



#### **ANDRITZ GROUP**

# LATEST INNOVATIONS IN SCREENING AND DEWATERING

21.11.2019 DITP POSTOJNA



ENGINEERED SUCCESS

## **CHAPTER OVERVIEW**



**PRIMESCREEN X – HIGHER PERFORMANCE, EASIER MAINTENANCE** 

**1 2** VERTICAL SCREW THICKENER – GOING VERTICAL IN DEWATERING

PULP & PAPER

# **PrimeScreen** X

THE NEXT GENERATION IN SCREENING AND FRACTIONATION



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#### Higher performance, easier maintenance



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#### Customer demands and market needs in screening

- Enhanced energy efficiency and screening performance
- Improvements in maintainability



- New screen rotor design *Prime*Rotor and foils
- PrimeScreen X with top-down concept

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Top-feed inlet of stock

#### **BENEFITS**

- Quick removal of heavy contaminants Taking advantage of gravity
- Long life time of rotor/screen basket Abrasive rejects don't flow through the entire screen
- Easier integration into the screening room No extra pipes in the cover for air bleeding







Easier maintenance – rotor

#### ROTOR

Streamlined rotor attachment

Drive flange connection to the rotor hub for quick and easy maintenance or replacement



Easier maintenance – basket

#### BASKET

Clamped screen basket fixing
 Very easy basket changes – much faster than with
 conventional screens



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### **PrimeScreen X**

#### Enhanced geometry

#### GEOMETRY

- Optimized height-to-diameter ratios of the screen basket
- To meet requirements of: Different furnishes and various applications
- Lower thickening factor Better control of fiber loss Reduced potential for plugging





#### Rotor and foil design

#### DESIGN

- Improved screening efficiency and better stickies removal
- Significantly lower power consumption Energy savings up to 25%\* depending on supplier and application
- Rotor can be installed in any screen type available on the market







Pilot plant trials – foil design



Corresponding to an OCC line (capacity:1,350 bdmt/d, electricity price: 10 c/kWh, configuration: 2-stage fractionation and fine screening)



Pilot plant trials – foil design





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Case study 01, China

#### **Customer's requirements:**

- Improvement of the fine screening performance
- Lower energy consumption in fine screening

#### Approach:

Upgrade existing primary fine screening stage by installing a ModuScreen F with *Prime* foils

#### Case study 01, China

Furnish / final product	OCC / liner grades
Production	1,350 bdmt/d
Position	1 <sup>st</sup> stage LC screening
Screen type	ANDRITZ F50 (two units) Both equipped with <i>Prime</i> foil
Sticky removal	98.0% / 95.4%
Energy consumption	~ 20kW/m <sup>2</sup>
Reject rate	Below 20%
Tip speed	17m/s, further potential for tip speed reduction



Inlet

# 30000 25000 20000 15000 10000 5000 0

Accept

# Case study 01, China Screen #1 Sticky reduction

### **PrimeScreen X**





Case study 02, China

#### **Customer's requirements:**

- Improvement of the coarse screening performance
- Lower energy consumption and achieve longer basket life time

#### Approach:

Upgrade primary coarse screening by installing a *Prime*Screen X in parallel to an existing conventional screen (other supplier) Case study 02, China

Furnish / final product	OCC
Production	1,350 bdmt/d
Position	1 <sup>st</sup> stage coarse screening
Screen type	<i>Prime</i> Screen X50 in a conventional screen installed in parallel
Stickies reduction	77.5 %
Energy consumption	103 kW
Reject rate	13.9 %
Thickening	1.38









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### **PrimeScreen X**

**PrimeScreen X** 

Case study 02, China

	Flow (l/min)	Consistency (%)	Mass (t/d)		Flow (l/min)	Consistency (%)	Mass (t/d)
Inlet	15,073	3.25	705.4	Inlet	15,962	3.20	735.5
Outlet	14,059	3.11	629.6	Outlet	14,346	2.88	595.0
Reject	1,515	4.50	98.2	Reject	1,615	4.70	109.3

Competitor



Case study 02, China

**PrimeScreen X** 

#### **PrimeScreen X**

Installed motor (kW)	Motor Ioad (%)	Power consumption (kW)	Specific energy consumption (kWh/t)
132	78	103	3.50

#### Competitor

Installed motor (kW)	Motor Ioad (%)	Power consumption (kW)	Specific energy consumption (kWh/t)
250	69	173	5.63





	Reject rate (%)	Stickies (mm²/kg)	Sticky reduction (%)	Somerville residual (%)	Somerville reduction (%)
Inlet	-	81364.3	-	6.92	-
Outlet	-	18328.4	77.5	0.9	87.0
Reject	13.9	-	-	-	-





#### Case study 02, China

**PrimeScreen X** 

#### Competitor

	Reject rate (%)	Stickies (mm²/kg)	Sticky reduction (%)	Somerville residual (%)	Somerville reduction (%)
Inlet	-	61430.5	-	6.28	-
Outlet	-	26775.9	56.4	1.62	74.2
Reject	14.9	-	-	-	-





#### Case study 02, China – achieved results



- Reduced thickening with improved accept quality reducing loading on later stages
- Energy consumption decreased by 40%, from 173 kW to 103 kW
- Basket life time more than doubled, from 6-8 months to almost 2 years
- Very stable runability right after the start-up ٠



## PULP & PAPER

# Vertical Screw Thickener

GOING VERTICAL IN DEWATERING



ENGINEERED SUCCESS

Going vertical in dewatering

The pioneering Vertical Screw Thickener is a screw press with a vertical configuration and a very small footprint, making it also suitable for retrofit installations in existing buildings.



- Applicable for all kinds of pulp in the paper industry (chemical long- and short fiber, recycled fiber, mechanical pulp,...)
- With the possibility of different screw designs a variation of outlet consistencies is possible.
  - → Outlet consistencies from about 20% (medium consistency = MC)
    up to 35% (high consistency = HC) or more depending on the feedstock
     for different applications are feasible.
- Gravity-aided filling uniform dewatering from top to bottom
  Use of entire dewatering area thanks vertical arrangement
  → 100% filling degree

Filling is not limited by pulp transportation at low feed consistencies, but automatically achieved by gravity all around the basket.









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Increased throughput with wood kraft pulp - VST compared to SCP



#### Nomenclature



Example:	VST1005	Vertical Screw Thickener
		→ Screw diameter = Ø100 cm
		$\rightarrow$ Active dewatering length = 5 m





#### Operating conditions

Applicable for	All kinds of pulp
Beating degree	14 – 65 °SR
Feed consistency	3 – 8%
Outlet consistency	20 – 35%
Temperature	30 – 95°C
рН	4 – 10







#### Advantages



No bending force on screw shaft



Even dewatering from top to bottom

No fluctuations to sub-sequent equipment

Increased throughput and dryness

No leakage

Small floor space (smallest footprint)

Very robust design

No bending force on screw shaft

Increased lifetime of wear parts (symmetrical loads on screen basket)





#### VST453, Stock Preparation Pilot Plant, Graz



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#### Site erection: VST1004, Thailand





#### Site erection: VST1005, Austria



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