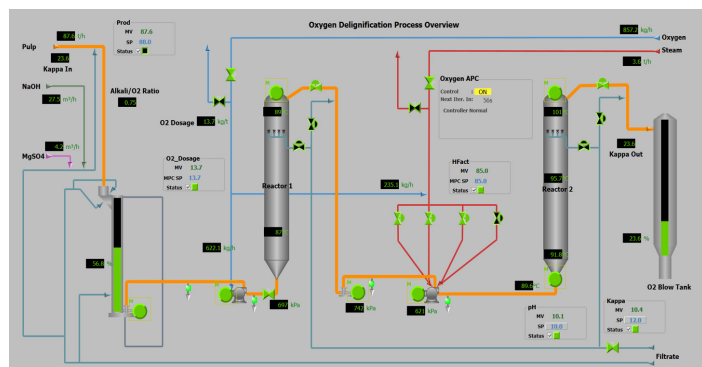PULP AND PAPER

OPT800 Oxygen
ABB Ability™ Advanced Process Control for superior delignification before bleaching

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OPT800 Oxygen overview display

Remove maximum lignin in the oxygen stage, while safeguarding optimum pulp strength levels with ABB's OPT800 Oxygen. By optimizing oxygen/alkali charge ratios and H-factor, even during inlet Kappa variations or grade changes, this Advanced Process Control solution makes it easier to produce high quality pulp at low chemical use and environmental impact. The result is maximum delignification ratio and reduced bleach loads at the lowest possible cost.

Getting ideal pulp quality out of the oxygen delignification process is a balancing act, with operators aiming to achieve maximum lignin removal while preserving the fiber strength (pulp viscosity). Variations in wood species and incoming Kappa, as well as changes in grades and production rates, increase the complexity of the challenge. Poor performance of the oxygen delignification stage can have a significant negative impact on both pulp quality and yield. It can also lead to increased operating costs and effluent discharge, due to higher bleaching chemical consumption.

To solve these challenges, OPT800 Oxygen gives operators superior monitoring and control of the oxygen delignification stage. This ABB Ability™ Advanced Process Control (APC) solution has algorithms tailored to balance and adapt to numerous key variables, which are based on real-time process conditions, to maintain stable and consistent lignin removal. This helps operators achieve a constant delignification ratio, helping to reduce Kappa variations by 30-50% and chemical use by 5-10%.

Features
• Reactor pH/O_2 charge ratio and temperature control
• Production rate and grade change controls
• Pulp tracking and pulp quality footprint programs
• Automatic Kappa number target adjustment
• Real-time adaptive modelling: Automatic adjustments based on process changes

• Higher-order model support: Captures process dynamics accurately
• Cost optimizer: Looks for ways to optimize operational costs within process constraints
• Automatic grade change using pulp tracking function
• KPI dashboard and control usage reports by day/shift
• Performance monitoring, with both on-site and remote access for customers and ABB

Benefits
• Effective management of disturbances due to variance in production rates, pulp grade, wood species, or incoming pulp Kappa
• Reduced outlet Kappa variations by up to 50%
• Reduced chemical usage in bleach plant by up to 10%
• Improved pulp quality, consistency and yield
• Smoother grade changes
• Maximum utilization of oxygen delignification before bleaching
• Reduced environmental impact

How it works - Selectively removing lignin
OPT800 Oxygen facilitates selective removal of lignin at a consistent rate before the bleaching stages by expertly managing the reactions and pH levels via tight control of the oxygen and alkali charges (kg per ton of pulp). It also maintains a constant delignification level by adjusting the outlet Kappa target – based on variations in the incoming Kappa.

The combined result is highly effective lignin removal and lower cellulose degradation, giving a stable outlet Kappa, high pulp strength, better yields, reduced chemical usage and lower environmental impact. In addition, the built-in Pulp Tracking function helps monitor and diagnose any anomalies in the process, while also tracking the key process and pulp properties through the oxygen reactors. Plus, control performance will not degrade over time with always-on monitoring and analysis of the APC solution.

Real-time adaptive modelling

Dynamic model adjustment and adaptation in real time is a unique feature to ABB's APC platform. It means process models (covering the digester, oxygen, bleaching, washing, causticizing and lime operations) are dynamically updated if the process conditions change for things like grade changes, production rate changes, high inlet Kappa, etc. If any important process condition or property changes, the models can be updated automatically, keeping production and quality smooth and consistent.

Pulp Tracking function accurately compensates for retention times

The Pulp Tracking function accepts various process and quality measurements upstream from the oxygen delignification stage and tracks them through the various sections of the process such as blow tank, brown stock washing line, and oxygen reactors up to the unbleached HD tower.
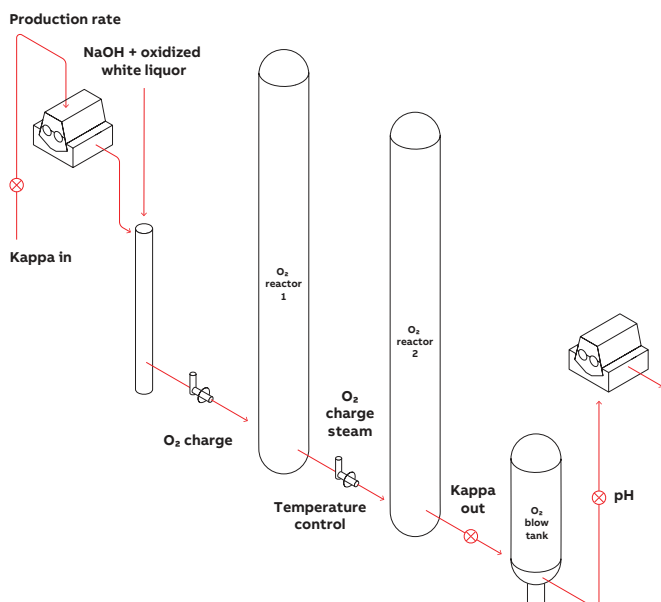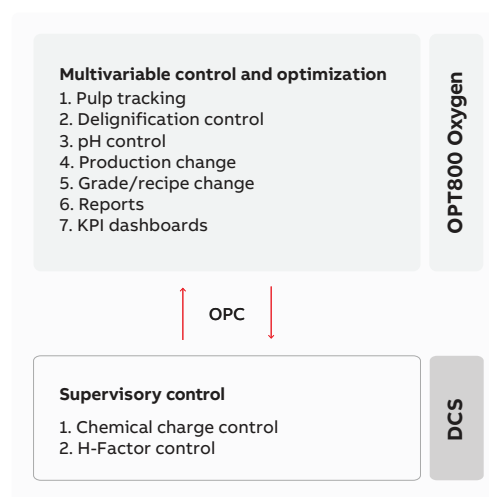
The tracked process variables are then used to develop non-linear empirical models of key quality variables such as pulp viscosity and used for tighter closed-loop control of the delignification ratio.

The function accurately captures the process delays and retention times in the storage tanks and oxygen reactors, which are critical for tight control of the post-oxygen delignification stage Kappa number. It also provides insights during swings in pulp quality and improves the process diagnostic capabilities. Furthermore, Pulp Tracking facilitates automated grade changes in the brown stock and oxygen delignification processes.

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. OPT800 Oxygen allows customization of the user interface to meet a wide range of project needs. The reports module calculates the key performance indicators such as usage of alkali, magnesium sulfate, and oxygen, , controls utilization, and steam consumption, and presents them in the day/shift report. OPT800 Oxygen is delivered as a subscription-based service and consists of the state-of-the-art APC installation, start-up, and training, as well as tuning and monitoring services.

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Oxygen delignification process overview

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The information provided in this data sheet contains descriptions or characterizations of performance that may change as a result of further development of the products. Availability and technical specifications are subject to change without notice.