

Key Characteristics of Formulation Ingredients/Cleaning Systems

Surfactants

~ Positive Environmental Characteristic: Biodegrade readily to compounds with low toxicity. *Example:* Straight carbon chain chemicals like linear alcohol ethoxylates or fatty acid glycidol esters.

~ Key Characteristics of Concern: Toxicity to aquatic organisms, like fish (vertebrates), daphnids (invertebrates) and algae; persistence in the environment; toxicity of biodegradation byproducts. *Example:* Nonylphenol ethoxylates—toxic to aquatic organisms, biodegrade under anaerobic conditions to nonylphenols, which persist in the environment, have high toxicity to aquatic organisms, and may be endocrine disruptors (compounds that adversely affect the endocrine system, which controls metabolism, reproduction, and growth).

Builders

~ Positive Environmental Characteristic: Low toxicity, low impact on the environment. *Example:* Maleic anhydride derivatives, zeolites, or sodium citrate.

~ Key Characteristics of Concern: Potential to cause eutrophication in fresh water (process by which a body of water becomes rich in dissolved nutrients, diminishing oxygen levels and a water body's ability to support aquatic life), *example:* Inorganic phosphates; possible metal loading in the environment, *example:* EDTA.

Bleaches

~ Positive Environmental Characteristic: Low toxicity, no toxic byproducts. *Example:* Hydrogen peroxide or ozone.

~ Key Characteristics of Concern: Inherent toxicity and toxic byproducts. *Examples:* 1) Sodium hypochlorite--may form hazardous gases and chlorinated organic byproducts; may also damage fibers in fabric or deteriorate substrates; 2) Sodium perborate--may present both human health and ecological concerns; and 3) Dichloro-isocyanurate--may form a toxic gas, nitrogen-trichloride, a threat to human health.

Colorants

~ Positive Environmental Characteristic: Low toxicity to humans and aquatic organisms. Minimize colorant use whenever possible.

~ Key Characteristic of Concern: Toxicity. Studies indicate that certain colorants may cause cancer or other adverse health effects in humans (e.g., Rhodamine B). Metalized dyes

present health and environmental concerns.

Fragrances

~ Positive Environmental Characteristic: Low toxicity to humans and the environment. Minimize fragrance use whenever possible.

~ Key Characteristic of Concern: Potential toxicity. Many fragrances cause an allergic response in sensitive individuals. *Examples:* Methyl salicylate raises concerns for aspirin-sensitive individuals; d-limonene may pose a hazard to aquatic organisms.

Solvents

~ Positive Environmental Characteristic: Low toxicity to humans and the environment. *Example:* Propylene glycol ethers.

~ Key Characteristic of Concern: Toxicity to humans and aquatic organisms. *Examples:* For human health concerns, ethylene glycol monobutyl ether; for toxicity to aquatic species, d-limonene.

Softeners

~ Positive Environmental Characteristic: Rapid biodegradation. *Example:* DEEDMAC, other ester quaternary compounds.

~ Key Characteristic of Concern: Toxicity to aquatic organisms. *Example:* Quaternary ammonium compounds.

Formulation pH

~ Positive Environmental Characteristic: Mild or neutral pH.

~ Key characteristics of concern: Highly caustic or acidic cleaning environments; may cause severe irritation or burns to living tissue in humans or aquatic organisms. *Example:* strong alkalis and sour. Highly alkaline ingredients can lead to alkaline hydrolysis on polyester fibers or deterioration of other substrates, shortening usable life. Extreme pH effluents may also damage pipes and sewer lines.

Resource Efficiency

~ Positive Environmental Characteristic: Low-temperature and low-water formulations; closed-loop systems.

~ Key Characteristics of Concern: Overuse and non-reuse of water and energy. Formulations that require high temperatures or multiple rinses deplete increasingly scarce natural resources.

Containers / Packaging

~ Positive Environmental Characteristic: User-friendly sizing/dispensers; minimize solid waste generation.

containers.

~ Key Characteristic of Concern: Large, heavy containers that can cause worker injury; non-reusable or non-recyclable

(Rev.
8/00)