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Chip washers – do we need them?

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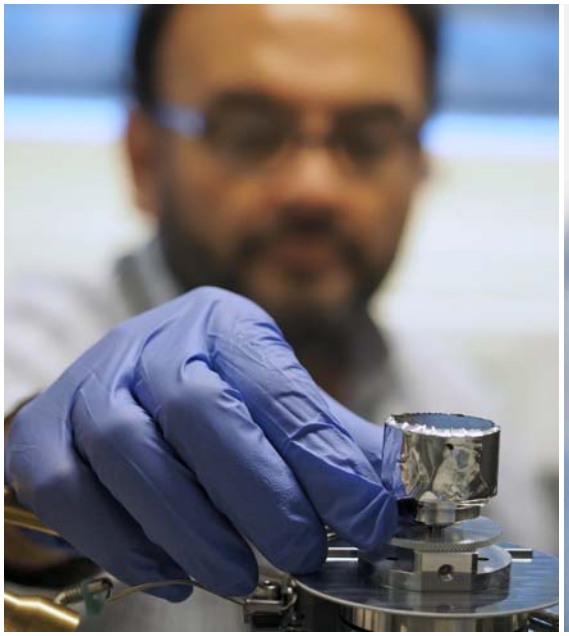
11th Fundamental Mechanical Pulp Research Seminar 2019

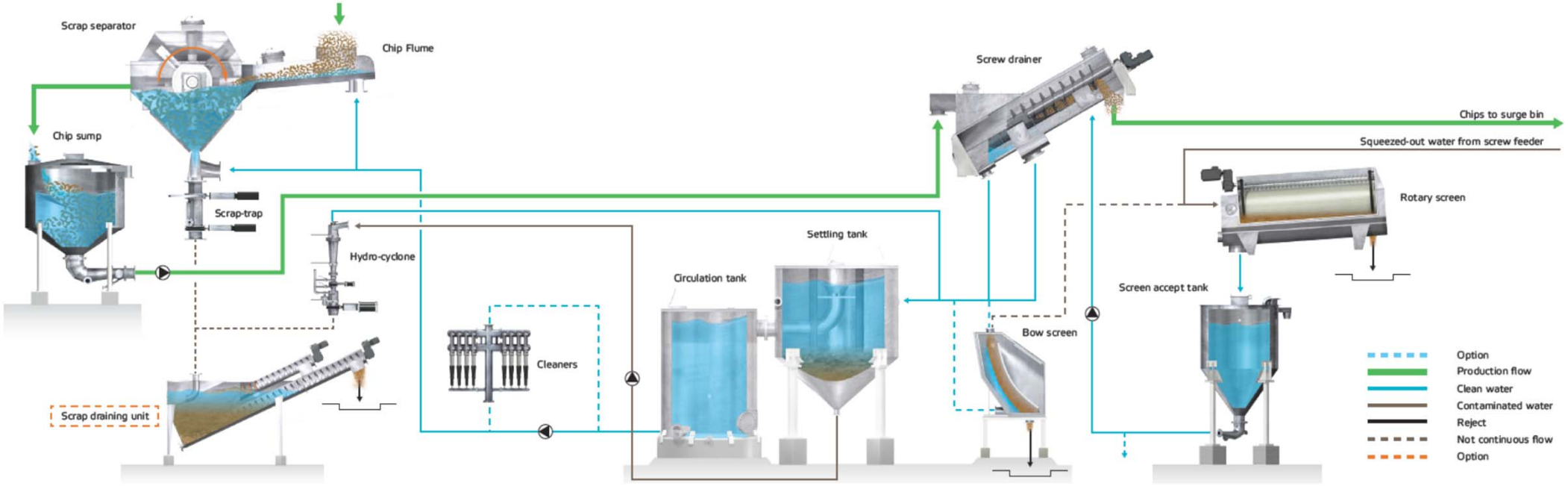
RISE PFI AS



Background

- The chip washer is one of the first unit operations in the mechanical pulping process
- There are few differences in the washer-designs, regardless of the manufacture company
- A chip washer should be a cheap and well running unit, witch do not use too much water and has a low demand of maintenance
- Many mills have a fixed addition of water to the chip washer. This means that the concentration in the chip washer will vary with the production. This can give disturbance forward towards the refiner and the washing efficiency will vary.
- Typical levels of sand and dirt in chips can be from 0.1-1%. If we consider a TMP line using 30 ton/h this means that 720-7 200 kg of sand per day will enter the mill.

Flow sheet of the chip-washing process



(Valmet chip-washing system)

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Experimental

- The frozen chips were steamed at 65 or 85°C for 3 min using an laboratory autoclave
- The chips were washed at 5% consistency in a Thermomixier rotating at 500 rpm at 45, 65 and 85 °C
- The time in the mixer was varied between 0, 30 and 60 s
- The water used in the mixer was **tap water**, **water into** a CTMP mill chip washer or **water from** a CTMP mill chip washer
- The washed chips were dewatered in a buchner funnel
- The ash content was determined according to TAPPI T413 at 900°C (silicate)

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Experimental

Trial no.	Steaming temp. (°C)	Chip wash temp. (°C)	Stirring time (s)	Water quality
1	65	45	30	Into chip washer
2	65	65	30	Into chip washer
3	85	85	30	Into chip washer
4	65	65	0	Into chip washer
5	65	65	60	Into chip washer
6	65	45	30	Tap water
7	65	65	30	Tap water
8	85	85	30	Tap water
9	65	45	30	From chip washer
10	65	65	30	From chip washer
11	85	85	30	From chip washer

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Results, material used

	Ash content (%)	Consistency (%)	pH	Other
Chips in	0.30			60% sawmill chips (spruce /pine)*
Water into chip washer	n.a.	1.15	7.13	
Water from chip washer	n.a.	1.20	7.02	

*Wood chips had at lot of fine material

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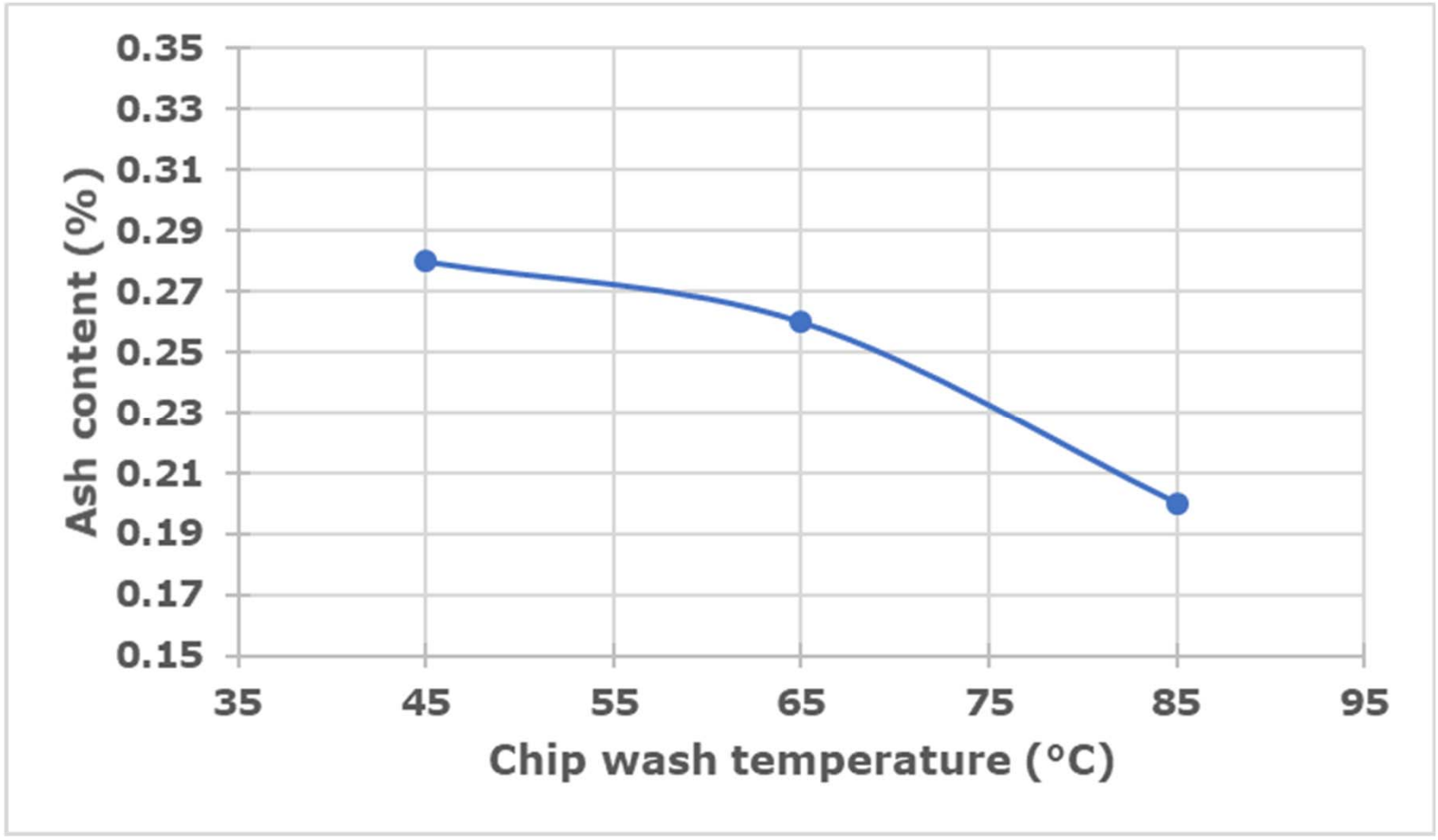
Results – Chip wash temperature (30 s)



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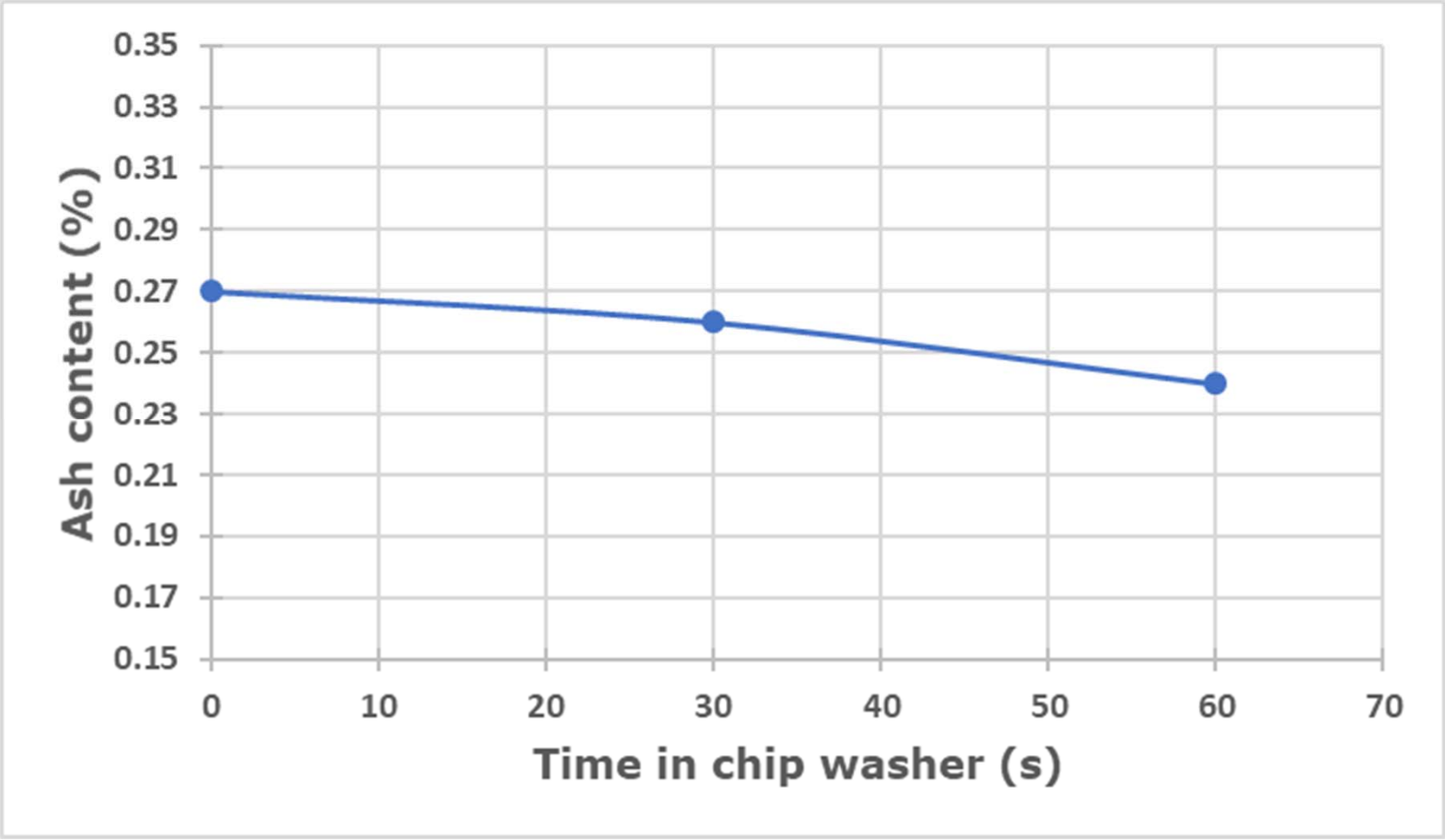
Results – time at 65°C



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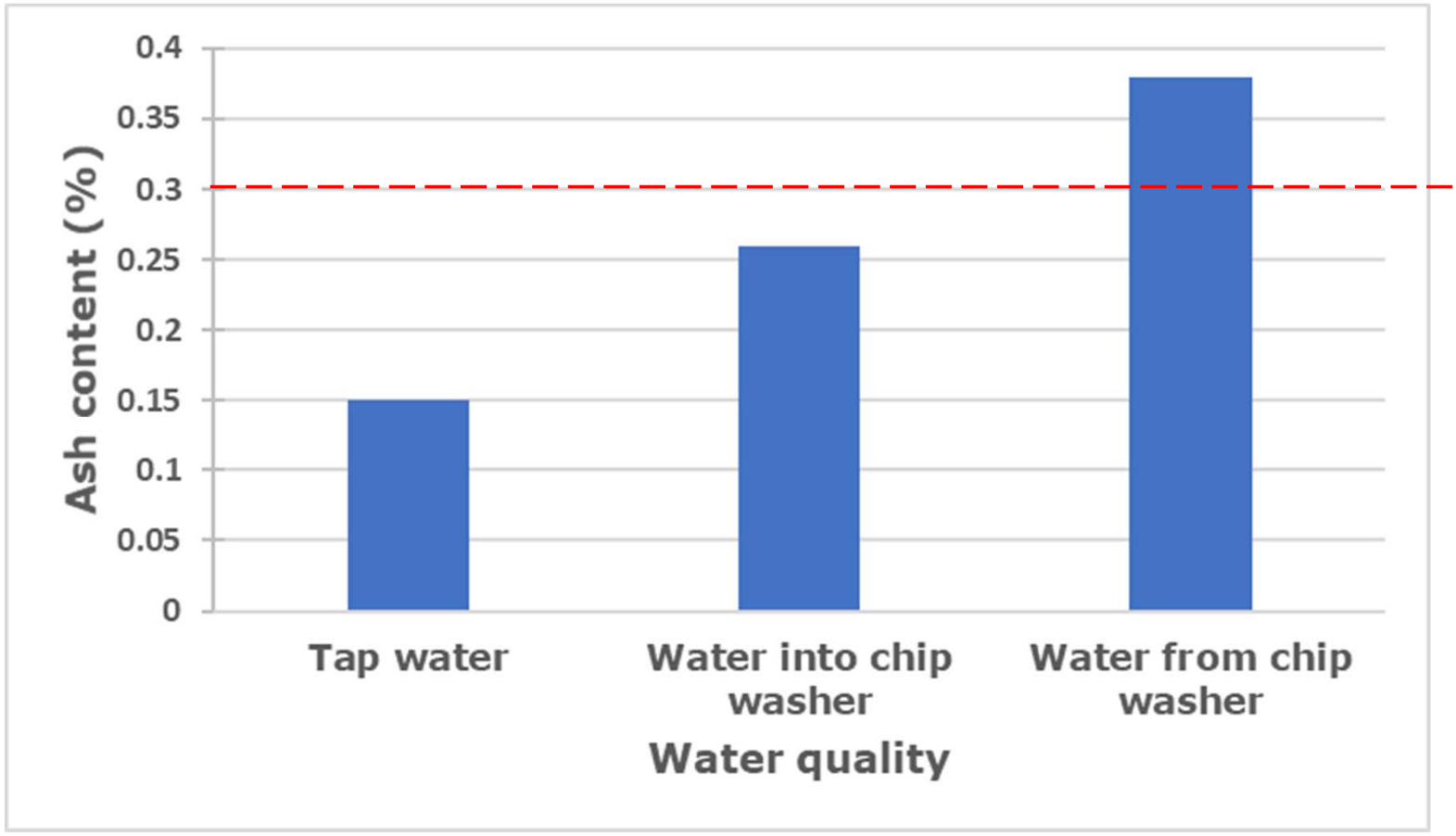
Results – water quality at 65°C



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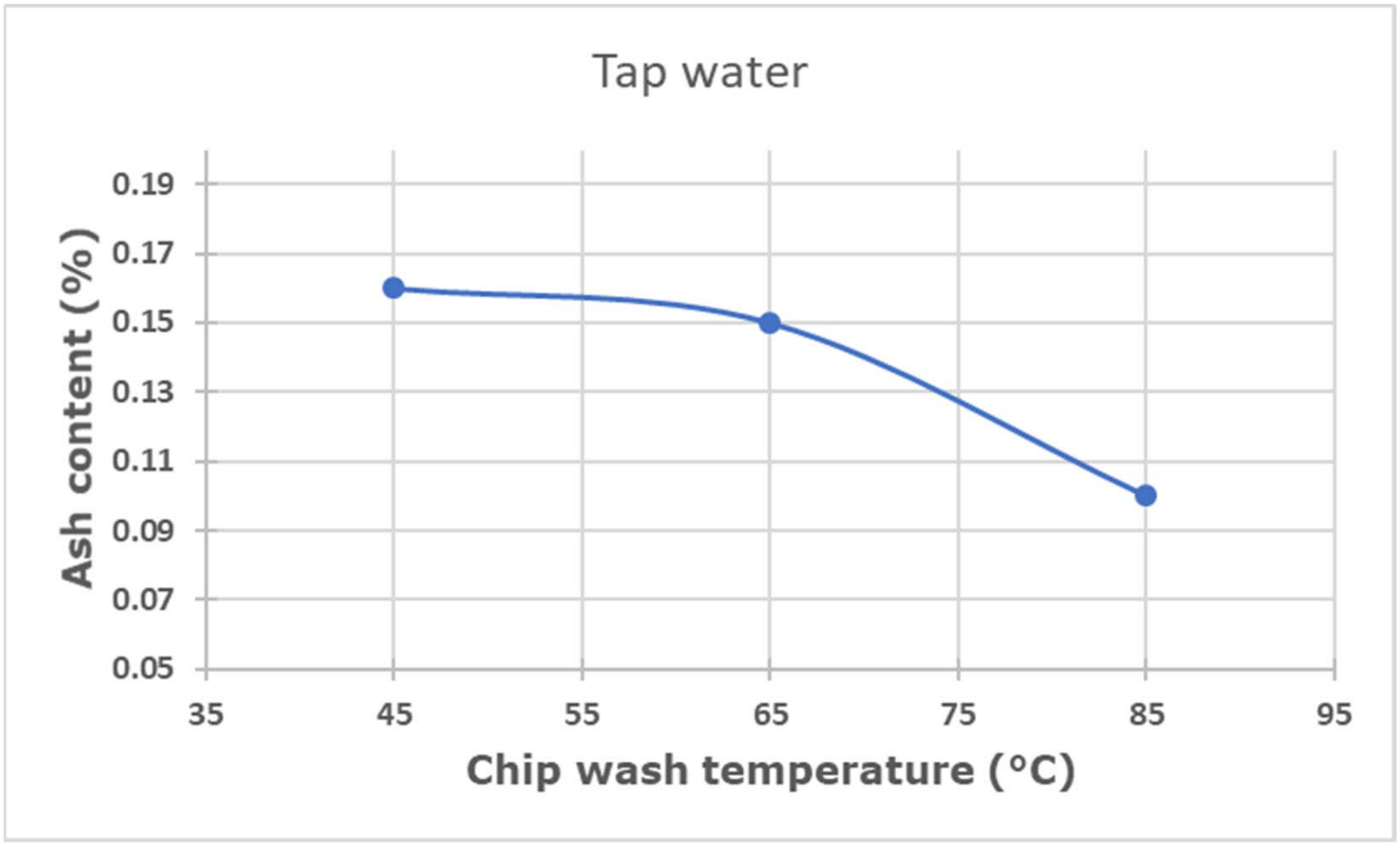
Results – tap water



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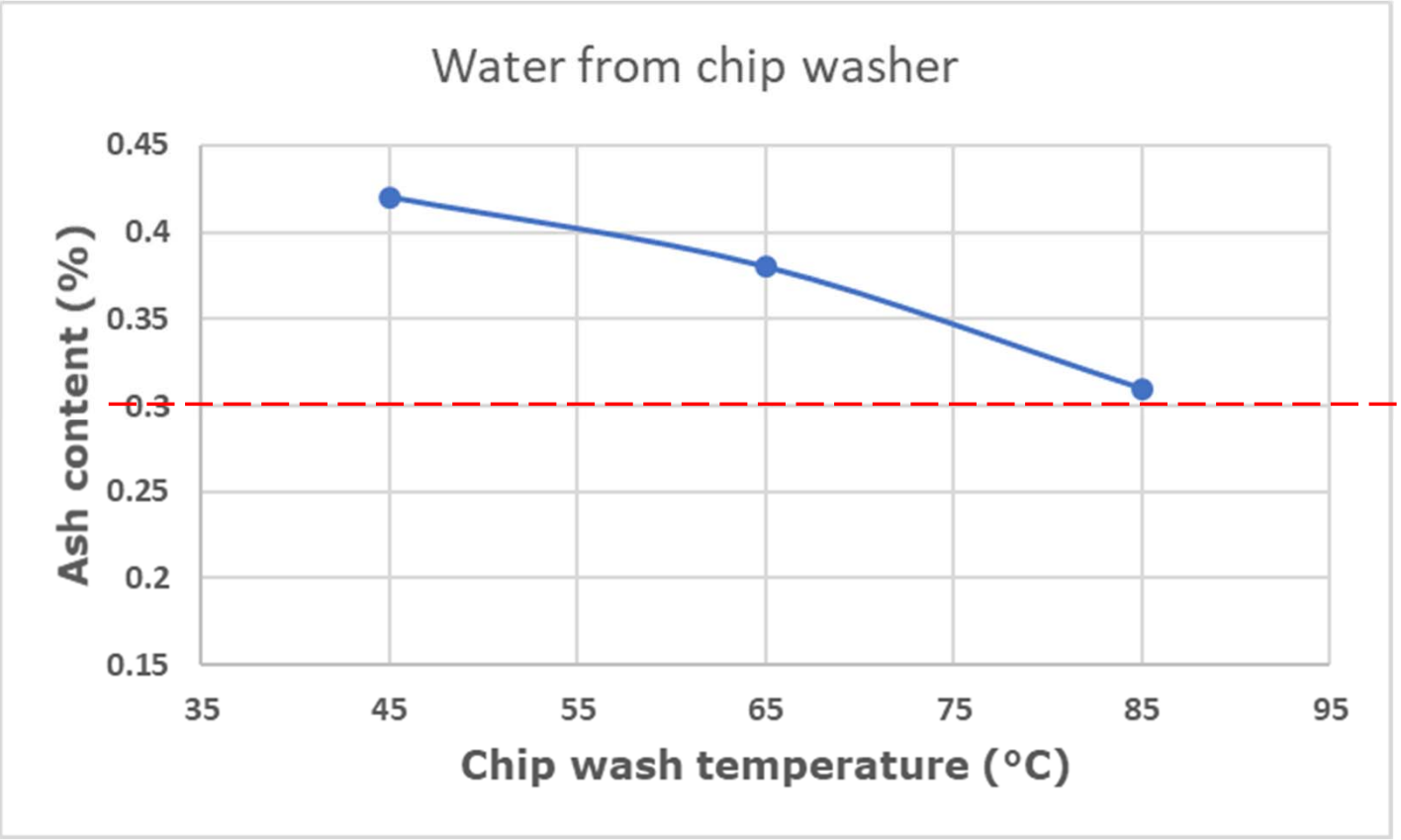
Results – water from chip washer



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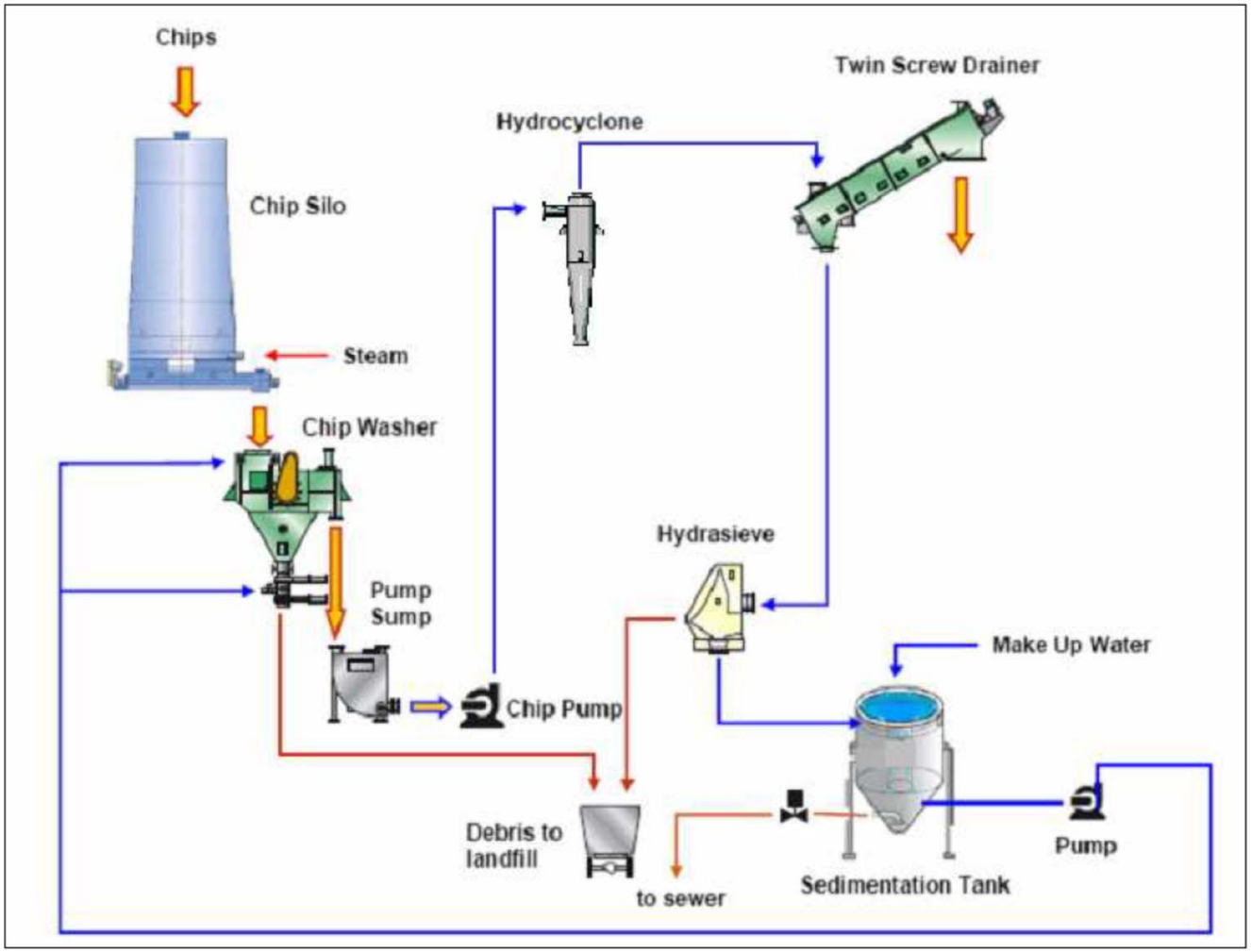
Conclusions

- Having high temperature both in presteaming and during chip washing is important in order to remove sand and dirt. This is especially important in winter time when the chips can be frozen.
- The water quality in the chip washer is also important. Here is both the quality of the incoming water as well as cleaning of the circulating water important. A low level of ions (for example chloride) is also important
- Mixing energy in the chip washer and removal of water in the end of the chip washer are also important factors
- In a mill it should be possible to take both chip and water samples around the chip washer

Conclusions



(Andritz chip-washing system)

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THANK YOU!

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