USING CORIAN® IN A LABORATORY ENVIRONMENT

Corian® has been used successfully in various types of laboratories as bench tops and other work surfaces throughout its history. Design flexibility, ease of fabrication, durability and ability to be renewed to its original appearance make Corian® a versatile material to use in a lab. In fact, solid surfaces are listed in SEFA 3-2002, Recommended Practices for Work Surfaces, by Scientific Equipment and Furniture Association (SEFA), of which DuPont™ Corian® is an executive member.

However, every laboratory application is unique and there are multiple factors that should be considered in deciding the suitability of Corian® in a particular installation. Some of these include:

- Chemicals in use
- Concentrations of the chemicals used
- Frequency and length of direct exposure to the chemicals
- Cleaning/maintenance procedures and performance expectations

Each of these can have an effect on the visual performance of the work surface as well as the degree of care and maintenance that is required to restore the original appearance of the top. **The best practice is to install a test piece of material to confirm the suitability of Corian® in a particular application.**

Chemical Resistance Testing

DuPont Surfaces has conducted internal studies to determine the effects of chemical exposure on Corian® to help define the limits for its use in laboratories. It is virtually impossible to test the performance of Corian® against all possible combinations of chemicals, concentrations and exposures that might be encountered in any given laboratory. However, the table below lists the chemicals or types of chemicals tested that are *representative* of a wide variety of chemistries that are frequently used in laboratories, and highlights their effects on Corian®. Following the table is a section on removing the effects of these chemicals and restoring the Corian® surface. The chemical testing procedures were similar to those outlined in the ANSI Z124.6 standard for chemical and stain resistance, in which several drops of reagent are placed on the Corian® surface, covered with a watch glass and left overnight (approximately 16 hours).

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Chemical Testing and Performance

REAGENTS*	EFFECT ON CORIAN®
Acids 10% acetic acid 0.10M nitric acid (HNO_3) 0.10M hydrochloric acid (HCl) **Bases** 0.10% sodium hydroxide Concentrated ammonium hydroxide **Oxidizers** Concentrated sodium hypochlorite 15% sodium hypochlorite	**No Effect** No visible surface change
Bases 10% sodium hydroxide **Solvents** Carbon tetrachloride (CCl_4) Acetone Toluene	**Slight** Barely visible deglossing of surface
Acids 1.0M nitric acid **Bases** 50% sodium hydroxide **Solvents** Methyl ethyl ketone	**Moderate** Visible deglossing or slight etching
Acids Glacial acetic acid **Solvents** Chloroform ($CHCl_3$) Methyl methacrylate	**Pronounced** Surface change with slightly raised or moderate etching
Acids Aqua regia 11M nitric acid (HNO_3) 10M hydrochloric acid (HCl) **Solvents** Methylene chloride (CH_2Cl_2)	**Very Pronounced** Significant raised or etched surface
Dyes, Pigments, Stains, Iodine	**None to Pronounced** depending upon concentration and time of exposure
Disinfectants, Detergents Disinfectants and cleaners are frequently comprised of bleach (3–6% sodium hypochlorite) or water-based mixtures containing chemical compounds such as surfactants, alkyl chlorides (e.g., benzalkonium chloride), alcohols (e.g., ethanol, isopropanol, phenol) and/or hydrogen peroxide.	**None to Barely Visible** Deglossing depending upon concentration and time of exposure

* Corrosive and/or aggressive acids, bases and solvents should always be used in a fume hood with extreme caution to conform to health and safety requirements. Corian® is not recommended for use in fume hoods where these types of compounds are frequently used.

USING CORIAN® IN A LABORATORY ENVIRONMENT — *continued*

Surface Restoration and Maintenance Procedures

Start with the finest grit sanding pad to remove the damage. Pads are available from Abrasive Pads Micro-Surface Finishing Products, Inc., (800) 225-3006. (The color of the pads from roughest to smoothest are: white, yellow, green, peach, lilac, blue, gray.) Rub over the damaged area in a straight line to remove it. Periodically switch rubbing direction 90°. Be sure all of the affected area is removed. If this first step takes too long, try the next heavier grit sanding pad. To minimize dust during sanding, wet the surface. Rinse pad periodically to clean residue. Clean top with water. Select next lighter grit and repeat process. Rub over a larger area to blend in sanding. Continue process using successively finer grits until desired gloss level is achieved. Rinse out all pads used and air dry before putting them away.

Mechanical Performance After Chemical Exposure

In order to quantify the practical risk of chemical exposure to the mechanical integrity of a Corian® installation, several tests were performed. Pieces of Corian® were subjected to simulated spills of three chemicals: 1.0M nitric acid, methylene chloride and acetone. Ten milliliters of each reagent was placed on the surface; the spill was covered with a plastic lid, and the lid was weighted. These samples were left overnight and tested the following day.

Mechanical Performance After Chemical Exposure

PROPERTY	TEST	RESULT
Impact Strength	Ball drop (ASTM D3029) Up to 4 lbs. x 10 ft.	No effect compared to unexposed control
Flexural Properties	ASTM D790 on milled specimens	No effect compared to unexposed control
Surface Hardness	Barcol or Rockwell hardness	None from 1M HNO_3 Slight decrease from acetone Noticeable decrease with methylene chloride**

** Light sanding restored both appearance and hardness

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