



## SANITARY DESIGN, INDUSTRIES, LLC.

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# Sanitizers in the Dairy Plant

Sanitizing is a process by which the number of bacteria on a product contact surface is reduced to a safe level. This safe level is defined as a 99.999% reduction (also known as a 5-log reduction) in the number of bacteria within a 30 seconds of application. Sanitizing can be accomplished with the use of chemicals, heat, or UV radiation. Sanitation chemicals are regulated by the Environmental Protection Agency (EPA) and require an EPA registration number to be on the product label. A very important requirement to get registration approval is to provide efficacy data that proves the product kills the microorganisms listed on the product label when used at the recommended concentration and procedure. Sanitizing solutions must be routinely tested to verify that the target concentration listed on the product label is being met. In order to effectively sanitize your equipment it is absolutely paramount to follow the instructions on the product label.

Several chemical sanitizers are available for your choosing. Knowing the active ingredient of these sanitizers is very helpful when considering which one to use in your plant. All of these active ingredients accomplish the task of killing bacteria. They all break down the cell wall and disrupt the processes of regeneration and metabolism. Sanitizers most common to the dairy plant are acid sanitizers, quaternary ammonium, chlorine, iodine, and peroxyacetic acid (PPA). Sanitizers not so common to the dairy plant are aldehydes, alcohols, phenolics, and chlorine dioxide.

Acid sanitizers are very effective sanitizers and are economical to use. Recommended concentrations of acid sanitizer solutions have a very low pH levels. A low pH provides a significant benefit to the user by not only being an effective sanitizer but also addressing mineral build-ups and hard water conditions. Acid sanitizers kill a broad spectrum of bacteria and, in most cases, bacterial spores. Some of the acid sanitizers also have a residual effect (lasting longer 30 seconds ) to kill bacteria at a 5-log reduction. This residual effect can be anywhere from a couple of hours up to twenty four hours. There are surfactants in acid sanitizers which can cause foam in CIP applications. This does no harm to the product. Remember initial sanitizer solution contact is all that is required, not recirculation.

Quaternary ammonium sanitizers are effective sanitizers against a wide range of bacteria but they do not kill bacterial spores. They can be used at different levels of concentrations per the need. It is at the lower levels (200-400ppm) they are used as sanitizers for product contact surfaces in the dairy plant. At higher concentrations they are typically used for environmental sanitation. They can tolerate low levels of soil and still remain efficacious. Quats are not corrosive nor do they stain. One concern is that they do kill bacterial cultures. Given this and their residual effect, one needs to be very cautious using them in the same space cultures are being used.

Chlorine when combined with salts like sodium, calcium, and potassium is called a hypochlorite. Sodium hypochlorite being the most common. These hypochlorites are effective sanitizers and have a relatively low cost. They are efficacious against a broad spectrum of bacteria but, they do not kill bacterial spores. Some disadvantages are that they are corrosive to metals, weakened by organic material and high temperatures, and they do not have residual effect.

Iodine in combination with a surfactant is called an iodophor. These are effective sanitizers and, like hypochlorites, are efficacious against a broad spectrum of bacteria but, are not considered effective against bacterial spores. The biggest disadvantage is that they stain.

Finally, peroxyacetic acid sanitizers are very effective sanitizers against a wide range of bacteria and bacterial spores. They work well in cold conditions. Because they break down into vinegar, water, and



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oxygen they are considered environmentally friendly. One disadvantage is that they are expensive to use.

I will finish with this one thought about sanitizing. Sanitizers will not be efficacious if there is dirt present on the surface you are sanitizing. An effective sanitizing program can only be accomplished if there is an effective cleaning program. Remember, you cannot sanitize dirt. Only properly cleaned surfaces can be effectively sanitized.