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Cleaning Products in the Dairy Plant

Selection of the proper cleaning products to be used in your plant is very important in achieving effective cleaning of your equipment. Knowing the basics of product chemistry and what soil each product can break down will make it easier to choose which product to use.

Product pH is the most basic concept to understand about how these products work. Their pH indicates which soils they will be most effective in breaking down. A pH of 0-7 tells us it is an acid product and it will break down minerals. The closer the pH is to 0 the stronger the acid. A pH of 7-14 tells us it is an alkaline product and it will break down fat, protein, and carbohydrates. The closer to 14 the stronger the alkaline. There are several other chemicals that can be added to acid and alkaline products to enhance the performance of the wash solution.

Let's start with surfactants. These are chemicals that break down surface tension of water. Think of it this way. Adding a tiny amount of surfactant to a bead of water sitting on top of a freshly waxed surface of a car will allow that bead to spread out across that entire surface. What this means is that surfactants, when combined with acids or alkaline products and water to create a wash solution, will allow for very significant penetration of the soils and surfaces on your equipment by breaking down the surface tension of the water. The degree of penetration depends directly on the chemical make-up of the individual surfactant and the number of different surfactants utilized in the product. Use of surfactants in acid and alkaline products greatly enhances the ability of the wash solution to get the job done at lower concentrations of product, thus maximizing efficient use of those products.
Another group of chemicals that can be added to cleaning products is chelating agents. These chemicals "bind up" the components (minerals) that make water hard. You may ask why we want to do this. Water hardness, the amount of mineral in water, has a detrimental effect on the ability of the wash solution to do its job. By "binding" these minerals up with a chelating agent (called softening) the full strength of the cleaning product can then be devoted to breaking down the soil. One common way of expressing the level of water hardness is in grains per gallon. Concentrations of many cleaning products, when measurements of water hardness are above 10-12 grains per gallon, will be need to be increased to compensate for the harder water. Use of chelating agents allow for effective cleaning to be done at lower concentrations of product, again maximizing product efficiency.
Still another group of chemicals that can be added to cleaning products to enhance the performance of the wash solution is what we call builders. They help break down non soluble soils (especially oils and fats) into much smaller components, a process called emulsification. And, they help suspend these soils in solution, called peptizing, which prevents them from reattaching to equipment surfaces. Builders also dissolve soluble minerals and hold them in solution which is called sequestration. And, finally builders have the ability to hold insoluble minerals in solution as a precipitate. All of these chemical processes enhance the performance of the wash solution. It may not be as important to remember these specific processes as it is to just be aware that the presence of the chemicals that create these processes will improve the ability of the wash solution to do its job.

Finally, the last group of chemicals that can be added to cleaning products to enhance the performance of the wash solution is solvents. Water is a solvent and can dissolve many soils but, there are petroleum based greases and oils and water insoluble soils that cannot be dissolved in

water. These soils require specific solvents to dissolve these soils. Rubbing alcohol and butyl are such solvents. It is not common to run into these soils in dairy plants, but it has been known to happen. It's in those cases that solvent cleaning products will be needed.

Cleaning products are composed of many different chemicals. The quantity and type of chemical components present in a particular type of product can vary significantly from one manufacturer to another. So, when choosing a product be conscious of your water hardness, the type of soil you are trying to remove, and the chemical make-up of the product you are choosing. Knowing the history of performance when choosing these products is a wise thing to do. Talk to the manufacturer and get references if possible.

Sanitizers are another group of chemicals used in the dairy plant. They are not used for cleaning. These will be addressed in another paper.