

How chemical and biological cleaners work

 By Clinton Smith

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With greater environmental, health and safety consciousness cultivating an evolved cleaning industry, consumer education is essential to ensuring that educated product choices are made.



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Delving deeper into how a product works will aid in selection, ensuring that the best, safest, most hygienic and environmentally friendly product is chosen.

In her article 'How do detergents clean?' chemistry expert, Anne Marie Helmenstine, confirms that detergents and soaps are used for cleaning because pure water can't remove oily, organic soils. Soap cleans by acting as an emulsifier, meaning that soap allows oil and water to mix so that oily grime can be removed during rinsing.

Helmenstine goes on to state that detergents are primarily surfactants, which could be produced easily from petrochemicals. Surfactants lower the surface tension of water, essentially making it 'wetter', so that it is less likely to stick to itself and more likely to interact with oil and grease.

More than surfactants

"Modern detergents contain more than surfactants. Cleaning products may also contain bio-enzymes to degrade protein-based stains, bleaches to de-colour stains and add power to cleaning agents, and blue dyes to counter yellowing. Like soaps, detergents have hydrophobic or water-hating molecular chains and hydrophilic or water-loving components," confirms Helmenstine.

"The hydrophobic hydrocarbons are repelled by water, but are attracted to oil and grease. The hydrophilic end of the same molecule means that one end of the molecule will be attracted to water, while the other side is binding to oil. Neither detergents nor soap accomplish anything except binding to the soil until some mechanical energy or agitation is added into the equation. Swishing the soapy water around allows the soap or detergent to pull the grime away from clothes or dishes and into the larger pool of rinse water."

Rinsing washes the detergent and soil away. This is one of the most important realities of cleaning with chemical products. Without rinsing, one would merely be redistributing the soil/organic waste evenly over surfaces that are to be cleaned, without actually removing it.

"Modern detergents may be made from petrochemicals or from oleo chemicals derived from plants and animals. Alkalis and oxidising agents are also chemicals found in detergents," concludes Helmenstine.

Five elements

In a nutshell, soaps and detergents emulsify dirt. The five most important elements of cleaning are to select the correct product for the application (ensuring that the cleaner chosen is fit to do the job), there must be agitation, there must be aeration, there must be water, and an elevated temperature is required. If any of these elements are missing from the cleaning process, it will not be effective.

Avmor, a Canadian cleaning solution provider that focuses on health and safety requirements, released a White Paper which highlights some interesting facts about biological cleaning. According to the White Paper, the overarching requirements when cleaning are clean and safe.

"As people have become increasingly aware of and concerned about environmental, sustainability, health and safety issues, businesses have come under significant pressure to take active measures in order to safeguard the health and safety of their workers, customers and the surrounding environment," says Paul Golding, director of marketing and customer satisfaction at Avmor.

The paper goes on to confirm that biological cleaning solutions for cleaning and maintenance make use of biological decomposition to clean and deodorise, without harming workers, customers or the environment. These products harness nature's own process to recycle waste into simple and essential substances.

Natural processes

When a biological product is applied to a surface, the microbials eat at the soil - turning it into water and carbon dioxide. Thereby, biological cleaning products utilise natural processes to provide a solution to cleaning, odour control and waste elimination requirements; all without the use of potentially harmful chemicals.

Golding confirms that there are four main advantages to using biological cleaners and odour control products. These products are more environmentally friendly and safer for the users and occupants; they contain highly specialised enzyme producing microbials which eliminate soils that traditional chemical products alone cannot get rid of; they provide residual cleaning up to 80 hours after application, aiding in the reduction of overall labour; and they help to displace unknown, potentially disease causing bacteria with known, healthy microbials, contributing to better health.

"Biological based products should not be confused with solely enzyme-based products since the latter do not provide the same cleaning results. Enzyme-based products break down the organic matter into smaller pieces and displace it without completely eliminating it. In contrast, biological based products continue eating at organic matter until there is nothing left,"

says Golding.

The result is the neutralisation of mal-odours and the eradication of dirt and bad bacteria.

ABOUT CLINTON SMITH

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