METRO
PERFORMANCE GLASS

LAMINATED SAFETY GLASS

Keeping it together.

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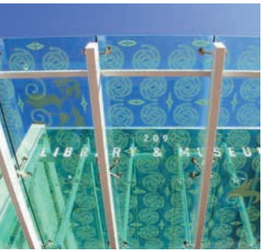
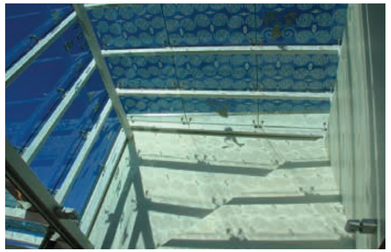

"Once upon a time" there was just laminated glass – a safety glass known for its use in automotive windscreens and human impact safety glazing applications, such as doors. The interlayer was known as PVB, or plastic, as no one could remember its real name.

Now Metro Performance Glass are offering a range of SafeLite Laminated Safety Glass (LSG) using a wide range of interlayer's, each with different properties and applications, so it is important to understand which one to use where, to ensure you "keep it together".

Applications of Laminated Safety Glass.

Laminated Safety Glass is ideal for applications that require, Safety, Security and Environmental Protection, and by using a special interlayer and or heat treated glass it can have high Strength.

In combination with printed glass and the use of printed, coloured or special inserts it can be used to create Decorative Effects.

- Window and Door Joinery
- Framed Rooflights, Skylights and Canopies
- Framed Shopfronts
- Internal Partitions
- Frameless Canopies
- Frameless doors and entries
- Balustrades
- Pool fences
- Splashbacks
- Wall Cladding
- Shopfittings and display cases
- Façade Glass (curtain wall)
- Spider and Point Fixed
- Glass Floors and Treads
- Security (shops, banks, prisons, detention cells)
- Cyclone area glazing
- Auto/Marine windows

SafeLite Key Features.

- Laminated Safety Glass (LSG) compliant to AS/NZS 2208
- Compliant with NZS 4223 and the NZ Building Code
- Holds together when broken
- Reduced risk of fallout (overhead glazing & balustrades)
- Reduced damage from toughened glass breakage fallout
- Less heavyweight monolithic glass required (12 to 19mm)
- In line with international trends and standards
- Compliant with DBH Guidance on Barrier Design
- Less need for interlinking handrails in barriers
- Less edge de-lamination
- Better warranty from de-laminations
- Clear edge tape not required (used in SafeLite CIP)
- Good Fading Reduction (UV elimination) properties
- Good Sound Control (acoustics)
- Annealed, Toughened and Heat Strengthened combinations
- Tinted glass matching is easier
- Low iron (Ultra Clear) glass laminates available
- Custom self cleaning laminates available
- Custom Low E laminates available
- Ceramic frit printed glass laminates available
- High Security laminates available
- High Strength structural glass laminates available
- Special Effects laminates with decorative inserts available
- Decorate inserts or colours can be used in most of the above

SafeLite PVB

Laminated Safety Glass with PVB interlayer

The PVB laminated process involves glass sheets being washed and dried and assembled with a sheet of PVB between in a special "clean room".

The laminate is first "pre-nipped" together using heat and rollers and then placed in an a autoclave where it is heated and bonded under extreme pressure, until the air is forced out of the sandwich and the glass becomes transparent.

The PVB process is normally automated and the equipment requires large factory floor area, but it is the most common method of laminated glass manufacture in the world today, and can be used for stock sheets or special multi-laminates. All SafeLite PVB is imported and complies with AS/NZS 2208 or similar as a laminated safety glass.

PVB interlayer is available in clear, translucent and in a range of tints and colour's and is normally 0.38mm, 0.76mm and 1.52mm in thickness. Different grades of PVB are used for automotive and architectural use and recently new softer acoustic grades have been added to improve sound control performance (Refer SoundStop PVB).

The deficiencies of PVB laminates are that they soften and weaken with temperature and the edge is susceptible to minor de-lamination from moisture and/or sealant attack.

The major use for SafeLite PVB is safety glazing for windows, doors, framed sloped and overhead glazing.

SaleLite CIP

Laminated Safety Glass with Cast-in-Place resin interlayer

Cast-in-Place (CIP) is a process to make laminated glass using a liquid resin.

This is why it is sometimes known as "liquid laminate". The glass sheets are separated by a special edge tape and the void filled with a resin which is cured by chemical reaction over time or by UV radiation which enables the cure.

The resins are often known as Poly-Methyl-Meth-Acrylate (PMMA) and are basically acrylic based resins.

Several grades of resin exist for different applications such as safety and acoustic (SoundStop), and they are commonly made in 1mm, 1.5mm and 1.8mm resin thicknesses to suit the tape thickness.

The Metro Performance Glass SafeLite CIP process is ideal for low volume production of specialty laminates as the panes are normally made to size. Most glass types can be laminated, but some restrictions apply to high UV eliminating glasses. The CIP safety glass process is third party audited which means Metro Performance Glass is licensed to manufacture Liquid Laminated Safety Glass to AS/NZS 2208 (license number 2465).

The deficiencies of SafeLite CIP laminated glass are that the clear edge tape is normally visible at the edge and they can be attacked by sealants, especially polyurethane. Some size and glass type make-up restrictions also apply as the resin is cured with UV light which must be able to transmit through the glass panes.

SafeLite EVA

Laminated Safety Glass with EVA Interlayer

Metro Performance Glass are proud to offer a new range of SafeLite EVA Laminated Safety Glass.

Ethylene Vinyl Acetate (EVA) is a sheet interlayer developed and used internationally for laminating glass and photovoltaic solar panels. EVA is ideal for laminating special inserts inside the laminate such as PET film and mesh and is ideal for decorative and stone laminates. However, it is also suitable for laminating float glass and specialty glass products such as toughened laminates and screen or digital printed glass. EVA is also available in colours.

The EVA process usually involves a special batch oven to create temperature with pressure created with vacuum bags and is a low to medium volume process. It is often known as "batch laminating" as the glass panes are laminated together in oven batches. The SafeLite EVA safety glass process is third party audited which mean Metro Performance Glass are licensed to manufacture Liquid Laminated Safety Glass to AS/NZS 2208 (license number 2465 and 2625).

SafeLite EVA interlayer is typically 0.4 and 0.8mm and can be layered to 1.2 and 1.6 mm thick. It is less susceptible to temperature softening and edge de-lamination, as it has high moisture resistance, so it is ideal for exposed edge applications, such as balustrades and canopies, and for laminating inserts into the glass.

SafeLite EFFECTS

Laminated Glass with Special Effects

One of the most exciting features of EVA interlayer is its ability to laminate inserts into the glass or to laminate special materials.

EXAMPLES OF INSERTS ARE;

+ Print – Ceramic Frit ink glasses such as TempaScreen and TempaPrint can be laminated
+ Colour – PET Colour Film enables a wide range of special colour laminates
+ Metallic – PET metallic film for stunning metal effects
+ Image – PET Image Film allows high resolution picture perfect image laminates
+ Stone – Natural stone and glass can be combined for stunning effects
+ Mesh – Internal metal or fiberglass mesh enables a range of special decorative effects
+ Veneer – Wood veneers can be protected inside the laminate
+ Fabric – Silks, papers and fabrics create special effects when laminated
+ Switch – Switchable Film is laminated with EVA to create Switchable Glass
+ LED – LED lights can be bonded inside the laminate to create signs and logos
+ Solar – Photovoltaic cells can be laminated with EVA to generate power

Note – Manufacturing size limits apply to SafeLite Effects products

SafeLite S

Laminated Safety Glass with Structural Interlayer

SafeLite S uses a special high strength interlayer such as SentryGlas, which provides increased structural properties, making the laminate ideal for special applications such as structural glass walls, fins, canopies, balustrades, floors, and some security applications.

The Structural interlayer is normally in sheet form, with some high strength film in rolls and the laminates can be made by Metro Performance Glass on a batch laminating line.

Typical interlayer thickness is 1.52mm and 2.28mm, and sheet size limits apply. These structural laminates are so strong and stiff they can hold a toughened laminated panel together even if both panes are fractured. In some cases they can be bonded to metal so special stainless steel fittings can be bonded into the glass, via holes and notches. They are normally very stable at the edge from moisture attack, but care is required with sealants.

SecurLite

Laminated Security Glass

SecurLite is a range of security glass for special applications and can manufactured using a range of glass types, polycarbonate and interlayer's depending on the application.

+ AB – Anti-Bandit laminated glass for smash and grab security
+ CR - Cyclone Resistant laminated glass to comply with AS/NZS 1170
+ FEP - Forced Entry Protection glass such as prisons and police holding cells
+ BR - Bullet Resistant laminate for special applications
+ BB - Bomb Blast resistant glass for special applications

SoundStop

Laminated Acoustic Glass

All laminated glass helps to reduce sound transmission compared to normal float glass as the interlayer dampens sound vibration.

To further improve the acoustic performance special interlayer's have been developed which are softer and help to further dampen the sound transmission. These products are known as SoundStop and are available as follows;

+ SoundStop PVB – PVB laminated glass using special Acoustic Grade PVB
+ SoundStop CIP – Cast in place laminated glass using special Acoustic (A) resin
+ SoundStop EVA – EVA laminated glass using EVA interlayer

Production Limitations

SafeLite Type	Max Size mm	Min Size mm	Max Thickness mm	Min Thickness mm
SafeLite PVB	5100 x 3210	100 x 100	12.38	6.38
SafeLite CIP	3500 x 2300	300 x 100	75	7
SafeLite EVA	4500 x 2400	250 x 100	40	6.4
SafeLite S – SG	3660 x 2140	250 x 100	40	7.5

Effects Specifications

SafeLite Type	Max Size mm	Min Size mm	Max Thickness mm	Min Thickness mm
TempaScreen	3000 x 1600	400 x 100	40	8.8
TemapPrint	4500 x 2400	300 x 300	40	8.8
Image Film	4000 x 1570	250 x 100	40	8.8
PET Colour film	4500 x 1550	250 x 100	40	8.8
EVA Translucent	4500 x 2200	250 x 100	40	6.4

Note: Will request proof
for Black on Blue readability
from printer.

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