

## Kurita's PROCLEAN developed to enhance evaporator & extend time between cleanings

### Designed to enhance back-end CIP processes



#### 1. Keywords

Fuel ethanol industry, deposits, air pollution, inhibit corrosion, corn oil recovery, fermentation

#### 2. Background

Kurita's Process Technologies (PT) team supports the fuel ethanol industry with innovative chemistries designed to reduce air pollution, prevent deposits, inhibit corrosion and enhance fermentation and corn oil recovery, in order to improve fuel ethanol manufacturer profitability. A common issue in the fuel ethanol industry are fouled evaporators resulting from increased Clean-in-Place (CIP) events, higher chemical usage, upset corn oil recovery and reduced evaporator efficiency. Kurita has a proven track record offering alternative additives designed to enhance the evaporator and other back-end CIP processes. The Process Technologies team was requested to assist in improving CIP results for a Midwest dry grind fuel ethanol plant. The PT team conducted a trial to measure the effectiveness of the evaporator CIP methods. Comparisons against standard CIP procedures in a Midwest dry grind fuel ethanol plant with a 100 MMGpy nameplate capacity were completed.

#### 3. Action/Approach

Evaporator deposit samples were collected and analyzed to determine the nature of the fouling. Once the characterization of the deposit was complete, the PT team chose the two-product blend and developed a CIP procedure. To provide enhanced evaporator CIP for the Midwest dry grind fuel ethanol plant - ProClean 335 and ProClean 810 were implemented. ProClean products are used to supplement current CIP

programs and provide optimum results, returning contacted surfaces back to "like new" bare metal. The Process Technologies team also worked with the facility to ensure all safety measures were taken specific to chemical handling, monitoring procedures and visual inspections. Kurita's approach to remote monitoring and analyzing of operational data brought additional value to plant operations, as operators were engaged with our representatives 24/7 to mitigate risks that could lead to unexpected downtime.

#### 4. Achievements

Previous CIP results were compared to the PT team's enhanced CIP events for visual observations and analysis. These picture comparisons can be seen here:



*Photos taken after a regular CIP event.*



*Photos taken after use of Kurita's ProClean.*

During the time of this case study, the facility was 30 days from a scheduled shutdown and was experiencing severe evaporator fouling. ProClean 335 and ProClean 810 enabled the facility to not only continue to run, but also

provided improved operation leading into the scheduled hydro-blasting event. Additionally, evaporator pressures significantly decreased after the enhanced CIP events— as much as 10% per evaporator depending on amount of fouling with the highest decrease seen in 2nd effect evaporators. Combined with a continuous on-line inhibitor, ProHib 150, evaporator fouling issues have become negligible.

## 5. Conclusions

In conclusion, the changes recommended by Kurita increased the plant's cleanliness (from visual inspections), the evaporator pressure decreased across the board and recovery from upsets - that caused accelerated evaporator fouling - was possible from the enhanced CIP events.

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**Head Office:**  
Kurita Europe GmbH  
Theodor-Heuss-Anlage 2  
68165 Mannheim  
Germany

Phone: +49 621 1218 3000  
Fax : +49 621 1218 3600

Visit us: [www.kurita.eu](http://www.kurita.eu)  
[kurita-europe@kurita-water.com](mailto:kurita-europe@kurita-water.com)

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