DLUBAK CORPORATION

520 Chestnut Street • Blairsville, PA 15717
US: 800-800-2977 or 800-336-0562
Phone:724-459-9540
Fax: 724-459-0866

CURVED GLASS & EXTRUSIONS • SPECIALTY FLAT GLASS & LAMINATES

CLEANING INSTRUCTIONS FOR ALL LAMINATES OF GLASS, GLASS/POLYCARBONATE, ALL POLYCARBONATE OR DUPONT SPALLSHIELD®

Security laminates are comprised of multiple layers of glass and various plastic materials that can be adversely affected by different chemicals and solvents. The following techniques are for cleaning the surfaces of Security Glass, Glass/Polycarbonate and Dupont Spallshield® Products. Care should be taken to not expose the laminate edges to any moisture or chemicals. The following guidelines are based on standard industry practices, to ensure acceptable results, always test a sample of the material with the cleaner and technique to be used.

STEP #1
Wash with a mild soap or detergent (see recommended cleaners) and lukewarm water using a clean sponge or soft cloth. Rinse well with water. Dry thoroughly with chamois or moist cellulose sponge. (Do not use a squeegee on polycarbonate, Spallshield® or any plastic surface.)

STEP #2
Remove masking adhesives, glazing compound, grease and paint splashes with compatible cleaning agents (see Instructions below). NEVER USE CLEANING AGENTS IN DIRECT SUN LIGHT OR AT ELEVATED TEMPERATURES. NEVER LEAVE CLEANERS ON SURFACE FOR LONG PERIODS OF TIME, WASH IMMEDIATELY. DO NOT USE GASOLINE.

To Remove Masking Adhesive and Glazing Compound:
Isopropyl Alcohol, Naphtha VM&P grade or Kerosene will help lift stickers and other adhesive backed labels. Apply with clean soft cloth, wash immediately with soap and lukewarm water and rinse with thoroughly with clean water.

To Remove Graffiti:
Naphtha VM&P grade, Isopropyl Alcohol or Butyl Cellosolve removes paint, marker ink. (Do not use in direct sunlight).

STEP #3
Final Wash with a mild soap or detergent (see recommended cleaners) and lukewarm water using a clean sponge or soft cloth. Rinse well with water. Dry thoroughly with chamois or moist cellulose sponge. (Do not use a squeegee on polycarbonate, Spallshield® or any plastic surface.)

TO MINIMIZE FINE OR HAIRLINE SCRATCHES ON POLYCARBONATE
Fine scratches and minor abrasions can be minimized by using a mild polish (see compatible list).Plastic Polishes applied and removed per manufacturer instructions.

Suggested Polishes:
Mirror Glaze Clear Plastic Polish, Cleaner & Detailer (by Meguiars 800-347-5700 or Meguiars.com)
Novus Plastics Polish #1, #2 (by Novus Inc. 800-NOVUS60 or noscratch.com)
Plexus Plastic Cleaner and Polish (by BTI Chemical Co. PlexusPlasticCleaner.com)

GENERAL GUIDELINES:

- ALWAYS use clean soft clothes or sponges for application of cleaners and again for washing and rinsing.
- ALWAYS follow application with warm water rinse.
- DO NOT use abrasives or high alkaline cleaners.
- DO NOT leave cleaners on surface for long periods of time, wash immediately.
- DO NOT use cleaners in direct sunlight or at elevated temperatures.
- DO NOT use scrapers or razors.
- DO NOT use squeegee on Polycarbonate, Spallshield® or any plastic surface.
- DO NOT use Benzene, Gasoline, Acetone, Carbon Tetrachloride or other detrimental chemicals. (See attached list)
- DO NOT expose the edges of laminates with PVB (Polyvinyl Butyral) Interlayers, to organic solvents, which can react with the plastic interlayer. This includes but is not limited to, Naphtha VM&P Grade, Isopropyl Alcohol, Kerosene, Petroleum Spirits, or any Aliphatic Hydrocarbons.

RECOMMENDED CLEANERS AND DETERGENTS:
Joy1, Windex with Ammonia D2, Palmolive3, Naphtha VM&P Grade, Isopropyl Alcohol, Kerosene
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If there are any questions or doubts, call Dlubak Corporation for technical information at 724-459-9540.

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ADDITIONAL INFORMATION ON ON ENVIRONMENTAL RESISTANCE OF POLYCARBONATE:
Polycarbonate sheet may be used in a diverse range of environmental conditions. However, as with any thermoplastic, some environmental conditions have proven to be detrimental to polycarbonate. Varying degrees of stress, strain and temperature may also alter the resistance of polycarbonate sheet; consequently fabricated parts should be tested thoroughly under actual in-service conditions prior to final design.

POLYCARBONATE IS RESISTANT AT 70°F AND 0% STRAIN TO:

Chemicals:
Amyl Alcohol
Aluminum Chloride
Aluminum Sulphate
Ammonium Chloride
Ammonium Nitrate
Ammonium Sulphate
Antimony Trichloride
Arsenic Acid 20%
Butyl Alcohol
Calcium Nitrate
Chlorinated Lime Paste
Chrome Alum
Chromic Acid 20%
Citric Acid 40%
Copper Chloride
Copper Sulphate
Cuprous Chloride
Formic Acid 10%
Formalin 30%
Glycerine
Heptane
Hydrochloric Acid 10%
Hydrogen Peroxide 30%
Hydrofluoric Acid 10%
Isopropanol
Lactic Acid 20%
Magnesium Chloride
Magnesium Sulphate
Manganese Sulphate
Mercuric Chloride
Nickel Sulphate
Nitric Acid 10%
Nitric Acid 20%
Oleic Acid
Oxalic Acid
Pentane
Phosphoric Acid 10%
Potassium Bromate
Potassium Bromide
Potassium Nitrate
Potassium Perchlorate
Potassium Permanganate
Potassium Persulphate
Potassium Sulphate
Silicone Oil
Silver Nitrate
Sodium Bicarbonate
Sodium Bisulphate
Sodium Carbonate
Sodium Chlorate
Sodium Chloride
Sodium Hypochlorite
Sodium Sulphate
Stannous Chloride
Sulfur
Sulfuric Acid 10%*
Sulfuric Acid 50%
Tartaric Acid 30%
Zinc Chloride
Zinc Sulphate

Industrial Petroleum Products:
Axle Oil
Compressor Oil
Diesel Oil
Kerosene
Refined Oil
Spindle Oil
Transformer Oil
Vacuum Pump Oi
Note: Elevated temperatures and/or strain significantly alters resistance to industial petrolium products.

Common Household Materials:
Beer
Borax
Cocoa
Cement
Chocolate
Cod Liver Oil
Cognac
Coffee
Detergents (nonionic and anionic)
Fish Oil
Fruit Syrup
Grapefruit Juice
Gypsum
Joy Liquid Detergent
Insulating Tape
Linseed Oil
Liquor
Milk
Mineral Water
Mustard
Olive Oil
Onions
Orange Juice
Paraffin Oil
Rapeseed Oil
Rum
Salad Oil
Salt Solution 10%
Soap (soft and hard)
Table Vinegar
Tincture of Iodine 5%
Tomato Juice
Vodka
Washing Soap
Water
Wine

Sulfuric acid 1% attacks polycarbonate

POLYCARBONATE HAS LIMITED RESISTANCE AT 70°F AND 0% STRAIN TO:

Anti-freeze
Calcium Chloride
Cyclohexanol
Ethylene Glycol
Hydrochloric Acid (concentrate)
Milk of lime (CaOH)
Nitric Acid (concentrate)
Sulfuric Acid (concentrate)

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POLYCARBONATE IS NOT RESISTANT TO:

Acetaldehyde
Acetic Acid (concentrate)
Acetone
Acrylonitrile
Ammonia
Ammonium Fluoride
Ammonium Hydroxide
Ammonium Sulfide
Benzene
Benzoic Acid
Benzyl Alcohol
Brake Fluid
Bromobenzene
Butyric Acid
Carbon Tetrachloride
Carbon Disulfide
Carbonic Acid
Caustic Potash Solution 5%
Caustic Soda Solution 5%
Chlorothene
Chlorobenzene
Cutting Oils
Cyclo Hexanone
Cyclohexene
Dimethyl Formamide
Ethane Tetrachloride
Ethylamine
Ethyl Ether
Ethylene Chlorohydrin
Formic Acid (concentrate)
Freon (refrigerant & propellant)
Gasoline
Lacquer Thinner
Methyl Alcohol
Methyl Ethyl Ketone
Nitrobenzene
Nitrocellulose Lacquer
Ozone
Phenol
Phosphorous Hydroxy Chloride
Phosphorous Trichloride
Propionic Acid
Sodium Sulfide
Sodium Hydroxide
Sodium Nitrate
Tetradydronaphthalene
Thiophene
Toluene
Turpentine
Xylene

POLYCARBONATE IS DISSOLVED BY:

Chloroform
Cresol
Dioxane
Ethylene Dichloride
Methylene Chloride
Pyridine

In general, polycarbonate sheet has good resistance to water, organic and inorganic acids, neutral and acid salts and aliphatic and cyclic hydrocarbons. Alkalines, amines, ketones, esters and aromatic hydrocarbons attack polycarbonate. Solvents for polycarbonate are: methylene chloride, ethylene dichloride and dioxane

This chemical and solvent resistant listing is intended to assist designers in determining whether polycarbonate can be used in certain environments. It is very important to test prototype parts under end-use conditions for final verification of performance. All data is based on 700°F and 0% strain.

Polycarbonate sheet has good resistance to water up to approximately 1500°F Above this temperature, the effect of moisture is time-temperature related. Exposing polycarbonate sheet to repeated steam cleaning or dish washing can create hydrolic crazing. The result can be a clouding of the surface and ultimately a loss of physical strength properties.