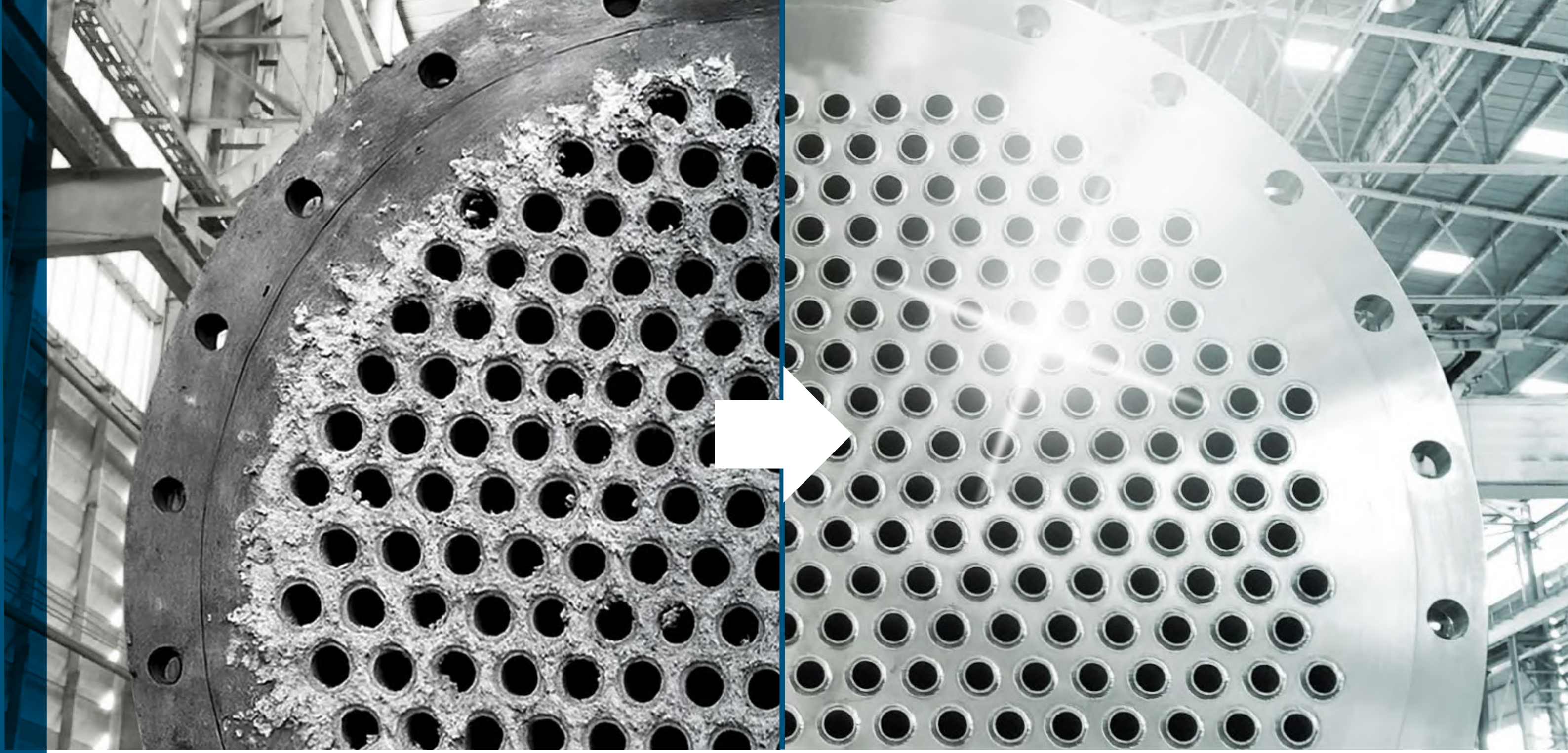
Longer service life.
Less downtime.
Lower energy consumption.
Greater yield.

How **efficient cleaning helps maintain consistent performance at cane sugar mills worldwide.**

This best practice uses a real-world example from Brazil to demonstrate how heat transfer can be stabilized and cleaning requirements reduced in the cane sugar process, **ensuring stable operation at high throughput rates.**



Unavoidable deposits on heat transfer surfaces in the cane sugar production process reduce heat transfer and plant performance as well as increase steam consumption.

The requirement

Preventing deposits – Reducing energy costs and extending service life

In the evaporators, heat exchangers, and piping used in **food and bioethanol production** stubborn deposits form: greases, proteins, and calcium and silicate scaling. **The consequences:**

- **Increasing energy consumption**
- **Unstable processes**
- **Compromising hygiene and product quality**

Regular cleaning restores performance, but it also leads to downtime, chemical use, and water consumption. Therefore, the key to economic efficiency lies in the efficiency of scaling management throughout the entire cycle.

- **Heat transfer determines energy demand and throughput.**
- **Cleaning is a must – efficiency is the key.**
- **Anti-scaling & optimized chemical cleaning work together.**

!

The goal is to reduce the frequency, duration, and effort required for the cleaning cycle without compromising process reliability.

What matters economically is not whether cleaning takes place but rather how efficiently deposits are controlled and removed.

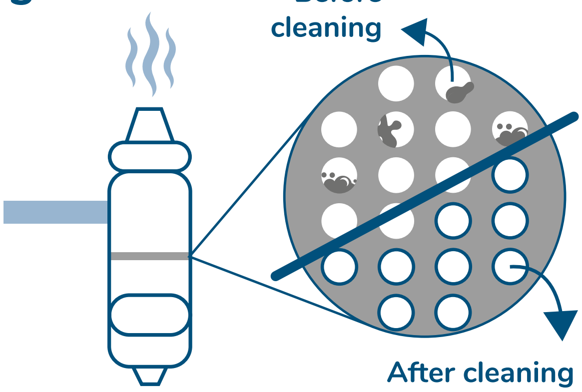
The solution

Chemical cleaning: reproducible, projectable, and more reliable

In practice, deposits are usually neither purely mineral nor purely organic. They consist of multilayered and organic-mineral structures. Individual cleaning mechanisms are not sufficient in such cases. **Therefore, effective removal requires a coordinated approach throughout the entire cleaning sequence.**

In cane sugar factories, chemical cleaning is not an isolated process, but rather a technically defined part of the overall process control, whereby the cleaning effectiveness depends on the nature of the deposits and the cleaning sequence. **It is crucial to break down the organic and organic-mineral scaling so that subsequent steps can be effective.**

Cleaning as part of process management



The effectiveness of a cleaning process does not depend on the potency of the individual chemicals used, but rather on their proper sequence and the interaction of the following three coordinated levels:

- **Anti-scaling**
  Preventive measures in the operating environment affect the formation and adhesion of deposits.
- **Efficient alkaline cleaning**
  Determines whether organic and organic-mineral scaling is structurally open.
- **Protected acid cleaning**
  To gently remove any remaining mineral deposits.

If any of these steps is not carried out properly, the time and chemical costs in the subsequent phases will increase, which is why the key advantage does not lie in the individual product, but rather in the consistency of process performance throughout the entire process time.

Mechanical and hydraulic cleaning in cane sugar plants involves

- increased personnel effort
- additional safety risks
- limited cleaning quality
- greater stress on the plant components

Efficient chemical cleaning is the controllable, reproducible, and significantly safer alternative, using targeted active ingredients that remove scaling while being much gentler on the equipment.

Practical example from Brazil

Alkaline cleaning made more efficient

The starting point is a Brazilian cane sugar plant that operates continuously and has multiple evaporation stages. **Due to the high throughput, deposits regularly build up in the evaporators and heat exchangers.** Cleaning is performed every 2–3 weeks using highly concentrated caustic soda, which is sometimes supplemented with high-pressure water.

The problem

- High consumption of caustic soda
- Long cleaning and downtimes
- Increased use of water and energy
- Additional high-pressure water cleaning required
- Frequent cleaning

The goal

- Reducing caustic soda consumption
- Shortening the cleaning duration
- Improving the cleaning quality
- Reducing the number of cleaning actions
- More stable plant performance after restarting

The solution

KEBOPLEX SP was added to the existing alkaline cleaning process as a cleaning additive

KEBOPLEX SP was directly added to the caustic soda solution. The plant did not require any adjustment. The cleaning parameters, such as temperature and circulation times, remained unchanged in order to clearly assess the additive's effectiveness.

The figures

show the difference as a result of process improvement

Fewer cleaning cycles thanks to more efficient cleaning – the table shows the results of the previous cleaning practices as well as three optimization scenarios based on the customer's operational data.

	Cleaning solution	NaOH concentration	KEBOPLEX SP dosage	Cleaning cycles per year
Previous cleaning practice	25,000 L	19.1%	-	47 ×
Scenario 1 Reduction of the NaOH concentration and addition of **KEBOPLEX SP**	25,000 L	8.0%	2.0%	47 ×
Scenario 2 Using a lower dosage of **KEBOPLEX SP**	25,000 L	8.0%	1.5%	47 ×
Scenario 3 Combining optimized chemicals with fewer cleaning cycles per year	25,000 L	8.0%	2.0%	32 ×

Observations and results

- The use of caustic soda has been reduced by over 50%.
- Instead of 47 cycles, the cleaning time was reduced to merely 32 cycles, which is a reduction of over 30%.
- The deposits could be removed more evenly and completely.
- The subsequent acid cleaning was more efficient, resulting in fewer residual deposits, which led to a longer production cycle.
- Thanks to this more thorough cleaning, there will be fewer residues in the future that would otherwise require early cleaning.

!

The use of **KEBOPLEX SP** improves cleaning performance in alkaline cleaning processes while also enabling a significant reduction in the NaOH concentration. Because scaling is removed more thoroughly, less residual material remains, which helps extend service life.

This reduces the overall chemical consumption, downtime, and total costs, while also ensuring more stable operating conditions.

Conclusion

Less effort per cleaning cycle – more stability in operation!

The Brazilian example illustrates the key role of **the alkaline cleaning phase using KEBOPLEX SP.** To ensure consistently stable results in the cane sugar production process, this effect is reinforced by two complementary chemical components: **Scaling prevention during operation and corrosion protection in the acid cleaning phase:**

Scaling prevention during operation

High-performance **antiscalants such as KEBO DS** are used during the process to specifically control the nucleation, growth, and adhesion of mineral deposits. **This slows down the buildup of scaling, keeps heat transfer surfaces longer in the efficient operating range, and makes it easier to schedule cleaning intervals.** Any remaining deposits can also be removed more evenly and with less effort.

Material protection in the acid cleaning phase

When removing mineral residual scaling using acid, corrosion protection is crucial, especially with regard to temperature, exposure time, and acid concentration. **LITHSOLVENT inhibitors are added as an additive to acid cleaning solutions to effectively protect metal surfaces from corrosion without compromising cleaning performance.** This preserves the surface quality and reduces the risk of corrosion-related damage.

The KEBO Anniversary

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