

OUR SCIENCE – ADVANCED SURFACE CARE - GLOSSARY

Unelko Corporation has a long history in the manufacture & marketing of innovative products for the cleaning and coating of everyday surfaces/objects ranging from glass, porcelain and ceramics to polished & painted metals, plastics, marble and granite.

This involves understanding the nature and structure of these surfaces...and the weathering, soiling and wear to which they are subjected, often on a daily basis. Since it is irrefutable that surfaces will never be self-cleaning, the ultimate goal of surface care products is **easier cleaning** (initially and next-time); using products that are harmless to the environment, safe for users, non-destructive to the surface and which will inhibit the adhesion & buildup of re-soiling.

The Nature of Surfaces: Although invisible to the naked eye, even the hardest of surfaces (from glass, porcelain and ceramics to marble, granite, stainless steel and laminates) are like sponges! They have microscopic pores that trap water, soil, pollutants and microbes that combine, adhere to the pores and buildup in layers, even biofilms.

Everyday Surface Soil: When everyday spills and splatters are allowed to dry on interior or exterior surfaces, they result in soil that is either water soluble, oil soluble or water & oil **insoluble**. Water-soluble soil is easily cleaned with plain water, soapy water or mild detergent solutions. Oil soluble soil is readily softened and removed with suitable solvents or emulsifying degreasers. **It is the insoluble soil and buildup that present the greatest cleaning challenges!** Such soil and its buildup can only be removed by scraping and scrubbing with strong detergents, powerful acids or alkalis, penetrating solvents or abrasive cleansers.

The Impact of Water on Surfaces: **Insoluble soil** also results whenever rain water, ground water or tap water is allowed to evaporate on any interior or exterior surface. Even municipally furnished water – while generally safe for drinking, cooking, washing and bathing – still contains enough salts, hard water minerals, bacteria, organic and inorganic contaminants and water treatment chemicals to be chemically active. **When such water evaporates on windows, sinks, tubs, toilets, shower enclosures, bathroom mirrors, tile walls, counters and other hard surfaces, it combines with ordinary soil to promote the formation, adhesion and build-up of insoluble buildup of soap scum, foodstuff, lime scale, mold, mildew, rust and hard water mineral deposits.**

A Surface-Damaging Vicious Cycle: This ongoing exposure to chemically active water and everyday spills & splatters contributes directly to increased soiling - and to the surface damaging vicious cycle that results from scraping and scrubbing the otherwise insoluble soil with harsh cleansers to remove the buildup. The stronger the cleaning action, the more it opens the microscopic pores of the surface. The more open and vulnerable the pores, the deeper the new soil penetrates and the greater its adhesion and build-up - and the stronger the cleaning action required to remove the soil - with greater and greater destruction of the surface. Although microscopic at first, this cycle of scraping and scrubbing with powerful surface-active cleaners and cleansers ultimately leads to surfaces that are visibly rough, exhibit the loss of color and clarity, and become even more prone to soiling.

The Need for Water, Soil & Stain Repellent Surfaces: The world's leading manufacturers of glass, porcelain sinks, tubs & toilets, ceramic tile, plumbing hardware and other kitchen & bath surfacing materials have confirmed that the only way to reduce the adhesion and build-up of insoluble soil is to make surfaces more water and soil repellent - in effect, to **shield surfaces against the ravages of water and the formation of insoluble soil from everyday spills & splatters**. Although manufacturers have improved the density and “finish” of many surfaces over the years, **until rain, ground water and municipal water is completely de-mineralized** - no glass, porcelain, ceramic or other household



surface can permanently withstand the erosive, abrasive impact of chemically active water, everyday soil and strong cleaners – and **no surface will ever be self-cleaning...let alone permanently self-cleaning**. Surfaces and their microscopic pores can, however, be protected with water, soil & stain repellent barrier coatings to reduce the adhesion & buildup of re-soiling for easier next-time cleaning!

The Importance of “Renewable” Surface Protection: Even DuPont’s world-famous Teflon® coatings do not **prevent** soiling, they just make Teflon-coated cookware & utensils infinitely easier to clean. The densely opaque, surface-altering Teflon coatings – although extremely durable – are nonetheless deteriorated by abrasion. Unfortunately, they are also **non-renewable**. **By important contrast**, Unelko’s barrier coatings are absolutely **invisible**, and do not change the appearance, texture or color of the surface to which they are applied. Although resistant to removal by any soap, solvent or detergent that would not damage and untreated version of the same surface, Unelko’s coatings – like Teflon – are deteriorated and damaged by abrasion. But, unlike Teflon, Unelko’s water, soil & stain repellent barrier coatings are designed and formulated to be **easily renewable** using ordinary “wipe on-polish in” or “spray & wipe dry” techniques.

Inherent in the understanding of advanced surface care is the meaning of common words and phrases. As used by Unelko in its patents, labels, literature and websites:

Angstrom means a unit of length (measurement) equal to one hundred-millionth of a centimeter (10^{-10})

Antimicrobial means an agent or product that is capable of inhibiting or destroying microorganisms

Bacteria means a group of microscopic organisms, many kinds of which can cause disease

Barrier means a substance or coating that reduces the penetration of organic or inorganic liquids and other substances into the microscopic pores of surfaces

Cleaner means a product (liquid or cream) that cleans organic soil from hard or soft surfaces without smearing or streaking

Cleanser means a product (generally a cream) containing abrasives that cleans both organic and inorganic soil from hard surfaces

Coating means a product that will adhere, bind or bond to a surface to provide a covering that will enhance the properties of the same uncoated surface

Contact angle means the angle, conventionally measured through the liquid, where the liquid meets a solid surface. Contact angle is used to measure the wettability or the repellency of the surface to the liquid. Generally, pure or distilled water must be used on a clean surface to measure contact angles. In practical terms, contact angles of 0° to 45° denote wettability or hydrophilicity of the surface by the liquid, 45° to 90° denotes a modest in-between level of wettability and contact angles of 90° and more denotes repellency or hydrophobicity of the surface to the liquid.

Fungus or fungi (pl.) means a type of organism that has no leaves or flowers and grows on plants or decaying vegetable matter and reproduces by spores

Germ means a microorganism; especially one that causes disease

Ground/Well Water means any water that is sourced from creeks, streams, rivers, lakes and cisterns, but which is untreated and which has not had any possible contaminants removed.

Hydrophilic means having a tendency to mix with or dissolve in water.

Hydrophobic means the relative inability to mix with or dissolve in water; to repel water

Inorganic means not containing or coming from living matter; in chemicals, not containing carbon

Inorganic Surface Soil means dirt & grime that is not biologically active (non-living) and typically consists of minerals, salt, clay, silt, sand, and other particles. Typically, inorganic soil is not readily soluble in water, soaps, solvents and detergents.

Invisible (coating) means a coating whose film cannot be seen with the naked eye or with conventional microscopes

Microbe means a bacterium, virus or fungus; a germ

Microorganism means an organism that is so small that it can only be seen with a microscope

Organic means having to do with living matter; in chemicals, containing carbon

Organic Surface Soil means dirt & grime that is biologically active (living) and typically consists of plant & vegetable matter, soap scum, body oils & excretions that are solubilized by water, soaps, solvents and detergents for cleaning or removal.

Organism means an animal, plant or life form

Nano (unit of measure) means one-billionth of a meter (10^{-9}); on any other scale it means small, very small, invisible to the naked eye and most microscopes

Nanotechnology means technology on a very tiny (atomic or molecular) scale

Repellent means a substance or a coating that keeps water and soil from passing through it or from adhering to it

Shield means a substance or a coating that acts as a protective barrier or screen

Tap Water means any potable water furnished by municipalities or state agencies to homes, businesses and public buildings; typically water from lakes, streams and rivers that has been treated and/or recycled in regulated water treatment plants to remove minerals, microbes, chemicals and other contaminants.

Treatment means the use of a substance or process to preserve or give particular properties to something.

Virus means a submicroscopic organism or groups of organisms that can cause disease