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 soft clean cloths 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 Benzen, 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.
CLEANING INSTRUCTIONS FOR ALL LAMINATES
OF GLASS, GLASS/POLYCARBONATE, ALL POLYCARBONATE OR DUPONT SPALLSHIELD® (cont.)

ADDITIONAL INFORMATION 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
- Ammonium Nitrate
- Ammonium Sulphate
- 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 Bromide
- Potassium Chloride
- Potassium Chlorate
- Potassium Hypochlorite
- Potassium Hydroxide
- Potassium Iodide
- Potassium Nitrate
- Potassium Persulphate
- Potassium Sulphate
- Silver Nitrate
- Sodium Bicarbonate
- Sodium Carbonate
- Sodium Chlorate
- Sodium Chloride
- Sodium Hypochlorite
- Sodium Nitrate
- Sodium Persulphate
- Sodium Stannate
- Sulfur
- Sulfuric Acid 10%
- Sulfuric Acid 50%
- Sulfuric Acid (concentrate)
- Tannic Acid
- Zinc Chloride
- Zinc Sulphate

**Industrial Petroleum Products:**
- Axle Oil
- Compressor Oil
- Diesel Oil
- Kerosene
- Refined Oil
- Spindle Oil
- Transformer Oil
- Vacuum Pump Oil

**Notes:**
- Elevated temperatures and/or strain significantly alters resistance to industrial petroleum products.

**Common Household Materials:**
- Beer
- Borax
- Sulfuric acid 1% attacks polycarbonate
- Milk of lime (CaOH)
- Nitric Acid (concentrate)
- Sulfuric Acid (concentrate)
### Cleaning Instructions for All Laminates of Glass, Glass/Polycarbonate, All Polycarbonate or Dupont SpallShield® (cont.)

#### 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%
- Chlorathene
- 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
- Tetradyclonaphthalene
- 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 hydraulic crazing. The result can be a clouding of the surface and ultimately a loss of physical strength properties.