

Hygienic mixing and tank cleaning increases ice cream food safety and quality

Better mixing efficiency and cleanability reduces the risk of contamination in ice cream maturation tanks.

Ice cream manufacturers must adapt production lines to meet consumer demand in a wider range of categories yet keep cleaning cycles to the shortest possible amount of time. Easy-to-clean, hygienic Alfa Laval EnSaFoil agitators, used in combination with high-efficiency Alfa Laval Rotary Jet Head tank cleaning machines, help producers reduce downtime during cleaning-in-place (CIP) while ensuring food safety and quality.

Challenges with seasonal demand

Producing ice cream mix requires a high degree of flexibility and efficiency; process lines must therefore be able to handle a variety of dry and liquid ingredients, adapt to fluctuations in seasonal

demand, and create an innovative and varied product portfolio. To meet demand with limited plant capacity, ice cream producers plan ahead, stretching production over the longest possible period of time before the summer peak. To extend shelf life, manufacturers ensure formulation quality by reducing fat and/or sugar content and add functional ingredients that prevent ice crystal formation during storage. Maturation tanks are therefore becoming increasingly important to ensure ice cream quality.

Commercial pasteurization of liquid food products generally takes place immediately prior to packaging to prevent recontamination by microorganisms. Ice cream mix, however, is an exception to this rule. It is kept under slow agita-

tion in a refrigerated maturation tank, typically overnight, for four to 24 hours without any further treatment prior to freezing. This ensures both proper fat crystallization as well as hydration of the functional ingredients, which is essential for the final quality and storage properties of the ice cream.

Food safety first

During the hours-long storage in maturation tanks, the pasteurized ice cream mix is highly sensitive to recontamination. Any residue left in the maturation tank after cleaning can promote the growth of psychrophilic microorganisms such as *Listeria monocytogenes*.

Upgrade tank cleaning technology for exceptional maturation tank hygiene

The standard design for ice cream maturation tanks is an insulated cylindrical vessel, equipped with a chilled water jacket and top-mounted agitator. The typical tank size for industrial lines is between two to six cubic metres, although some of the larger tanks can be up to 20 cubic metres in size. Static spray balls are often used to clean these tanks; however, due to the immovable nature of the equipment, it is difficult to flush all of the tank and equipment surfaces with cleaning fluid. Moreover, due to the high fat content, sticky consistency and frequent presence of particles such as chocolate flakes and fruit bits, ice cream mixes are difficult to clean, especially underneath the agitator blades. To ensure thorough cleaning, additional water, cleaning agents and



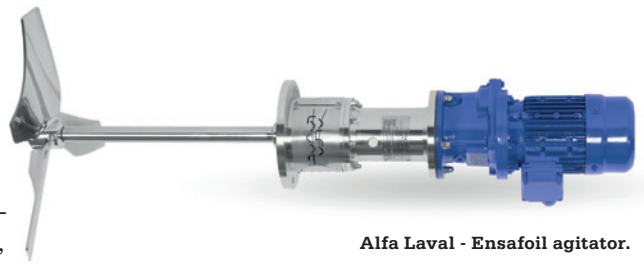
time are required; this impacts plant output and profitability.

The use of high-impact rotating jet spray devices, such as Alfa Laval Rotary Jet Heads, can reduce cleaning time and improve plant efficiency. Rotating spray devices move in three-dimensional patterns and use impingement as the primary cleaning parameter to remove even the most difficult residues in a fraction of the time required by static spray balls. Rotary jet head technology is so effective that it can reduce your water and chemical consumption by up to 70% compared to the traditional spray ball technology, while reducing cleaning cycle times by more than 50%. An investment in rotating spray devices generally pays for itself in less than 12 months.

Optimizing agitator cleaning

Cleaning the underside of the agitator is the most critical aspect of CIP for maturation tanks, as it is not directly exposed to jet spray from tank top. It

is therefore important to use mixers and agitators with open, easy-to-clean designs, such as Alfa Laval agitators with EnSaFoil impellers. These agitators have no overlap between the blades and therefore eliminate shadow areas, or blind spots that are not reached by the cleaning fluid, during CIP. The unique profile of the front end of the impeller blade enables the high-impact jets of the CIP fluid to clean the underside of the blade. What's more, the robust design and slow rotating speed allows an axis length of up to seven metres without requiring any bottom connection. The wide Alfa Laval EnSaFoil impeller blades ensure that even viscous mixes are homogeneously blended, while keeping energy consumption to a minimum. Alfa Laval agitators with EnSaFoil impellers reduce power consumption by more than 30 percent compared to conventional agitators.



Alfa Laval - Ensafoil agitator.

Reducing contamination risks in maturation tanks

Shorter, more efficient cleaning cycles of ice cream maturation tanks are the key to higher capacity and higher yields. Using easy-to-clean Alfa Laval agitators with EnSaFoil impellers with high-efficiency Alfa Laval Rotary Jet Head cleaning systems help reduce cleaning cycle downtime without compromising with product quality or consumer safety.


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