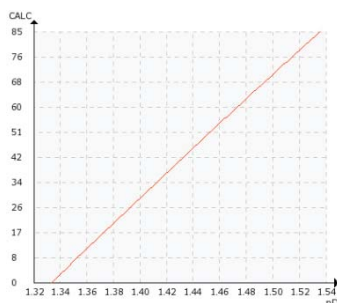


BLACK LIQUOR

Typical end products

Wood pulp, paper, board.

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



Introduction

A resultant by-product of the Kraft process is black liquor. It is a combination of the 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 generating high-pressure steam for the mill processes.

When softwood, such as conifers, is used in pulping, 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

To maximize the capacity and stabilize the output concentration, feed to the evaporation process should be as consistent as possible. Feed concentration is

kept constant through regulation of the mixing liquor. This is achieved by using a K-Patents SAFE DRIVE™ Process Refractometer PR-23-SD for concentration measurement.


Output concentration is controlled by regulating the steam flow through the evaporators. This control is achieved by constant measuring with the refractometer. Concentration readings can also be taken after the concentrator. The typical operating temperature in this application is about 120-130 °C (248-266 °F).

If the steam cost is high in the mill, it is profitable to measure the liquor concentrations at intermediate stages to minimize total steam consumption.

Instrumentation and installation

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

Automatic steam washing 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>