

PULP AND PAPER

OPT800 Cook/B

ABB Ability™ Advanced Process Control for optimal cooking and efficient scheduling in batch pulping



OPT800 Cook/B overview display

Batch cooking methods present numerous operational challenges to pulp line personnel. The ability to produce consistent quality cooks at uniform production rates depends on how well the cooking process sticks to the schedule. Furthermore, it is desirable to optimize steam utilization. Thus, digester house scheduling, production rate control and steam management are intertwined variables that play a crucial role in ensuring steady operation and uniform production.

OPT800 Cook/B is an ABB Ability™ Advanced Process Control (APC) solution for controlling, monitoring and reporting on batch digester house operations for overall cooking optimization. It's accomplished by maintaining a steady Kappa number and even cooking by using the built-in Kappa control module that works in sync with the H-factor control.

This APC solution can be applied to different types of digester houses including direct/indirect steaming, cold blow and displacement cooking methods such as Rapid Displacement Heating (RDH) or SuperBatch, varying cooking sequences, special batch digester house configurations and for both the sulphate and sulfite processes. The result is consistently high pulp quality coming out of the entire batch digester house, with the lowest raw material and energy inputs.

Features

- Production rate control and scheduling
- Steam leveling
- Quality control
- Grade change controls
- Cook batch scheduler
- Cook time/temperature optimization

OPT800 Cook/B brings Advanced Process Control (APC) to batch digesters to ensure optimal cooking conditions for all chips charged to each digester. This leads to decreased variation in pulp quality compared to conventional control methods. The APC solution also effectively minimizes variations in total steam demand with its ability to adjust to the actual needs of the digesters.

- KPI dashboard and control usage reports by day/shift
- Performance monitoring, with both on-site and remote access for customers and ABB
- Task-oriented, user-friendly and customizable operator displays

Benefits

- Increased capacity (2-7%)
- Decreased Kappa variations (20-50%)
- Reduced energy consumption (5-20%)
- Reduced chemical consumption (2-9%)
- Decreased steam flow variations (30-70%)
- Smoother production, species, and/or grade changes
- Reduced environmental load
- Fewer headaches managing the batch digester

How it works - Production rate and scheduling

Production rate in the digester house is governed by the amount of steam available and amount of time between cooks. Production Rate Control determines the best spacing between cooks while considering the constraints – the number of digesters in service and the maximum amount of steam available – to achieve the desired production rate from the digester house. The control performance will not degrade over time with always-on monitoring and analysis of the APC solution.

OPT800 Cook/B plays an important role in achieving desired production levels; its scheduler feature predicts events in the digester house over the coming three-to-four hour horizon. This assists operators who can use this predictive information to update the schedule and avoid "collisions" due to unexpected delays.

Cooking time/temperature optimization

This feature in OPT800 Cook/B maximizes the usage of available cooking time by minimizing the cooking temperature. Lower cooking temperature results in energy savings as well as improved quality due to milder cooking conditions. The APC solution enables necessary impregnation time by adjusting the temperature bring-up time to its optimum value within established limits.

The control uses numerical optimization methods to ensure that the temperature is minimized while the target H-factor is still achieved in the given cooking time available. For instance, if excess time is available and the digester is scheduled to cook at its minimum allowed temperature, OPT800 Cook/B will automatically extend the bring-up and cook times to maximize impregnation.

Steam leveling

Steam leveling or steam smoothing control provided by OPT800 Cook/B is based on an adaptive steam flow control concept. It continuously adapts the steam flow target to the actual demand in the digesters and minimizes instantaneous variations in the total steam flow. This feature calculates the total steam flow setpoint along with the individual digester steam flow targets to give exceptional control of steam flow magnitudes and rates while maintaining the required quality control targets. The desired level of steam flow leveling can be easily adjusted through the operator display.

Pulp quality control

Quality and yield – the pulp maker's two most important goals – are achieved by cooking exactly to the grade specification targets. The pulp quality tests (Kappa, K-number etc.) entered by the operators are used by the Kappa control module to adjust the grade specific targets for the H-factor and/or alkali-to-wood ratio. Corrections to the H-factor target are made automatically after a test entry. The "modified H-factor" is used to calculate the correct temperature, blowing time, reaction rates, etc. to maintain quality and yield within the desired limits. The required quality/yield is adjustable through the grade recipes, which include cooking parameters and targets.

Operator displays and reports

Highly-intuitive, task-oriented and easy-to-access operator displays are provided to monitor real-time, historical and prediction trends as well as modify tuning parameters. Using OPT800 Cook/B, operators can create their own displays using the predefined graphical elements to meet their specific needs. The reports module calculates the key performance indicators for cooking cycle time, raw materials (wood, liquor and steam) and quality indicators such as Kappa, H-factor, etc. OPT800 Cook/B is delivered as a subscriptionbased service and consists of the state-of-the-art APC installation, start-up, and training, as well as tuning and monitoring services.



Cook/B - Batch cooking process overview



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