

# Cleaning Mechanisms

## Understanding Cleaning Mechanisms to Determine Proper Cleaning Agents

Select the right cleaning agent to decrease cleaning time, lower utility consumption and maximize efficiency. Pharmaceutical detergents are both effective and efficient because these products use multiple cleaning mechanisms working synergistically to provide effortless performance.

### Categories of Cleaning Mechanisms



#### DETERGENCY

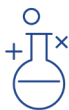
Detergents contain surfactants which may exhibit properties of wetting, emulsifying and dispersing. Surfactants are long chain molecules with a polar, hydrophilic head and a nonpolar, lipophilic tail. Since the surfactant molecule is both polar and nonpolar, it acts as a mediator between equipment surfaces, soils and cleaning agents. Detergents with surfactants generally 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 generally 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, 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

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