PULP + PAPER

KRAFT PULPING ANALYSIS SOLUTIONS

Tighten control in every facet of manufacturing

There are many processing steps used to turn wood into paper products. Liquid analytical measurements provide substantial control solutions that can reduce costs with a typical payback time of less than one year.

Chemical Pulping

Strong liquors are used to delignify the wood chips and the spent liquors are constantly collected and regenerated. Conductivity measurement is used to monitor the strength of these liquors and control the pulping process.

Measuring white liquor alkali concentration allows optimization of cooking time and product pulp properties. With a toroidal conductivity sensor, measuring the alkali concentration entering the digester allows fine control of the liquor flow rate to match the wood loading, improving throughput and minimizing variability.

The pulp slurry undergoes bleaching, blending, and refining prior to being run in the paper machine. pH control during these stages is essential for consistent quality. pH is measured in the wet end of the headbox and in bleach lines with the TUpH™ line of pH sensors.

Stock Filtrate Monitoring

Conductivity indicates the cook is complete and the pulp is released from the digester and further processed.

Bleaching

Pulp stock from the digesters is washed; screened; and put through the bleaching process, which brightens the pulp. Toxic chemicals used in this process include Cl_2 and ClO_2 with sulfur dioxide produced as by-product. Exposure to these toxic gases can be deadly and leaks must be quickly detected and contained.

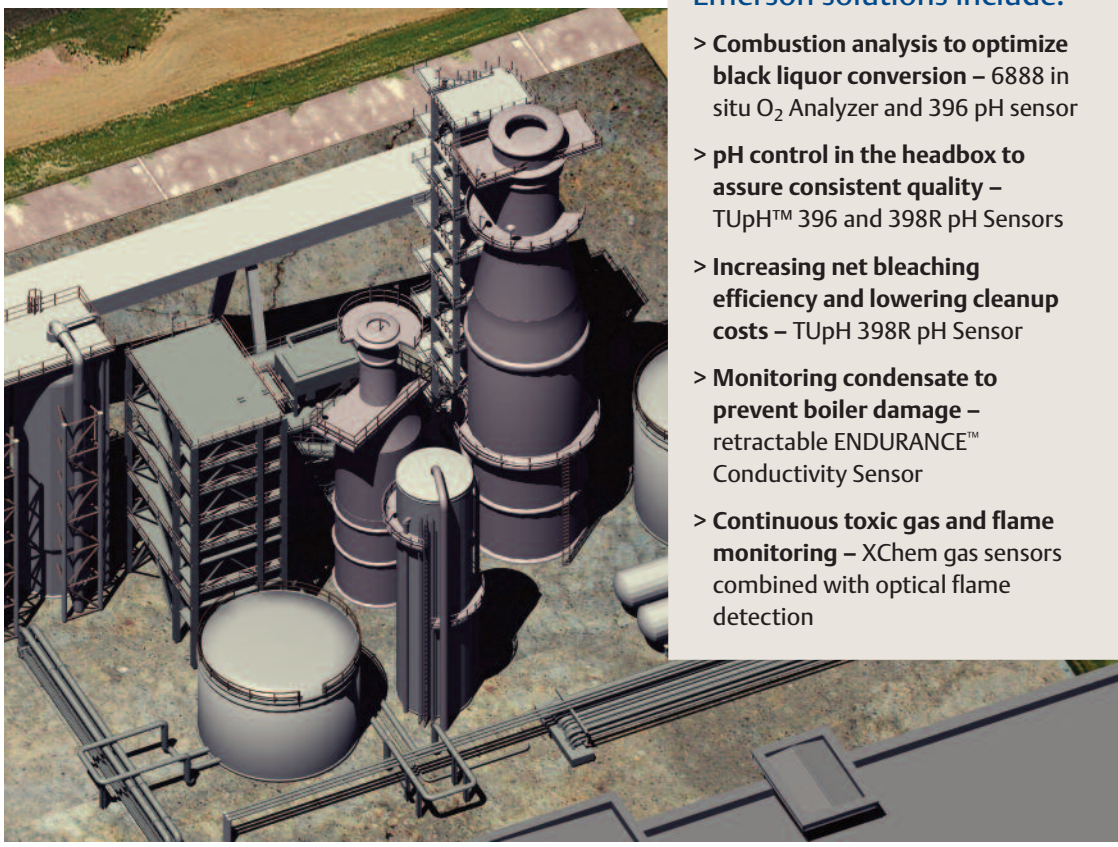
Boilers + Emissions Monitoring

Combustion analysis is used to optimize black liquor conversion and energy extraction in the furnace without compromising the safety and reliability of boiler tubes. The furnace is also optimized by controlling excess combustion air levels to maximize smelt recovery, prevent corrosion and maximize steam production.

Pulp and paper facilities may be required to measure SO_2, O_2, CO, NO_X, and opacity in the recovery boiler.

Gas Detection

Chlorine (Cl_2) and Hydrogen Sulfide (H_2S) along with other volatile sulfur compounds are characteristic of these processes and must be closely monitored with fast and accurate fixed gas detection using Net Safety Millennium series of detectors.



Emerson solutions include:

- **Combustion analysis to optimize black liquor conversion –** 6888 in situ O_2 Analyzer and 396 pH sensor
- **pH control in the headbox to assure consistent quality –** TUpH™ 396 and 398R pH Sensors
- **Increasing net bleaching efficiency and lowering cleanup costs –** TUpH 398R pH Sensor
- **Monitoring condensate to prevent boiler damage –** retractable ENDURANCE™ Conductivity Sensor
- **Continuous toxic gas and flame monitoring –** XChem gas sensors combined with optical flame detection

ROSEMOUNT® Analytical

EMERSON™ Process Management

Rosemount Analytical Sensors for Kraft Pulping

Stages	Rosemount Analytical Sensor/Measurement					
	pH	ORP	C	T	DO	
Digester Cooking Liquor				242		1 per digester
White Liquor to digester				228		1 per digester
Brownstock Washing/Black Liquor	396R			228		1 per stage
Evaporator/Condensate Purity			400		499A	multiple
Causticizer Alkali				228		1 per tank
Headbox pH	396R					1 per PM
Whitewater Chest	396R			228		1 per PM
Pulp Stock Prep	396R					1 per chest
Bleach Tower	398					1 per stage
Cooling Tower	3900		400			1 per tower
Wastewater	3900				499A	multiple
Scrubber	3300HT			228		1 per scrubber
DI water plant	3200HP		400	228		multiple

pH and ORP

396R SENSOR
Specifically designed for improved life in harsh, dirty, and abrasive applications such as paper machine headbox or the stock line where large quantities of suspended solids are present.

398 SENSOR
The chemical-resistant construction of Tefzel®, titanium, and the patented TUpH™ reference junction makes Models 398 and 398R the ideal sensors for measuring pH in harsh process liquids such as bleaching steps.

3200HP
3200HP pH sensor is designed for the accurate measurement of pH in low conductivity water.

3300HT
High temperature sensor with refillable reference and replaceable junction can be customized with different fill solutions depending on application needs.

3900
Features a double junction reference which protects the reference element from poisoning ions in the process.

CONTACTING CONDUCTIVITY

400
A screw-in type conductivity sensor available in three cell constants covering a broad range of conductivity. It has titanium electrodes and is available with both integral and quick-disconnect cable. Used in boiler applications.

TOROIDAL CONDUCTIVITY

242 SENSOR
This flow-through sensor with replaceable alumina liner is ideal for use with viscous or fibrous / abrasive liquids. It can fit line sizes from 1-inch to 4-inches (DV 100).

228
A general purpose toroidal conductivity sensor for use in dirty, corrosive, and high conductivity applications. Available in both PEEK and Tefzel®.

DISSOLVED OXYGEN

499A
Designed for the continuous determination of dissolved oxygen in ppm and ppb ranges. A rugged, membrane-covered amperometric sensor with an easily replaced membrane.

Rosemount Analytical Analyzers for Kraft Pulping

TWO-WIRE INSTRUMENTS

5081 TRANSMITTER

Features a rugged, weatherproof, corrosion-resistant enclosure.

> Available to meet NEMA 7B explosion proof standards.

> Digital communication protocols: HART® and FOUNDATION® fieldbus, allowing access to AMS (Asset Management Systems)

1066 TRANSMITTER

Broad range of measurements, advanced communications capability, and unique ease-of-use.

> Uses HART version 7 and FOUNDATION fieldbus digital communication protocols.

> User-definable measurement diagnostic parameters.

FOUR-WIRE INSTRUMENTS

56 ANALYZER

> Process disruptions can be pinpointed in the color trending graphs.

> Information can be downloaded in Excel format to a USB drive.

1056 ANALYZER

> Single or dual input analyzer.

> Large, easy-to-read display allows operators know at a glance if the process is within allowable parameters.

> Easy to install and wire.

WIRELESS INSTRUMENTATION

6081

Remote locations and installation costs are no longer barriers to getting information you require for critical applications.

> 6081-C measures conductivity

> 6081-P measures pH

> Self-organizing network for high data reliability and network stability

> Industry leading wireless security

Rosemount Analytical CEMS for Kraft Pulping

6888 O_2 ANALYZER

The 6888 integrates an oxygen probe and field electronics into a single, compact package. The probe inserts directly into a flue gas duct to measure oxygen in combustion processes. No sampling system is required.

The 6888 In Situ Oxygen Transmitter's oxygen measurements can be used in a control system or by a boiler operator to fine tune burner fuel/air ratios for maximum efficiency with the lowest levels of NO_X, CO and CO_2.

Xi ELECTRONICS

This versatile electronics package is specifically designed to run most O_2 probes manufactured. The large backlit LCD display makes it easy to set up and operate. Fully automatic calibrations may be executed from this electronics with the addition of a small solenoid box for switching calibration gases.

Emerson Process Management
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