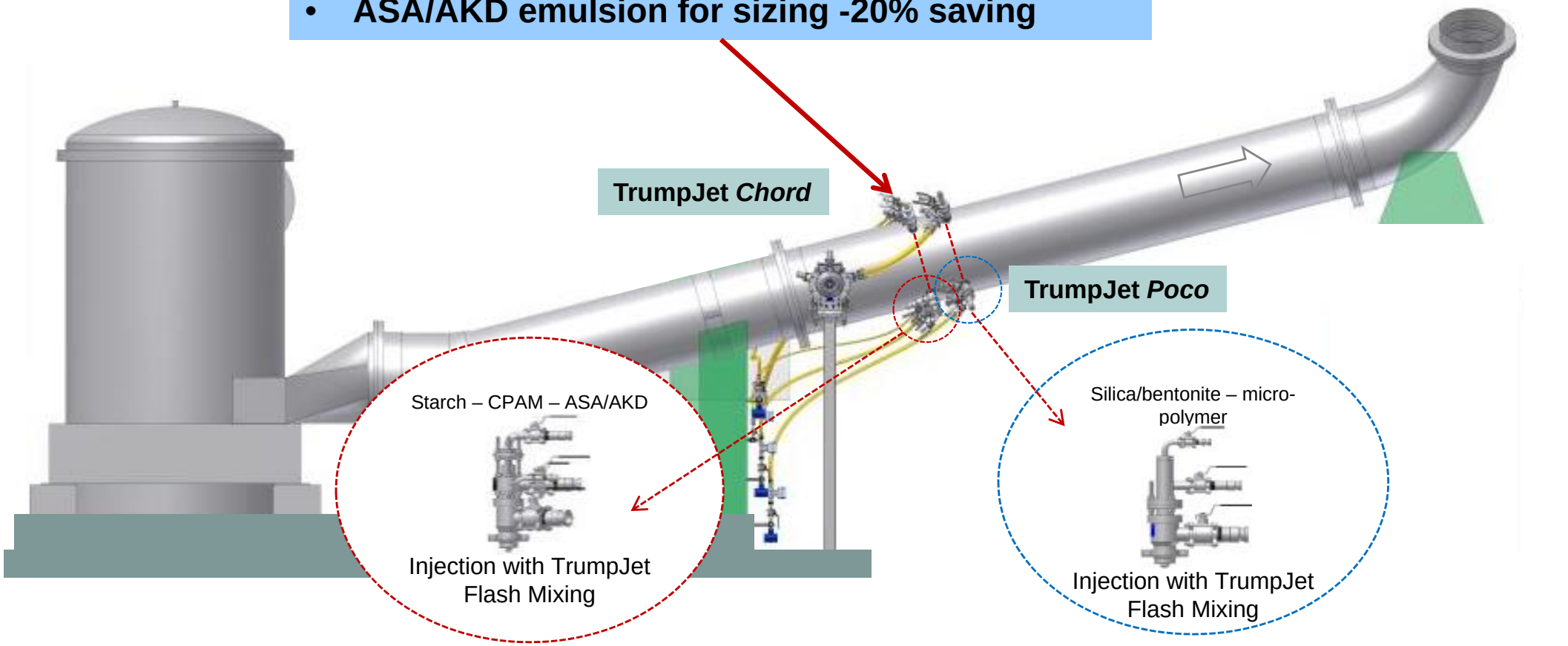
Cationic mixing stations B+C can be merged together for even higher efficiency

TrumpJet® Flash Mixing Reactor

Simultaneous mixing of strength starch and cationic retention aid polymer for higher reactivity and efficiency

Simultaneous flash mixing of cationic chemicals;

- **Cationized Starch for strength**
- **CPAM Retention aid polymer**
- **ASA/AKD emulsion for sizing -20% saving**



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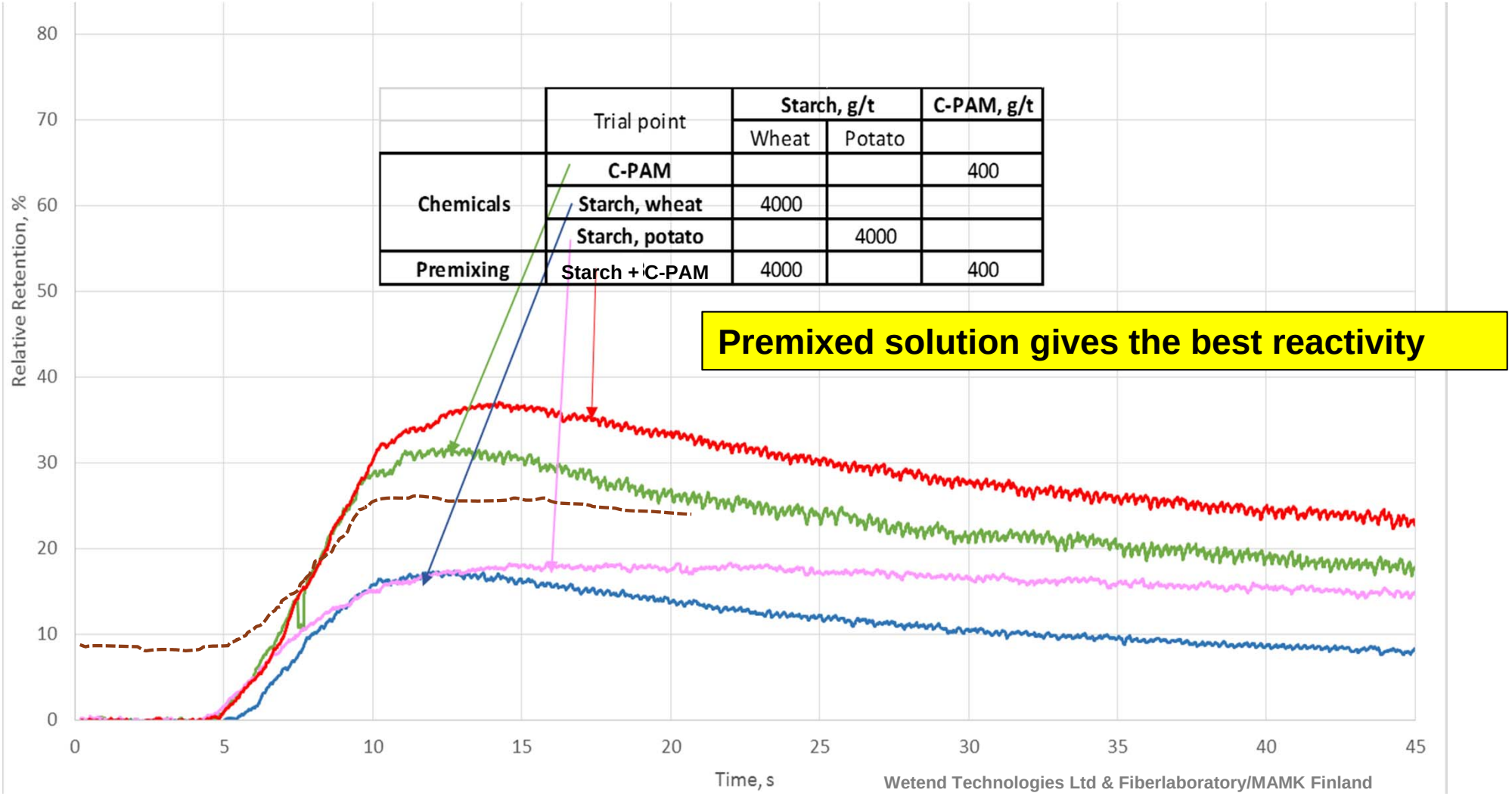
Premixing of starch and CPAM
Laboratory results support the innovation



	Trial point	Starch, g/t		C-PAM, g/t
		Wheat	Potato	
Chemicals	C-PAM			400
	Starch, wheat	4000		
	Starch, potato		4000	
Premixing	Starch + C-PAM	4000		400

Premixed solution gives the best reactivity

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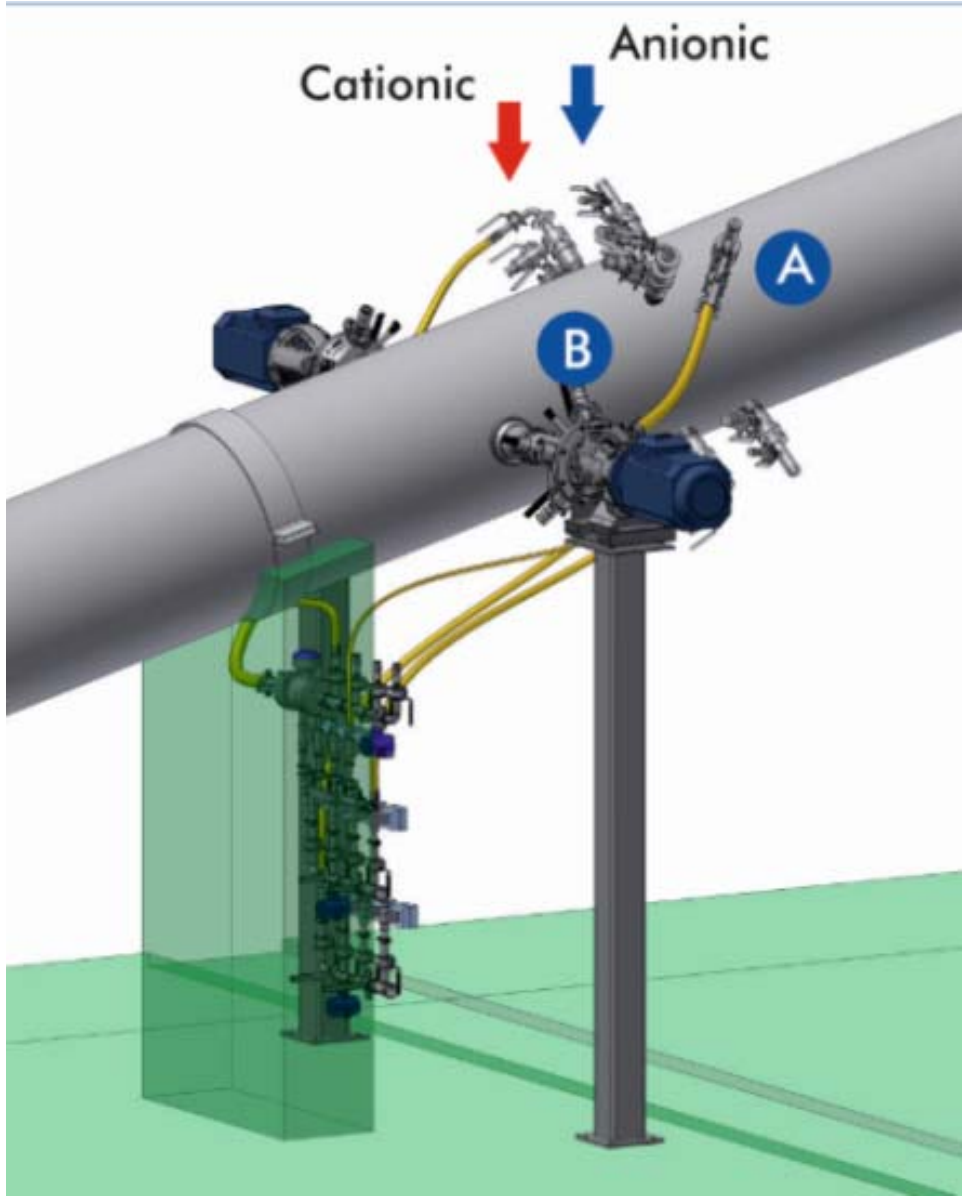
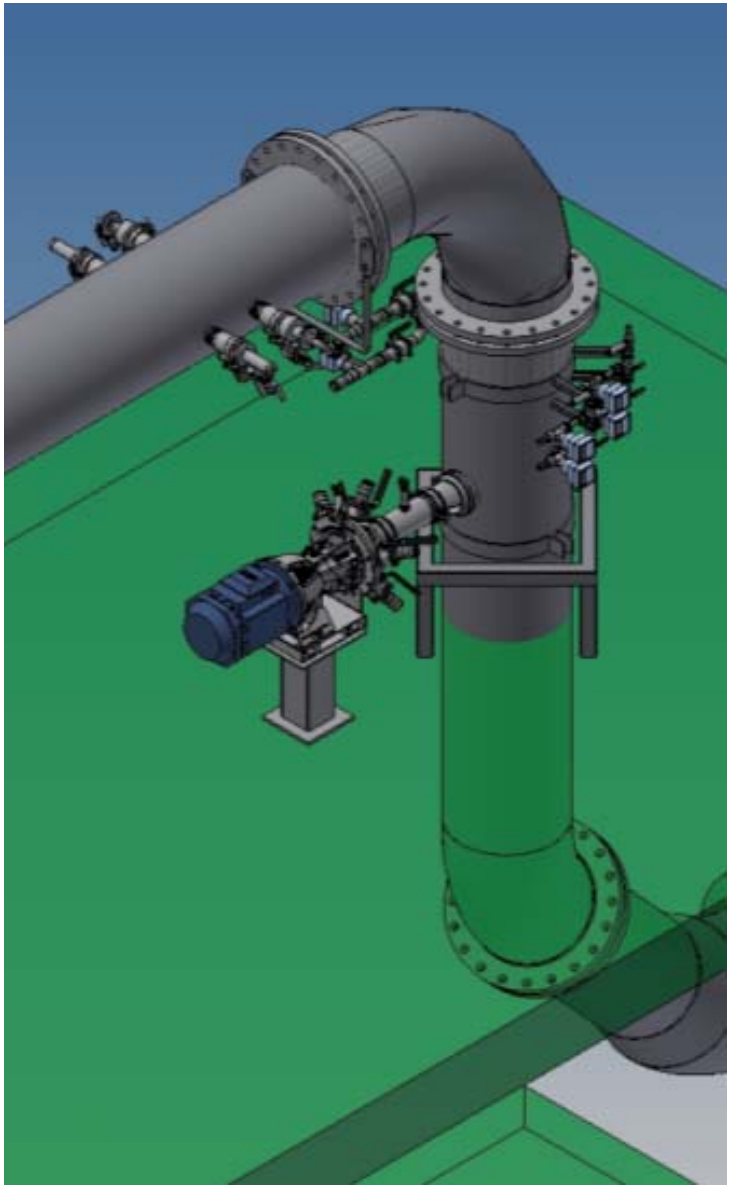
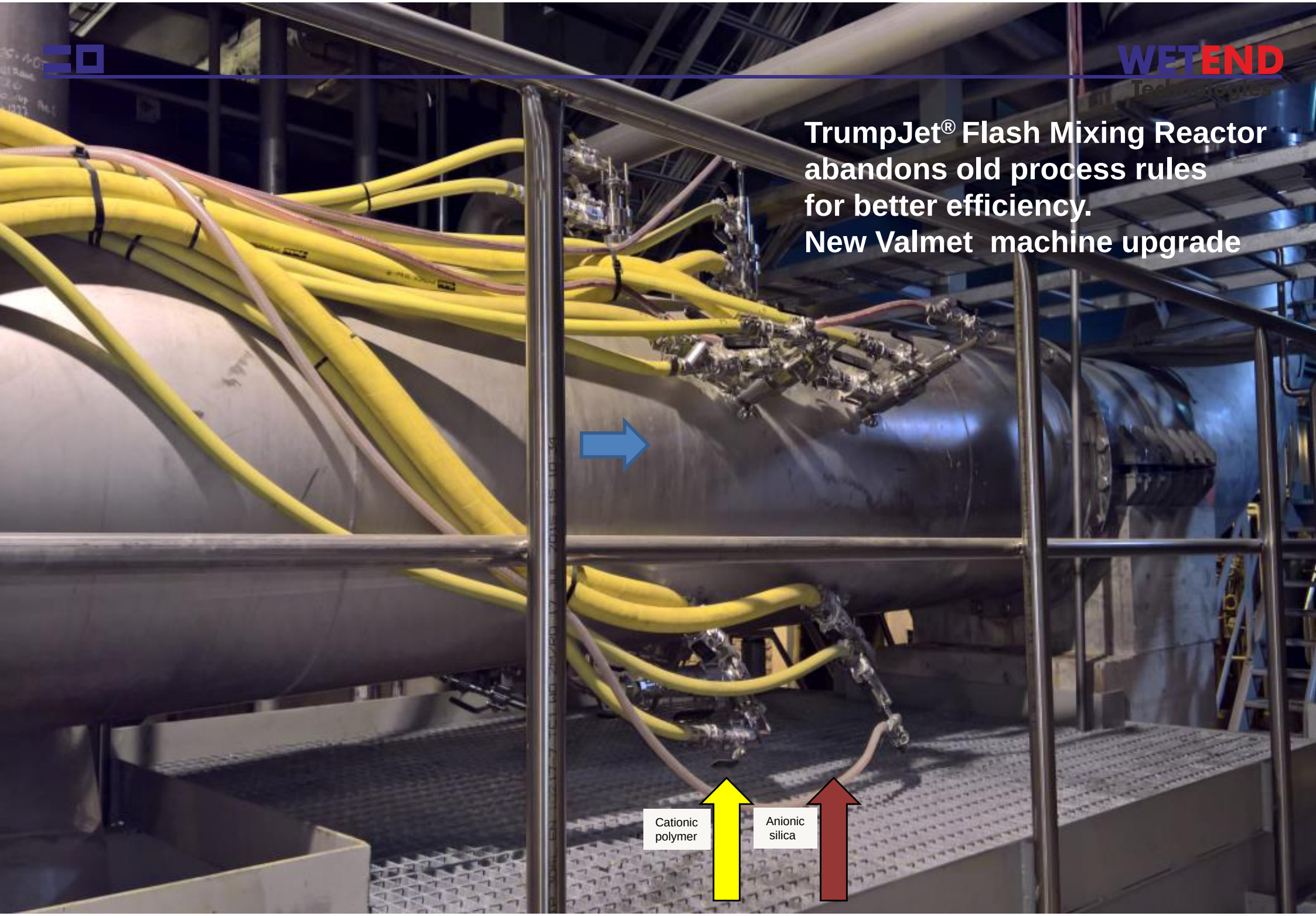
TrumpJet® Flash Mixing Reactor for multiple additives






WETEND
Technologies
TrumpJet® Flash Mixing Reactor abandons old process rules for better efficiency.
New Valmet machine upgrade
Cationic polymer
Anionic silica

Earnings and Sustainable results: Coated printing paper, USA

Power

- Energy saving: 14.650 MWh/a
- CO_2 emission reduction 2.750 tons/a

Fresh Water

- Water saving 300.000 m^3 /a

Raw materials and optimiced use of additives

- Saving of retention aid silica 43%
- Saving of retention aid polymer 33%

Process efficiency

- Incresed filler content of sheet 5%
- Increase of reel speed 8%
- Reduced steam consumption

ANNUAL SAVINGS: MORE THAN 1 MILLION EUR

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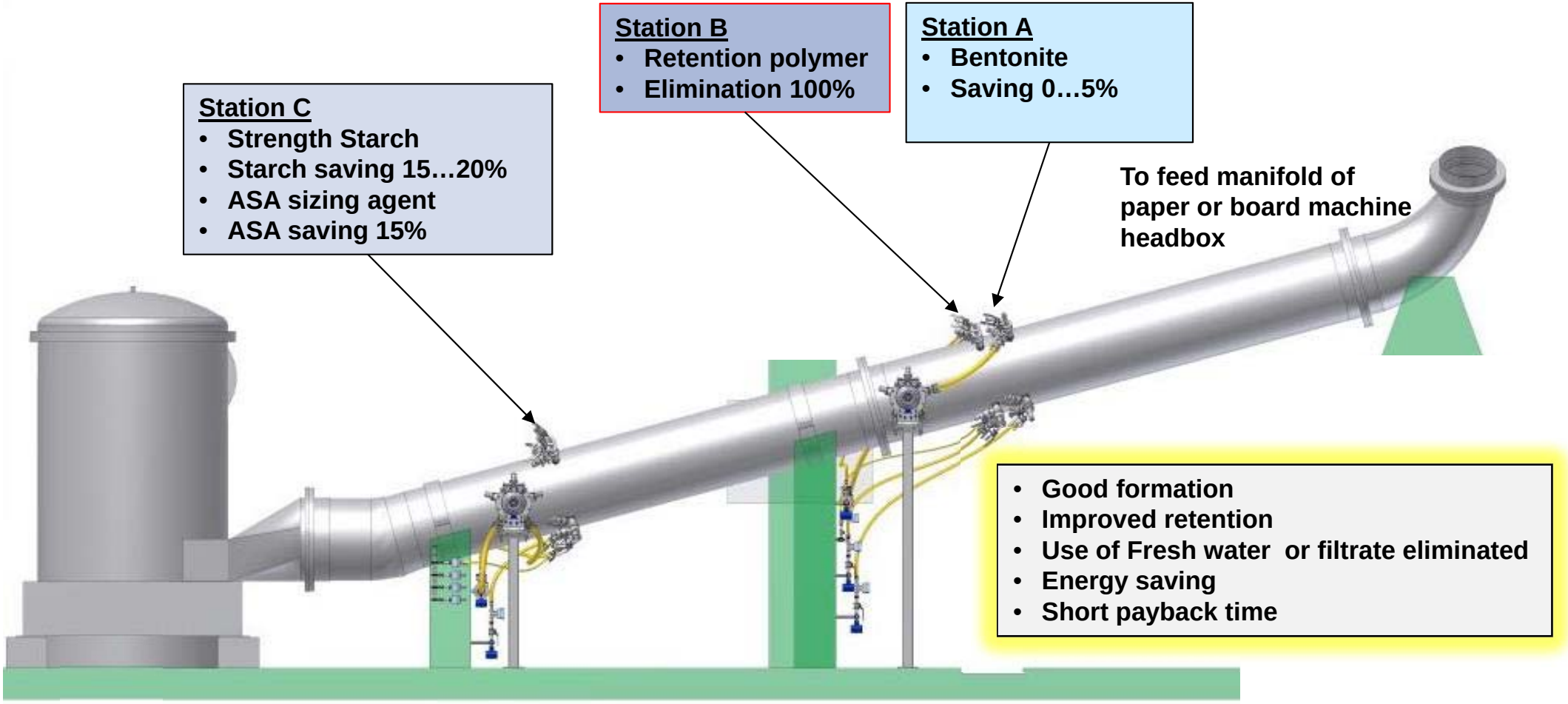
Fine paper production line

TrumpJet Flash Mixing Reactor, mill results



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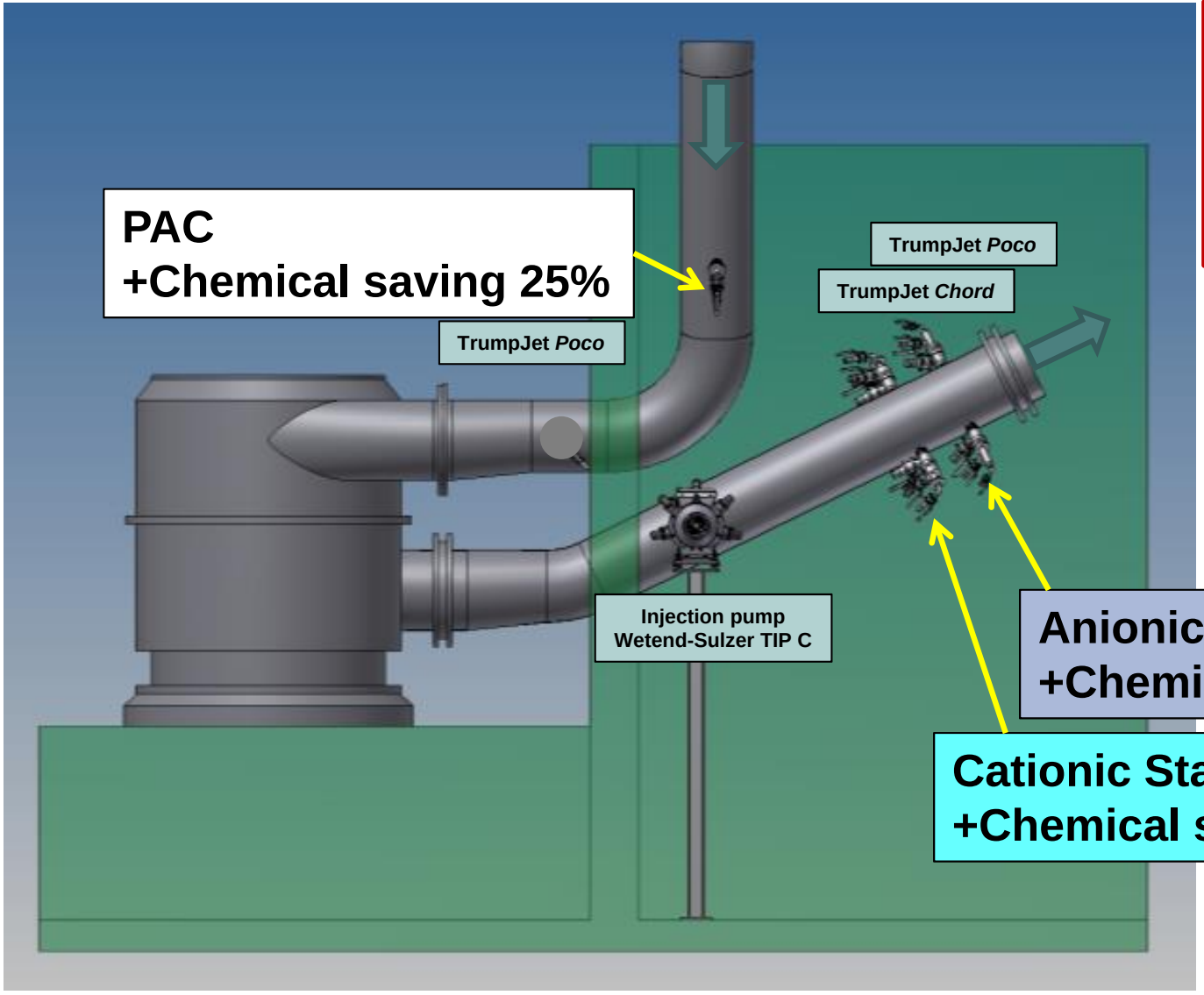
Coated fine paper, North-America

TrumpJet® Flash Mixing Reactor, Results



+Good sheet strength
+Improved dewatering
+Lower steam consumption
+Use of fresh water eliminated

Anionic Nanoparticle, Silica
+Chemical saving 48%

Cationic Starch for strength
+Chemical saving 25% (min 10% … max 30%)

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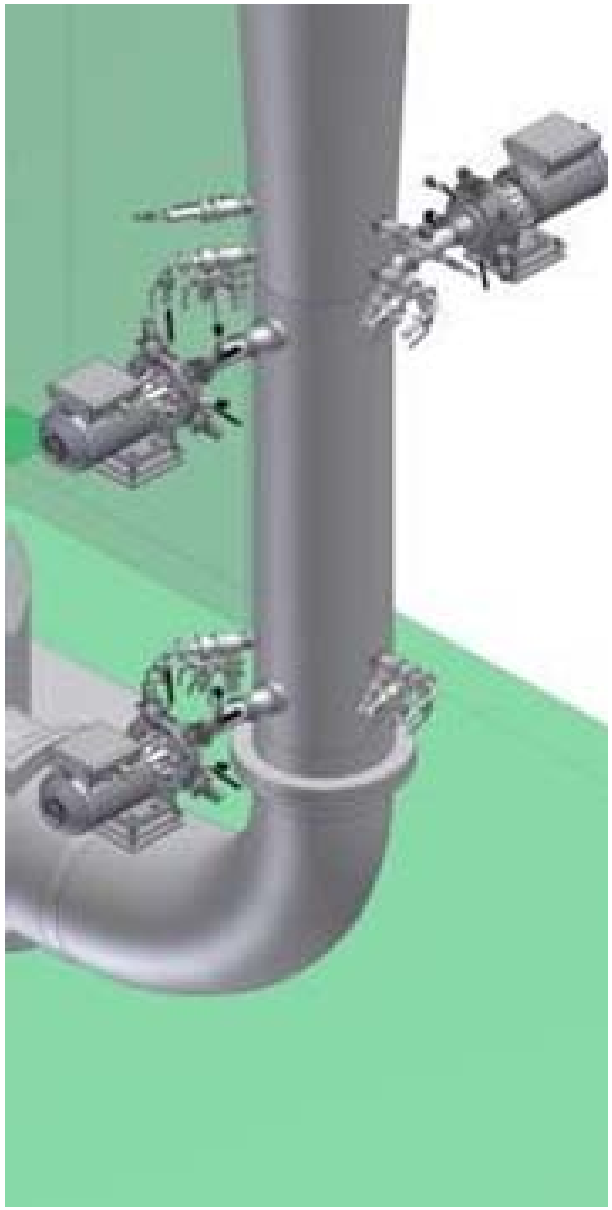
A large Fine paper production line, Europe

TrumpJet Flash Mixing Reactor, mill results

- **Strength Starch together with cationic and anionic retention aid components moved after the screen and just before headbox feed manifold according to the Flash Mixing Reactor process**
- *Strength starch was added earlier into the thick stock line*

- **Saving of strength starch >50%**
- **CPAM 15…20%**
- **Other results**
  - **Good sheet quality**
  - **Positive development of retention and filler presence in the sheet**
  - **Faster grade changes**
  - **Fresh water and energy saving**



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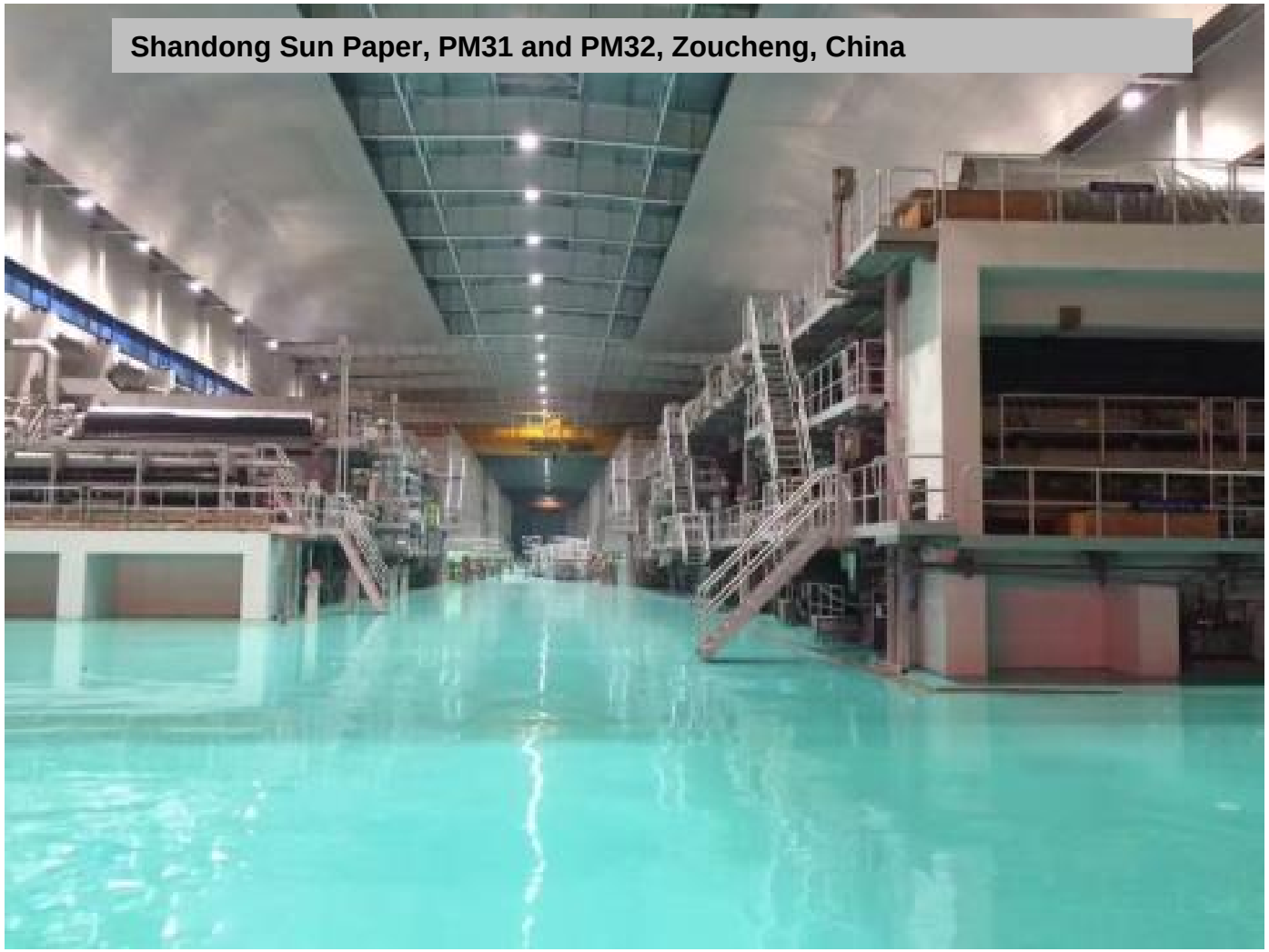
TrumpJet® Flash Mixing Reactor

Sun Paper PM31 and PM32

Wetend has supplied totally 10 TrumpJet mixing stations for production lines of PM31 and PM32, annual capacity of 800,000 metric tons


Shandong Sun Paper, PM31 and PM32, Zoucheng, China

Repeat orders 2017 for PM36 and PM37

Start ups in summer 2018

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TrumpJet® Flash Mixing Reactor

Sun Paper PM31 and PM32

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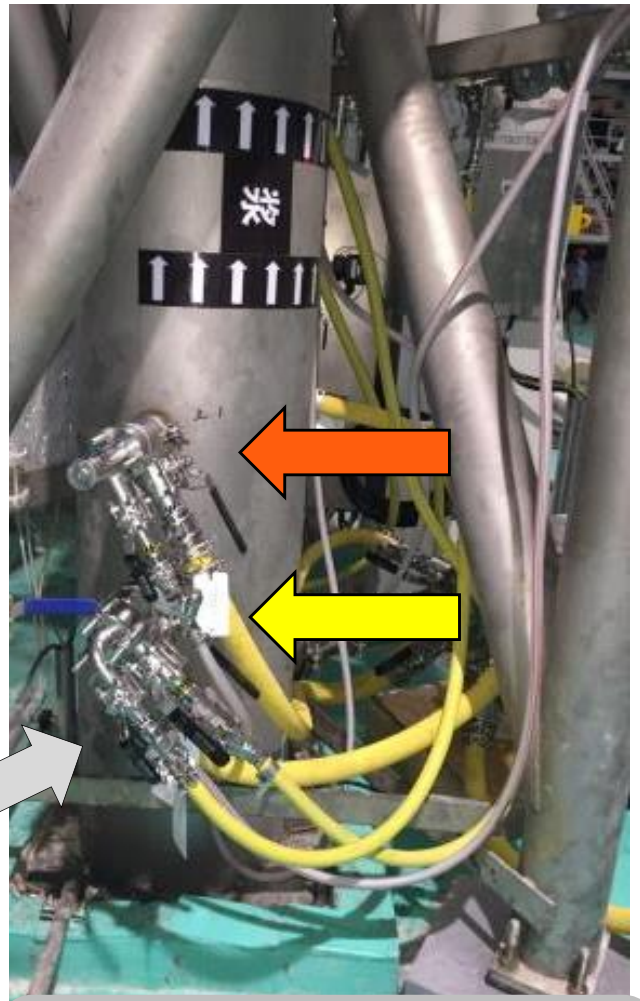

TrumpJet Flash Mixing Reactor:

- **Anionic at the top**
- **Cationic just before**

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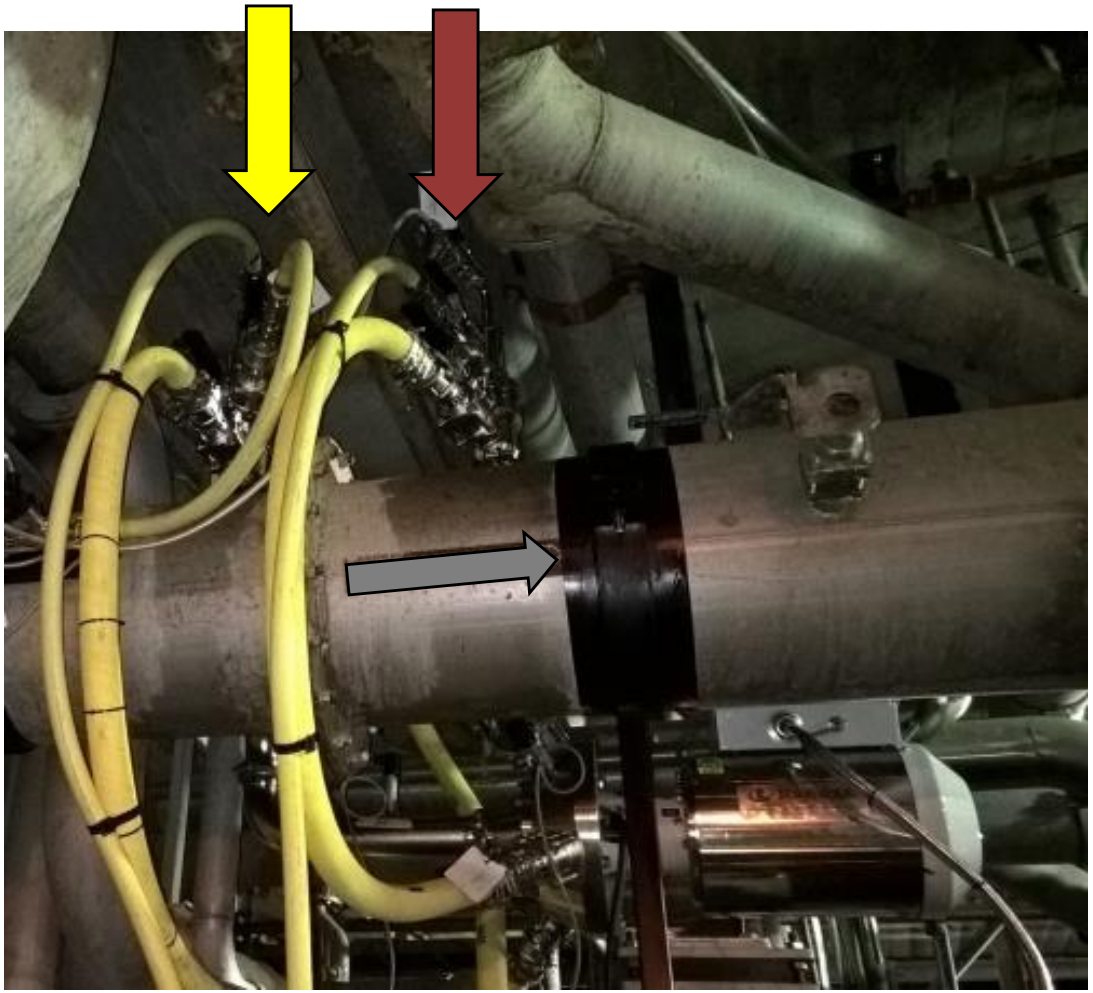
TrumpJet® Flash Mixing Reactor

Smurfit Kappa, Europe

Increased chemical efficiency

Cationic polymer

Anionic silica



Wetend has received two repeat orders based on the performance of the line

Polymer and silica saving is considerable

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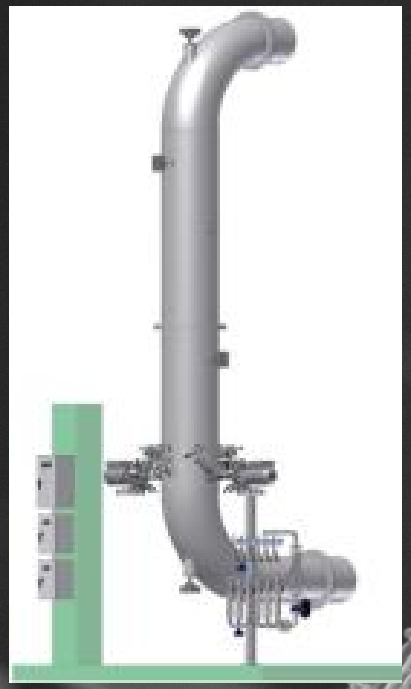
In–Line PCC™

Revolutionary filler and filler-fiber composite



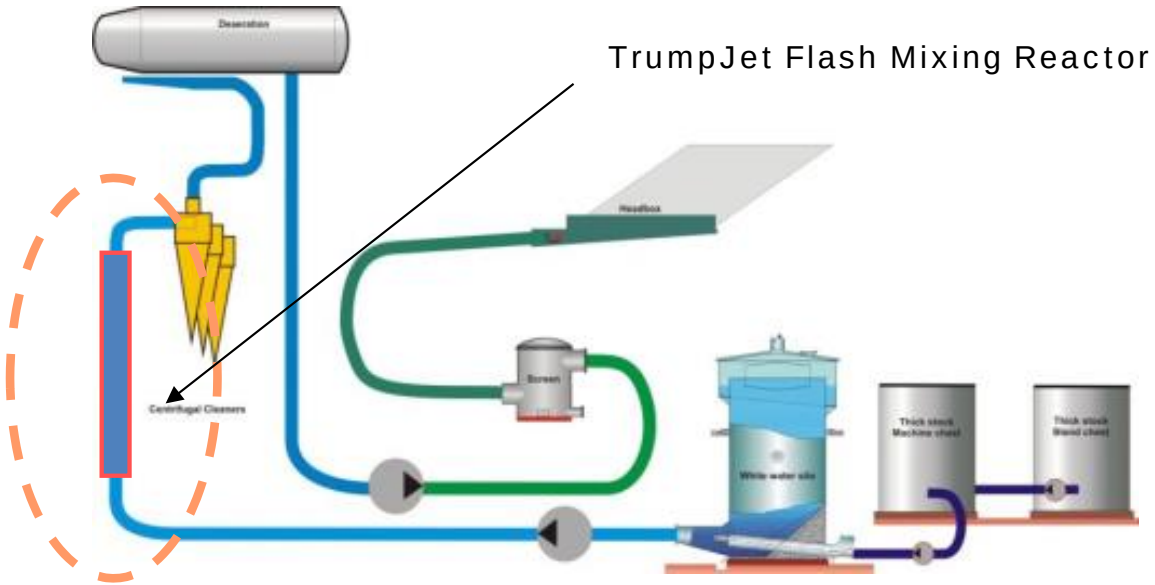
- Major improvement in end product quality
- Reduced raw material and operational costs
- Capital investment costs smaller than conventional satellite production plant
- Technology in use on running machines

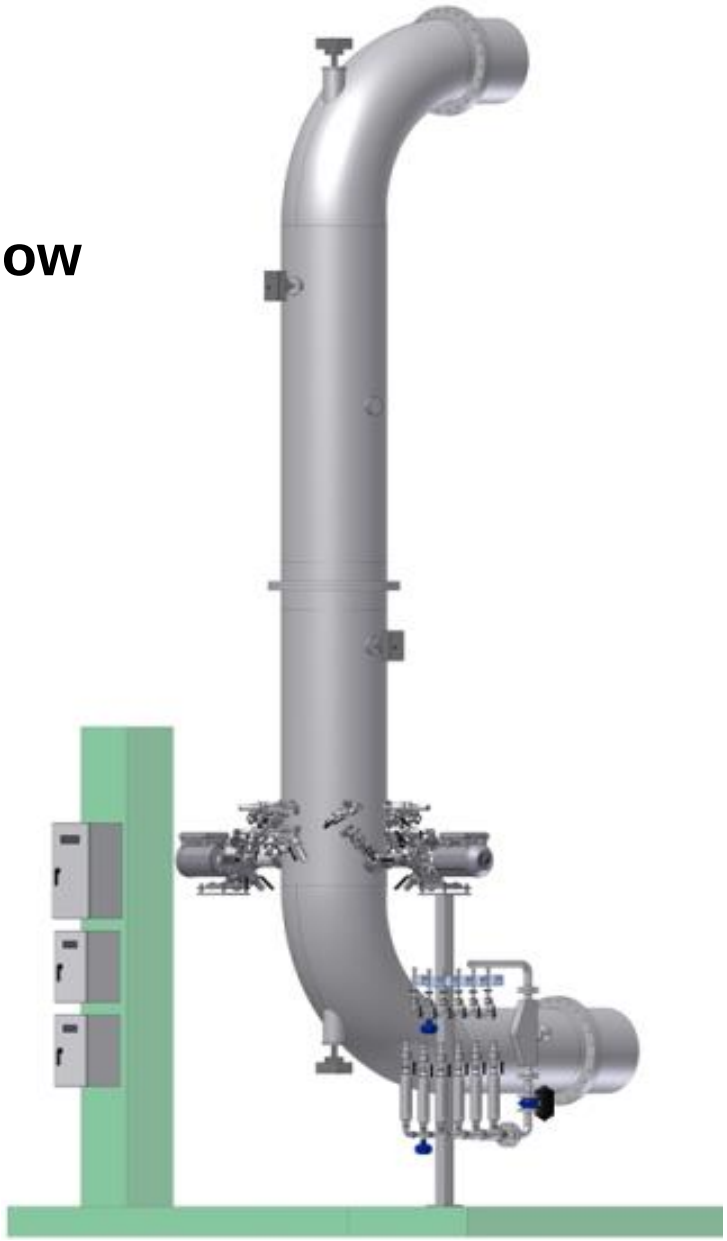
In-Line PCC™ Flash Mixing Reactor

Carbon dioxide + milk of lime + flash mixing

= Calcium carbonate crystals (PCC) into fiber flow

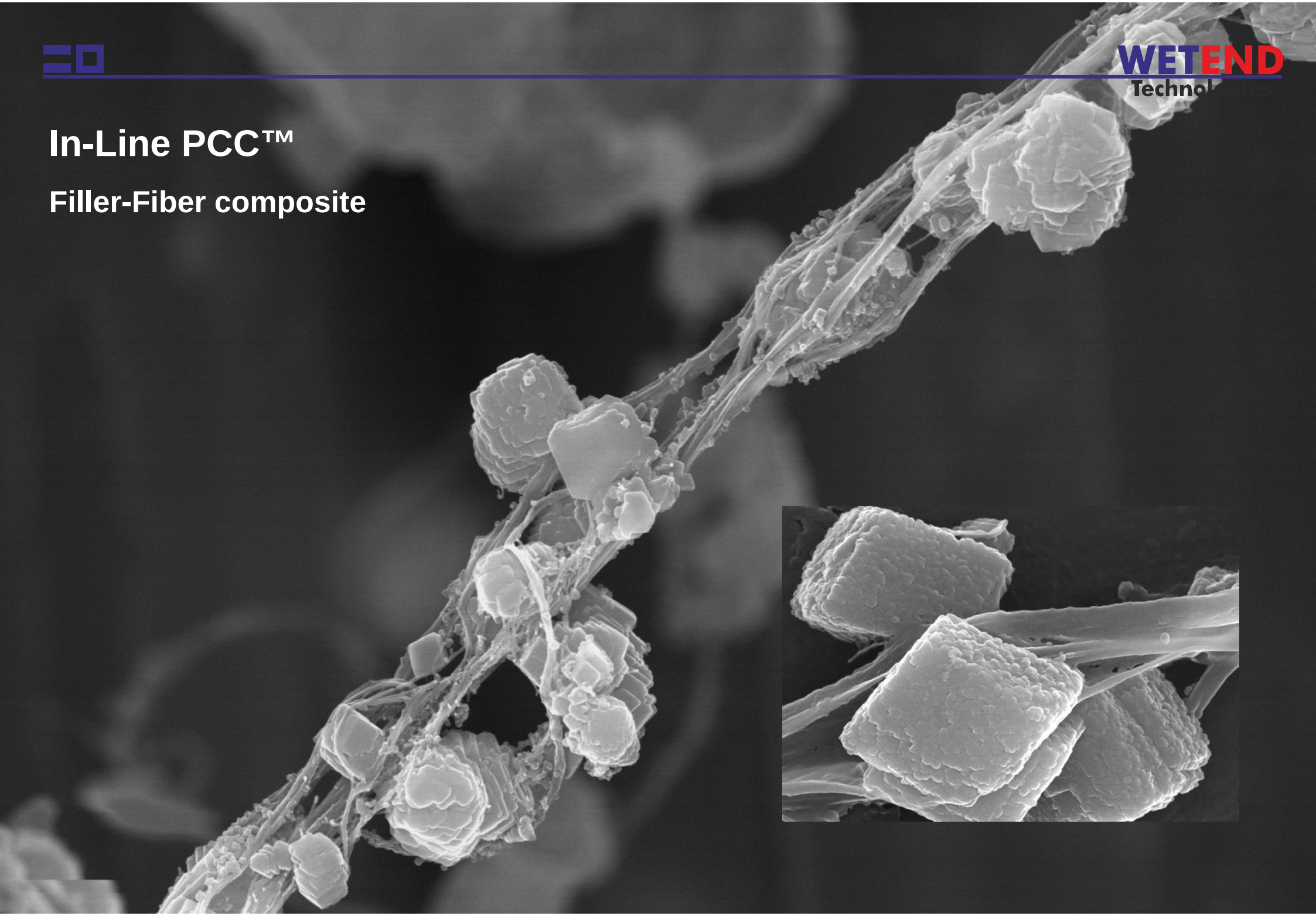
= cost effective filler & fiber composite





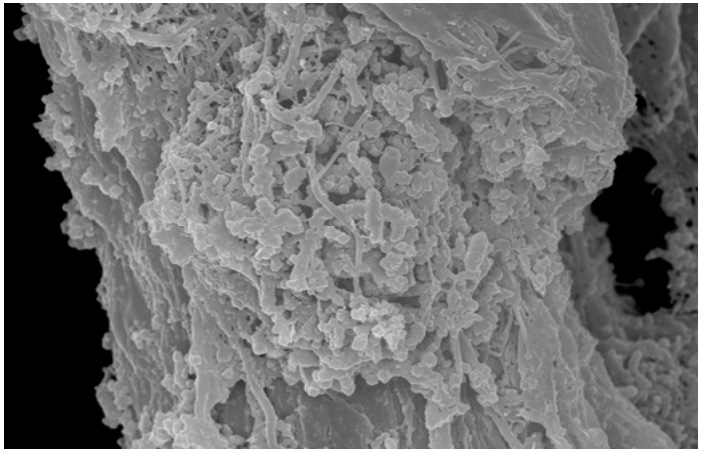
In-Line PCC™

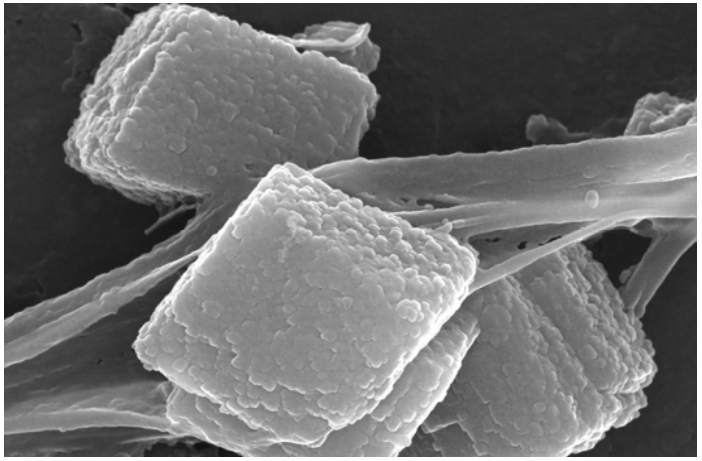
Filler-Fiber composite



In-Line PCC™

Cleaning of process waters with TrumpJet® Flash mixing technology





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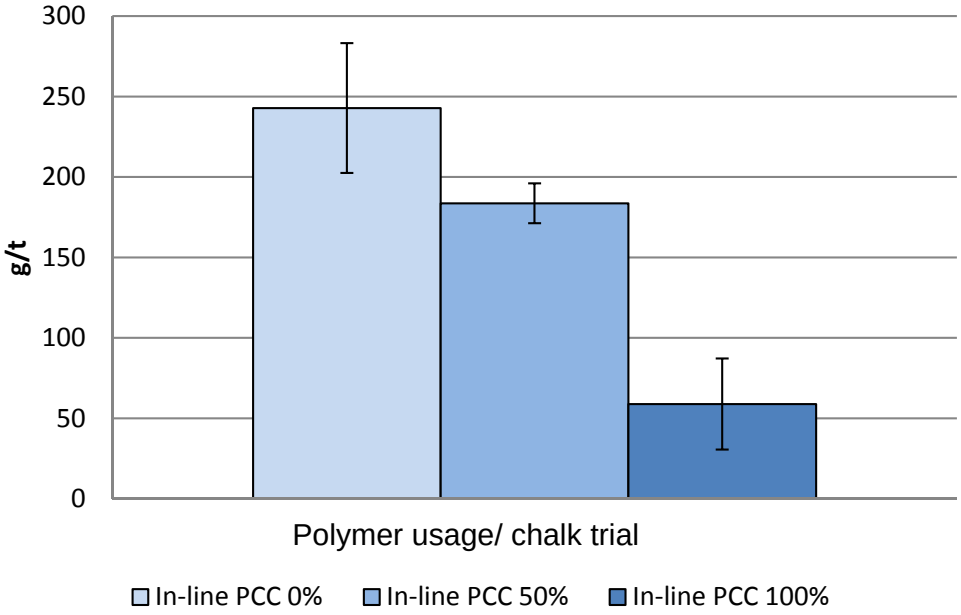
Printing paper production testrun results

Improved retention

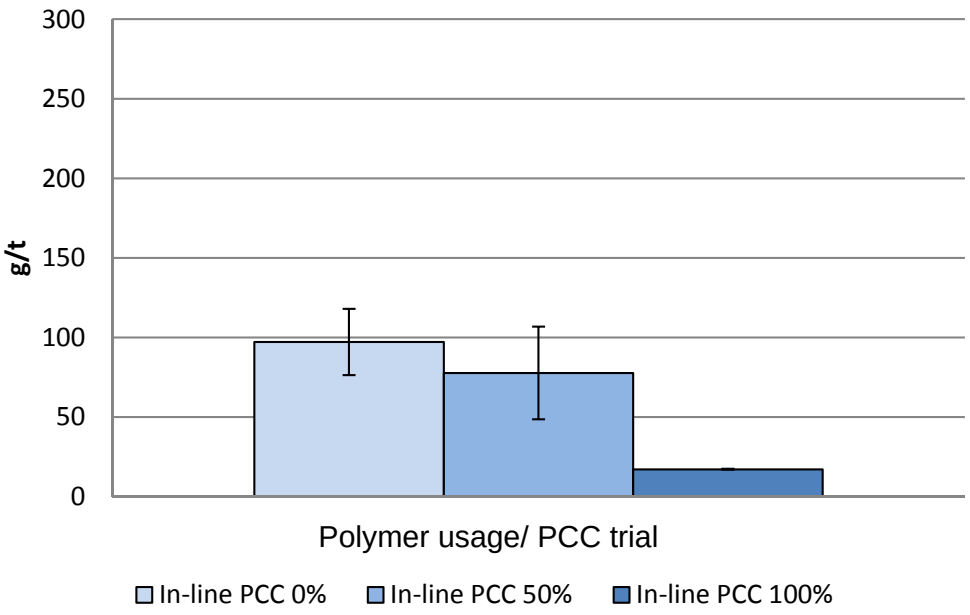
Trial with In-Line PCC (85% PCC , chalk 15%)

Retention polymer -76%



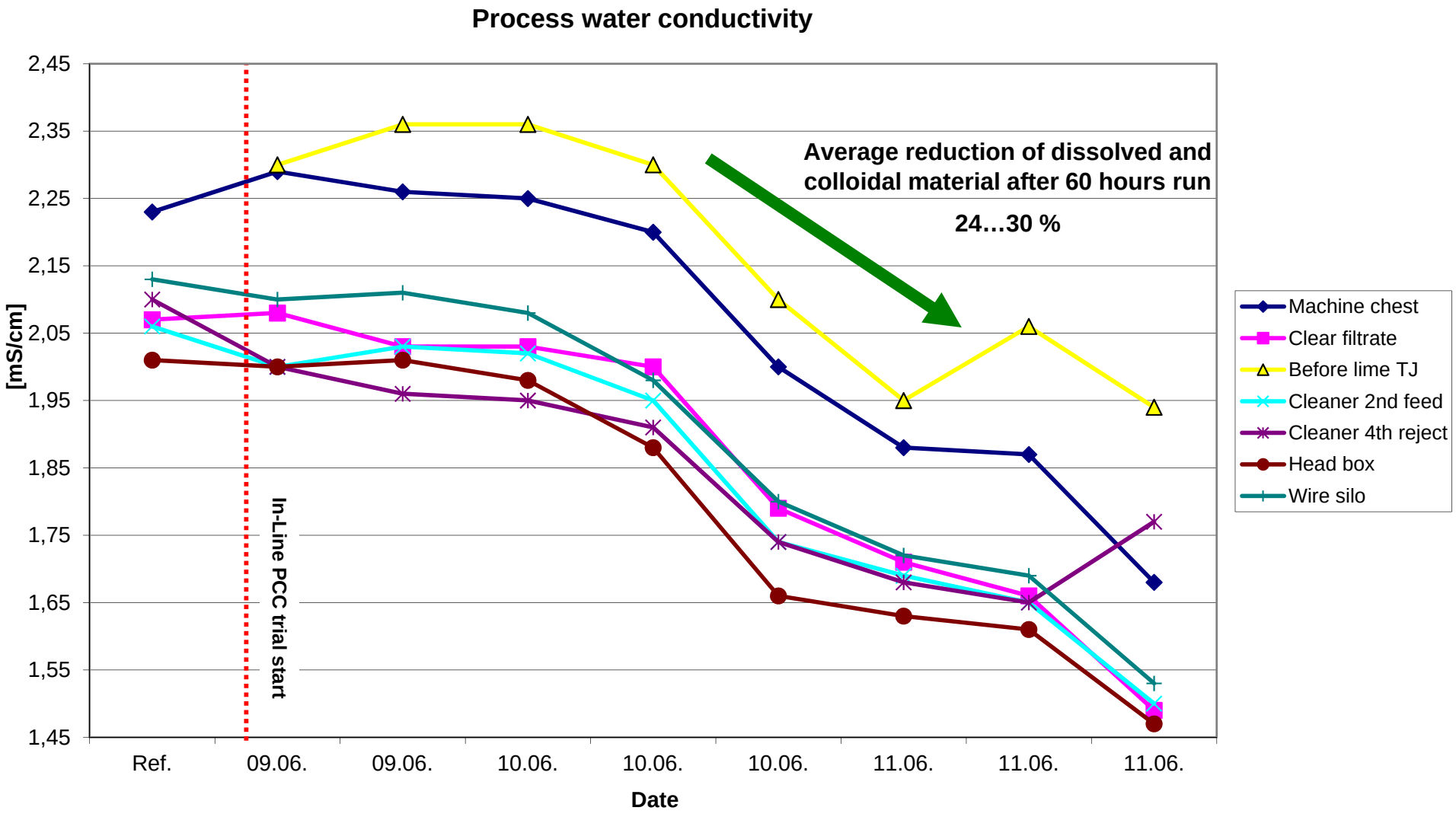
Trial with In-Line PCC (100% PCC)

Retention polymer -82%



In-Line PCC™

CASE A. Cleaning of paper machine water circulation



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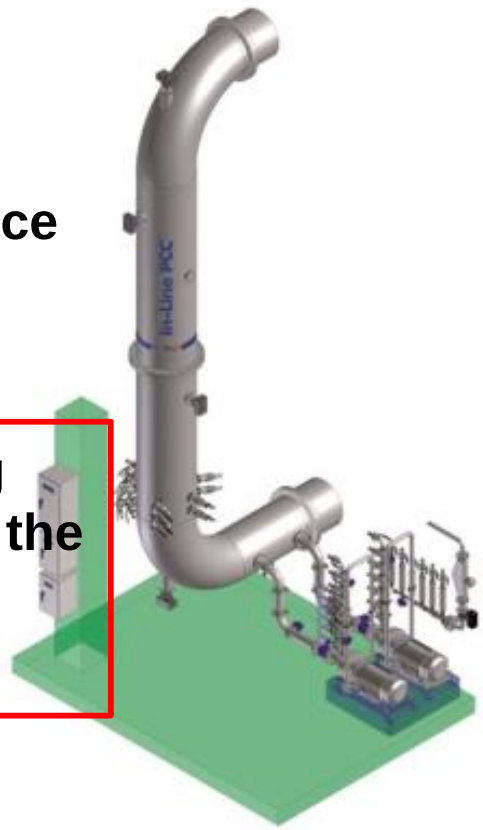
Finnish papermaker produces high quality SC paper 350.000 tons a year with In-Line PCC™ technology

In-Line PCC™ is a new straight forward filler – fiber composite manufacturing process consisting of TrumpJet Flash Mixing Reactor integrated into PM head box approach flow system, lime slaking and grit removal unit, carbon dioxide storage and dosing system.

In-Line PCC™ - calcium carbonate manufacturing process was installed at SC paper production line 1000 tn/d in Finland to produce precipitated calcium carbonate (PCC) loaded directly into papermaking stock generating filler–fiber composite.

Statement: Today the system is running well and the papermaking line is achieving the expected production. Results have exceeded the originally set objectives and profitability target of the total capital investment.

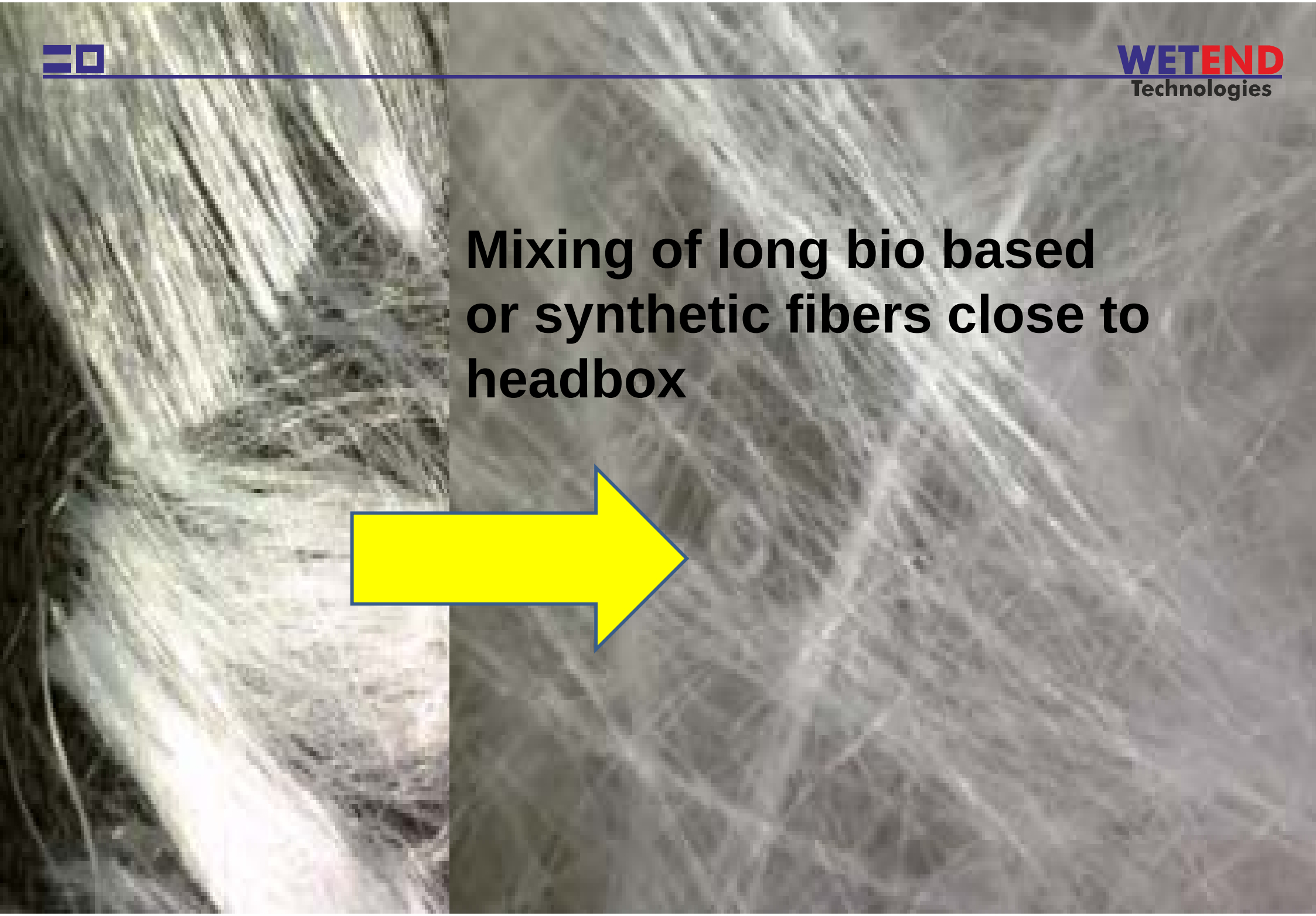


Trend: Replacings plastics by biomaterial

- Plastic bags are outlawed in multiple countries
- Plastics are replaced by fibermaterial in packaging and manufacturing
- TrumpJet Flash Mixing Reactor Technology brings new attractive tools for bio-based product development

France Bans All Plastic Dishware Starting in 2020

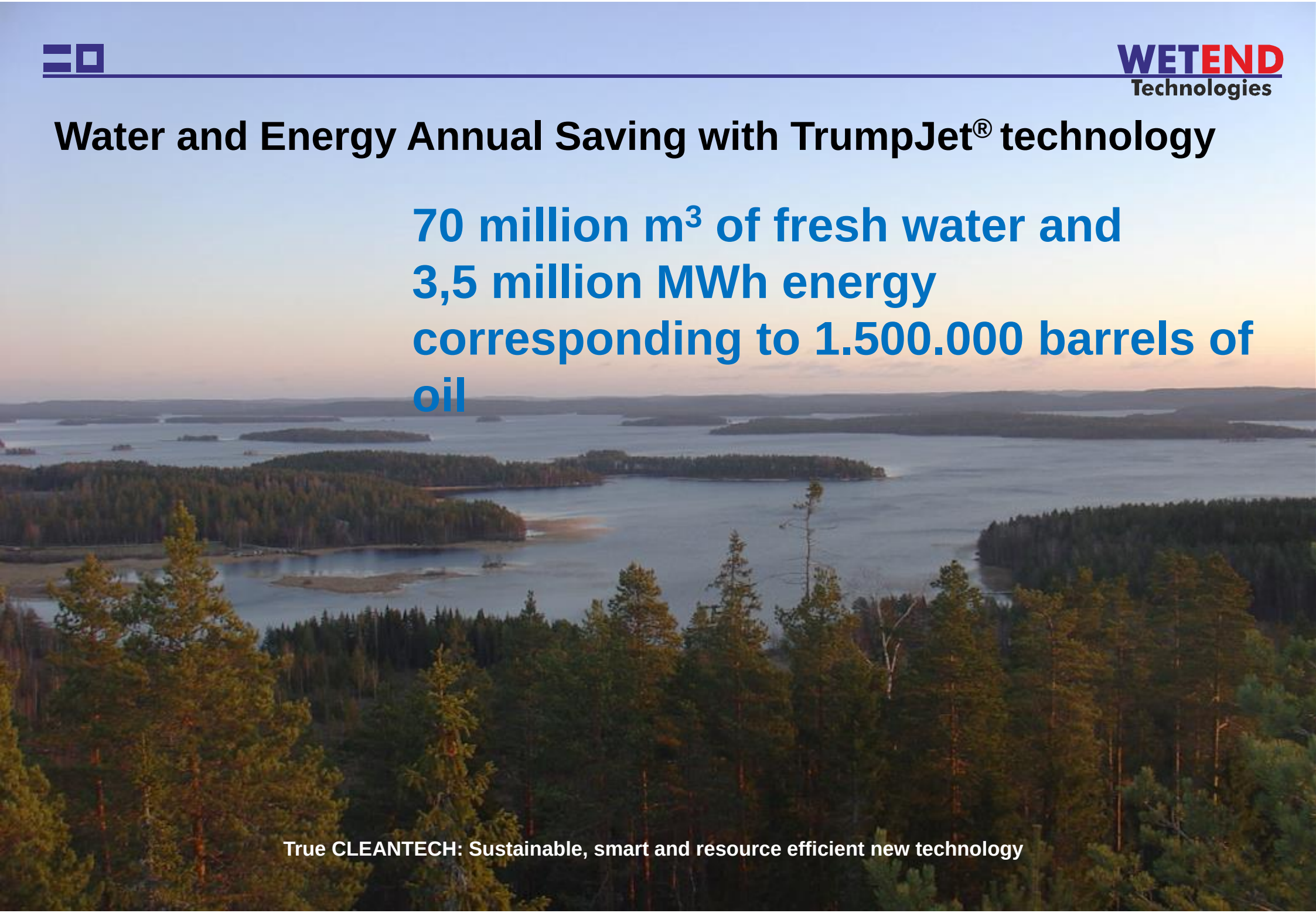
by David Z. Morris @davidzmorris SEPTEMBER 17, 2016, 5:12 PM EDT


WETEND
Technologies
Mixing of long bio based or synthetic fibers close to headbox

WETEND Technologies

Water and Energy Annual Saving with TrumpJet® technology

70 million m^3 of fresh water and 3,5 million MWh energy corresponding to 1.500.000 barrels of oil



True CLEANTECH: Sustainable, smart and resource efficient new technology

Kiitos!

Good mixing makes the difference

Jussi Matula
Jussi.matula@wetend.com
Wetend Technologies Oy

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