

SAFETY MEMO

November 28, 2022 – Clean In Place (CIP)



Did you know?

Clean In Place (CIP)

CIP is used to clean the interior surfaces of machines and equipment in food and beverage processing plants without disassembling the system. CIP is commonly used for piping and equipment to remove normal fouling that occurs during production or when changing recipes. The cleaning is accomplished with a combination of thermal, chemical, and mechanical actions. CIP systems can range from simple manually operated to highly complex fully automated systems¹ (the picture shown in Figure 1 is relatively simple and appears to be a semi-automated system).

Factors affecting CIP in a food and beverage facility include the type of fouling, materials of construction, and type of equipment being cleaned. The things that the CIP system can control are: temperature, concentration of the cleaning agent, contact time of the cleaning solution, and pressure/flow of the cleaning solution.

Although the focus of CIP is cleaning, it is important to consider the process conditions that were active prior to the CIP. For example:

- Before CIP of a freezer, it needs to be at or above freezing temperatures to avoid thermal shock.
- Before CIP of a vessel that operates under modified atmosphere, a purge cycle may be required to avoid adverse reactions.

CIP Cycles

There can be many steps in CIP but the four main are: Pre-Wash, Wash, Post-Wash, and Sanitize. Each step varies in the time, temperature, and chemistry.

1. Pre-Wash

This step removes excess residue and loose materials. It traditionally uses city water, though increasingly reclaimed water from the Post-Wash step is used for water savings. This water may be used at ambient

temperature or heated up to 60 °C or more. This water goes to drain.

2. Wash

This step removes persistent residue. It uses water with a cleaning agent. Alkaline agents are used to remove organic material, like fats and oils. Acidic agents are used to remove inorganic material, like minerals. If both alkaline and acidic agents are used, alkaline is used first with a short Post-Wash step in between. Temperatures from ambient up to 85 °C. Cleaning agents are recirculated throughout this step.

3. Post-Wash

This step ensures that all detergents are removed from the system. It uses city water. Water may be heated (especially to prevent thermal shock after a hot Wash step). This water either goes to drain or is captured for use as Pre-Wash for future CIP.

4. Sanitize

as the purpose of this step is to provide a final defence against any bacterial residue. This step uses city water with a chemical sanitizer added.



Figure 1: CIP skid example with water tank and control system. Courtesy of Dobbins Company.²

¹ Sani-Matic. Food & Beverage: Clean-In-Place (CIP) Systems. ND. Retrieved from [https://sanimatic.com/food-beverage/clean-in-place/#:-:text=Clean%2DIn%2DPlace%20\(CIP\)%20systems%20are%20automated%20systems,fittings%2C%20without%20disassembling%20the%20process](https://sanimatic.com/food-beverage/clean-in-place/#:-:text=Clean%2DIn%2DPlace%20(CIP)%20systems%20are%20automated%20systems,fittings%2C%20without%20disassembling%20the%20process)

² Dobbins Company. Clean-in-Place Tank Systems – Sani Matic. 2022. Retrieved from <https://dobbinsco.com/product/clean-in-place-tank-systems-sani-matic>