Operation of Multistage Drum Displacement (DD) Washers and Improved Efficiency with Continuous Process Measurements
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Operation of multi-stage Drum Displacer and optimization possibilities with continuous process measurements

We accept the challenge!

DD Washer main features

- Compact and efficient

- Environmentally friendly

- Fractional washing - enables innovative circulation of filtrates with different properties

- Enables a wide variety of washing configurations in a single Drum Displacer®

- Wide inlet consistency range

- Low power consumption

- Low filtrate fiber content
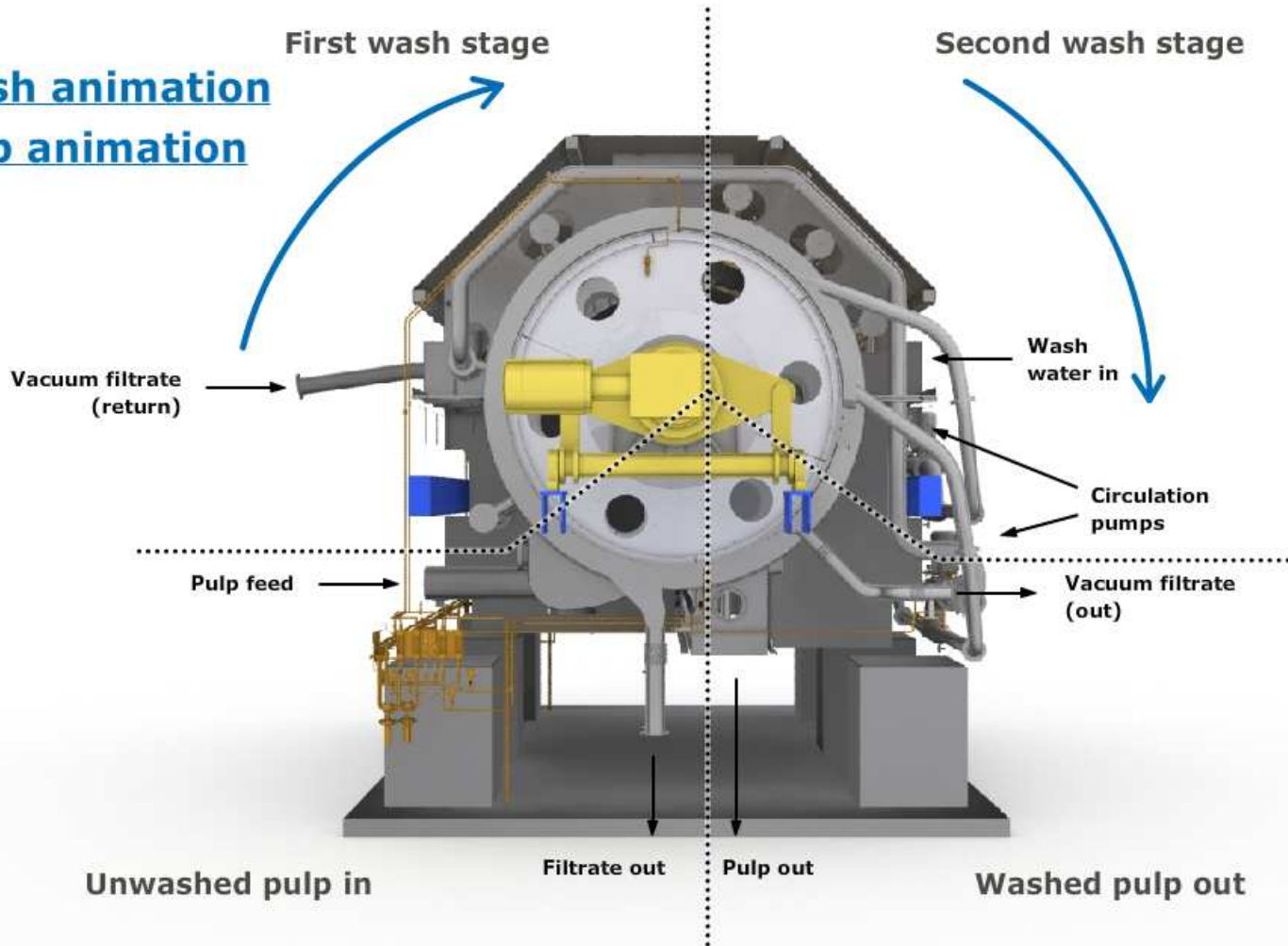
- Wide product range

- High unit capacity

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Applications

DD Washers in fiberline

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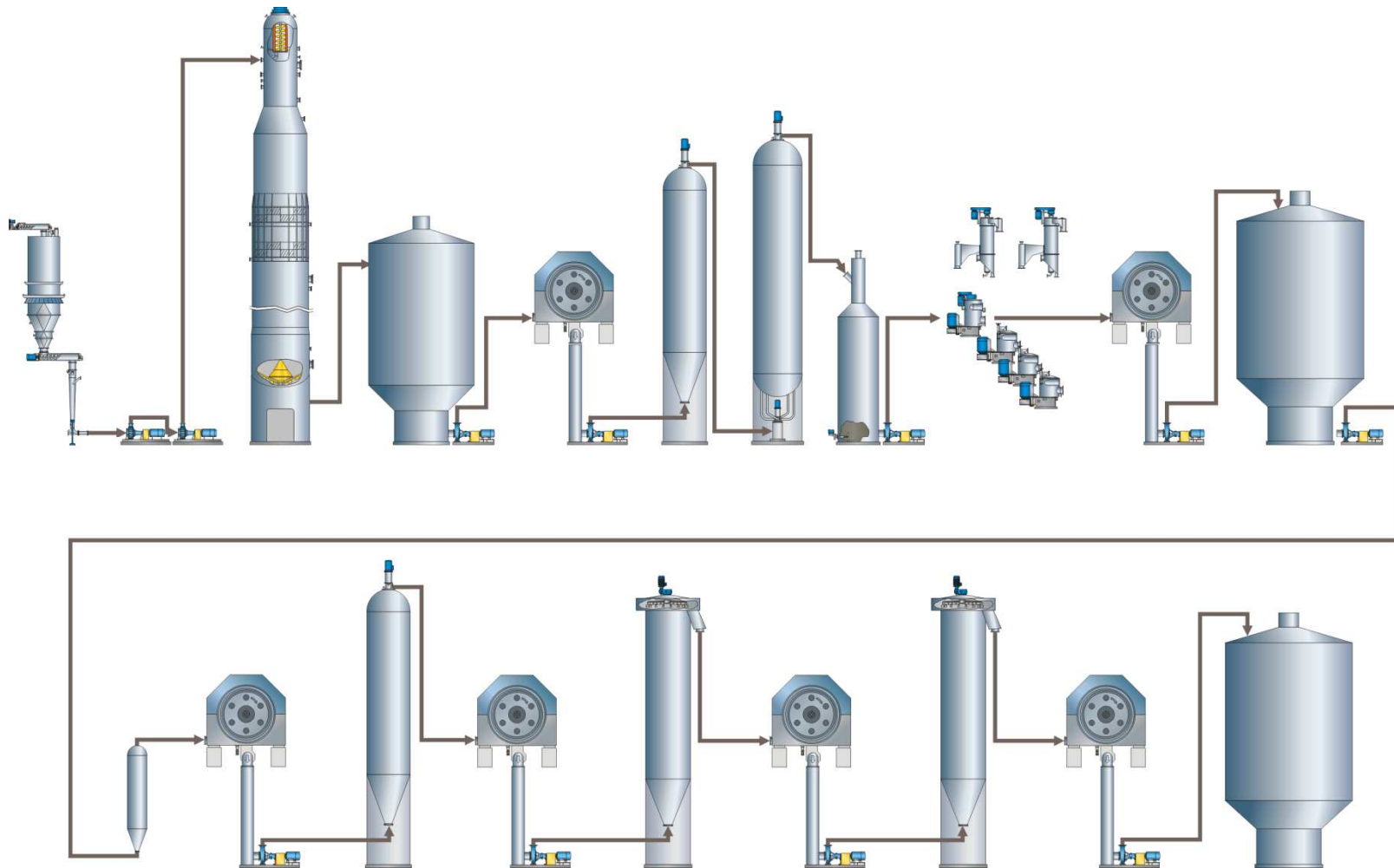
Operation principle (3)

2-stage DD Washer
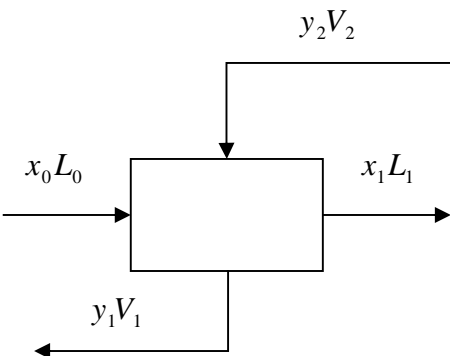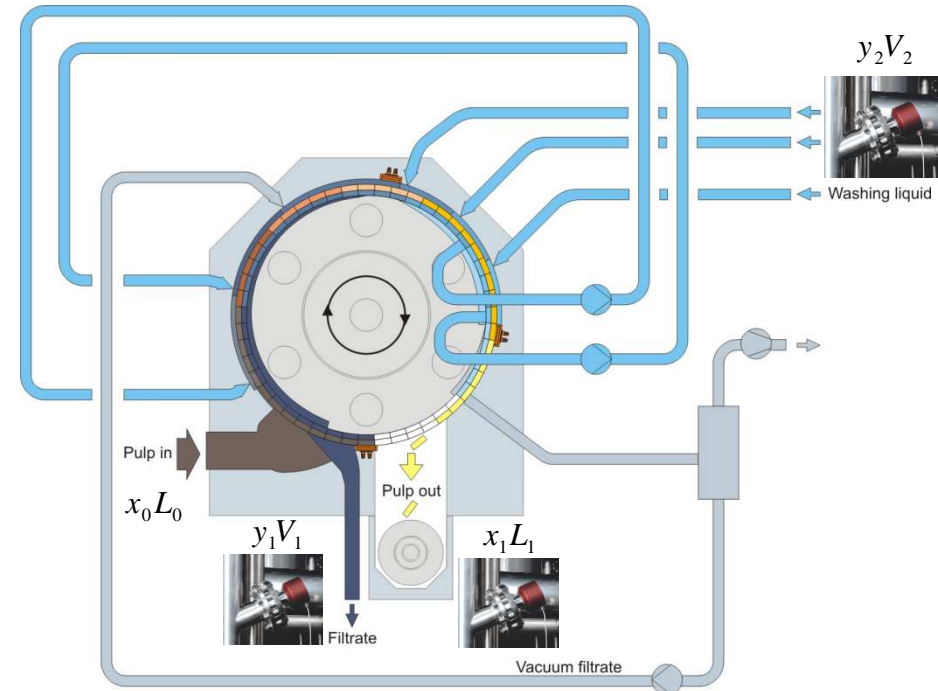
Washing Efficiency (1)

Washing efficiency with refractive index measurement

- The modified Nordén efficiency factor

$$E_{10} = \frac{LN \frac{L_0}{L_1} \frac{(x_0 - y_1)}{(x_1 - y_2)}}{LN\left(1 + \frac{DF}{Z}\right)} = \frac{LN\left(1 + \frac{DF}{L_1} \frac{(y_1 - y_2)}{(x_1 - y_2)}\right)}{LN\left(1 + \frac{DF}{Z}\right)}$$

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Washing Efficiency (2)
DD Washer efficiencies

Number of Washing Stages	Feed consistency %		Discharge consistency %	E10 value at DF 2.5
	LC-Feed	MC-Feed		
1-Stage	4–6	8–10	12–16	4–6
1,5-Stage	4–6	8–10	12–16	6–8
2-Stage	4–6	8–10	12–16	8–11
3-Stage	4–6	8–10	12–16	11–13
4-Stage	4–6	8–10	12–16	13–16

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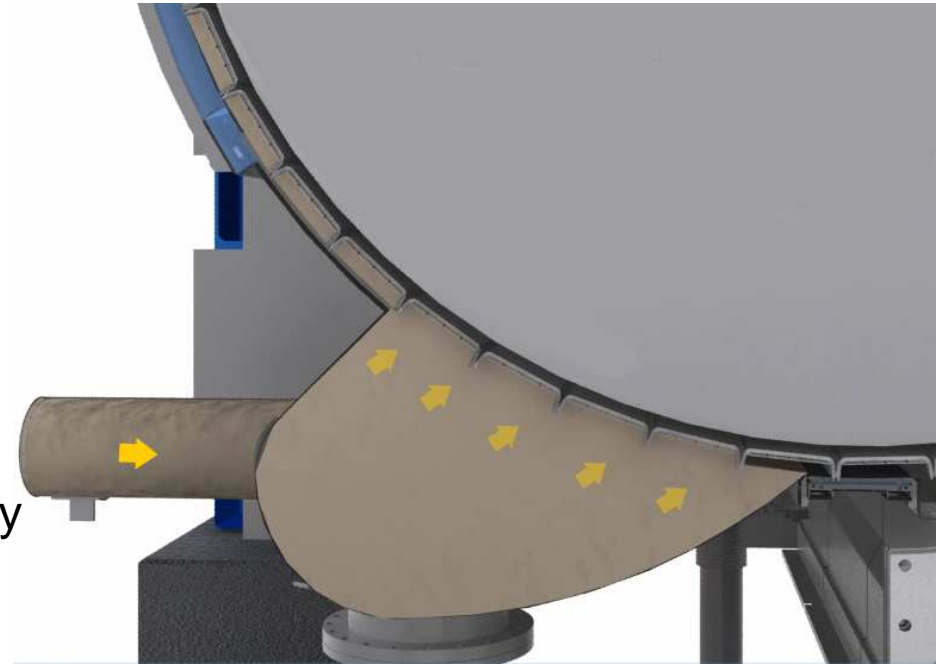
Washing Efficiency (3)

Case1: Feed box

Cake formation in the feed box is the base for efficient washing.

Main targets
- pocket totally filled with pulp
- air lead through the end valve to exhaust system
- porous cake with high wash consistency

Optimal feed pressure/consistency combination can be found with online washing efficiency calculation
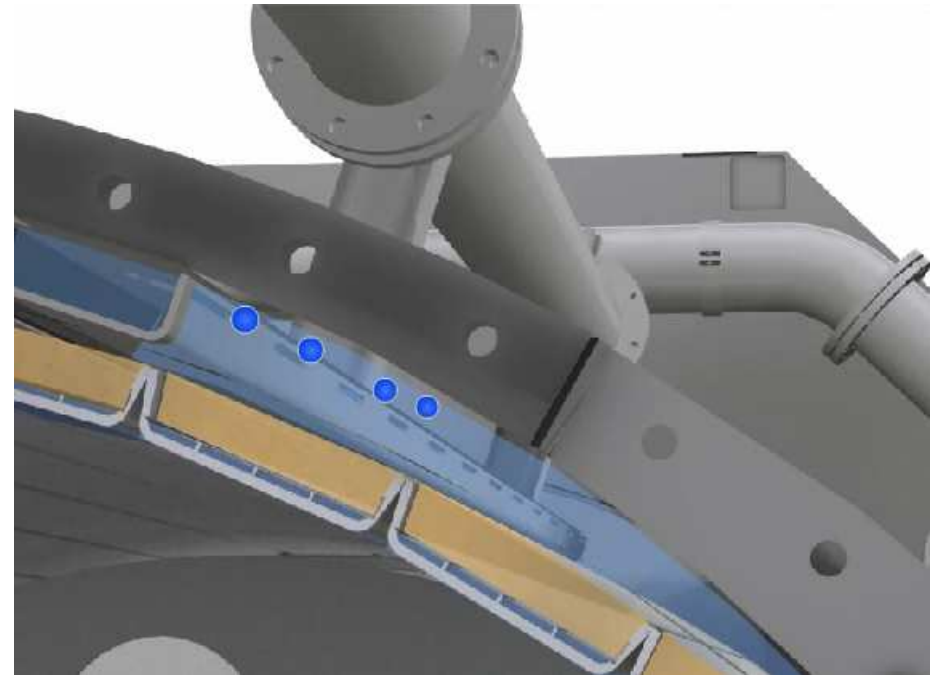
Washing Efficiency (4)
Case2: Wash Sector

Right drainage demand is the key for efficient displacement washing.

Main targets:
- pressure difference over the cake on desired level at every section including wash filtrate circulation

Optimal dilution factor can be found with online washing efficiency calculation

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Washing Efficiency (5)
Case3: Monitoring

Despite following the recommended operating procedures, malfunctions may occur, due to wear and tear or other mechanical faults.

Main targets:
- notice hidden faults as ASAP

Possible mechanical faults and consequent changes in the operation of the washer can be seen immideately with online washing efficiency calculation

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DD Washer Efficiency with online measurements
Conclutions

- The modified Nordén efficiency factor for DD Washers can be calculated online based on the refractive index measurement
- The result can be used to achieve optimal running conditions by changing operating parameters and monitoring the changes
- Possible mechanical faults and consequent changes in the operation of the washer can be seen immideately with online washing efficiency calculation
- Online measurement of washing efficiency has positive impact both economically and environmentally

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Any questions?

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