



Challenges in Dairy Processing Applications: CIP

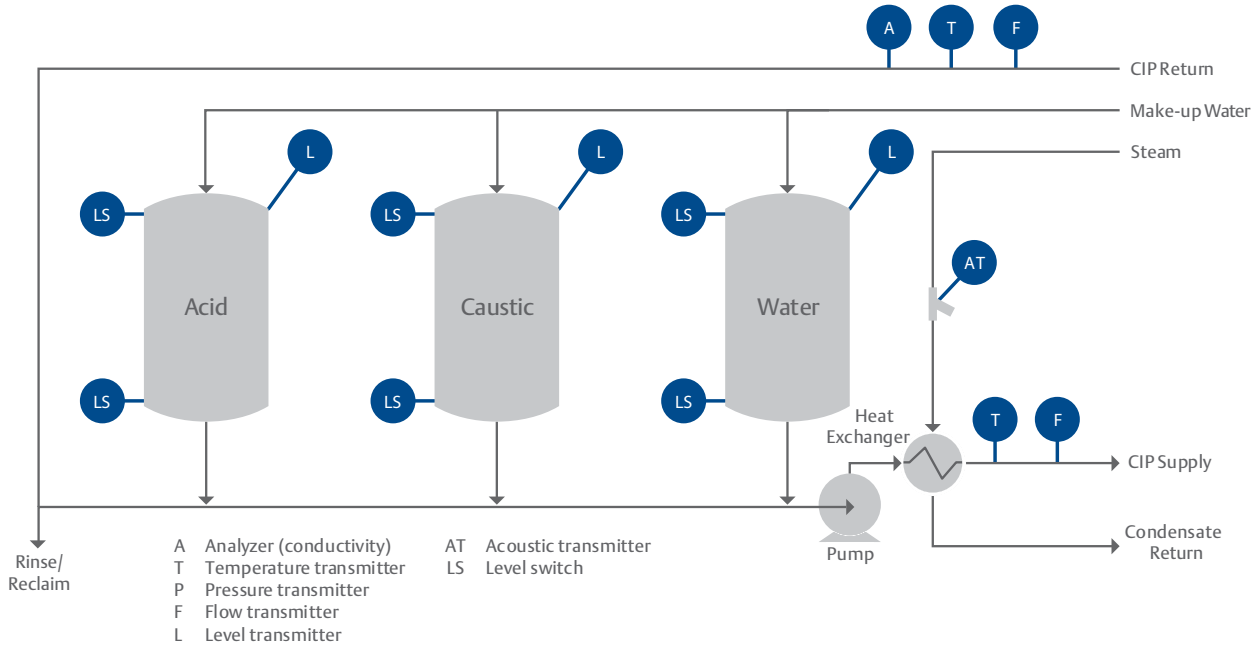
**Reduce Waste and Increase Efficiency During
Clean-In-Place Processes**



DAIRY PROCESSING APPLICATIONS: CIP

Minimizing waste and reducing the cost of utilities while ensuring highest product quality is a challenge in the dairy processing industry. The ability to maximize efficiency during cleaning and sanitization processes while ensuring the health and safety of consumers is key.

Clean-in-Place (CIP) procedures ensure that process equipment and pipework is clean/sterile, ready for the next process to be run.



A typical CIP station design: the system is usually highly automated.

In small dairies the CIP station is commonly centralized. In larger plants, the CIP station is replaced by smaller units located close to each group of processing equipment. Use of the correct sensing technology at each stage is important since there are a number of challenges with the procedures. Some of the key problems are highlighted here, along with the Emerson solution.

Product leftover within the pipes becomes waste during the CIP process



Problem

If sensors intrude into pipework, recovery of valuable product — that would otherwise be lost as waste — may not be possible since the cleaning process ("pigging") may damage the instrumentation.

Solution

Rosemount™ X-Well™ provides accurate non-intrusive process temperature measurements without thermowells or process penetrations that would impede pigging. Easy to install with quick response time, and suitable for rapid flow rates.

Utility steam heating adds costs when not managed properly



Problem

During the CIP program, steam is used extensively for sanitation, which is reflected in a facility's energy usage. Large energy usage translates to high costs if not properly managed.

Solution

The Rosemount 3051S MultiVariable™ Flow Transmitter reduces variability by providing compensated mass flow measurements of saturated steam. The transmitter integrates high performance pressure and temperature measurements to simplify installation and reduce costs.

Heavy vapors above liquid lead to inaccurate readings in CIP tanks



Problem

Hot CIP processes create vapors above the liquid level. High frequency radars have difficulty penetrating the vapors and give inaccurate level readings in CIP tanks.

Solution

The hygienically approved Rosemount 5408 Level Transmitter with non-contacting FMCW technology is able to handle changes in the vapor space, to provide accurate and reliable continuous level measurements even if steam, heavy vapor, or condensation is present.

Chemical holding tanks hold costly and hazardous chemicals



Problem

Tanks hold chemicals utilized in the CIP process. Inefficient usage increases costs. Inaccurate level measurements cause wastage and the potential for overfills and spills.

Solution

The Rosemount 3051HT Pressure Transmitter offers high accuracy at low pressure ranges for repeatable, continuous level measurement readings. It provides best-in-class performance over changing temperatures with rapid return to true zero after the completion of a CIP process.

In hygienic applications, the Rosemount 2120 Level Switch Vibrating Fork with robust housing and fast drip fork design, provides precise, repeatable, and reliable point level control and overflow prevention. An adjustable switch delay prevents false trips from spray balls and turbulence.

Steam trap failure adds costs of extra steam to keep plant running



Problem

Condensate is collected in steam traps and condensate tanks before being pumped back to the boiler. If the steam trap is failing, steam can be lost, requiring more energy to keep the plant running.

Solution

The Rosemount 708 Wireless Acoustic Transmitter provides reliable communication of real time data, wirelessly. Effective monitoring of steam trap health ensures energy is not being wasted, saving energy costs and maintenance hours.

The Plantweb™ Steam Trap Insight Application provides real-time information about steam trap conditions, energy usage, emissions and leak detection. The web-based platform allows you to securely access your data anywhere, and the solution seamlessly integrates with your current system.

CIP processes running too long increases material and energy costs



Problem

Inaccurate and/or slow conductivity measurement can mean that CIP chemical addition is poorly controlled or rinse time extended, unnecessarily increasing total CIP run time and wastage.

Solution

The line powered Rosemount 56 Dual Channel Transmitter can be connected to both the Rosemount 225 Toroidal Conductivity and 403 Contacting Conductivity Sensors.

Toroidal sensors are ideal for the high conductivity, and potentially harsh conditions, in CIP chemical addition. Contacting sensors have the accuracy and speed to quickly determine when the CIP cycle has completed.

Inability to differentiate between milk and water hampers efficient process changeover



Problem

During the CIP program, it is important to be able to detect whether there is milk, water, or caustic chemicals in the system. Access to this information helps ensure as little as possible wastage during changeover from CIP back to production.

Solution

The Micro Motion® H-Series Hygienic Coriolis Flow and Density Meter Sensor allows dairies to identify different fluid densities. This allows operators to rapidly detect the difference between product, rinse water, and cleaning solution, ensuring an efficient changeover to the next process.

CIP processes require a certain turbulence to maintain cleanliness



Problem

Liquid moving through pipes during the CIP process must maintain a certain velocity for optimal cleanliness. Liquids moving too slowly can leave behind undesirable chemicals and spoiled product.

Solution

The Micro Motion H-Series Hygienic Coriolis Flow and Density Meter provides the most accurate measurement of velocity to help maintain the highest degree of sanitation. It calculates volume flow rate, flow totals, and concentration measurement for process control and provides reliable performance even under extreme process conditions.

Valves that are not actuating properly jeopardize the entire system



Problem

Rapid cycling with aggressive steam and cleaning medias creates a difficult operational environment for valves. This application lends itself to problems with seal life, consistent on/off shutoff, and tight footprint requirements. Food safety must also be maintained without compromise in these harsh conditions.

Solution

The Asco™ 290 Angle Seat Valve utilizes an ultra-compact actuator to provide high flow for rapid cycling that can withstand steam and other aggressive cleaning agents. The Series 290FB is designed to comply with FDA CFR21 and (EC) 1935-2004 regulations for auxiliary fluids, making it an ideal choice for CIP systems in dairy cleaning.

Unscheduled maintenance inhibits use of clean process lines



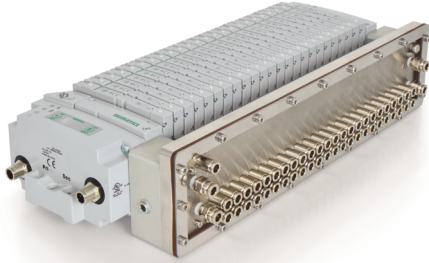
Problem

CIP components will wear at different rates based on operating temperature, system contaminants, and usage. Variable mean time to failure creates unexpected maintenance for system troubleshooting.

Solution

Aventics™ Smart Pneumatics Monitor (SPM) allows a low-cost foray into Internet of Things (IoT). Securely monitor the health and efficiency of CIP systems using any web-based browser device.

Troubleshooting downtime requires an experienced maintenance crew



Problem

CIP systems need to run throughout multiple shifts. Facilities are not necessarily equipped with maintenance experts during second or third shifts. Processes could be down much longer than anticipated due to troubleshooting inefficiencies.

Solution

The Asco Numatics™ G3 or 580 Series electronic platform communications module provides localized diagnostics to pinpoint sensor or valve failure.

Centralized expensive stainless-steel boxes create long air lines



Problem

Equipment wash down requirements in the food and beverage industry require CIP systems to protect electronics. Replacing damaged equipment is costly and increases downtime.

Solution

The Aventics CL solenoid pilot valve series enables customers to adhere to equipment wash down requirements. This series is IP69k rated to meet global washdown regulations for the food and beverage industry. Machine builders can increase performance and decrease expensive enclosures.

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