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Pulp & Paper

ShortFlow Deaeration

38th International DITP Symposium, November 2011

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ShortFlow Deaeration

Introduction

- Effective air and gas management is essential for high quality Paper and Board production
- Complete deaeration of stock and wire water is still standard practice today with high speed paper machines, especially those producing Printing & Writing grades
- Effective air removal is also becoming more important for other grades, for example fast board machines utilizing recycled fiber as a raw material
- Recently more attention has been focused on this area with smaller volume approach systems where the wire water is deaerated
- Partial deaeration is sufficient for certain applications

ShortFlow Deaeration

Recommendation for system design

As a general rule and instruction for board grades the following values should not be exceeded:

Wire speed [m/min]		
<1000	<1500	≥1500
<1.4%	<0.7%	<0.2%
Entrained air (free and bound) excluding dissolved gases		

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Air removal from white water

- Entrained air (air bubbles) is removed easily from white water under vacuum
- Entrained air removal doesn’t require boiling point vacuum
- Single vacuum pump system is sufficient
- No condenser is required
- Variable speed drive for vacuum adjustment to provide optimum deaeration performance
- Reduced energy consumption
- Low cost vacuum system

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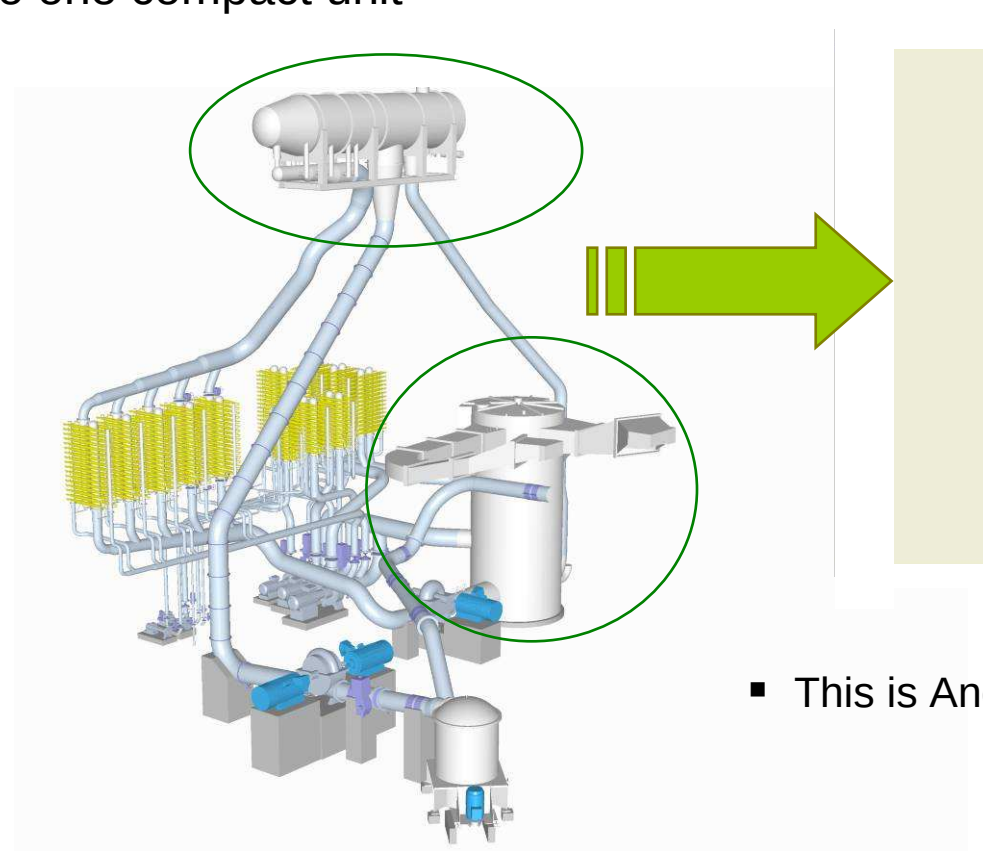
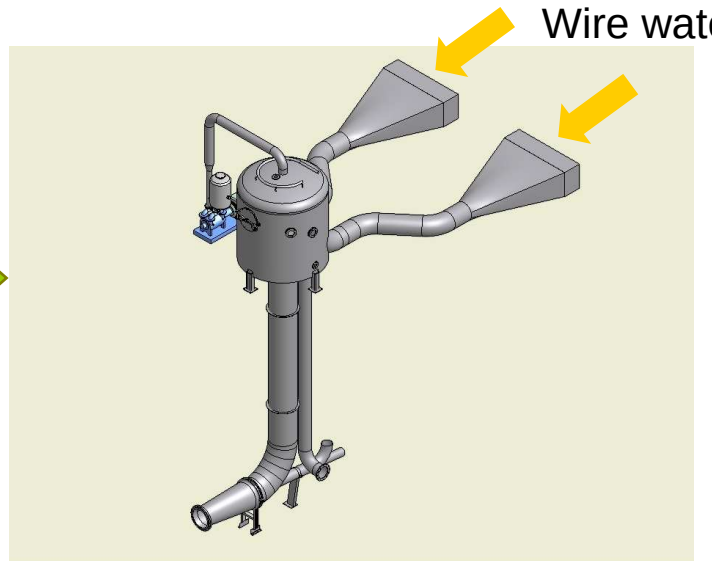
ShortFlow Deaeration

Innovation

- ANDRITZ ShortFlow deaeration is an advanced wire water deaeration system
- This system combines the existing white water silo and conventional deaeration into one compact unit



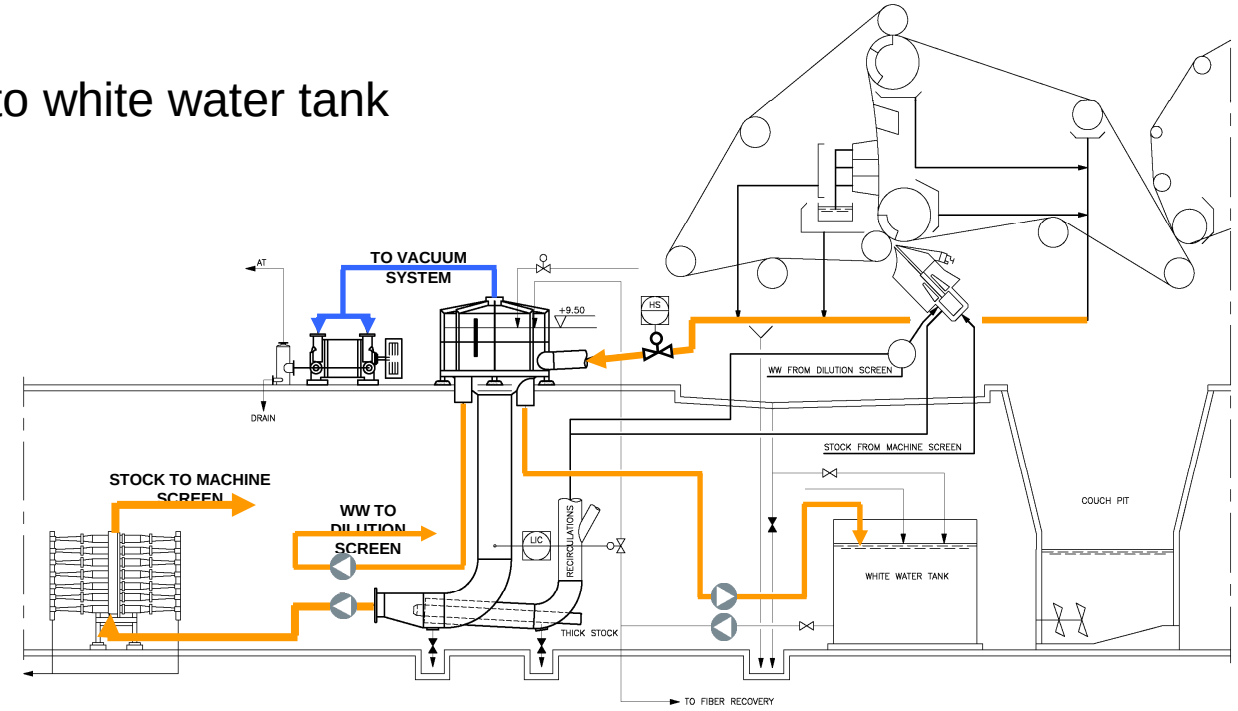


- This is Andritz solution for partial deaeration

ShortFlow Deaeration

Innovation

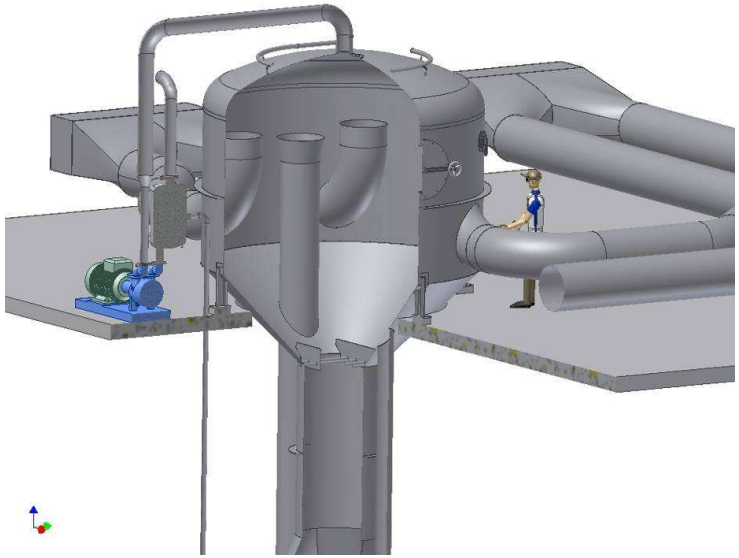
- The ShortFlow deaeration system collects wire water and former water to a deaeration tank, where a vacuum is applied
- Water from the paper machine is transferred to the deaeration tank through the transition pipes
- Overflow is pumped to white water tank

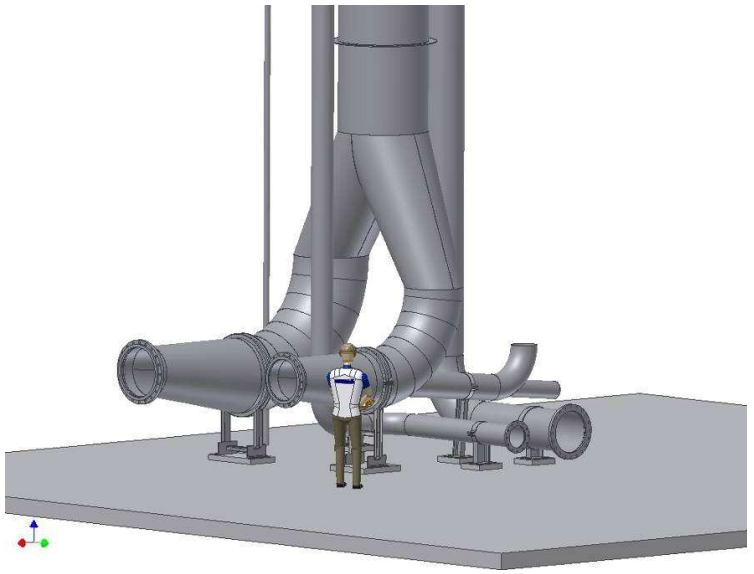


ShortFlow Deaeration

Innovation

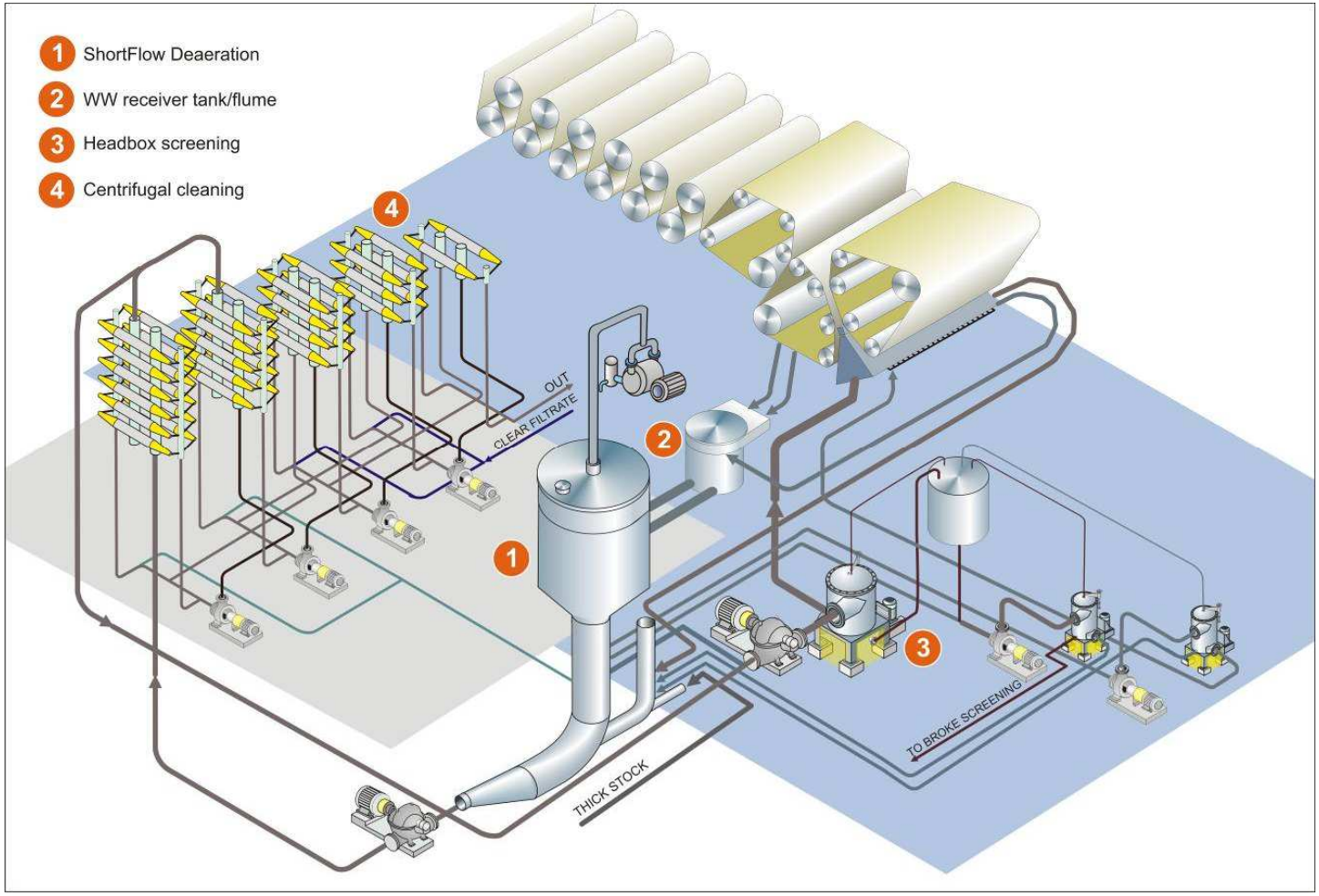
- Water is brought to vacuum space above the liquid level in the deaeration tank in order to prevent air submergence
- New ShortFlow deaeration system is adaptable innovation to all paper and board making processes where complete deaeration is not required
- It is applicable for new and existing paper machines





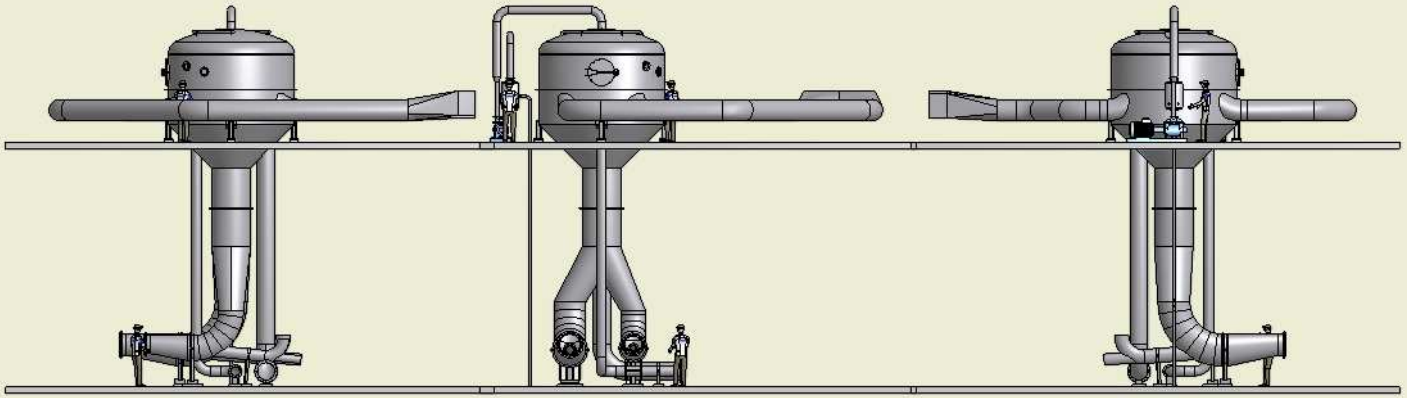
ShortFlow Deaeration

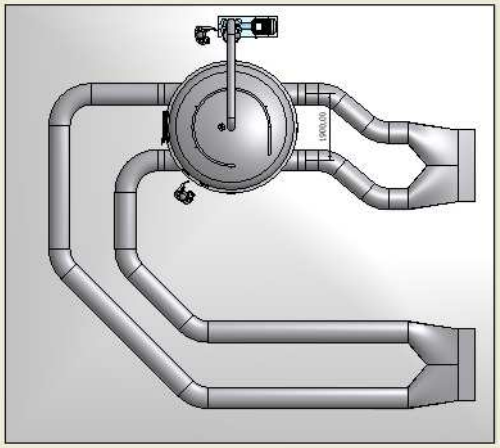
Typical installation diagram

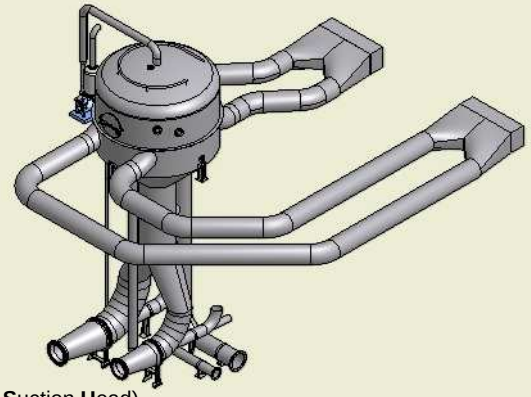


ShortFlow Deaeration

Typical layout







Pump calculation:

- NPSH (**N**et **P**ositive **S**uction **H**ead)
- In pumping conditions must be valid: **$NPSH_a$ > $NPSH_r$**

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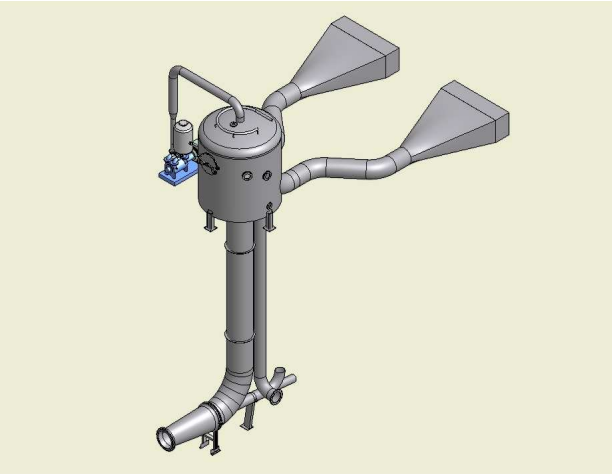
Operational results

- PM speed 800 m/min
- Graphic paper 90 g/m²
- Dilution headbox
- Deaerator vacuum -70 kPa … -85 kPa



Headbox HC manifold consistency:

- The coefficient of variation (cov) of the stock consistency variation is 0.8 % or less measured from HC line headbox manifold

Deaeration - Total air content:

- Total air content at the headbox less than 1.5% (incoming air content approximately 3.5%)
- Dilution water total air content less than 0.7%

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Features and benefits

Features	Benefits

▪ Easily adaptable design
▪ Flexible layout
▪ Single vacuum pump system
▪ No condenser required
▪ Variable speed drive for optimized vacuum adjustment
▪ Reduced amount of piping
▪ Reduced volume of approach system
▪ Best process cleanliness with polished surfaces
▪ Adaptable to all applications where complete deaeration is not required
	▪ High paper quality
	  ▪ Better sheet formation
	  ▪ High system stability
	  ▪ Less pin holes
	▪ High runability
	  ▪ Improved drainage
	  ▪ Increased productions
	  ▪ Increased machine efficiency
	  ▪ Reduced grade change times
	▪ Reduced energy consumption
	▪ Less cost
	  ▪ Lower investment cost
	  ▪ Less chemicals needed (less defoaming chemicals and less biocides)

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