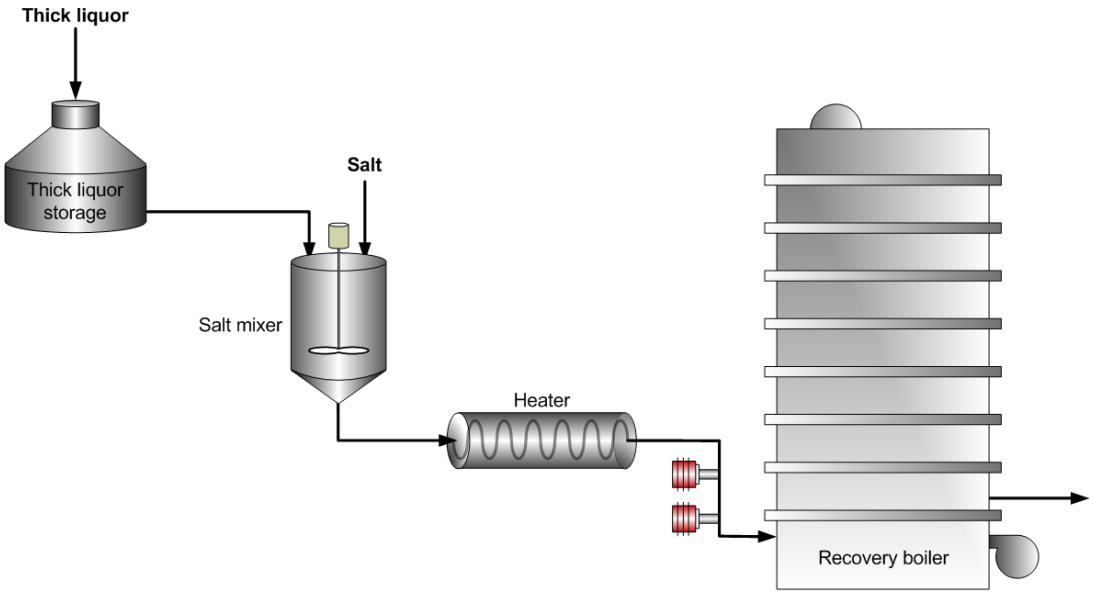
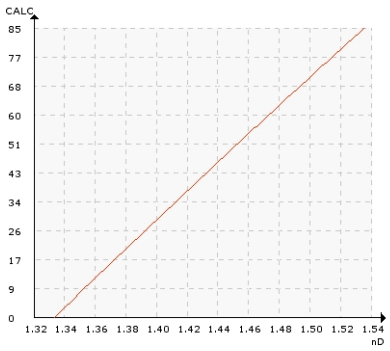


BLACK LIQUOR

Typical end products

Wood pulp, paper, board

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



Introduction

The recovery boiler plays a central role in the chemical cycle of a modern pulp mill. The recovery boiler is a chemical reactor, which is used for recovering chemicals from spent kraft liquor and generating energy at the same time.

In the recovery boiler, the organic matter is burned. The dry solids liquor content required for firing is at least 60% but preferably more than 65%. Black liquor is concentrated by evaporating water from the liquor. When the concentration of black liquor is maximized, so is the energy production. Before entering the burners, glauber salt is added to cover chemical losses.

Application

The liquor should have a high content of combustible dry solids in order to minimize flue gas emissions and maximize boiler efficiency.

Too low a concentration of dry solids fed to the burners may result in a steam explosion with consequent damage or destruction to the boiler. Therefore, it is essential to utilize the refractometer to monitor the black liquor feed to the recovery boiler for safety reasons.

Instrumentation

The K-Patents Digital Divert Control System DD-23 complies strictly with all recommendations of the Black Liquor Recovery Boiler Advisory Committee (BLRBAC).

The DD-23 system includes two SAFE-DRIVE™ Process Refractometer sensors in the main black liquor line, two indicating transmitters and a divert control unit in an integrated panel.

The K-Patents SAFE-DRIVE™ sensors are installed using a SAFE-DRIVE™ Isolation valve (Patent pending). This allows for safe and easy insertion and retraction of the refractometers under full operating pressure, without having to valve off the liquor piping or having to shut down the process. The SAFE-DRIVE™ Isolation valve contains a steam wash system for automatic prism cleaning. The system contains a SAFE-DRIVE™ Retractor Tool SDR-23 for safe sensor insertion and retraction.

Each refractometer is a completely independent measurement system. Each system sends a separate mA output signal, which can be used by the control system (PLC or DCS). The DD-23 system is entirely microprocessor controlled. The digital signal transmission and microprocessor implemented diagnostics ensure error free operation.

Instrumentation	Description
	Digital Divert Control System for safe operation of kraft chemical recovery boiler. K-Patents DD-23 system complies strictly with all recommendations of BLRBAC. The DD-23 system includes two K-Patents SAFE-DRIVE™ Refractometer PR-23-SD sensors in the main black liquor line, and two Indicating transmitters and a Divert control unit in an integrated panel. Remote monitoring and event data logging via Ethernet.
Measurement range:	Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight.