

# Profit Suite for Evaporation Plant

## Solution Note

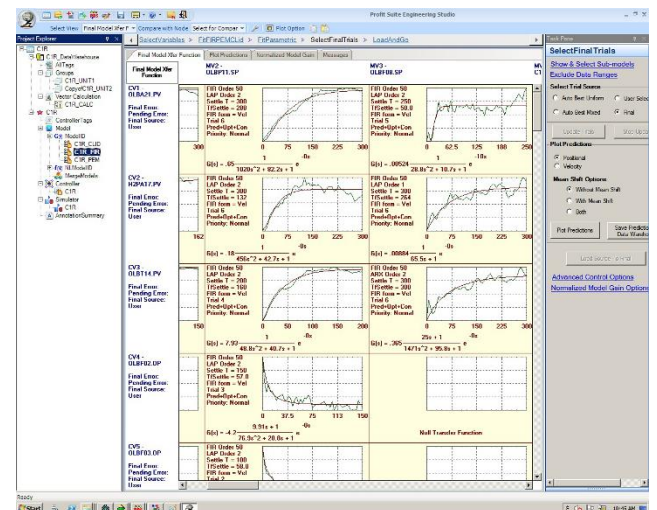
### Increases throughput while saving energy and improving liquor quality

Profit Suite for the pulp mill chemical Evaporation Plant is a complete, modular application designed to stabilize and to provide a strong liquor production of stable and desired quality. The optimum value for the black liquor dry solids content is dependent on the overall pulp mill production capacity and target values. With optimized control, the evaporation process will produce liquor of improved quality, with less variations in the final dry solid content. The Profit Suite advanced control allows to increase the average dry solids content, as result of even liquor quality and stable, coordinated process. The overall evaporation plant coordination will lead to reduced energy consumption.

The concentrators/crystallizers will be automatically washed, initiated by smart soft sensors and sequence programming. The control solution also calculates a “fouling index value” of each black liquor concentrator effect, optimizing the washing sequence and extending the periods between washing. Optimized washing with smooth processing of the effect switches, creates room for the load increase and minimizes disturbances.

The Black liquor evaporation is an essential part of the chemical recovery process as it significantly concentrates the dry solid matter in black liquor so that the liquor can be effectively combusted in recovery boiler. The evaporation plant is a dynamic process and has long process delays with sensitivity to disturbances caused by a variety of reasons, such as the varying quality of blackliquor, load changes, and different operating methods.

Honeywell' solution for the pulp mill evaporation plant as a part of chemical recovery solutions is powered by Profit Suite, a comprehensive collection of advanced process control and optimization offerings. These innovative solutions address increasing business complexity and profitability pressures by effectively managing all aspects of control and optimization, from improving regulatory loop control to optimizing the entire process



## BENEFITS

- Stable operations
- Reduction of black liquor dry solids variation (20 to 50%)
- Decreased specific energy consumption and Improved steam economy (3 – 5%)
- Improved washing and optimized use of concentrator effects
- Enables evaporation plant steam balancing functionality

## Full Range of Control Functions

The Advanced Control Solution includes advanced control modules that are based on the latest developments in sensor and algorithm technology. All control functions can easily be customized, and additional features included in order to fit the actual application to the mill's specific requirements.

- Production control
- Feed liquor control
- Intermediate liquor control (where appropriate)
- Semi-strong liquor control
- Strong liquor control
- Steam control
- Strong liquor dry solids control
- Tank level controls
- Soap skimming control
- Criteria based washing control

### Production rate control

The production rate can be defined as feed liquor flow or strong liquor flow [t/day]. Production rate is controlled by balanced changes of feed liquor flow, intermediate liquor flow, strong liquor flow and steam flow to the evaporation plant.

### Feed, Intermediate and Semi-strong liquors control

The Liquor flow is part of entire load and tank farm control functionality. The output signal is controlling the set point of the local controller of feed liquor flow. Feed liquor flow keeps production rate and tank levels at target. Tank levels before, within and after the evaporation are balanced to keep the process stable.

### Strong liquor dry solids control

The main objective is to keep the desired content of dry solids in final strong liquor on target and with minimal variations. Accurate and reliable measurement of density or dry solids content is very important for this function. Dry solids content is kept stable on target by control of steam flow and semi-strong liquor flow. Operators can select the priority order of those functions, or the system can be designed to do corrections in specific priority.

### Steam control

Steam flow keeps production rate and strong liquor dry solids content at target. Steam flow is related to evaporated liquid flow and therefore related to evaporation load or production rate. Variations of feed liquor density and evaporation effects efficiency can disturb the dry solids content control function, therefore steam flow is used for compensation.

## Tank farm level control

All liquor tank levels are continuously monitored and controlled. The main goal is to keep the liquor volumes in balance in all situations. The control sets all targets in accordance to valid operator level set points.

Multivariable control is used to optimize the liquor levels and stabilize the process by control of feed liquor flow and semi-strong liquor flow.

### Advanced washing control

The concentrators must be washed in order to keep the process efficient. The washing is often made by sequential changes of the concentrators order in the process. In this control solution, a function is included for automatic cleaning, based on criteria-based analysis of the process performance.

The advanced control function uses a "fouling index" as a parameter of defining how clean the surface is in all parts of the strong liquor process. Fouling indexes are calculated on all the effects in the concentrator and used to activate the effect exchange to predefined process order as established in the regulatory control level.

## Project and Consulting Services

### Ensure Your Success

Honeywell's experience in evaluating and optimizing pulp chemical recovery processes ensures smooth implementation of Profit Suite for Evaporation Plant —minimizing the impact on production and quality. In addition, our pulp mill processes and control experts and service organization are available for process consulting, tuning, and troubleshooting to ensure your process operates at peak performance.

### Improve Mill Performance

Profit Suite for Evaporation Plant is a key element of Honeywell's Pulping Solutions. These solutions are designed to improve quality and operational flexibility, reduce operating costs, and minimize environmental impact.

### **For More Information**

Learn more about the Honeywell's Profit Suite, at our website [www.honeywell.com/ps](http://www.honeywell.com/ps) or contact your Honeywell account manager.

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