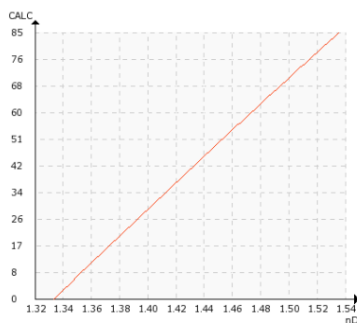


BLACK LIQUOR

Typical end products

Wood pulp, paper, board.

Chemical curve: R.I. per black liquor conc% at ref. temp. of 20 °C



Introduction

A by-product from the Kraft process is *black liquor*. It is a combination of removed lignin, water and chemicals used in the extraction process. The black liquor, which originates from the washing process, is concentrated through evaporation and then used to fire a boiler in order to generate high-pressure steam for the mill's operations.

When softwood is used in pulping (e.g. conifers), a soap-like substance is collected after the process. This soap is then acidified and used to produce *tall oil*. Tall oil is a source of fatty acids, resin acids and various other chemicals.

Application

The feed to the evaporation stage should be as consistent as possible to maximize the capacity and stabilize the output concentration. Feed concentration

is kept constant by regulating the mixing liquor. This is possible using a K-Patents SAFE DRIVE Process Refractometer PR-23-SD for concentration measurement.


The concentration after each evaporation step can be controlled by regulating the steam flow through the evaporators. This control is achieved with the continuous measurement by the refractometer. The final concentration can also be measured. Typical operating temperature range in this application is 120-130 °C (248-266 °F).

It is recommended to measure the liquor concentrations at intermediate evaporation stages to minimize total steam consumption. This is particularly important in mills where the cost of steam is high.

Instrumentation and installation

Typical concentration at the evaporation feed is 10 to 30 % dry solids and after the concentrator phase 60 to 80 % dry solids.

Automatic prism wash with steam is recommended for evaporation installations.

Instrumentation	Description
	<p>K-Patents SAFE-DRIVE Process Refractometer PR-23-SD for measuring black liquor dry solids and green liquor density or TTA in kraft chemical recovery process. K-Patents SAFE-DRIVE design allows for safe and easy insertion and retraction of the sensor under full operating pressure without having to shut down the process.</p>
<p>Automatic prism wash</p>	<p>Prism wash with steam. The components of a steam wash system are a sensor with integral steam nozzle mounted at the SAFE-DRIVE valve, a shut-off valve for steam line and an indicating transmitter equipped with relays to drive the wash valves.</p>
<p>Measurement range</p>	<p>Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight.</p>