

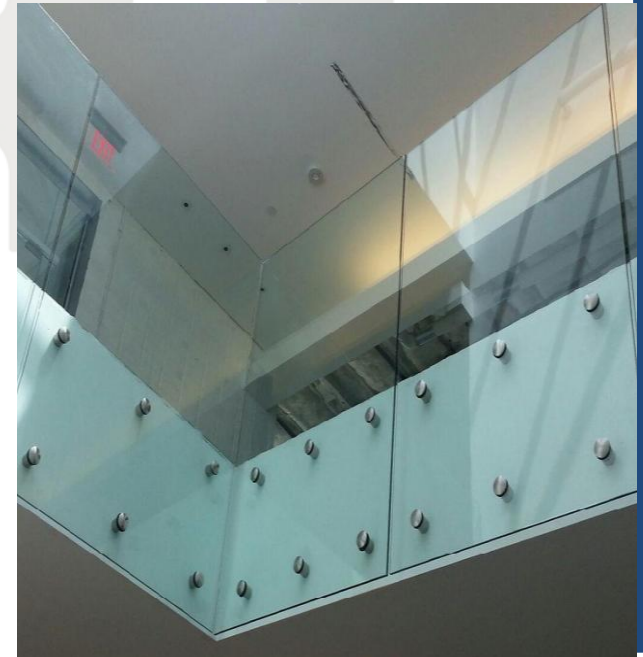


**GLASS
SYSTEMS**
www.prlglass.com

**Aluminum
ARCHITECTURAL PRODUCTS**
www.prlaluminum.com

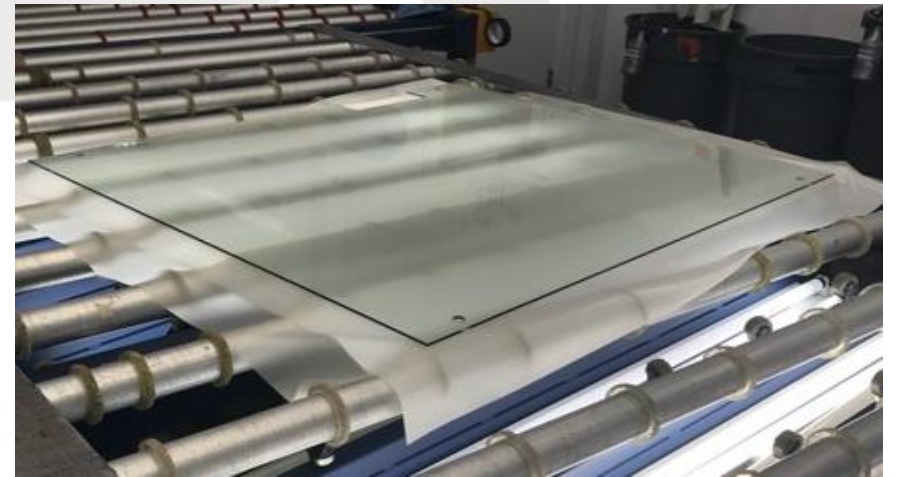
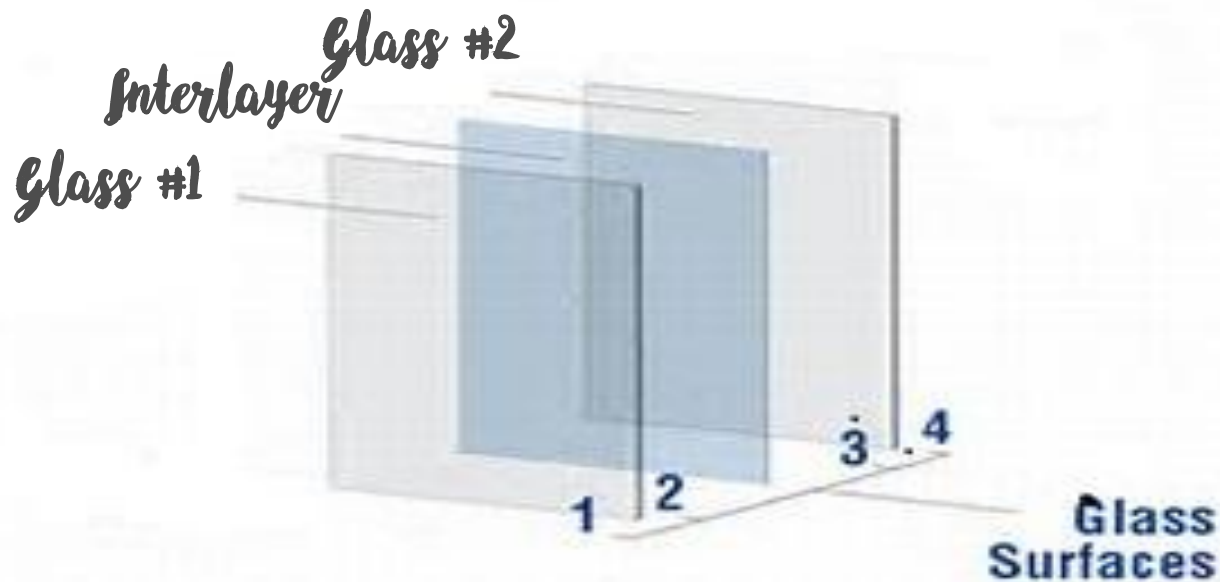
Complete Glazing Solutions

LAMINATED GLASS



WHAT IS LAMINATED GLASS?

- Defined as “Two or more lites of glass permanently bonded together with an interlayer material”
- Our process bonds the glass and interlayer together under pressure and heat

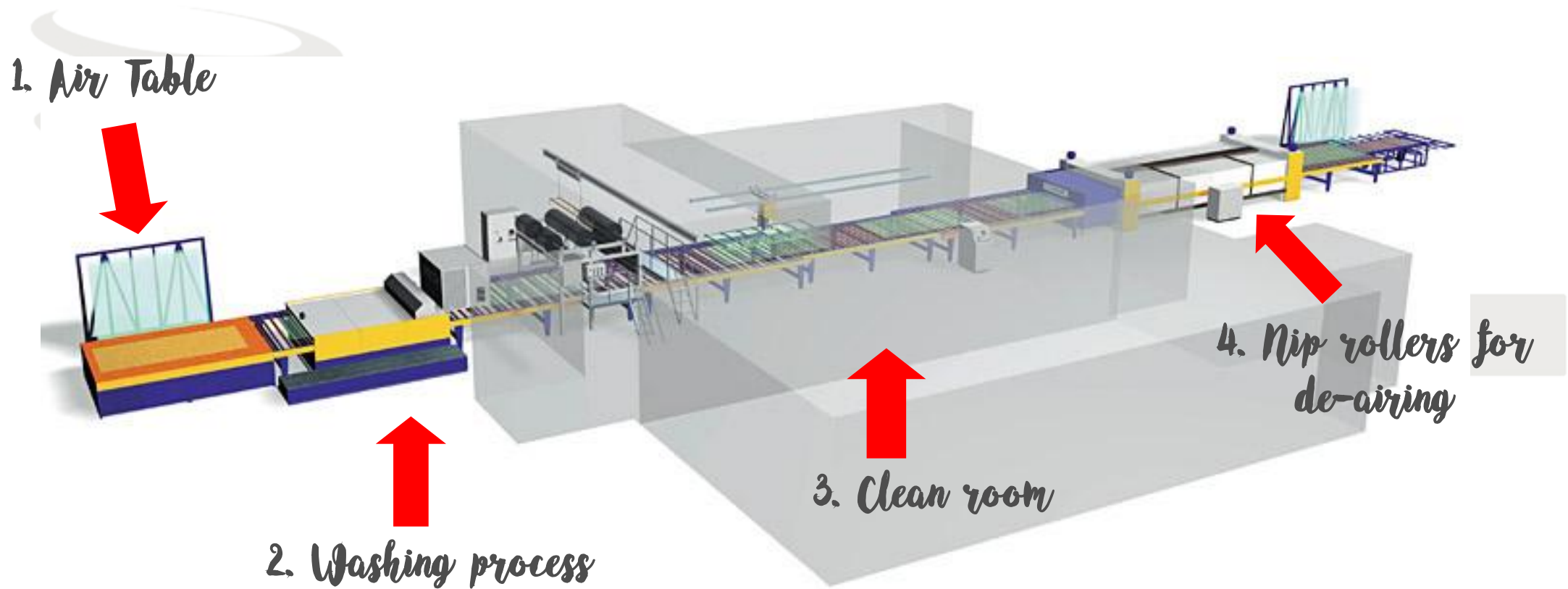


LAMINATED GLASS

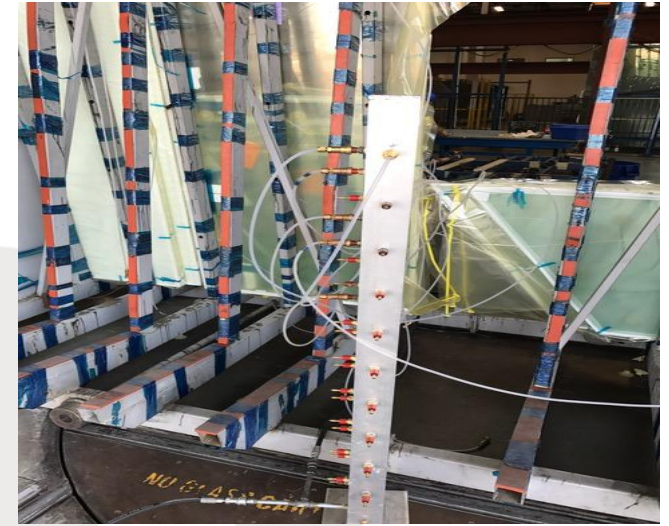
- Can be made using:
 - *Annealed, heat strengthened or tempered glass*
 - *Tinted, reflective, patterned, mirror and some low e's*
- Adds sound-damping
- UV-blocking properties
- Considered safety glass
 - *If glass breaks, glass fragments adhere to interlayer*
 - Reducing risk of injury or passage of persons or objects
 - *Meets:*
 - ANSI safety standards
 - ASTM standards for Laminated Architectural Flat Glass



LAMINATION LINE



LAMINATION VACUUM BAG



- After the laminated glass sandwich has come thru the nip rollers, the glass can not be separated
- Next our technicians examine the piece and determine if a Vacuum bag is needed
- Edges are wrapped with a breather material, then wrapped with a bagging material and hooked up to a vacuum
- While in the Autoclave the bagged pieces have a dedicated tube pulling out any possible air left between the glass and interlayer
- Pieces using tempered glass, shapes, having holes/cutouts or have multiple layers of glass/interlayer must be bagged

LAMINATION AUTOCLAVE

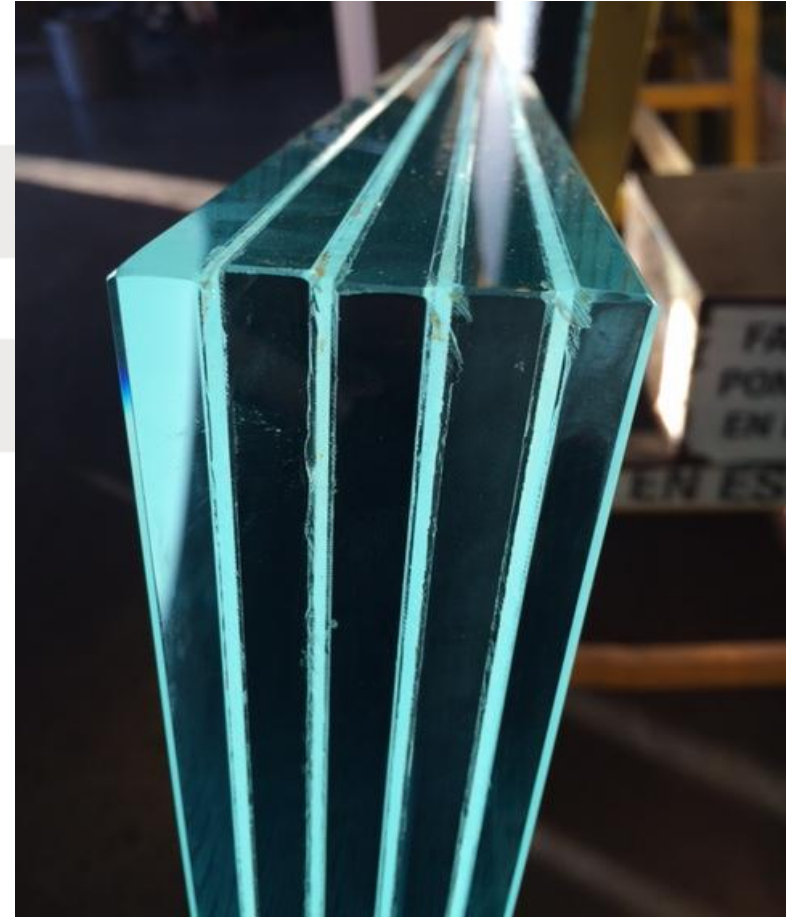
- Last step in lamination process
 - *Glass is loaded on a steel a-frame*
 - Glass will be cook in a vertical position



- While in the Autoclave glass is being heated and air pulled out at the same time

LAMINATED LIMITATIONS

- Max thickness is 2-3/4" overall
- Max size : 96" x 153"
- Min size:
 - *Annealed- can be cut down after lamination*
 - *Tempered – 12" x 12"*
 - But too small to go thru Nip rollers



INTERLAYER TYPES – POLYVINYL BUTYRAL (PVB)

- Most common used (Standard Interlayer)
- Lower cost with clear finish
- Four sided support glazing
- Wet Blanket effect when glass breaks



INTERLAYER TYPES – PVB CONT.

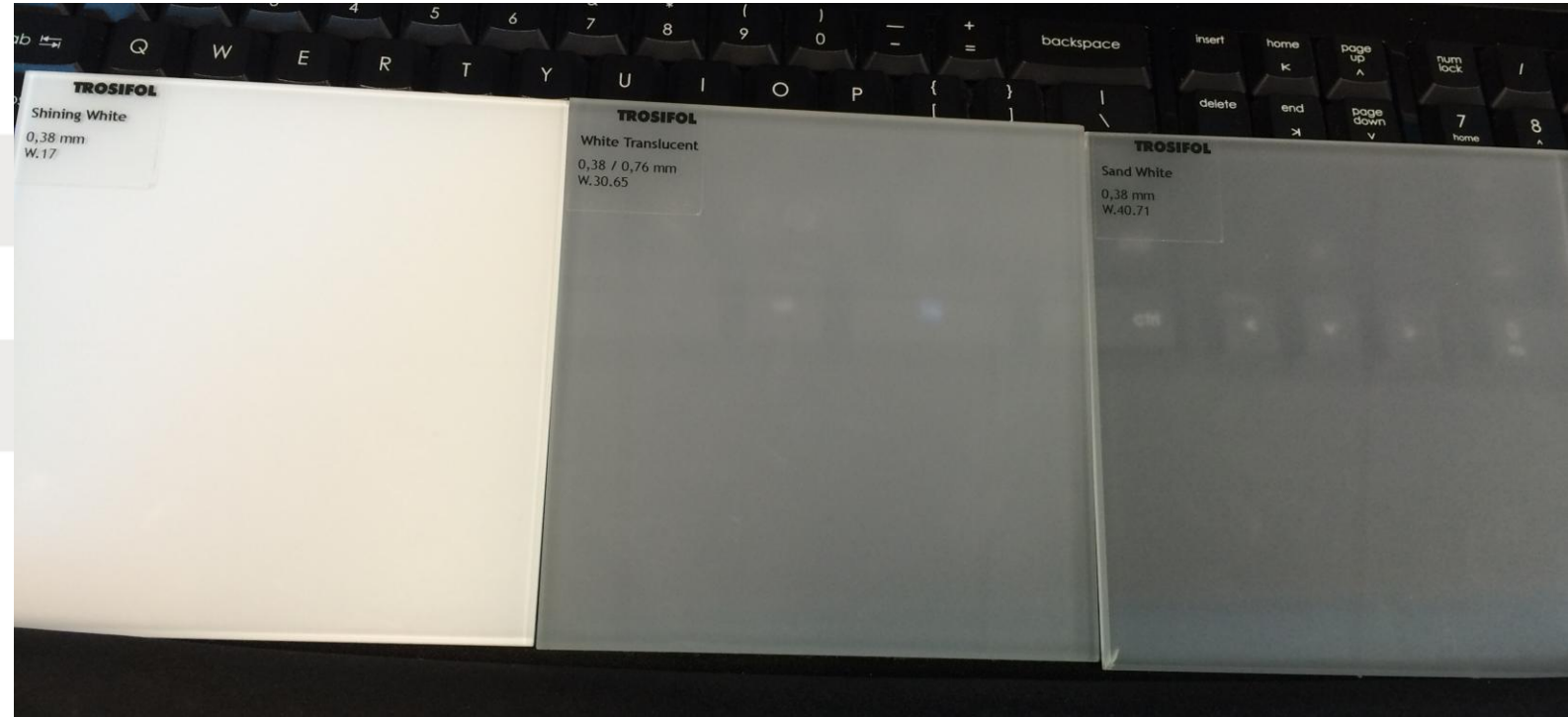
- PVB is offered in a variety of colors and thickness
- Our main supplier is Trosifol by Kuraray
- Supplied as rolls



INTERLAYER TYPES - PVB CONT.

PVB Options :

- Clear
 - Max 96”
- Sound Control
 - Max 84”
- Bronze 52%
 - Max 72”
- Brilliant Black
 - Max 72”
- Diamond White
 - Max 72”



- 7% Shinning White
 - Polar White
 - Max 84”

- 65% Translucent White
 - Artic Snow
 - Max 96”

- 81% Sand White
 - Cool White
 - Max 96”

INTERLAYER TYPES - PVB CONT.

- PRL Rainbow Interlayer
 - Max 60"
 - consists of 12 standard colors
 - can be combined with any other PVB to create custom PRL Rainbow Interlayer colors
 - Maximum 4 layers can be stacked
 - Samples sets sold for \$75 each



INTERLAYER TYPES - PVB CONT.



	1 CORAL ROSE
	2 AQUAMARINE
	3 SMOKE GRAY
	4 SAHARA SUN
	5 RUBY RED
	6 SAPHIRE BLUE
	7 EVENING SHADOW
	8 GOLDEN LIGHT
	9 DEEP RED
	10 TRUE BLUE
	11 TANGERINE
	12 OCEAN GREY

INTERLAYER TYPES – SENTRYGLAS® PLUS (SGP)

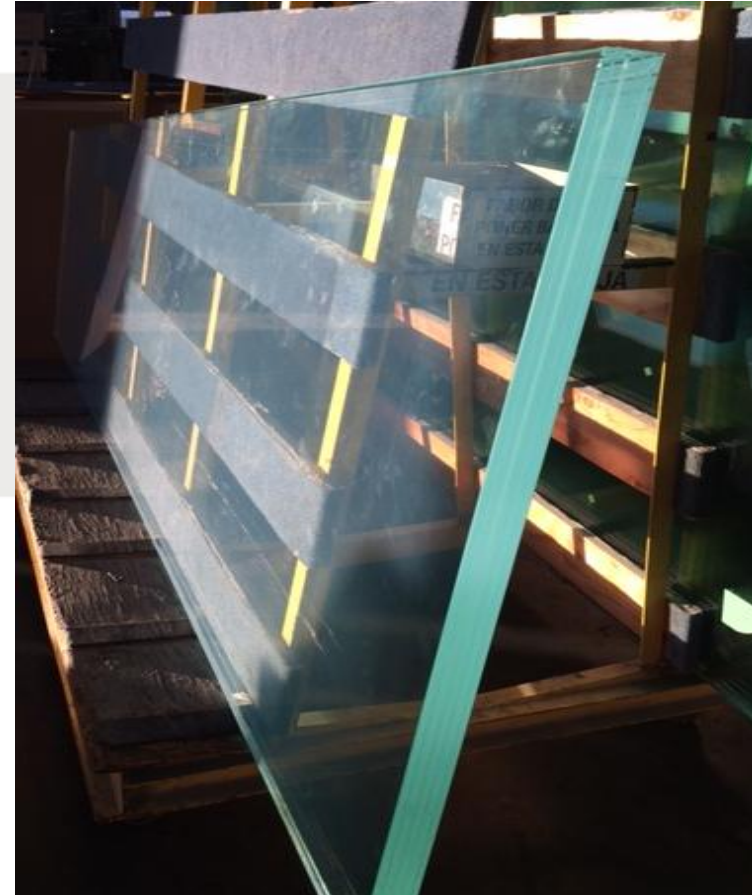
- Also known as Ionoplast interlayer
- Impact Resistant
- Post – breakage stability
- Structural interlayer
- Manufactured by Kuraray
- Can not be used with 1/8” glass
- Edges can be exposed
 - *Less susceptible to moisture intrusion*



INTERLAYER TYPES – SGP CONT.

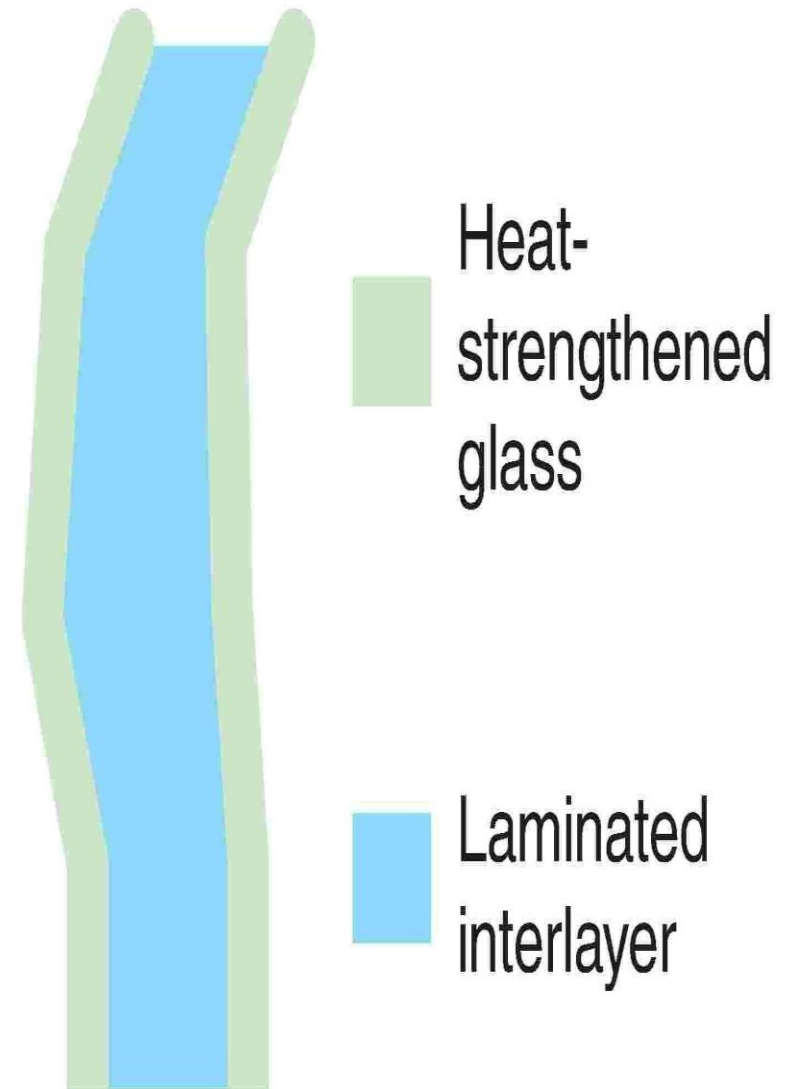
SGP Options

- Clear
 - *Rolls*
 - Thickness .035
 - Max 72”
 - *Sheets*
 - Thickness .090 sheets
 - 72” x 120” (stock)
 - 84” x 144” (special order)
- Translucent White
 - *Rolls*
 - Thickness .030
 - Max 60”



INTERLAYER THICKNESSES

- *Annealed*
 - *Can be made with .030, .060, .070, .090 or .105*
- *Heat Strengthened or Tempered*
 - *Minimum of .060 interlayer*
 - *Due to the process of heat treated glass each piece may have different distortions from the rollers. When sandwiched the additional interlayer will fill in this difference*
 - *1/8" tempered glass not recommended, will have bad distortion*
- *Textured glass*
 - *Require .090 interlayer*



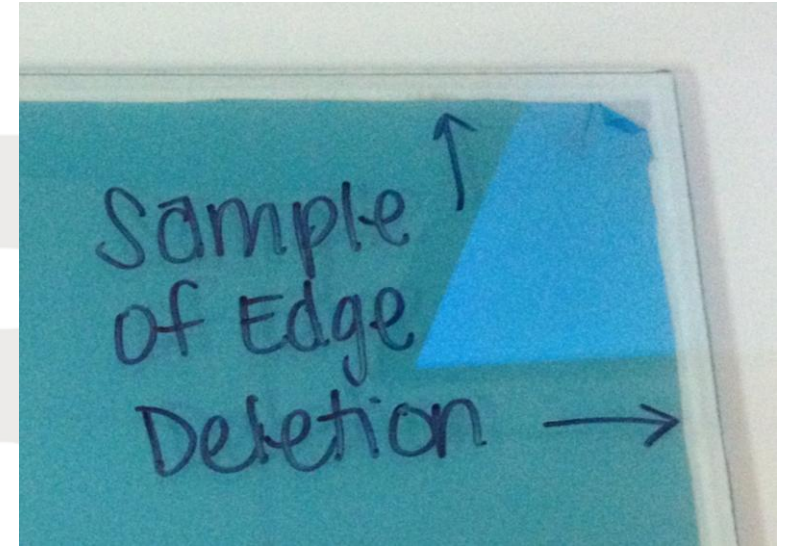
LAMINATING LOW E GLASS

We only laminate using:

- *Energy Advantage from Pilkington*
 - Hard coat
- *SN68 from Guardian*
 - Soft coat – requires edge deletion

Edge Deletion is required for all high performance glass

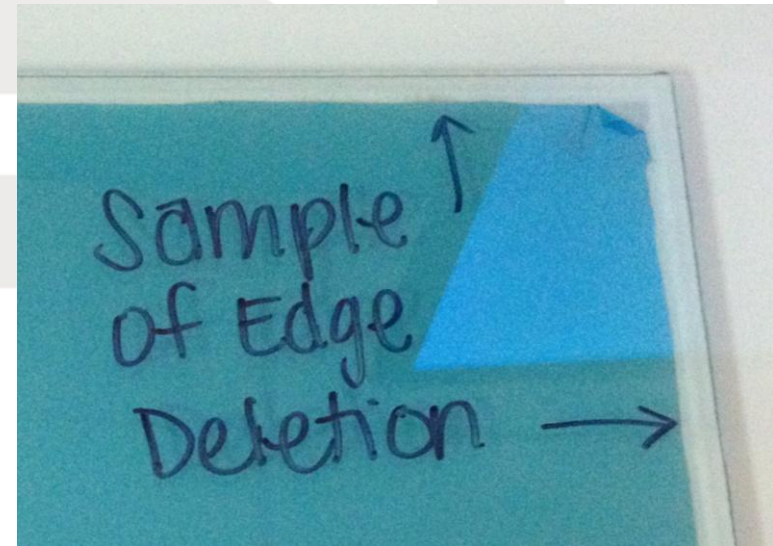
- Reduces the possibility of interaction from the chemicals in the sealant and the silver layers in the glass coating
- Applications with butt joints will show the edge deletion



LAMINATING LOW E GLASS

Two Options for Low E layup

- *Embedded*
 - *Low E coating in direct contact with interlayer*
 - *Thermal performance is about the same as if not using Low E glass*
- *Exposed*
 - *Low E on exterior of laminated sandwich*
 - *to be used in an insulated unit facing the air spacer*



LAMINATION FABRICATION

- Annealed laminated pieces
 - *Fabricated after the lamination process*
- Tempered laminated pieces
 - *Must have all fabrication done before being laminated*
 - *While in lamination process pieces can shift and cause a slight offset*



CUSTOM LAMINATED OPTIONS COMBO INTERLAYERS



Clear with 65%
translucent white

81% sand white with
65% translucent white



- Combining 2 layers of PVB on one laminated sandwich
- Possibility for air bubbles
- Interlayers and glass can shift during lamination process
 - *No guarantee*
 - To have a straight line at butt joint of interlayers
 - or
 - Will measure exactly to measurements requested

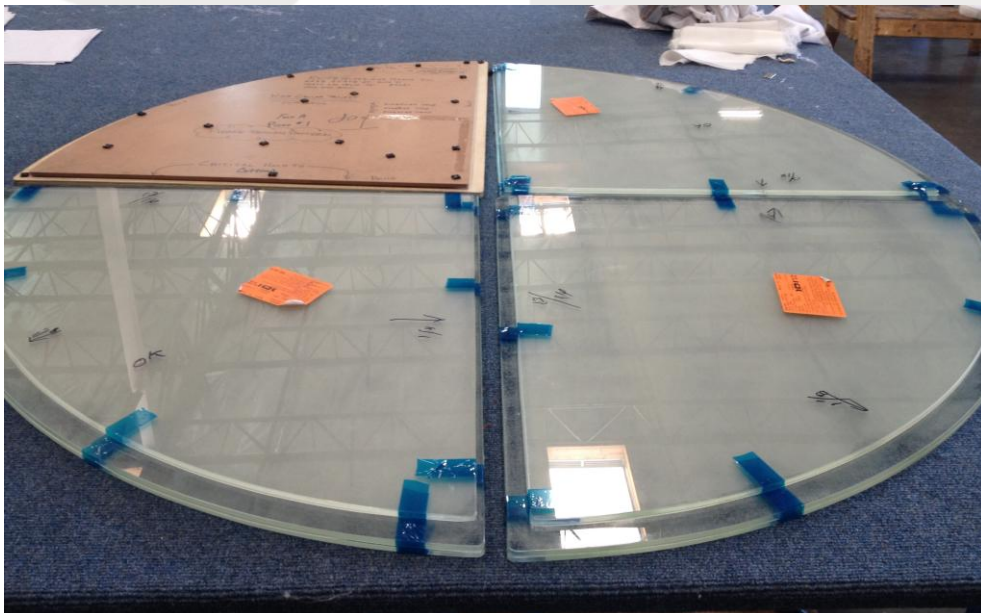
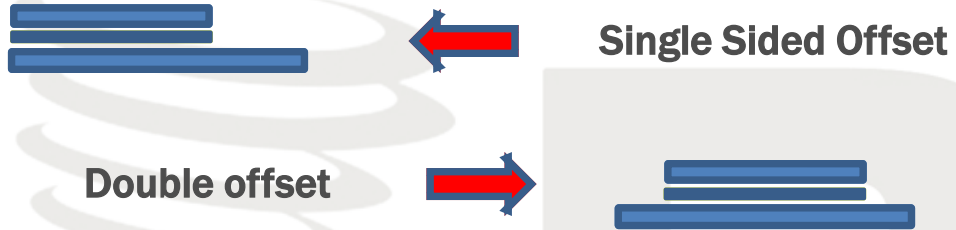
CUSTOM LAMINATED OPTIONS ARIA

- Custom cutting shapes in various glass types and combining like a puzzle in lamination



CUSTOM LAMINATED OPTIONS OFFSET

Side View of Offset



Created by having one glass smaller than the other and either centering or aligning one or more edge during lamination

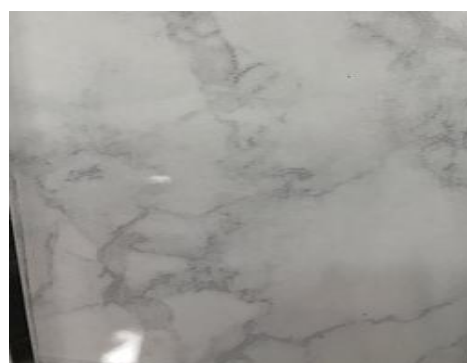
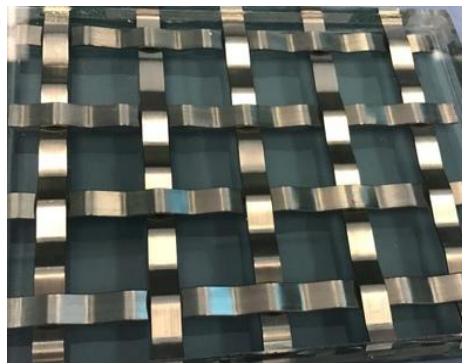
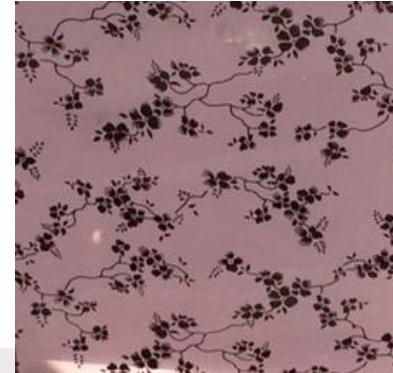
- Cannot guarantee offset will hold to measurements given
 - Can shift about 1/8" during lamination process
- Interlayer will not be removed from offset location
- No warranty

CUSTOM LAMINATED OPTIONS

It is possible to laminate other materials in the laminated sandwich

- Fabric
- Vinyl
- Metal
- Organic

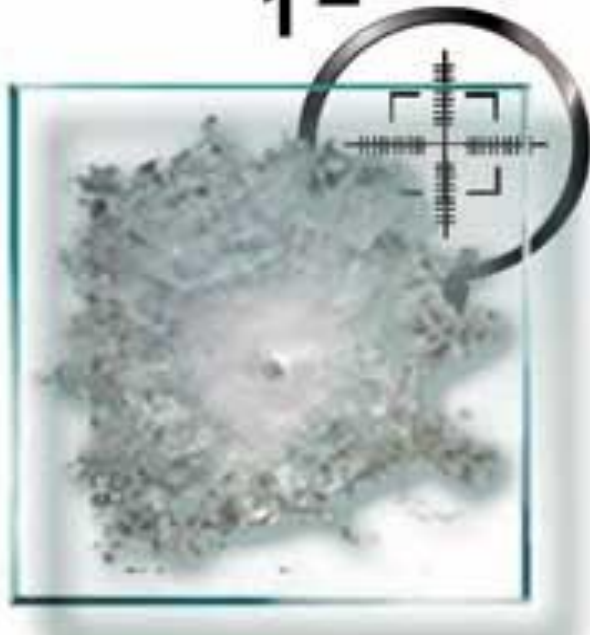
These types of jobs are very custom and bid on a case by case basis with no warranty



BULLET RESISTANT (BR)

Protection Levels

1 2 3



- 1-1/16" over all
 - *Can create thicker overall if requested*
- Max size is 48" x 96"
- Tested up to Level 3
 - *Not UL Approved*
- Made using Glass, PVB and Polycarbonate
 - *Exact make-up not given out (trade secret)*
 - Every manufacture has its own unique make-up
- Not considered physical attack resistant or blast resistant

LAMINATED - LIMITED 5 YEAR WARRANTY

- *From date of manufacture*
 - Will need order / invoice number to provide
- *When using PVB interlayer, PRL will not offer a warranty if the edges are exposed.*
 - PVB can absorb moisture resulting in discoloration at the edge and perimeter of the product and/or cause delamination
- *Custom laminated products may not offer a warranty*

PRL'S LAMINATED GLASS PROCESS:

