

Cleaning Mechanisms

Understanding Cleaning Mechanisms to Determine Proper Cleaning Agents

Understanding different types of cleaning mechanisms and residue characteristics helps in selecting a suitable cleaning agent. Selecting the right cleaning agent decreases cleaning time, utilities consumption, and cleaner concentration, thus maximizing efficiency. Formulated pharmaceutical detergents can be both effective and efficient because these products use multiple cleaning mechanisms working synergistically to provide effortless performance.

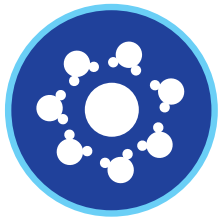
CATEGORIES OF CLEANING MECHANISMS

DETERGENCY



Detergents contain surfactants which may exhibit properties of wetting, emulsifying and dispersing. Surfactants are long chain molecules with a polar, hydrophilic (water-loving) head and a nonpolar, lipophilic (lipo = oil or fat, philic = loving) tail. Since the surfactant molecule is both polar and nonpolar, it acts as a mediator between equipment surfaces, soils, and cleaning agents. Detergents with surfactants may have wetting, emulsifying, and dispersing capabilities to clean efficiently.

- Wetting is a property that allows the detergent to penetrate surface crevices to remove soils.
- Emulsification occurs when several lipophilic tails of surfactants bind and surround soils. By emulsifying the soil, the surfactant helps remove insoluble, nonpolar materials.
- Dispersion properties of a detergent keep residues separated and suspended in the solution.



SOLVATION

Solvation is the ability of a cleaning agent to dissolve the residue. The pH of the cleaning agent enhances the solubility of the soil. The type of residue will impact which type of cleaner, whether alkaline, acidic, or neutral, is appropriate to effectively dissolve the residue.



CHEMICAL REACTIONS

Both detergency and solvation change the physical state of the soil during cleaning. The third category of cleaning, chemical reactions, break down residues at the molecular level. Components of cleaning agents, such as oxidizers and enzymes, chemically alter residues to make them easier to clean.

MECHANISMS FOUND IN CLEANING AGENTS

Pharmaceutical detergents are engineered to contain multiple cleaning mechanisms to clean efficiently and effectively compared to alternative cleaning agents, like water and commodity chemicals.

	DISSOLUTION	PH SOLVATION	CHELATION	DISPERSION	EMULSIFICATION	WETTING
WATER						
COMMODITY CAUSTICS AND ACIDS						
PHARMACEUTICAL DETERGENT						

*KEY: - - - = coverage without surfactant ● = residue ✓ = good coverage with surfactant