

USING A PROCESS REFRACTOMETER FOR MEASURING THE PERFORMANCE OF FIBERLINE PROCESSES

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ABSTRACT

In chemical pulping, the purpose of brown stock washing (BSW) is to remove both organic and inorganic soluble matter from the pulp suspension using the lowest possible amount of wash liquor in the fiber line. Without effective washing, the optimal perform of oxygen delignification and the optimal economic results of chemical pulp production cannot be reached.

Brown stock washing was a popular topic in the 1980s and 1990s. At the same time, the oxygen stages became more common on fiber lines. There is currently renewed interest within the pulp industry in O₂ delignification, brown stock washing, and real-time control of washing, because of environmental, energy, economic and legislative issues.

Due to the better yield attained in chemical pulping, there is a trend toward pulp being cooked for higher kappa and the residual lignin being removed by post-delignification in the O₂ stage. In addition, BSW has a great effect on the performance of the oxygen stage. An increase in washing loss causes reductions in pulp viscosity, strength, and yield in the O₂ stage. Correspondingly, efficient washing is key to low-cost bleaching. So on-line measurements which indicate wash loss levels as a dissolved material are needed.

During the past fifteen years, we have conducted several laboratory and mill-scale studies using refractometers for measuring total dissolved solids (TDS), both in the fiber line and chemical recovery. These have been done in close co-operation with the XAMK FiberLaboratory, Aalto-university, Vaisala, Andritz and Stora Enso.

This study demonstrates how an on-line process refractometer can be used in brown stock washing to monitor wash loss levels and washing performance and to calculate washing equipment efficiency. This work also shows interactions between brownstock washing and the oxygen delignification. Furthermore, it also discusses the economic benefits which can be achieved in the fiber line using real-time measurement emphasizing especially the energy savings.

Keywords: Brownstock washing, Energy saving, On-line measurements, Oxygen delignification, Process refractometer.