Care & Maintenance of Acrylic

Washing Instructions:

Wash your acrylic with a mild dishwashing detergent and warm water. Use a clean soft cotton flannel cloth or sponge. Use only light pressure. Rinse with clean water and blot dry with a damp cloth or chamois.

Do Not Use:

Any organic solvents such as acetone, gasoline, benzene, MEK (methyl ethyl ketone), carbon tetrachloride, lacquer thinner or alcohol solutions containing more than 5% alcohol. Even fumes from these products can be harmful. Note: Some algaecides, fumes and vapor from paint, cleaning agents and varnish have been known to cause damage to chemical bonds. DO NOT use Windex or similar window cleaning sprays, kitchen scouring compounds, abrasive cloths or solvents products. These will permanently damage the acrylic.

REFERENCE: Please see a more detailed guide on Harmful Substances for acrylics in the ASME PVHO manual ASME PVHO-2 Safety Standard for Pressure Vessels for Human Occupancy: In-Service Guidelines: APPENDIX V

Recommended Product:

Cleaning/polishing: 210 Plastic Cleaner/Polish, NOVUS 1 Polish Products, 3M Finesse-it Final Finish (restores bright finish to acrylic). For Minor scratches: 3M Finesse-it II or NOVUS 1, 2, & 3 (fine grit polishing liquid)

Dusting:

Dust with a soft, damp cloth or chamois.

Polishing:

To maintain a high gloss surface, you may use a good grade commercial acrylic polish or automotive paste wax. Apply a thin, even coat with a soft cloth and polish lightly with cotton Flannel. Then, wipe with damp cloth to help eliminate the electrostatic charges.

Scratch Removal:

Removal of minor fine scratches should be done with care and proper supervision. Hand polishing is recommended using fine grit polishing paste or liquid. Apply polish with a soft moist cloth using light pressure. (Caution should be used as scratch removal may cause optical distortion in the surface of the acrylic.) Some scratches need to be removed with the use of abrasive paper. We strongly recommend that this be done by a professional experienced in the use of scratch removal techniques. **NOTE: Do not use power tools as these can generate a lot of heat on the acrylic and add stress to the repair area. Use wet sanding, with enough water to keep the material cool.**

A thin coat of a final polish may be applied to remove dull appearance that may have been left from the fine grit polish or paste. (Finesse-it II then Final Finish). Novus 1, 2, & 3 may give you the desired results without further applications of products.

Protective Shipping Paper or Film:

Never leave the paper or film protective covering on the surface of the acrylic. Always remove paper or film prior to hydro testing and never leave in direct sunlight. Paper or film left on acrylic for prolonged periods may result in the adhesive solidifying, making the removal difficult and damage to the acrylic may result during the removal process.

MANDATORY APPENDIX V
PARTIAL LIST OF HARMFUL SUBSTANCES AND ACCEPTABLE PRODUCTS

V-1 SCOPE

This Appendix provides partial lists of cleaners, polishes, chemical ingredients, biocides, and lubricants that testing and/or experience have determined are either suitable or unsuitable. This information is provided as guidance only. Specific products not listed may or may not be acceptable for use with PVHO Acrylic Windows and/or PVHO Service. It is the user's responsibility to determine the appropriateness of any products prior to actual use and to be cognizant that reformulation of these products by the manufacturer may occur without notice. Compatibility with the acrylic windows, seals, metallic components, paints, and oxygen should all be considered.

V-2 HARMFUL SUBSTANCES

Extreme care must be exercised when exposing acrylic windows to chemicals, particularly all types of organic solvents. All of the following chemicals will cause severe window damage. They should not be used for cleaning acrylic windows or their seats, nor should they be stored in the vicinity of PVHO windows or other viewport components. (The bracketed numbers are the Chemical Abstracts Service registry numbers, often referred to as CAS numbers.)

(a) Ketones
- *(1)* acetone [67-64-1]
- *(2)* methyl ethyl ketone (MEK) [78-93-3]
- *(3)* cyclohexanone [108-94-1]
- *(4)* all other ketones

(b) Chlorinated Solvents
- *(1)* chloroform [67-66-3]
- *(2)* methylene chloride [75-09-2]
- *(3)* 1,1,2-trichloroethane (TCE) [79-00-5]
- *(4)* all other chlorinated solvents

(c) Aliphatic Acids
- *(1)* formic acid [64-18-6]
- *(2)* acetic acid [64-19-7]
- *(3)* all other aliphatic acids

(d) Alcohols
- *(1)* methanol [67-56-1] in all concentrations
- *(2)* ethanol [64-17-5] in high aqueous concentrations
- *(3)* isopropanol [67-63-0] in high aqueous concentrations
- *(4)* benzyl alcohol [100-51-6] in all concentrations
- *(5)* other aliphatic and aromatic alcohols

(e) Aromatic Solvents and Phenolics
- *(1)* xylene [1330-20-7, 95-47-6, 108-38-3, and 106-42-3]
- *(2)* toluene [108-88-3]
- *(3)* phenol [108-95-2]
- *(4)* cresols [95-48-7, 108-39-4, and 106-44-5]
- *(5)* other aromatic solvents and phenols

(f) Esters
- *(1)* ethyl acetate [141-78-6]
- *(2)* butyl acetate [123-86-4]
- *(3)* amyl acetate [628-63-7]
- *(4)* all other esters

(g) Ethers
- *(1)* diethyl ether ("ether") [60-29-7]
- *(2)* tetrahydrofuran (THF) [109-99-9]
- *(3)* methyl tertiary butyl ether (MTBE) [1634-04-4]
- *(4)* all other ethers

(h) Aroma Chemicals
- *(1)* pine oils [8002-09-3]
- *(2)* terpene [95327-98-3]
- *(3)* other citrus extracts such as d-limonene/carvone [5989-27-5]
- *(4)* all other aroma or perfume chemicals

V-3 ACCEPTABLE CLEANERS, BIOCIDES, AND POLISHES

CAUTION: Do not apply cleaners when windows are hot or pressurized; otherwise, crazing may result. Care should be taken NOT to leave fingerprints on the acrylic surface as they contain oily and acidic by-products that may damage the acrylic.

V-3.1 Acceptable Cleaners

(a) Recommended Method. Mild, preferably nonperfumed detergent in warm water [120°F (50°C) max.]

(b) Acceptable but Not Preferred Methods
- *(1)* aliphatic naphtha [64742-89-8]
- *(2)* n-hexane [110-54-3]

(c) Windex: contains 4% isopropanol (considered an acceptably low level not to damage acrylic)

(d) Simple Green: contains 2-butoxyethanol (EGBE), at under 4% (considered an acceptably low level)

(e) Mer-maids Plexiglas/Plastic Cleaner & Polish: a low-viscosity silicone-based liquid spray

V-3.2 Acceptable Biocides

(a) bleach, up to 15% aqueous sodium hypochlorite (NaOCl) [7681-52-9]

(b) aqueous hydrogen peroxide (H_2O_2), 3% to 20% [7722-84-1]

(c) aqueous chlorine dioxide (ClO_2), up to 2% [10049-04-4]

V-3.3 Acceptable Polishes

Window surfaces may be polished with compounds specifically endorsed by the manufacturer for polishing of acrylic. These polishes may also be used for removing small scratches from the surface.

The following is a partial list of acceptable products, but users should note that reformulation of these products by the manufacturer may occur at any time and the user is responsible for the correct choice and usage of appropriate polishes:

(a) Mer-maids Plexiglas/Plastic Cleaner & Polish [see para. V-3.1(e)]

(b) Meguiar's 10-08 (previously Mirror Glaze and Plastic Polish Mirror Bright MGH-10)

(c) Plastic Polish Novus #1 and #2

(d) Farécla 6 and Farécla 3 polishing paste

(e) or equivalent

V-4 ACCEPTABLE LUBRICANTS

When it is necessary to lubricate O-ring seals and/or window cavity seats, the following is a partial list of products that are compatible with acrylic windows:

(a) Apiezon Type H Vacuum Grease

(b) Dow Corning High Vacuum Grease (formerly Dow Corning 976 or 976V High Vacuum Grease)

(c) Dow Corning Molykote 3452 Chemical Resistant Valve Grease

(d) Dow Corning #4 Electrical Insulating Compound

(e) Dow Corning 112 High Performance Lubricant

(f) DuPont Krytox LVP High-Vacuum Grease

(g) Christo-Lube Oxygen Grease

(h) Parker Super O-Lube

(i) Castrol Braycote 601EF

(j) or equivalent

CAUTION: In the case of chambers that are pressurized with oxygen, the user shall also select a lubricant that is compatible with 100% oxygen and acrylic.

V-5 ACCEPTABLE SEAL AND GASKET ADHESIVES

When it is necessary to bond neoprene or cork gaskets to the metal window seat surface, the following is a partial list of adhesives compatible with acrylic windows when fully cured.

(a) Room-Temperature Vulcanizing Silicon Rubber Compounds

(1) Dow Corning 3145 RTV MIL-A-46146

(2) Dow Corning 995

(3) Dow Corning 795

(4) Dow Corning 832

(5) or equivalent

Adhesion of the silicon rubber products may be improved by coating the mating surface with Dow Corning 1200 Primer.

(b) Contact Cements

(1) cyanoacrylate adhesives

(2) 3M Scotch-Grip Rubber and Gasket Adhesive 1300 or 1300L

(3) Eclectic Products Polyurethane Plumbers Goop Adhesive 150012

(4) or equivalent

To provide adequate cure time for the bond, when using the above bonding materials with gaskets, the window shall not be installed until the material has become cured in accordance with the manufacturer's recommendation, and should not be pressurized for a period of 24 hr.