

A product recall can have a devastating impact on a dairy producer. Not only in the direct costs associated with recalling and replacing the product, but also the damage to reputation. Maintaining rigorous hygiene standards during production is a key factor in avoiding recalls. It is therefore critical for equipment used in the processing of dairy products to be washed down frequently to keep it clean and avoid contamination.

The challenge is that the general purpose motors used widely in dairy plant to power equipment such as pumps, conveyors and mixers are not designed to withstand frequent sanitation with caustic cleaning agents, or for being sprayed with water at high temperatures and pressures. This causes corrosion of housings and enclosures while damaging moisture can form inside the motor casing. The result is that in extreme cases, standard motors have been known to fail in less than a month. In some applications, a painted coating might be used to protect the motor, but paint can chip or peel off and contaminate dairy products.

Placing a protective shroud around the motor is a common solution, but it can create as many problems as it solves. This is because small particles of dairy products can accumulate beneath the shroud with the potential for bacteria to grow presenting a serious hygiene risk. To avoid this build-up, the shroud needs to be removed for cleaning in a time-consuming operation that holds up production.

A better approach is for a dairy plant to use stainless steel motors developed specifically for the food and beverage industry. As well as being made of hygienic material, they have a smooth design that eliminates the crevices and cavities where food particles and debris can lodge. They can also withstand caustic sanitation chemicals without risk of corrosion.

Furthermore, their smooth bright surface makes cleaning easier because any



Why stainless steel motors are useful for frequent wash-down cycle zones. Pekka Uusitalo of ABB Motion explains

contamination is clearly visible.

It is also vital to specify the correct level of ingress protection. IP69 is the benchmark as it confirms protection against high power, high temperature jets of water from all directions. Using motors that are easy to clean will actually save time and water.

Depending on the specific dairy application, a stainless steel motor can last five times as long as a general purpose motor and will soon deliver a return on investment in terms of enhanced product safety, improved reliability and reduced maintenance costs.

Stainless steel versus aluminium

ABB's stainless steel motors have been subjected to rigorous testing at a hygiene laboratory in Västerås, Sweden. The test regime reproduced typical cleaning practices, with a seven-stage cycle representing a full week of daily wash-down procedures.

Using two IEC motors for the tests, detergent and sanitiser were applied during every stage, with acid applied once per cycle. This reflects the common industrial practice of washing down with acid once a week. Temperatures of up to 55°C and pressures up to 25 bar were used. In all, a total of 158 cycles were conducted – equal to 1,106 daily washdowns or 418 total hours of testing.

At the end of the test programme, the motors were generally unaffected and still in full working order. Notably, no water, condensation, or signs of corrosion was found inside the motors. All three main O-rings and drain plugs remained tight.

For comparison, the test team put a standard painted aluminium motor through the same test. However, it started to deteriorate very quickly and failed before the end of the test period. The paint on the housing blistered and flaked off, and the shaft and other steel components suffered severe corrosion. Washdown chemicals penetrated both the terminal box and the main housing, causing short circuits between the phases and ground. The aluminium rating plate also became detached from the motor.

These tests prove that the stainless steel motors can successfully withstand washdown conditions, giving operators of dairy processing plant the confidence to reduce unscheduled downtime. Their construction material and design features combine to decrease the likelihood of hygiene problems, minimise contamination hazards, and ensure a longer life cycle compared to aluminium motors. [Dii](#)

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