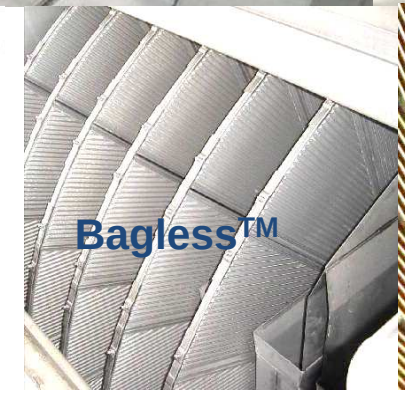
BlueLine –
Sustainable Solutions for Stock Preparation Plants

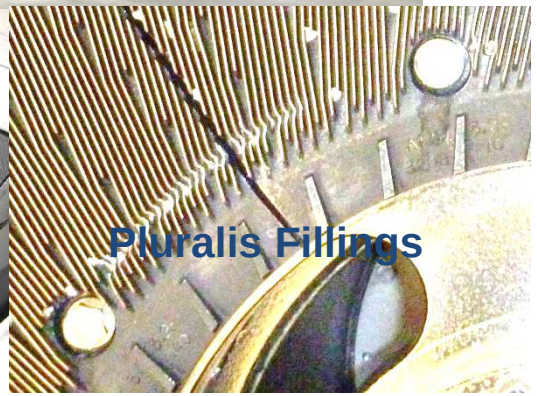
IntensaPulper™

IntensaMaxx™

EclipseRotor™
C-bar™ baskets



Bagless™



Pluralis Fillings

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Introduction

Rising energy and raw material costs are meanwhile the biggest cost drivers in paper mills all over Europe. Beside this, water consumption, chemicals, etc. are increasing the expenditures for papermakers, additionally. With the BlueLine family Voith Paper developed new plant components and also some re-designed equipment to support the paper industry regarding those challenges.

As pulping of the raw material is one of the biggest energy consumption processes in stock preparations, the Intensa series, like the IntensaPulper™ (off-set arrangement of rotor), was developed with the main purpose to decrease energy consumption at the same or even better flake reduction. This principle is adaptable to existing pulpers, as well as for most of the competitive products.
As the amount of impurities in the raw material is increasing day by day, the IntensaMaXX™ detrashing machine ensures a constant and reliable detrashing of the pulp at lowest fiber loss, wear and energy costs.

Regarding screening, new rotors as i.e. the EclipseRotor™ were developed, ensuring high capacity and high screening efficiency at lower energy consumption and wear. In combination with the constant enhancement of screen baskets it is possible to upgrade existing screening plants to highest performance.

Also in case of refining the principle of “low intensity refining” was developed further. With the family of Pluralis fillings nearly all double disc refiner types can be optimized regarding energy consumption and strength development.
Last but not least our DiscFilter technology with BaglessPlus™ segments made out of stainless steel will help reducing operating costs. With the BaglessPlus™ technology it is possible to rebuild nearly all kinds of Disc Filters to improve capacity, filtrate quality and yield as well as to reduce water consumption and maintenance

Experimental and Results

IntensaPulper™

- **Off-set arrangement of rotor**
- **Double cone bottom comes closer to the ideal circle-shaped**
- **Round tank has lowest flow losses**
- **Reduced energy for the same pulping quality**
- **Perfect turbulence and optimized flow with lower energy consumption than with previous pulpers**
- **Min. 20% Energy Savings compared to conventional pulpers**

Case Studies:

1. Rebuild of a 50 m³ Pulper to IntensaPulper™ (rebuild of existing pulper)

	Original Pulper	IntensaPulper	
Type	18DHPS	IP50	
Operating Volume	43 m³	50 m³	
Power Consumption	400 kW	420 kW	
Production	450 bdmt/d	850 bdmt/d	increase of 89 %
Flakes (Somerville)	25 %	12 %	improvem. of 48 %
Pulping/Accept Cons.	6/4 %	7/4 %	
Specific Power	21 kWh/t	12 kWh/t	savings of 57 %

Energy savings about 75.600 €/a!!

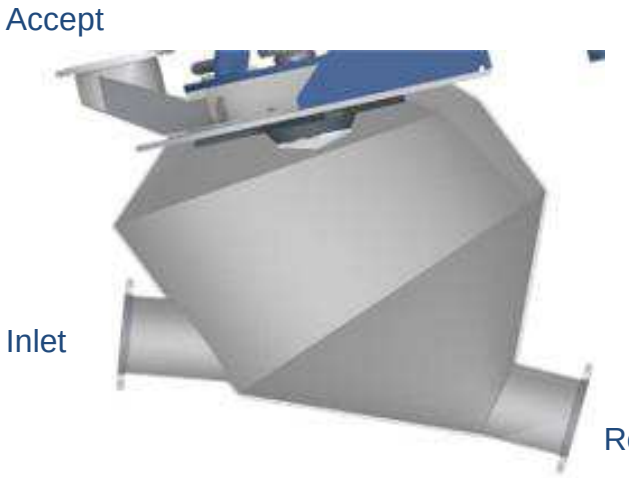
Case Studies:

2. Rebuild of KBC Pulper with PlateRotor & NDuraPlate_ES (rebuild of existing pulper)

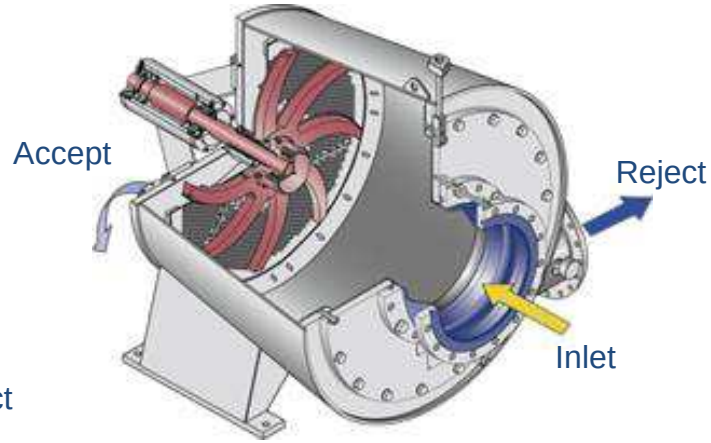
	Before	After	
Type	KBC Hydrapulper Continous		
Raw Material	OCC		
Throughput	382 bdmt/d		
Pulping Consistency	4,5 %	4,5 %	
Rotor Speed	192 rpm		
Installed Power	300 kW		
Power Consumption	247 kW	197 kW	savings of 20 %
Rotor Type	KBC Vokes Rotor	Voith PlateRotor	
Screen Plate	Standard hole plate	NDuraPlate ES	
Accept Flakes content	23,9 %	20,9 %	improvem. of 13 %

Energy savings about 29.400 €/a!!

IntensaMaXX™



Conventional detrashing machine



Why is the machine trouble-free?

Rotor on top

- **Difficult for big contaminants to flow against gravity**
- **Therefore less wear, no blockages, no rotor damages**
- **Reliability proven since decades in Contaminex™ CMV**

Asymmetrical Tank Design

- **Benefit of all the asymmetrical features helps to prevent rags and wear while keeping maximum turbulence**

Position of reject nozzle

- **Short & direct channel between feed & reject nozzle for quick reject extraction**
- **Lowest position of nozzles ensures rejecting of all types of rejects**

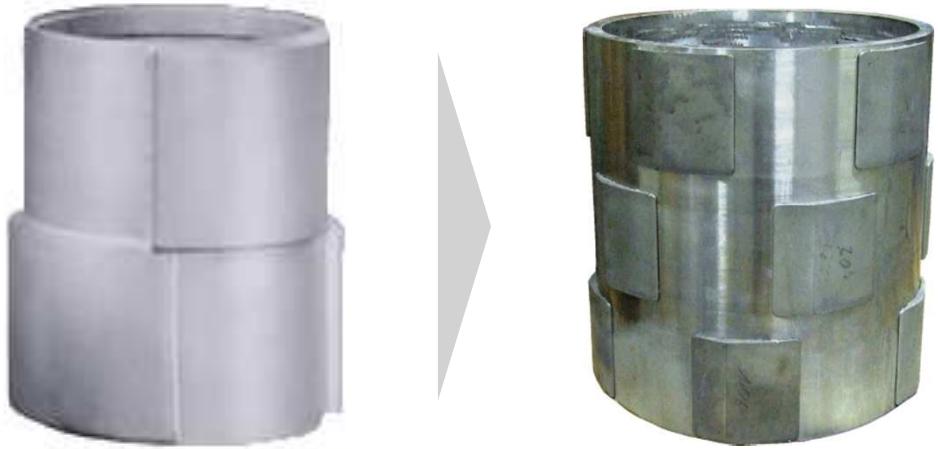
Case Study:

Rebuild of 2x Fiberizer to 1 IntensaMaxx

	Before	After	
Machine Type	2x F2-T.S	IM15	
Raw Material	OCC		
Throughput	1.000 bdmt/d		
Installed Power	2x 160 kW	75 kW	
Power Consumption	2x 128 kW	60 kW	savings of 77 %

Energy savings about 160.000 €/a!!

EclipseRotor for Screening Applications



StepRotor: 12,5 mm gap

EclipseRotor: 5 mm gap

- **Influence factors and weighting for rotor energy consumption:**
- **60% use of energy goes to blank rotor drum**
- **Remaining use of energy is influence able by:**
  - **- Quantities of Foils**
  - **- Arrangement on drum surface**
  - **- Height of Foils**
  - **- and Rotor-basket gap**
- **Whereby gap has biggest influence**

EclipseRotor for Screening Applications

Eclipse Performance:

- **Higher throughput performance up to 20%**
- **Specific use of energy reduced up to 45%**
- **Similar thickening factor for both rotor types**
- **Up to 30% higher screening efficiency**

Operational Recommendation:

- **For rebuild and new installation instead StepRotor**
- **Rotor tip speed 18 to 20 m/s**
- **Fiber consistency 2 to 4.5 %**
- **Used Rotor-Basket gap is 5 mm**
- **Basket combination: All styles**

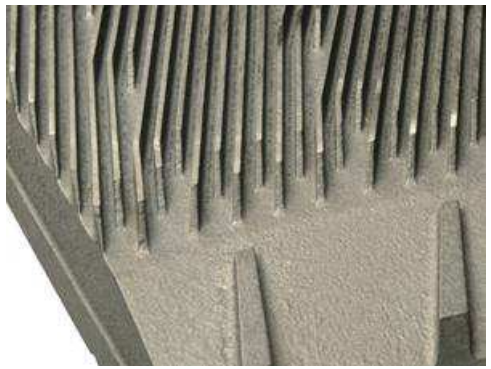
Case Study:

Corse Screening Rebuild of Black Clawson UV400 MC – hole screening primary stage

	Before	After	
Rotor Type	Black Clawson	Eclipse F	
Paper Grade	B&P		
Inlet Consistency	3,7 %		
Rotor Speed	20,2 m/s	18 m/s	
Power Consumption	93 kW	62,5 kW	savings of 33 %

Energy savings about 18.000 €/a!!

Pluralis Fillings for Refining Applications



Flow optimized bar and groove design

- **Higher hydraulic capacity**
- **Smooth surface**
- **Low draft angle**

Designed for different fiber types

- **Pluralis effect treats higher number of fibers more uniformly (Larger plate gaps)**
- **Inlet area adapted to process requirements**
- **Target optimal cutting edge length (CEL) for each fiber type SSF/SF/IF/LF/AO/CF**

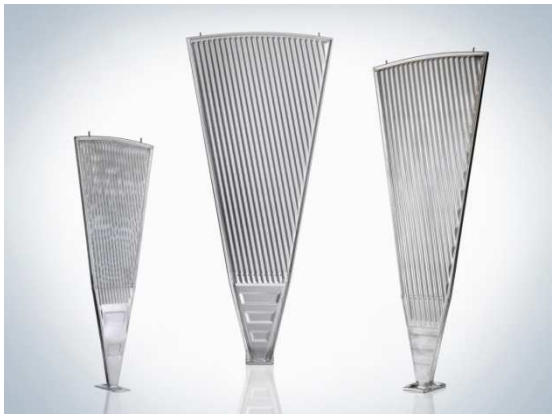
Case Study:

Pluralis vs. Techmelt fillings for LBKP – 30” 1SDM Refiner

	Techmelt	Voith Pluralis SSF
Bar width	1,7 mm	1,3 mm
Groove width	2,0 mm	2,3 mm
Cutting edge length (CEL)	100 %	108 %
Hydraulic capacity	100 %	124 %
No-load power (water)	100 %	100 %

Energy savings about 75.000 €/a!!

Disc Filter Rebuilds for nearly all Disc Filter Applications



BaglessPlus™ Sectors

Shower nozzles

Filtrate valve

- **Highest stable filtrate quality over the whole lifetime of BaglessPlus due to endurable & high end design of sector → ROI < 0.8 year!**
- **Lowest maintenance and operation cost due to long lifetime of Bagless**
- **Highest capacity due to corrugated surface of discs, optimal knock off with nozzles and/or HiCon installation**
- **Clear defined split in cloudy, clear and/or super clear filtrate by the filtrate valve due to high constant vacuum**

Case Study:

Rebuild of 4x GL&V saveall disc filter 520 in China 2012, board and packaging application

Superclear filtrate	Before	After rebuild
PM3	160 to 370 ppm	25 to 35 ppm
PM4	200 ppm	40 ppm
PM5	150 ppm	25 to 35 ppm
PM13	150 ppm	20 to 30 ppm

Results and Benefits

- Fresh water savings
- 80 % reduction in super clear filtrate consistency
- Capacity increase possible by up to 25 %
- Reduction in heat and chemical consumption
- Reduction of solid material losses to effluent

Value Added Savings

- Payback calculated to 8 to 12 months
- Savings in retention chemicals
- Less maintenance

Conclusion and Acknowledgement

Voith Paper Fiber and Environmental Solutions (FES) has a lot of machine parts and equipment to help our customer saving energy, improving quality and increasing easily the production.
Furthermore FES provides tailor-made rebuild offers based on an experienced survey from our Voith experts.

References

- **IntensaPulper™ - new**

Saica PM11 in GB, **73 m³ for 1040 t/d EOCC (2012)**
Wuxi Long Chen (PRC), **73 m³ for 650 t/d COCC/EOCC (2012)**
Houli Cheng Loong (ROC), **95 m³ for AOCC/TOCC (2011)**
Donghae (Korea), **40 m³ for 150 t/d BCTMP (2010)**
Dunaujvaros (HU), **120 m³ for 1440 t/d OCC (2009)**
Soka Mill (JP), **60 m³ for MW (2008)**

- **IntensaTechnology™ - rebuilds**

Atena (JP/2013), **B/P grade:**
KBC 14DHPSC, new equipped with Intensa™ rotor, deflector, rotor cap and vat modification
CMPC Maule (Chile/2012), **B/P grade:**
Voith VS40, new equipped with Intensa™ rotor, deflector and rotor cap
Procor (Bra/2011), **Tissue grade:**
Voith UP90, new equipped with Intensa™ rotor and rotor cap
Stockstadt (DE/2010), **graphical grade:**
Andritz Fiber Solve, new equipped with rotor modification and deflector
Thai Paper (TH/2009), **B/P grade**:
Tampella HD5500, new equipped with rotor modification, deflector, bale breaker and services

- **IntensaMaXX™**

Varel (DE/2012), **B/P grade: IM15**
Thai Union Bangkok (TH/2012), **B/P grade: IM08**
Kreuzau-Metsä (DE/2012), **B/P grade: IM30**

- **EclipseRotor for Screening Applications**

Freital (DE/2012), **OmniScreen OS8 MC - slot screening primary stage**
Freital (DE/2012), **OmniScreen OS4 MC - hole screening primary stage**
Freital (DE/2012), **OmniScreen OS2 MC - hole screening secondary stage**
Paprinsa (E/2013), **Black Clawson UV400 MC - hole screening primary stage**

- **Pluralis Fillings for all Refining Applications**

Varel (DE/2012), **OCC: Voith TF3E**
Hillegossen (DE/2012), **BSKP/BHKP: Voith 1SDM**
Krapkovice (PL/2012), **virgin & DIP: Voith TF1E**
Burg (DE/2011), **OCC: Voith TF3E**
West Carrolton (USA/2010), **DIP: Beloit DD**
SCA Ortmann (A/2010), **DIP: Sprout**
Dunaujvaros (HU/2009), **OCC: Voith TF4E**

- **Disc Filter Rebuilds mainly Saveall DF**

Aisa especially Lee&Man (PRC/2012), **DF from Andritz and GL&V**
NAFTA countries, DF from GL&V, Beloit, Dorr Oliver and Andritz/Impco