

# Public defence of a Doctoral Thesis in Chemical Engineering

## Process intensification in mechanical pulping Reduced process complexity and improved energy efficiency

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### Abstract

The purpose of this work is to demonstrate how the production cost for mechanical pulps can be decreased through increased energy efficiency and reduced number of unit operations. This research demonstrates that improved mainline refining conditions enables adequate fibre development with simplified processes at 30% lower specific refining energy than most processes in use today.

Mechanical pulp is used to produce a variety of products, where the two largest categories are printing papers and paperboard for packaging. This research is focused on mechanical pulp, intended for the manufacture of printing paper, produced in refiners with Norway spruce (*Picea abies*) as raw material. However, this approach could also be applied in other mechanical pulping processes, for example, in integrated paperboard mills.

The mill trials have shown that a low shive content and appropriate fibre development can be attained in a process without separate treatment of long fibres (reject refining). High intensity primary stage refining was necessary to reach a low shive content at a low specific refining energy. The lowest specific refining energy attained was only 1280 kWh/ton to reach a newsprint quality level which was 900 kWh/ton lower than the reference final pulp for newsprint based on single disc refining. Moreover, the auxiliary energy was reduced with around 150 kWh/ton for the simplified processes.

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**Place** Campus Sundsvall  
Room C306 and online in Zoom

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