

# Welcome

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This binder is designed to supply you with the additional technical information on Goldray's decorative glass products required for making design or compliance decisions. Goldray's team will work with you on your projects right from the design stage through to manufacturing the final product. If you do not find the specific information you require, or if you have need of more in-depth information, please do not hesitate to contact the Goldray sales department and we will be happy to assist you.

Thank you for your interest in Goldray Industries Ltd. We look forward to being your solution to complex glass problems.

# Ceramic Frit

## Product Description

Ceramic Frit is a pigmented glass enamel permanently fused to the glass surface, fired at temperatures in excess of 1200°F. This product is available in solid, metallic and translucent colors. Goldray Industries offers both traditional silkscreened ceramic frit and the patented DecoTherm Digital Ceramic Imaging Process (see *What is DecoTherm?* below). Both products are available in laminated or monolithic form.

## What is DecoTherm?

The DecoTherm process is an innovative way to decorate glass using digital ceramic images. DecoTherm Digital Ceramic Frit Glass Decoration is a patented process for placing graphic designs permanently on the glass without the maintenance issues of sandblasting or the set up costs associated with screen printing.

## Features and Benefits

- Cost effective
- Low maintenance
- Highly durable
- Abrasion resistant
- Long lifetime
- Available in myriad colors and patterns
- Can be recycled
- Available in laminated or monolithic form

## Applications

- Balustrades
- Bus shelters
- Canopies
- Ceiling tiles
- Elevator interiors
- Interior glazing
- Public art
- Signage
- Spandrel
- Store fronts
- Sunshades
- Vanity tops
- Wind walls

## Applicable Industry Standards

- ASTM C1036 - Standard Specification for Flat Glass
- ASTM C1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass
- ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass

# Ceramic Frit

## Capabilities

### Glass Thicknesses

- 3mm (1/8") to 19mm (3/4")

### Patterns

- Large selection of in-house patterns and comprehensive graphics lab for creating custom patterns

### Colors

- Virtually limitless color palette
- Most orders accompanied by a color chip can be matched to one delta E

### Edgework

- Standard edge for screen printed glass is a seamed edge
- Polishing and grinding available

### Fabrication

- Available on this product (See *Edgework and Fabrication* section in this binder.)

### Surface

- Exterior applications must be on an interior surface and not exposed to the elements

### Heat Treating

- This product is available on either fully tempered or heat strengthened glass

## Technical Data

### Film Thickness

- ~15 microns

### Acid resistance

- 15 min. 10% Citric Acid produces slight iridescence

### Alkali Resistance

- < 0.10 weight loss

### Heavy Metal Release

- N/A

### Average Opacity

- Varies upon pattern and application

### Color Tolerance

- 1 delta E (CIE LAB) (ASTM D 2244)

## Maintenance

Follow Goldray's standard *Glass Cleaning* instructions found in this binder.

## Warranty

A typical 5 year limited warranty is available for Goldray glass coated with Ceramic Frit. Contact the Goldray sales office for specific terms and conditions.

# Color Tolerance

## Color and Color Tolerances in the Architectural Glass Industry

### History

Because of natural changes in raw materials, every industry requires a quantitative system of measurement to insure that its products stay consistent from one batch to the next. Many techniques have been developed to measure color. Some set color chips use comparison while others use numerical data found from electronic equipment. In 1931, the CIE (Commission Internationale de l'Eclairage) created a method that allowed color measurement based on the perception of the human eye. Most modern color systems have adopted this data model.

### Perception of Color

The intensity of specific wavelengths of light influences its perceived color. Light travels to the human eye by two means, light reflecting off an object and light transmitting through an object, which are perceived as the reflected and transmitted colors. Both of these types of light affect glass color. When a manufactured good must meet a particular color specification, the color system must compare data from the product to a static production standard. The variance between the two colors will determine whether the product is acceptable or if modification to its formula is necessary. The difference in color is referred to as the delta E. A determined value of Delta E is used as a guideline for mixing and re-matching colors.

### Color Hindrance

When fabricating decorative glass, there are two ways in which the color is hindered. The first is the pigments present in the coatings applied to the surface of the glass. Pigments are typically mined materials and have inconsistent levels of impurities. These contaminants, even at very low levels, can change the color of a product enough to make it of unacceptable quality. Therefore, the producer must compensate by adjusting the amounts or the colors of pigments used. The second way in which color is hindered is by the color of the glass itself. The oxides used in manufacturing glass have the same traits as pigments, however, the colors are produced by a chemical reaction. During the manufacture of float glass, the hue is tested continually to ensure that it meets a specific range of color. If the contrast is too high, slight adjustments to the formula will shift it back to the center of the spectrum. Though the color will be acceptable, it is rarely identical. Compound effects from minute changes in both the glass substrate and the coatings applied challenge the final fabricator.

A common example of complications for a decorative glass manufacturer is the case when a paint color is matched too far in advance. Initially, the customer supplies a color chip to match. The producer will provide a sample that, when painted on the back surface of the glass, is as close as possible to the customer's request. When a job performs within a few months of sample approval, there is little chance that the company has replaced the materials used in making the sample. However, the longer time elapses, the more likely the materials will be of different hue, which necessitates adjustment to the color formula. This will ensure the new material on the new glass is comparable to the original mock up. This scenario is the norm for most industrial fabricators.

### Conclusion

Every industry must alter their colors to keep within a dictated range. The paint supplier and the glass supplier go through the same process, as mentioned earlier. Unfortunately, some adjustments can make certain colors impossible to match a second time. For example, an off-white color matched on a piece of clear glass will be problematic because of the glass hue. From one crate to the next, the glass color can shift toward green at a delta E of 0.05. This very small change is tolerable by industry standards and undetectable to the human eye. However, when paint is applied to its surface, the color will appear grey. Any adjustment to the formula will make the color darker or push the delta E too far, causing an unsuccessful match. To avoid delays resulting from these deviations, the recommendation for all jobs requiring custom colors is a full size mock-up immediately prior to the job release.

# Edgework and Fabrication

## Product Description

Polished or ground edgework is available in many different profiles and gives a finished look to all exposed edges. Fabrications range from simple holes and notches, to accommodate installation hardware, to complex cutouts for wall cladding applications.

## Features and Benefits

- Available on any shape
- Consistent across panels within very precise specifications
- Available on both monolithic and laminated products

## Applications

Available on all of Goldray's decorative glass products.

## Applicable Industry Standards

- ASTM C1036 - Standard Specification for Flat Glass
- ASTM C1048 - Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass

## Capabilities

### Glass Thicknesses

- 3mm (1/8") to 19mm (3/4")

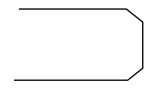
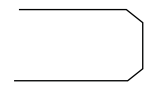
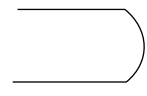
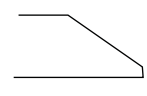
### Sizes

- Range from 12" x 12" to 84" x 144" subject to heat treating limitations
- (See *Heat Treated Glass*)

# Edgework and Fabrication

## Edgework

1/8" (3mm)	5/32" (4mm)	3/16" (5mm)	1/4" (6mm)	5/16" (8mm)	3/8" (10mm)	1/2" (12mm)	5/8" (15mm)	3/4" (19mm)
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Flat grind	●	●	●	●	●	●	●	●	●	
Flat polish			●	●	●	●	●	●	●	
Pencil Polish				●	●	●	●	●	●	
Mitre (0 - 45°)			●	●	●	●	●	●	●	

## Fabrication

- See the following page for fabrication limitations

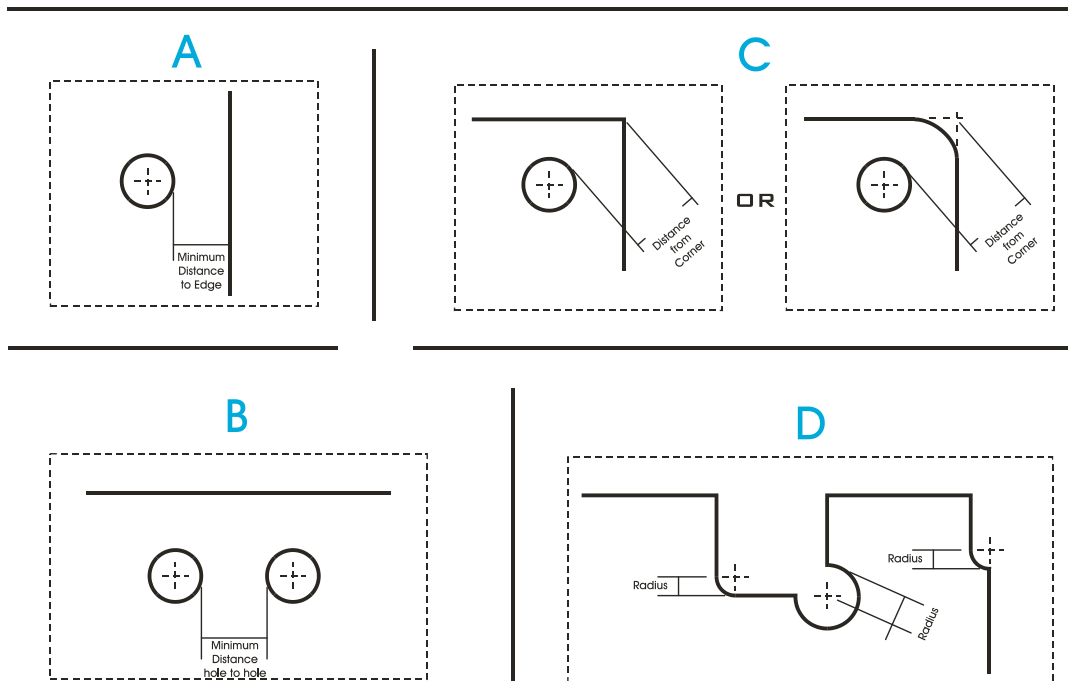
## Warranty

A typical 5 year limited warranty is available for Goldray edged and fabricated glass. Contact the Goldray sales office for specific terms and conditions.

# Edgework and Fabrication

## Fabrication Limitations

Glass Thickness		Minimum hole diameter	SEE DRAWINGS BELOW			
			A Minimum distance from rim of hole to edge of glass	B Minimum distance from rim of hole to rim of adjacent hole	C Minimum distance from rim of hole to corner of glass	D Minimum Inside Radius
Imperial	Metric	Equal to thickness 1/4 inch minimum	2 X thickness 1/4" (6mm) minimum	2 X thickness 3/8" (10mm) minimum	6.5 X thickness	Equal to thickness 1/4 inch minimum
1/8"	3mm	1/4" (6mm)	1/4" (6mm)	3/8" (10mm)	13/16" (21mm)	1/4" (6mm)
5/32"	4mm	1/4" (6mm)	5/16" (8mm)	3/8" (10mm)	1" (25mm)	1/4" (6mm)
3/16"	5mm	1/4" (6mm)	3/8" (10mm)	3/8" (10mm)	1-1/4" (31mm)	1/4" (6mm)
1/4"	6mm	1/4" (6mm)	1/2" (12mm)	1/2" (12mm)	1-5/8" (41mm)	1/4" (6mm)
5/16"	8mm	5/16" (8mm)	5/8" (16mm)	5/8" (16mm)	2-1/16" (52mm)	5/16" (8mm)
3/8"	10mm	3/8" (10mm)	3/4" (19mm)	3/4" (19mm)	2-7/16" (62mm)	3/8" (10mm)
1/2"	12mm	1/2" (12mm)	1" (25mm)	1" (25mm)	3-1/4" (83mm)	1/2" (12mm)
5/8"	15mm	5/8" (15mm)	1-1/4" (31mm)	1-1/4" (31mm)	4-1/16" (103mm)	5/8" (15mm)
3/4"	19mm	3/4" (19mm)	1-1/2" (38mm)	1-1/2" (38mm)	4-7/8" (124mm)	3/4" (19mm)



# Glass Cleaning

## **Exterior**

Regular cleaning is an important part of building maintenance when glass is used on the exterior of a building. Pollutants in the air and water as well as run off from concrete or mortar during construction will leave deposits on the glass. These deposits, if not cleaned off during routine maintenance, will corrode the glass and permanently etch the surface.

### **Instructions:**

To wash glass on the exterior of a building:

- 1) Rinse it off with clean water to remove any loose dirt or other particles that may scratch the glass.
- 2) After the glass is thoroughly soaked, use a mild, abrasive-free detergent and a soft brush or other non-abrasive applicator to wipe down the glass.
- 3) Dry the glass with a squeegee; any residue on the glass or surrounding gaskets, frame or sealants must be wiped dry with a cloth.

## **Interior**

Cleaning glass in an interior application requires some delicacy, especially if the surface is etched. Use light to moderate pressure; excessive pressure or hard scrubbing motions may damage the glass surface.

### **Instructions:**

To clean interior glass:

- 1) Use a mild, non-alkaline detergent. Ensure the detergent does not contain abrasives (which cause scratches) or polishing agents (which leave residue on the glass) to prevent patchiness on the etched surface. Abrasive or caustic cleaners are not to be used in any application.
- 2) Wipe the glass until dry using a soft cloth or paper towel removing any streaks that may have formed. Liquids left on the glass may cause staining.
- 3) If any contaminants remain on the glass, a solution of 50/50 of water and isopropyl alcohol can be used to remove it. This works well with sticky or gluey materials.

# Glass Marker Boards

## Product Description

Glass marker boards are made using a coating or interlayer applied to an unexposed surface of glass as an opacifier, resulting in a writable surface. The product is available in standard or magnetic, with either polished or framed edges.

## Features and Benefits

- Endless design possibilities
- Very low maintenance
- Highly durable
- Long lifetime
- Easy to clean
- Available in magnetic
- Available with virtually any text, simple/complex logos or photo realistic images

## Applications

Glass marker boards provide a writable surface for such applications as:

- Conference room or office walls
- Table tops
- Calendars
- Maps or way finding signs
- Custom signage
- Hospital charts

## Applicable Industry Standards

- ASTM C1036 - Standard Specification for Flat Glass
- ASTM C1048 - Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
- ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass3

## Disclaimer

Goldray's magnetic marker boards are not themselves magnetized. A rare earth magnet is required to hold documents, product samples, etc., to the marker board. Only dry erase markers should be used to write on the marker board surface.

# Glass Marker Boards

## Capabilities

### Thicknesses

- Typical overall thickness is 6mm (1/4") to 10mm (3/8")

### Patterns

- Large selection of in-house patterns and comprehensive graphics lab for creating custom patterns
- All postscript or raster graphics that are supplied in an acceptable media type

### Colors

- Virtually limitless color palette
- Most orders accompanied by a color chip can be matched to within one delta E

### Edgework

- Standard edge on this product is a polished edge
- Framing on seamed edges is also available

### Fabrication

- Available on this product (See *Edgework and Fabrication* section in this binder.)

### Surface

- Must be on an interior application

### Heat Treating

- This product is available on either fully tempered or heat strengthened glass

## Technical Data

### Film Thickness

- 12 - 25 microns (ASTM D 1212 & ASTM D 823)

### Average Opacity

- Fully opaque

### Color Tolerance

- 1 delta E (CIE LAB @ D65 10°)(ASTM D 2244)

### Durability

- Passes ASTM D 3359

### Tested Installation Materials

- Dow 795 Silicone (in compatible color)

## Maintenance

Follow Goldray's standard *Glass Cleaning* instructions found in this binder.

## Warranty

A typical 5 year limited warranty is available for Goldray Glass Marker Boards. Contact the Goldray sales office for specific terms and conditions.

# Heat Treated Glass

## Product Description

Standard float glass is heated and rapidly cooled, changing the stress in the glass making it safer for use. Heat treated glass is heated in a furnace to temperatures in excess of 1200°F and then rapidly cooled leaving the outside surface in compression and the inside surface in tension. The added stress put into the glass increases the amount of tensile stress required to break the glass as it must overcome glass' natural tensile strength as well as the added compression.

## Features and Benefits

- Tempered and heat strengthened glass meets many safety specifications due to its additional strength and impact resistance (see below)
- Most products from Goldray Industries can be tempered or heat strengthened, or laminated with heat treated glass, to ensure safety and resiliency

## Applications

- Balustrades
- Bus shelters
- Canopies
- Ceiling tiles
- Elevator interiors
- Entrance systems
- Interior glazing
- Partitions
- Many other applications where safety or impact resistance is a concern
- Public art
- Signage
- Shower and bathroom enclosures
- Spandrel
- Store fronts
- Sunshades
- Vanity tops
- Wind walls

## Applicable Industry Standards

- ASTM C1036 - Standard Specification for Flat Glass
- ASTM C1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass
- Goldray is SGCC (Safety Glazing Certification Council) certified for tempering 3mm (1/8"), 4mm (5/32"), 5mm (3/16"), 6mm (1/4"), 10mm (3/8") and 12mm (1/2") flat glass
- All of our tempered and heat strengthened glass complies with ANSI (Z97.1-1984) CAN/CGSB-12.1-M790 standards

# Heat Treated Glass

## Capabilities

### Glass Thicknesses

- 3mm (1/8") to 19mm (3/4")

### Sizes

	3mm	4mm	5mm	6mm	8mm	10mm	12mm	15mm	19mm
<b>Heat Strengthened</b>	48x96	48x96	84x120	84x144	84x144	84x144	—	—	—
<b>Tempered</b>	34x76	36x80	84x120	84x144	84x144	84x144	84x144	84x144	84x144

Minimum diagonal measurement is 18 inches.

### Edgework

- Standard edge for tempered glass is seamed edge on glass 12 mm and thinner
- Polishing and grinding available
- A flat ground edge is the minimum edge for 15mm and 19mm

### Fabrication

- Available on this product (See *Edgework and Fabrication* section in this binder.)

## Technical Data

### Compression

#### Tempered

- Edge: 9,700 psi min.
- Surface: 10,000 psi min.

#### Heat Strengthened

- Surface (when glass is 6mm (1/4") or less): 3,500 - 7,500 psi

## Maintenance

Follow Goldray's standard *Glass Cleaning* instructions found in this binder.

## Warranty

A typical 5 year limited warranty is available for Goldray heat treated glass. Contact the Goldray sales office for specific terms and conditions.

# Laminated Glass

## Product Description

Laminated glass is a type of multi-ply glass consisting of an assembly of two or more lites of glass bonded with an interlayer that holds together when shattered.

## Features and Benefits

- Laminated glass is used for safety or security glass and in applications which require sound control because of its additional strength and acoustical control, as compared to monolithic lites
- Different colors, textures and patterns can be combined using the laminating process to create special effects not possible with monolithic panels
- Laminated glass can be used in interior or exterior applications

## Applications

- Balustrades
- Elevator cabs
- Interior partitions
- Flooring
- Furniture; can be combined with ceramic frit patterns or full coverage opaque LCBA
- Overhead glazing
- Signage
- Sloped glazing
- Stair treads

## Applicable Industry Standards

- ASTM C1036 - Standard Specification for Flat Glass
- ASTM C1048 - Standard Specification for Heat-Treated Flat Glass -- Kind HS, Kind FT Coated and Uncoated Glass
- ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass

## Capabilities

### Glass Thicknesses

- Any combination of flat glass 3mm (1/8") to 19mm (3/4") or pattern glass can be laminated (subject to weight restrictions)

### Edgework

- Standard edge for laminated glass is a seamed edge
- Polishing and grinding available

### Fabrication

- Available on this product (See *Edgework and Fabrication* section in this binder.)

### Heat Treating

- This product is available using annealed float glass, fully tempered or heat strengthened glass

# Laminated Glass

## Technical Data

### UV Light Transmission

- < 1%

### Sound Loss

- Subject to glass makeup

### Average Opacity

- Varies upon application

### Color Tolerance

- 1 delta E (CIE LAB)

### ANSI 97.1

- Passed

### 16 CFR 1201

- Passed

### Compatible Sealants

- Dow 795
- Dow 999A (Butt Glazing)

## Maintenance

Follow Goldray's standard *Glass Cleaning* instructions found in this binder.

## Warranty

A typical 5 year limited warranty is available for Goldray laminated glass. Contact the Goldray sales office for specific terms and conditions.

# LCBA Colored Glass Cladding

## Product Description

LCBA (low cure baked acrylic) is a glass coating applied to the unexposed surface of glass in order to produce an opaque colorful finish.

## Features and Benefits

- LCBA is an opaque finish available in a wide palette of standard and custom colors including both solid and metallic
- Glass cladding is an impact and abrasion resistant product
- Easy to keep clean
- Very low maintenance
- Available in both laminated and monolithic form

## Applications

- Back splashes
- Counter tops
- Elevator cabs
- Interior partitions
- Signage
- Wall cladding

## Applicable Industry Standards

- ASTM C1036 - Standard Specification for Flat Glass
- ASTM C1048 - Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
- ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass

## Capabilities

### Glass Thicknesses

- 3mm (1/8") to 19mm (3/4")

### Patterns

- Full coverage

### Colors

- Virtually limitless palette of colors available

### Edgework

- Standard edge for LCBA glass is a seamed edge
- Polishing and grinding available

### Fabrication

- Available on this product (See *Edgework and Fabrication* section in this binder.)

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# LCBA Colored Glass Cladding

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## **Technical Data**

### **Film Thickness**

- 12 - 25 microns (ASTM D 1212 & ASTM D 823)

### **Average Opacity**

- < 0.5%

### **Color Tolerance**

- 1 delta E (CIE LAB @ D65 10°)(ASTM D 2244)

### **Durability**

- Passes ASTM D 3359

### **Tested Installation Materials**

- Dow 795 Silicone (in compatible color)

## **Maintenance**

Follow Goldray's standard *Glass Cleaning* instructions found in this binder.

## **Warranty**

A typical 5 year limited warranty is available for Goldray painted glass. Contact the Goldray sales office for specific terms and conditions.

# Satin Etch

## Product Description

Satin Etch is a translucent glass with a light diffusing etched surface to which patterns may be applied.

## Features and Benefits

- Provides privacy
- High light transmission to help increase daylight within a building
- Easy to clean surface
- Provides glare control
- High resistance to stains
- Can also be overlaid with graphics viewable from both sides
- Available in clear and low iron as well as various tints and colors
- Available in laminated or monolithic form

## Applications

- Balustrades
- Bus shelters
- Canopies
- Ceiling tiles
- Counter tops
- Elevator cabs
- Exterior glazing and sunshades
- Flooring panels
- Interior glazing and partitions
- Public art
- Signage
- Stair treads
- Store fronts
- Vanity tops
- Wind walls

## Capabilities

### Glass Thicknesses

- 3mm (1/8”), 6mm (1/4”), 10mm (3/8”) and 12mm (1/2”)

### Patterns

- Large selection of in-house patterns
- Comprehensive in-house graphics department available for creating custom patterns

### Colors

- Available in clear and low iron as well as various tints and colors

### Edgework

- Standard edge for satin etch glass is a seamed edge
- Polishing and grinding available

### Fabrication

- Available on this product (See *Edgework and Fabrication* section in this binder.)

# Satin Etch

## Technical Data

All data provided relates to standard 6mm (1/4") satin etch.

### Light Transmission

- 89%

### Light Diffusion

- 87%
- Soft, natural appearance

### UV

- 53%

### Surface Roughness

- Ra: 1.8 (+/- 0.2)
- Rz: 10 (+/- 0.5)
- Rsm: 110 (+/- 10)

## Applicable Industry Standards

- ASTM C1036 - Standard Specification for Flat Glass
- ASTM C1048 - Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
- ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass

## Clear Satin Etch

Thickness	Visible Transmission	Solar Transmission	SC	SHGC	U Value
3mm (1/8")	89.8%	82.7%	0.98	0.854	1.04
6mm (1/4")	88.6%	77.1%	0.94	0.815	1.02
10mm (3/8")	86.7%	69.3%	0.88	0.763	1.02
12mm (1/2")	85.1%	63.5%	0.84	0.724	1.02

## Low Iron Satin Etch

Thickness	Visible Transmission	Solar Transmission	SC	SHGC	U Value
3mm (1/8")	91.0%	89.0%	1.05	0.90	1.00
6mm (1/4")	91.0%	89.0%	1.04	0.90	1.00
10mm (3/8")	91.0%	87.0%	1.03	0.89	0.98
12mm (1/2")	91.0%	86.0%	1.02	0.87	0.96

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# Satin Etch

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**Maintenance**

Follow Goldray's standard *Glass Cleaning* instructions found in this binder.

**Warranty**

A typical 5 year limited warranty is available for Goldray Satin Etch Glass. Contact the Goldray sales office for specific terms and conditions.

# Technographic Interlayer

## Product Description

Technographic Interlayer is a high resolution printed polyester interlayer laminated between two or more glass surfaces.

## Features and Benefits

- Virtually all color profiles can be reproduced on clear, translucent or opaque film
- Images can be standard text, simple/complex logos or photo realistic images
- Can be a single image viewed from both sides, two individual images viewed from respective sides or backlit for display purposes

## Applications

- Balustrades
- Bus shelters
- Canopies
- Ceiling tiles
- Counter tops
- Elevator cabs
- Floor panels
- Interior glazing
- Public art
- Signage
- Stairs

## Capabilities

### Glass Thicknesses

- Minimum: 6mm (1/4") laminated glass
- Maximum: to be defined by weight restrictions

### Patterns

- All postscript or raster graphics that are supplied in an acceptable media type

### Colors

- Few color restrictions
- Any patterns that contain white must be made by printing on white media

### Sizes

- Film can be laminated in sizes up to 59" x 144"

### Edgework

- Standard edge for laminated glass is a seamed edge
- Polishing and grinding available

### Fabrication

- Available on this product (See *Edgework and Fabrication* section in this binder.)

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# Technographic Interlayer

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## Applicable Industry Standards

- ASTM C1036 - Standard Specification for Flat Glass
- ASTM C1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass
- ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass

## Technical Data

### ANSI 97.1

- Passes

### 16 CFR 1201

- Passes

## Maintenance

Follow Goldray's standard *Glass Cleaning* instructions found in this binder.

## Warranty

A typical 5 year limited warranty is available for Goldray laminated. Contact the Goldray sales office for specific terms and conditions.

# Traction Control Flooring

## Product Description

Traction Control Flooring is made using a self texturing glass enamel permanently fused to the glass surface. The aggressive traction properties of this product yield a superior slip coefficient as a safety feature for glass flooring.

## Features and Benefits

- Available in many thicknesses and combinations of thicknesses laminated together to satisfy weight or building code requirements
- Offered in standard or custom patterns to accomplish varying degrees of translucency

## Applications

- Glass flooring
- Stair treads
- Glass tiles

## Applicable Industry Standards

- ASTM C1036 - Standard Specification for Flat Glass
- ASTM C1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass
- ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass

## Capabilities/Availability

### Glass Thicknesses

- Monolithic pieces: 3mm (1/8") to 19mm (3/4")
- Laminated: to be defined by weight restrictions

### Patterns

- Large selection of in-house patterns
- Comprehensive in-house graphics department for creating custom patterns

### Colors

- Typically translucent
- Can be tinted or applied over top of other ceramic frit colors for added design flexibility

### Edgework

- Standard edge for screen printed glass is a seamed edge
- Polishing and grinding available

### Fabrication

- Available on this product (See *Edgework and Fabrication* section in this binder.)

### Heat Treating

- This product is available on either fully tempered or heat strengthened glass

# Traction Control Flooring

## Technical Data

### Static Friction Coefficient

- Dry = 1.074
- Wet = 1.107

### Film Thickness

- 15 - 75 microns

### Acid Resistance

- 15 min. 10% Citric Acid produces slight iridescence

### Alkali Resistance

- < 0.10 weight loss

### Heavy Metal Release

- N/A

### Slip Coefficient

- Dry = 1.1
- Wet = 1.1 (ASTM C 1028)

### Index of Abrasion Resistance

- 95

## Maintenance

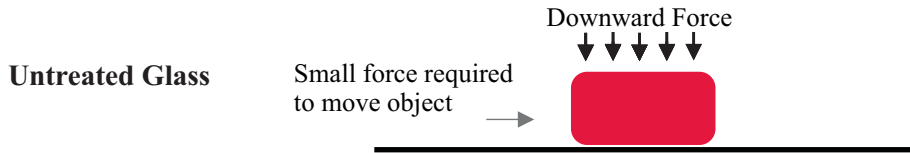
Follow Goldray's standard *Glass Cleaning* instructions found in this binder.

## Warranty

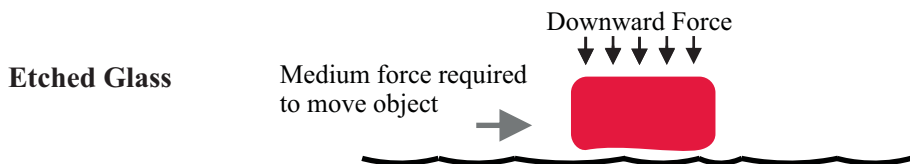
A typical 5 year limited warranty is available for Goldray Traction Control glass. Contact the Goldray sales office for specific terms and conditions.

# Traction Control Flooring

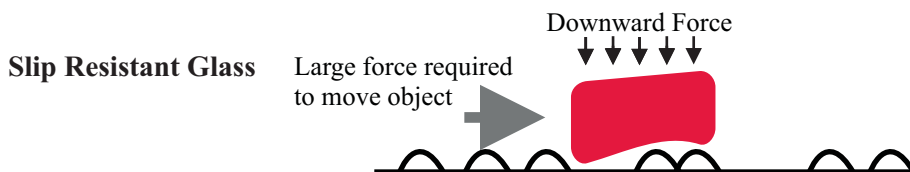
## How It Works



Plain glass has a flat surface with no ‘bite’; all static and kinetic friction rely totally on the molecular bond of the glass and one’s shoes.



Etched Glass has more tooth than flat glass but the top surface is still relatively flat and the angle of the indentation is small.



Slip resistant glass has a texture that protrudes outwards as opposed to shallow chips being removed from the glass. This makes the surface far more rough and increases the contact angle between the glass and traffic. The tips of the texture are less prone to abrasion and wear.