

3form Glass offers the timeless nature of glass with our signature design aesthetic. The design choices of 3form Glass panels are as diverse as your imagination. By allowing you to custom select color, pattern, interlayer, and type of glass, 3form Glass transforms into the perfect medium for your architectural application.

## Features and Benefits

- Monolithic and laminated options
- Produced on an individual order basis, allowing for creative design and product selection
- Made-to-order sizes arrive ready to install
- Timeless properties of glass – durable long-lasting product that is easy to maintain
- Non-combustible surfaces
- Rigid – allows for long unsupported spans
- Optically clear – showcases crisp aesthetic interlayers
- Certified for use in safety glazing applications
- Pressed Glass interlayer screens 99% of UV light
- Easily customized when combined with 3form Digital Printing
- Micro-sandblast Etching Options

## Glass Types, Conditions and Surface Treatments

3form Glass is available in two types of glass - Clear Float (green-edge) and Low Iron (colorless) - and two conditions - Annealed and Fully Tempered. As a customization option, different types, conditions and surface treatments can be specified for the front and the back lites of 3form Pressed Glass.

## Specialty Glass Finishes

Satin is an etched finish that provides diffusion and privacy.

Mirror available as one side, annealed only.

	Monolithic Glass	Pressed Glass	
	Satin Tempered	Satin	Mirror
Available Gauges	1/4" 3/8" 1/2"	5/16" 9/16" 13/16" 1-1/16"	5/16" 9/16" 1-1/16"

For Markerboard specs please refer to the Glass Markerboard Technical Document.

## Tempering

Glass in the Fully Tempered condition is about four (4) times more resistant to breakage than Annealed glass. However, the heating and cooling process used to produce Fully Tempered glass can cause the glass to have a slightly “wavy” appearance that can create subtle optical distortions at certain angles of view. Because of this, all mirror glass must be specified as annealed. 3form Monolithic Glass is fully tempered glass by default.

## Available Interlayers

3form Pressed Glass is available with 3form Color, Digital Printing and Graphic Patterns Color.

## Panel Sizes and Tolerances

3form Monolithic Glass is offered as a standard product in made-to order sizes up to 5'x10' (1.5m×3.0m). 3form Pressed Glass is offered as a standard product in made-to-order sizes up to 4'x10' (1.2m×3.0m). Minimum size available is 8"×12" (20.3cm×30.5cm). The available nominal thicknesses are listed below with the associated minimum and maximum thickness tolerances.

## Thickness Tolerances

Nominal Thickness	Monolithic Glass		Pressed Glass	
	Minimum	Maximum	Minimum	Maximum
3/16" (5mm)	0.180" (4.57mm)	0.199" (5.05mm)	not available	
1/4" (6mm)	0.219" (5.56mm)	0.244" (6.20mm)	not available	
5/16" (7.9mm)	0.292" (7.41mm)	0.332" (8.43mm)	0.250" (6.35mm)	0.344" (8.73mm)
3/8" (10mm)	0.355" (9.02mm)	0.406" (10.31mm)	not available	
7/16" (11.1mm)	not available		0.375" (9.53mm)	0.469" (11.91mm)
1/2" (12mm)	0.469" (11.91mm)	0.531" (13.49mm)	not available	
9/16" (14.2mm)	not available		0.500" (12.70mm)	0.594" (15.08mm)
13/16" (20.6mm)	not available		0.750" (19.05mm)	0.844" (21.43mm)
1-1/16" (26.9mm)	not available		1.000" (25.40mm)	1.094" (27.78mm)

## Length and Width Tolerances

Tolerances for length, width and squareness are based on ASTM C1048-04 ASTM Standard Specification for Heat Treated Flat Glass and C1172-03 Standard Specification for Laminated Architectural Flat Glass.

Nominal Thickness	Monolithic Glass	Pressed Glass	
	All Conditions	Annealed	Fully Tempered
1/4" or less (6mm or less)	+/- 1/16" (1.6mm)	n/a	n/a
>1/4" - 1/2" (6 - 12mm)	+/- 1/8" (3.2mm)	+1/4", -1/16" (+6.3, -1.6mm)	+1/4", -1/8" (+6.3, -3.2mm)
>1/2" (12mm)	n/a	+1/4", -1/8" (+6.3, -3.2mm)	+5/16", -1/8" (+7.9, -3.2mm)

For example, if you were to order a 3/8" (9.5mm) thick tempered Pressed Glass product, the finished length and width dimensions would have tolerances of +1/4" (6.3mm) and -1/8" (3.2mm).

Minimum dimension for Tempered glass is 18" diagonal with a minimum of 4 inches on one dimension.

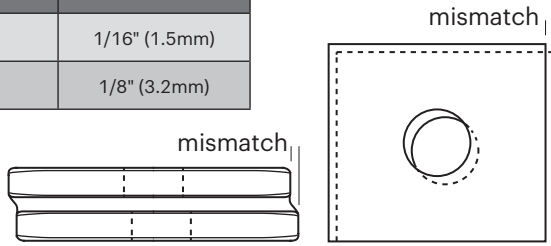
## Squareness Tolerances

Nominal Thickness	Monolithic Glass	Pressed Glass	
	All Conditions	Annealed	Fully Tempered
≤1/4" (≤6mm)	5/64" (2mm)	n/a	n/a
>1/4" - 1/2" (6 - 12mm)	11/64" (4.4mm)	5/64" (2mm)	5/64" (2mm)
>1/2" (12mm)	n/a	11/64" (4.4mm)	11/64" (4.4mm)

## Feature Alignment Tolerances

Feature alignment between front and back lites may vary when 3form Pressed Glass is specified in a fully tempered condition. The table below indicates the allowable amount of mismatch for edges, holes, notches and cutouts.

Nominal Thickness	Allowable Mismatch
<9/16"	1/16" (1.5mm)
≥9/16"	1/8" (3.2mm)



**Note:** Corner slippage tolerance could be up to .088" and .176" respectively.

## Surface Pattern and Decorative Insert Tolerances

All surface patterns and decorative inserts with visible directionality will have a squareness tolerance of 3/4" (19.1 mm). The maximum allowable skew of surface patterns and fabric inserts is 1/4" (6.3 mm) over 48" (1200 mm).

## Flatness Tolerances

Maximum allowable bow and warp will vary with edge length, glass thickness, glass condition, and construct (e.g. monolithic versus laminated).

## Monolithic Glass

3form Monolithic Glass is typically sold with micro-sandblast etching and by default will be fully tempered glass. Since it is shipped out as tempered glass no fabrication should be done on-site due to risk of breakage. For tempered monolithic glass, reference the following chart for the maximum allowable overall bow and warp.

Maximum Overall Bow and Warp For Tempered 3form Monolithic Glass				
Edge Dimension	Nominal Thickness			
	1/4"	5/16"	3/8"	1/2"
0" - 20" (0 - 500mm)	0.08" (2mm)	0.08" (2mm)	0.08" (2mm)	0.04" (1mm)
>20" - 35" (500 - 900mm)	0.12" (3mm)	0.08" (2mm)	0.08" (2mm)	0.08" (2mm)
>35" - 47" (900 - 1200mm)	0.16" (4mm)	0.12" (3mm)	0.08" (2mm)	0.08" (2mm)
47" - 59" (1200 - 1500mm)	0.20" (5mm)	0.16" (4mm)	0.16" (4mm)	0.08" (2mm)
>59" - 71" (1500 - 1800mm)	0.28" (7mm)	0.20" (5mm)	0.20" (5mm)	0.16" (4mm)
>71" - 83" (1800 - 2100mm)	0.35" (9mm)	0.24" (6mm)	0.24" (6mm)	0.20" (5mm)
>83" - 94" (2100 - 2400mm)	0.47" (12mm)	0.31" (8mm)	0.28" (7mm)	0.20" (5mm)
>94" - 106" (2400 - 2700mm)	0.55" (14mm)	0.39" (10mm)	0.35" (9mm)	0.28" (7mm)
>106" - 118" (2700 - 3000mm)	0.67" (17mm)	0.51" (13mm)	0.47" (12mm)	0.39" (10mm)
>118" - 130" (3000 - 3300mm)	0.75" (19mm)	0.59" (15mm)	0.55" (14mm)	0.47" (12mm)

## Pressed Glass

For annealed Pressed Glass the overall bow will not exceed  $\frac{1}{8}$ " (1.5mm) per 12" (300mm) of length.

For tempered Pressed Glass, reference the following chart for the maximum allowable overall bow and warp.

Maximum Overall Bow and Warp For Tempered 3form Pressed Glass					
Edge Dimension	Nominal Thickness of Individual Glass Lite				
	1/8"	3/16"	1/4"	3/8"	1/2"
0" – 18" (0 – 460mm)	1/8" (3.1mm)	1/8" (3.1mm)	1/16" (3.1mm)	1/16" (1.5mm)	1/16" (1.5mm)
>18" – 36" (460 – 910mm)	3/16" (4.8mm)	3/16" (4.8mm)	3/16" (4.8mm)	3/32" (3.1mm)	1/16" (1.5mm)
>36" – 48" (910 – 1220mm)	9/32 (7.1mm)	9/32 (7.1mm)	9/32 (7.1mm)	1/8" (3.1mm)	3/32" (3.2mm)
>48" – 60" (1220 – 1520mm)	3/8" (9.5mm)	3/8" (9.5mm)	3/8" (9.5mm)	3/16" (4.8mm)	1/8" (3.1mm)
>60" – 72" (1520 – 1830mm)	1/2" (12.7mm)	1/2" (12.7mm)	1/2" (12.7mm)	1/4" (6.3mm)	3/16" (4.7mm)
>72" – 84" (1830 – 2130mm)	5/8" (15.9mm)	5/8" (15.9mm)	5/8" (15.9mm)	5/16" (7.9mm)	1/4" (6.3mm)
>84" – 96" (2130 – 2440mm)	3/4" (19.0mm)	3/4" (19.0mm)	3/4" (19.0mm)	3/8" (9.5mm)	9/32 (7.1mm)
>96" – 108" (2440 – 2740mm)	7/8" (22.2mm)	7/8" (22.2mm)	7/8" (22.2mm)	1/2" (12.5mm)	3/8" (9.5mm)
>108" – 120" (2740 – 3050mm)	1" (25.4mm)	7/8" (22.2mm)	11/16" (17.5mm)	1/2" (12.5mm)	3/8" (9.5mm)

## Bow and Warp Measurement

Overall bow and warp is to be measured with the panel oriented vertically with the long edge resting on blocks placed at the quarter points. Use a string or other straightedge across the concave surface and measure the maximum deviation with a feeler gauge or dial indicator.

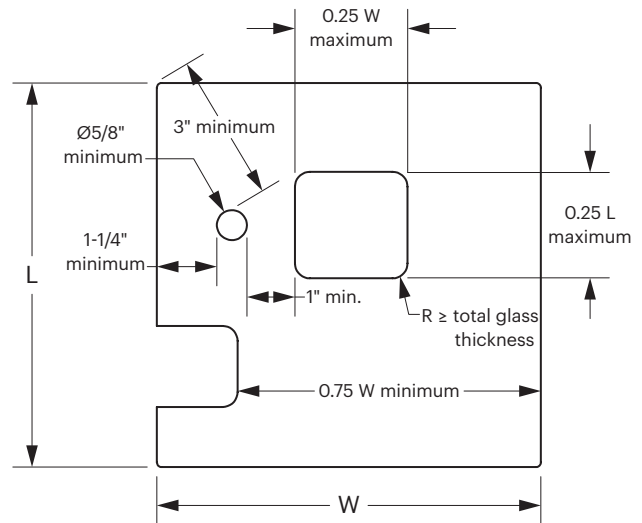
## Panel Weight

Nominal Thickness	Weight Flux
3/16" (5mm)	2.5 lb/ft <sup>2</sup> (12.2 kg/m <sup>2</sup> )
1/4" (6mm)	3.0 lb/ft <sup>2</sup> (14.6 kg/m <sup>2</sup> )
5/16" (7.9mm)	4.3 lb/ft <sup>2</sup> (21.0 kg/m <sup>2</sup> )
3/8" (10mm)	5.1 lb/ft <sup>2</sup> (24.9 kg/m <sup>2</sup> )
7/16" (11.1mm)	6.0 lb/ft <sup>2</sup> (29.3 kg/m <sup>2</sup> )
1/2" (12mm)	6.8 lb/ft <sup>2</sup> (33.2 kg/m <sup>2</sup> )
9/16" (14.2mm)	7.7 lb/ft <sup>2</sup> (37.4 kg/m <sup>2</sup> )
13/16" (20.6mm)	11.1 lb/ft <sup>2</sup> (54.0 kg/m <sup>2</sup> )
1-1/16" (26.9mm)	14.5 lb/ft <sup>2</sup> (70.6 kg/m <sup>2</sup> )

## Fabrication

3form Glass can be specified to include holes, notches, cutouts and pattern cuts. Any glass that is tempered will need to be fabricated prior to shipping. Trying to fabricate tempered glass on-site will result in breakage. For tempered Pressed Glass please reference the "Feature Alignment Tolerances" section of this document. When placing holes, notches, or cutouts in 3form Glass, it's recommended that the following guidelines be followed:

- Specify 3form Pressed Glass that is  $\frac{3}{16}$ " or thicker
- If Fully Tempered lites are specified, holes, notches or cut-outs must be oversized by at least  $\frac{1}{32}$ " (4mm) to account for dimensional and mismatch tolerances
- Diameter of circular holes must be at least  $\frac{5}{8}$ " (15.8mm)
- Corners (e.g., non-circular holes, notches or cutouts) must have fillets with radii at least  $\frac{3}{16}$ " (7.9mm)
- Edge-to-edge distance between adjacent holes, notches or cutouts must be at least 1" (25mm)



- Edge-to-edge distance between a hole and an adjacent panel edge must be at least  $\frac{1}{4}$ " (31.7mm)
- Edge-to-edge distance between holes and an adjacent panel corner must be at least 3" (76mm)
- The lay-up must be symmetric (e.g. ABCBA vs. ABCDE) Note that all standard 3form Pressed Glass meets this criterion
- Minimum Fillet Radius  $\geq$  total thickness of glass

## Support Conditions

When specifying point supports for 3form Pressed Glass, the following guidelines must be followed.

- Point-supported 3form Pressed Glass must meet the following thickness criteria:

Nominal Thickness	Allowable Condition
<9/16"	fully tempered
≥9/16"	all conditions

- Polymeric or elastomeric spacers are required to prevent glassmetal contact. It is recommended that at least one spacer be of a soft (50 shore A), compressible material (e.g. silicone, EPDM, neoprene) with a thickness of at least 3/32"
- Hole dimensions and positions must follow 3form Fabrication guidelines for Pressed Glass (see Fabrication)

## Edge Sealing and Edge Deletion

When incorporating 3form Pressed Glass into wet or exterior applications, fully glazed (framed and sealed) designs are highly recommended. Interlayers with a propensity for wicking - such as fabrics, organics, and woven colors - should, if possible, incorporate edge deletion, i.e. inset from the edge of the glass at least 1/2" (12.7mm). When edge deletion is not possible, these interlayers require edge sealing. Note that all woven color used in 3form Pressed Glass must be framed and sealed.

For edge sealing, 3form recommends the following silicones, manufactured by Momentive Performance Materials, for application in the field during installation. The SilGlaze II SCS2801 should be used when a clear Silicone is required for aesthetic purposes.

- For glazing/sealing (translucent): Momentive SilGlaze II SCS2801 (3form part # 3-05-0069)
- For structural glazing (translucent): Momentive Construction SCS1201 (3form part # 3-05-0070)

## Deflection

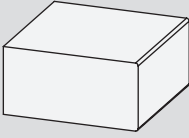
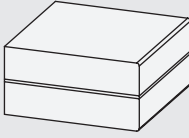
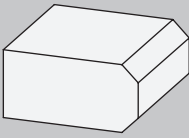
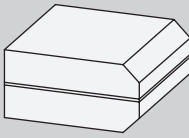
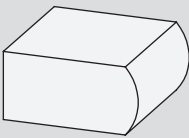
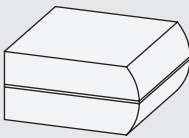
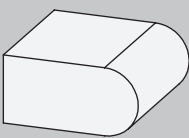
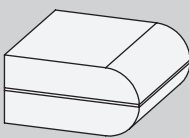
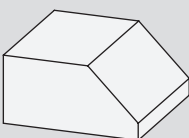
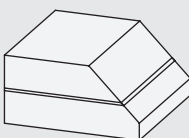
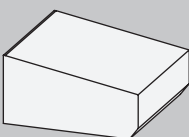
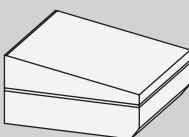
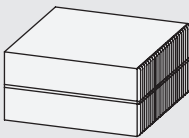
3form Glass will exhibit different amounts of deflection given a variety of factors: fastening techniques, loads, gauges, panel dimensions, etc. The 3form Technical Support Team can assist you with general deflection guidelines for your application. If your application has specific engineering requirements, please contact the 3form Product Technology team for additional direction.

## Heat Forming/Cold Bending

3form Glass cannot be heat formed or cold bent and is only sold as flat sheets.

## Edge Finishing

3form Glass can be specified with a variety of edge finishes. Note that not all edge profiles are available with 3form Pressed Glass that uses tempered lites.

Edge Finish	Monolithic Glass	Pressed Glass
<b>Seamed</b>  Snapped edge sanded free of shards and splinters.		
<b>Flat (Polished or Ground)</b>  Ground to shape and available with a polished or ground (matte) finish.		
<b>Pencil (Polished or Ground)</b>  Ground to shape and available with a polished or ground (matte) finish.		 (Annealed Only)
<b>Bullnose (Polished or Ground)</b>  Ground to shape and available with a polished or ground (matte) finish.		 (Annealed Only)
<b>Mitered (Polished Only)</b>  Ground to shape and available with a polished finish.		
<b>Beveled (Polished or Ground)</b>  Ground to shape and available with a polished or ground (matte) finish. This option is available on individual glass lites thicker than 3/16".		
<b>Waterjet</b>  Waterjet-cut edge sanded free of shards and splinters. Only available when annealed lites are specified.	not available	

## Selected Mechanical and Physical Properties for 3form Glass

3form Glass is available in two types of glass - Clear Float (green-edge) and Low Iron (colorless) - and two conditions - Annealed and Fully Tempered. As a customization option, different types, conditions and surface treatments can be specified for the front and the back lites of 3form Pressed Glass.

			0.236" (6mm)	
Property*	Conditions	ASTM Method	SI	U.S.
<b>General</b>				
Density	23°C (73°F)	D 1505	2,440 kg/m³	152.3 lb/ft³
<b>Mechanical</b>				
Youngs Modulus	5mm/min (0.2"/min)	D 623	72 GPa	10,442,000 psi
Shear Modulus	1.27mm/min (0.05"/min)	D 623	2,000 GPa	4,350,000 psi
Flexural Strength	1.27mm/min (0.05"/min)	D 790	83 MPa	12,000 psi
Hardness (Moh's Scale)	-	-	-	6-7
Knoop Hardness	-	C1326	585 kg/mm²	832,065 lb/in²
Safety Glazing	75°F 23.8°C	ANSI Z97.1	Passes	
<b>Thermal</b>				
Continuous Max Use Temperature (Pressed Glass)	-	-	100°C	212°F
Coefficient of Thermal Expansion	-	E 831	8.6 10 <sup>-6</sup> /°C	-

\*Unless noted otherwise, all tests are run @ 23°C (73°F) and 50% relative humidity, using specimens with a thickness as indicated.

## Sound Transmission Class (STC) Values

STC values for 3form Glass are presented below.

Thickness	STC Values <sup>1</sup>	
	Monolithic Glass	Pressed Glass
1/4" (6.3mm)	31	36
1/2" (12.7mm)	36	38

<sup>1</sup>Measurement protocol: ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

## Thermal Insulation and Optical Values

Thermal and optical values for 3form Monolithic Glass were measured using clear float glass with no etched surface patterns. Thermal and optical values for 3form Pressed Glass were measured using laminated clear float glass with no decorative interlayers. For details on how the pattern or interlayer may affect performance, consult the 3form Technical Support Team.

PROPERTY	Monolithic Glass		Pressed Glass	
	1/4" (6mm)	1/2" (12mm)	1/4" (6mm)	1/2" (12mm)
Visible Light Transmittance	88%	84%	88%	84%
Visible Light Reflectance	8%	7%	8%	8%
Solar Energy Transmittance	80%	69%	77%	77%
Solar Energy Reflectance	7%	6%	7%	7%
U-Value (Summer)	0.93	0.90	0.93	0.89
U-Value (Winter)	1.02	0.99	1.02	0.98
Shading Coefficient	0.96	0.88	0.94	0.84
Solar Heat Gain Coefficient	0.84	0.76	0.81	0.73

## Flammability

3form Glass has non-combustible surfaces and can be used in all glazing, interior finish, and light transmitting applications requiring class A performance for flame spread.

**Note: Glass is not produced with fire-rated glass and should not be utilized in time-rated fire stop applications (e.g., 20 minutes, 30 minutes, 1 hour, etc.).**

## Safety Glazing

3form Glass meets the requirements of ANSI Z97.1 Class A and CPSC 16 CFR 1201 Cat II. A permanent etched marking is placed on all Pressed Glass product, identifying it as safety glass, unless otherwise specified by the customer.

## UV Screening

The polymeric interlayer used in 3form Pressed Glass is UV stable and resistant to the degradation and associated yellowing caused by sunlight. Additionally, these UV stabilizers screen 99% of light in the UV range (200-400 nm wave length).

Note that organic interlayers may change in appearance over time due to the natural drying-out of the interlayer material.

## Chemical Resistance of 3form Glass 6 Day Full Immersion Testing @ 73°F (23°C)

Glass has very good surface resistance to most chemicals. However, the polymeric tie-layer used to laminate 3form Pressed Glass may come in contact with chemicals in frameless applications. Polymer materials are affected by chemicals in different ways. Changes in performance or appearance are due to a variety of factors, including: fabrication methods, exposure conditions, concentration of chemical substances or exposure duration of certain substances. Such factors can even influence the final effect of substances that the 3form polymeric layer is considered “Resistant” to under standard conditions. Further details are explained below:

### Fabrication

Stresses generated from sanding, grinding, drilling, polishing and/or mashing.

### Exposure

Exposure duration; stresses imparted during the application life-cycle due to loads, temperature changes, heat, environments, etc.

### Application of Chemicals

Application from contact, rubbing, wiping, spraying, soaking, etc. Also having an effect is the relative concentration of the chemical in question.

The following table provides indicative performance of the chemical resistance characteristics of this polymeric layer material. Samples remained immersed and were stored at 73°F (23°C). The following codes are used to describe the chemical resistance characteristics:

- R = Resistant**                      Excellent resistance with little or no change in mechanical properties.
- LR = Low Resistance**            Resistant when in contact with this compound for short periods at room temperature. It is advised that the effect of the substance be further tested in your particular application.
- N = Not Resistant**                Not resistant, material may swell, craze, haze or dissolve when exposed to this substance.

Reagent	Result	Reagent	Result
Acetic Acid, 5%	LR	Acetone	N
Ammonium Hydroxide, 20%	N	Benzene	N
Brake Fluid	N	Butane	R
Carbon Tetrachloride	N	Chlorox, 5%	R
Cyclohexanone	N	Dimethyl Formamide	N
Dimethyl Sulfoxide	N	1,4 Dioxane	N
Diocetyl Phthalate	LR	Ethanol	N
Ethylene Glycol	R	Ethyl Ether	LR
Formic Acid	N	Gasoline	LR
Hexane	LR	Hydrochloric Acid, 10%	LR
Hydrogen Disulfide, 5%	R	Isopropanol, 50%	N
Kerosene	R	Methanol	N
Methylene Chloride	N	Methyl Ethyl Ketone	N
N-Methyl-2-Pyrrolidne	N	Oil, Detergent 20W	R
Oil, Non-Detergent 20W	R	Oil, Transmission	R
Oleic Acid	LR	Perchloroethylene	N
Pyridine	N	Sodium Chloride	R
Sodium Hydroxide, 20%	LR	Synthetic Perspiration	R
Sulfuric Acid, 20%	LR	Tetrahydrofuran	N
Tide Detergent, 1%	R	Toluene	N
Trichloroethylene	N	Turpentine	R
Water	R		

For specific questions relating to the chemical resistance of etched surface patterns, please contact the 3form Technical Help desk.

### Receiving

These instructions should be made available to your receiving department personnel, your field captain, and any other individual, which may be required to receive delivered goods.

The following steps should be taken to avoid damage to 3form Glass after it has been received on the job site:

- Plan the shipping schedule to minimize job site storage time, and to avoid off-job storage and handling
- Minimize handling by scheduling shipments by floors and by locating crated products as close to their installation point as possible
- Never store or transport 3form Glass in a horizontal orientation
- Carefully inspect each shipment immediately upon delivery. Pay particular attention to the crating and

other packaging. Note on the freight bill or delivery receipt any evidence of shortage, abuse, damage, or wet packaging and have the delivering driver sign the receipt or freight bill. If damage or abuse is evident from the inspection of the exterior crate, immediately open any crate or packaged shipment, ideally in the presence of the driver. It is recommended to have a camera available to take photos of any damaged material. Be suspect of any materials “laying down” on the floor of the carrier’s vehicle. Often if a crate does not originally look damaged, the goods inside the crate may be damaged.

## Storage

Follow these guidelines to avoid damage to 3form Glass while stored on-site:

- Store in crates in a cool, dry, well-ventilated area sheltered from rain and direct sun. If storage is expected to be prolonged, or in areas where temperature differentials can be extreme, it is highly recommended that temperature and humidity controlled storage facilities be utilized to prevent damage to laminated products
- If not opened immediately, cover crates with plastic or canvas. Sufficient air circulation (under, over, around, and between crates) is encouraged to minimize potential condensation within the crates. Building a tent may be necessary to achieve the necessary circulation
- Secure crates to building columns if possible. Otherwise stand several crates together and fasten them to each other with scrap lumber, to prevent the crates from tipping onto their sides and possibly damaging the glass inside
- 3form Glass must never be stored in standing water

## Installation

3form recommends that Glass be installed and handled by an experienced glazier. All labels should be removed promptly. If labels are left on for an extended period in elevated temperatures, they will leave a permanent mark.

## Cleaning Instructions

3form Glass, like all glass materials, should be cleaned periodically. Since glass products can be permanently damaged if improperly cleaned, 3form recommends strict compliance with the following procedures. Micro-sandblast etched glass should follow these same guidelines, although it should also be resealed periodically. With standard maintenance the sealant on the glass will need to be reapplied to prevent oils and debris soaking into the micro-sandblast etch. To reseal we recommend something like CRL TPC16 TPC

Surface Protector.

All dirt and residues that appear on interior or exterior glass surfaces should be cleaned thoroughly. Cleaning should begin with soaking the glass surfaces with clean water and soap to loosen dirt and debris.

Using a mild, non-abrasive commercial window washing solution, uniformly apply the solution to the glass surfaces with a brush, strip washer or other non-abrasive applicator. Immediately following the application of the cleaning solution, a squeegee should be used to remove all cleaning solution from the glass surface. Care should be taken to ensure that no metal parts of the cleaning equipment come in contact with the glass surface. All water and cleaning solutions should be dried from the window gaskets and seals to avoid degradation of these materials.

### Do not:

- Use scrapers of any size or type for cleaning glass
- Allow dirt and residue to remain on glass for an extended period of time
- Begin cleaning glass without knowing if a coated surface is exposed
- Allow water or residue to remain on the glass or adjacent materials
- Begin cleaning without rinsing excessive dirt and debris
- Use abrasive cleaning solutions or materials
- Allow metal parts of cleaning equipment to contact the glass
- Trap abrasive particles between the cleaning materials and the glass surface
- Allow splashed materials to dry on the glass surface

### Do:

- Clean glass when dirt and residue appear
- Exercise special care when cleaning coated glass surfaces
- Avoid cleaning tinted and coated glass surfaces in direct sunlight
- Start cleaning at the top of the building and continue to lower levels
- Soak the glass surface with clean water and soap solution to loosen dirt and debris
- Use a squeegee to remove all of the cleaning solution
- Dry all cleaning solution from window gaskets, sealants and frames
- Clean one small area and check to ensure procedures have not caused any damage

### Pressure Washing

Pressure washing can also be an effective way to remove miscellaneous debris from surfaces of 3form Glass installations that are in exterior or hard-to-reach places.

Pre-soak panels with a light water spray to loosen and remove incidental surface debris.

It is recommended that the water pressure for cleaning Glass panels be 1,500 psi or less. 3form Glass can be damaged if high pressure is concentrated in a single position too long. Use a gradual sweeping motion over the application. Never concentrate water spray in a single position. The pressure nozzle should never be positioned less than 8" (203 mm) from the panel surface.

Always test a portion of the sheet first before spraying. If test piece shows any sign of material fatigue, abrasion or delamination – discontinue pressure washing and proceed with manual cleaning instructions as described above. (If using detergent, use mild detergents only. Rinse sheet with light water spray after washing.)

Coated or painted parts are not suitable for pressure washing as finish may be stripped off. Pressure washing is not suitable for Pressed Glass panels that have been edge sealed.

**Do Not:**

- Concentrate spray in single position
- Use more than 1,500 psi pressure
- Pressure wash Glass panels that have been painted or coated to maintain coating integrity
- Pressure wash Pressed Glass panels with sealed edges to ensure edge seals remain intact

### Important

If a cleaning material is found to be incompatible in a short-term test, it will usually be found to be incompatible in the field. The converse, however, is not always true. Favorable performance is not guarantee that actual end-use conditions have been duplicated. Therefore, these results should be used as a guide only and it is recommended that the user test the products under actual end-use conditions.

For more information, please visit [3-form.com](http://3-form.com) or call 877-649-2670.