

**WE
CHANGE
LIFESTYLE
USING GLASS
TECHNOLOGY**

www.innoglass.com.my

**inno
GLASS**





Introduction

WHO WE ARE

Innoglass is our name and our name has been the byword for innovative solutions in safety glass for both architecture and automotive functions since 2004. Our glass developments and products not only provide the highest level of safety and modern aesthetics to buildings, but are also eco-friendly. Our philosophy is – ‘Do the right thing. Do the thing right’ – so we strive to provide our clients with not just innovative products and cost savings, but also help reduce your carbon footprint with energy efficient, environmentally-conscious glass designs. Together with you, we can build better living and working spaces for tomorrow.

WHAT WE DO

Whether you are looking for smart glass or safety glass, Innoglass has the right type of glass for you. Being an experienced glass supplier for many years, we understand the importance of using quality glass for your premise.

Therefore, we have many different types of glass for our customers to choose from which are able to meet with their requirements for quality and safety purposes.

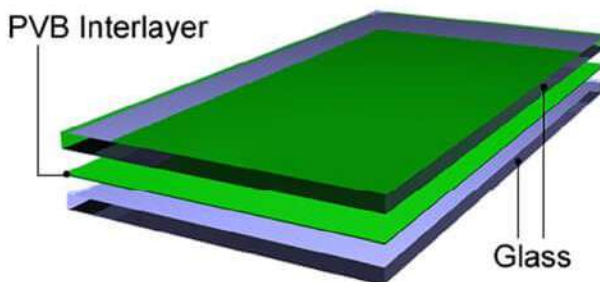
LAMINATED GLASS

What is Laminated Glass?

Laminated glass is produced by combining 2 or more sheets of glass with 1 or more plastic interlayer. The commonest is a PolyVinyl Butyral (PVB) interlayer. Laminated glass may shatter or crack when being impacted. The shattered fragment of glass may fall with the protective rather than shattering all over and cause injury. Laminated glass is offer a great variety in design and installation versatility. Laminated glass is the only glass to provide durability, high-performance and multifunctional benefits while at the same time preserving the aesthetic appearance of the glass.

Why choose Innoglass Flat Laminated Glass ?

Glass is an indispensable material in modern architecture. Our continuous development and improvements of our properties, processing technologies, as well as the technical, aesthetical and artistic applications of Innoglass's laminated glass products, have transformed yesterday's impossible requirements into today's dependable strengths for contemporary design. Our experience in this area is vast, Innoglass is capable of laminating various kinds of glass, like float glass, tempered glass, low-iron glass, low-E glass, reflective glass, tinted glass. The interlayers that we provide also come in various colours, which enables our clients and designers to create unique palettes suited to any taste or requirement.



Advantage of using Laminated Safety Glass

Safety & Standards

Laminated glass does not shatter like ordinary glass. The tough, clear interlayer absorbs impact, resists penetration and remains intact even if broken, holding glass fragments in place and lowering the risk of injury. As global building standards increasingly specify stricter safety requirements, especially for overhead glazing where any breakage could mean a major hazard from falling glass, laminated glass provides a convenient, comprehensive solution.

Sound Reduction

Noise penetrates a building easiest through glass, but laminated glass is an excellent barrier to noise due to the visco-elastic properties of the PVB interlayer that provides a dampening effect on the transmission of sound, reducing unwanted noise.

Security

Laminated glass resists intrusion because the interlayer continues to safeguard the building even after the glass itself has been broken, buying time for replacement. Laminated glazing also cannot be cut from a single side, rendering ordinary glass-suffers useless as break-in tools.

Solar Energy Control

While natural light plays a vital part in architectural design, too much sunlight will cause heat-gain inside a building, leading to high energy costs due to the increase usage of air-conditioning. Laminated glass using tinted, reflective or Low-E glass can act as a solar diffuser to reduce heat gain, control glare and lower electrical expenditure.

UV Control

Ultraviolet light is the leading cause of the deterioration and fading of furnishings, pictures, and fabrics. As laminated glass generally comes installed with UV-absorbing additives that can screen out almost all damaging UV rays without affecting visibility and light for plant growth, it is ideal for use in household environments.



Design Versatility

Laminated glass is available in a wide variety of glass types, including annealed, tempered, heat-strengthened, tinted, decorative ceramic-coated or reflective glass. It also can be manufactured in a broad spectrum of colours and textures for stylish impact and dramatic visual effect.

Durability & Ease of Use

Laminated glass retains its colour and strength long after installation. Maintenance is also easy, as laminated glass can be easily cleaned with the wipe of a cloth.

Fire Retardancy

Laminated glass does not disintegrate as easily as ordinary annealed glass, which allows for greater protection against fire and provides a longer-lasting buffer against flames, allowing more time for detection, evacuation and extinguishing.

Installation

Laminated glass using annealed glass can be cut to any size required on site and can also be drilled or notched.

TEMPERED GLASS

Innoglass use tempering furnace with force convection. It has advantage like less distortion, more efficient and better quality for special coated glass like Low-E and reflective glass. We always believe that Quality is worth going that extra mile for.

What is Tempered Glass?

Tempered glass is also known as toughened glass. The cut-to-size glass sheets are fed into a furnace until the sheets reach approximately 650°C. The glass is then moved into a quench where it is rapidly cooled by blasting both sides of the sheet with air. The rapid quenching induces compressive stresses to the glass surface, while leaving the centre remaining in tension. The additional stresses created with the glass by the heating and quenching increases its strength by four to five times that of annealed glass of an equal thickness, even though the physical characteristics remain unchanged. In addition to clear sheets, tempered glass is also offered in various tints, Low-E glass, hard-coat reflective glass and temperable soft-coat reflective glass. In the event of breakage, the panel will fracture into relatively small harmless particles. Compared to annealed glass, tempered glass has greater resistance to thermal stress, with a temperature range of 70°C to 290°C. Due to its mechanical strength, it is ideal to create a frameless or 'transparent structure' concept in all glass assemblies such as shop fronts and curtain walls. Tempered glass is also suitable for use in doors, side panels, glass balustrades, shower screens, glass walled squash courts, etc. It can also be used in automotive and furniture applications.





Innoglass Tempered Glass

Tempered Glass by Innoglass is created using a state-of-the-art tempering furnace with force convection. This provides our tempered glass with advantages such as minimum distortion, higher efficiency and greater quality for special coated glass orders using Low-E and reflective glass. Quality is a valuable commodity in today's world. And Innoglass believes that Quality is worth going that extra mile for.

Heat Strengthen Glass

Heat strengthened glass is also known as half-tempered glass. Thus manufacturing process is similar to tempered glass. For heat strengthened glass, however, the glass sheet is quenched at a slower rate, over a longer period of time. This results in a glass sheet with lower compressive stress, increasing the strength to twice that of annealed glass of equal thickness, as well as a greater resistance to thermal stress. Compared to tempered glass, heat strengthened glass has less distortions due to the slower cooling process. When broken, heat strengthened glass normally breaks into large pieces. Typical applications of heat strengthened glass are for skylights, where it is laminated with a PVB interlayer which will retain the glass fragments and prevent excess glass debris falling down, which would be the case if tempered laminated glass was used.

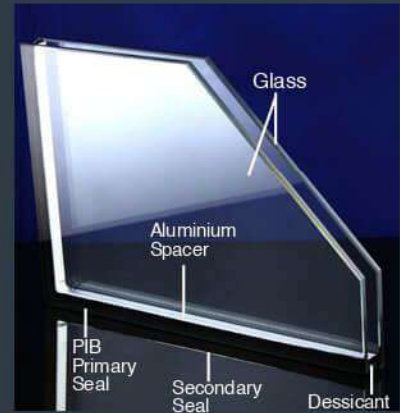


Heat Soak Testing

Heat soaking is a destructive test in which the glass is heated up for several hours at $290^{\circ}\text{C} (\pm 10^{\circ})$ to speed up the Alpha-to-Beta transformation of any Nickel Sulphide (NiS) present in the glass. This accelerated testing process reduces the likelihood of glass breakage by a factor of 20, or 5 per 1000 panes. Identifying NiS inclusion prior to on-site installation has distinctive cost, safety and security benefits. Heat Soak Testing is therefore strongly recommended for any application of tempered glass or where the consequence of breakage could result in injury and inconveniences.

DOUBLE GLAZING

Double glazing is also known as an insulated glass unit (IGU), consisting of two or more panes of glass, isolated by a desiccant-filled spacer and sealed with a sealant. The main function of double glazing is to improve comfort and reduced heating and cooling costs by reducing the external-internal flow of heat, depending on the climate. The insulation value (U-value) is dependent on the configuration, which includes criteria such as glass type, glass thickness and spacer width. Double glazing glass units incorporating solar control products such as Low-E, Solar Low-E and reflective glass can also significantly reduce solar heat gain, glare control, reduced air-conditioning costs, improved noise reduction, and increased security.



Shading Coefficient

The ratio of solar heat gain through a window to the solar heat gain through a single light of 3mm clear glass under the same set of conditions. Dimensionless and varying between 0 and 1, the smaller the number, the better the window is at stopping the entry of solar heat.

$$\text{SHGC} = \frac{\text{SUN'S DIRECT TRANSMISSION ENERGY} + \text{RE-RADIATED HEAT}}{\text{SUN'S DIRECT TRANSMISSION ENERGY}}$$

U-Value

The heat flow rate through a given construction is expressed in $\text{W/m}^2/\text{°C}$. The lower the U-Value, the less heat is transmitted through the glazing material. Values given for summer calculated for outside air temperature at 32°C , outside air velocity at 2.8 m/s , and inside air temperature of 24°C , and a solar intensity of 783 W/m^2 . Winter night time U-Values are calculated for outside air temperature at -18°C , outside air velocity at 5.5 m/s , and a solar intensity of 0 W/m^2 .

Relative-Heat Gain (RHG)

The total amount of heat gain through a glazing system specified summer conditions, incorporating the U-Value and the Solar Heat Gain Coefficient. The conditions are 783 W/m^2 outdoor temperature of 32°C indoor temperature of 24°C and 2.8 m/s wind.

$$\text{RHG} = U_{\text{SUMMER}} \times (32-24) + \text{SHGC} \times (783)$$

Expressed in terms of W/m^2

Solar Heat Gain Coefficient (SHGC)

The fraction of incident solar radiation which enters a building as heat. It is based on the sum of the solar energy transmittance plus the inwardly flowing fraction of absorbed solar energy on all lites of the glazing (This measure equates to the Sun's direct transmittance energy plus the part of this energy absorbed by the glass and re-radiated inside). Dimensionless and varying between 0 and 1, the smaller the number, the better the glazing is at preventing solar gain. 3mm clear coat has a SHGC of 0.86. It is preferred over the shading coefficient since it can be used for solar incidence angles other than normal to the glass surface. SHGC can also be calculated as 86% of the Shading Coefficient.

| Insulation Comparison U-value W/m^2 | |
|--|-----------|
| Single Pane | 5.60-6.20 |
| Single Pane Low-E | 3.80-4.20 |
| Standard IGU | 2.40-2.70 |
| Low-E IGU | 1.60-2.10 |
| Low-E/Argon gas IGU | 1.50-2.00 |
| Low-E/Argon gas/ Triple Glaze | 0.25-0.33 |

Double glazing is also useful in regulating temperature. When air with excess water vapour come into contact with a colder surface, condensation will form on the surface (the temperature at which the condensation occurs is the 'dew point'). Double glazing can provide a thermal barrier between the inside and the outside, minimizing the occurrence of condensation, regulating temperature and preventing water damage to surrounding areas. Double glazing is widely used in applications such as curtain walls, windows and industrial units such as freezers and coolers.

U-Value VS. SHGC

Conduction, convection and radiation are measured by the U-value where direct transmittance energy from the Sun is measured by the SHGC. Why use both measures?

In general terms where buildings are artificially cooled or heated in any climate, glass with a lower U-value will reduce energy costs. However, for warm climates when we combine the SHGC and U-value into one total heat gain number RHG on an unshaded glazing, the SHGC which becomes more relevant. The Sun's direct heat (measured by SHGC) controls a much larger percentage of the total heat gain when compared to other heat flows (as measured by U-value). For warm climate unshaded windows, control of the Sun's direct energy with a glass that has a lower SHGC is the first important step in design.

As previously mentioned, a lower U-value will further assist in heat gain reduction and lower energy costs. Improving the U-value will further improve and lower the total heat gain impact on the building. By using glass with a lower U-value provides both benefit to daytime shaded windows and during warm nighttime conditions. It is often the surroundings of the building including objects, the ground, other buildings etc which absorb heat and re-radiate it (long wave radiation) towards the window. These objects may continue to release this energy throughout the day and into the night. Energy use can thus be reduced through selection of glass with lower U-values. Preferred glazing solutions for warm climates are low SHGC glass with an integral low-E coating or low SHGC low-E coated glass combined in IGU's.

Acoustics

The acoustical performance of windows and doors is affected by:

- Glass size
- Glass thickness
- Airspace gap
- Presence of laminated products
- Framing members
- Gaskets, sealants, weather stripping
- Window design

Sound transmission class (STC) is the standard method for rating sound attenuation characteristics of glass products and window assemblies. The higher the STC rating, the higher the sound attenuation properties of the window.

Glare Reduction

Reducing annoying glare can be achieved through controlling the amount of daylight that passes through the glass. Though it should also be noted that glare is subject to individual perception. Some situations may require other methods to control glare such as external barriers, blinds, ceramic fritted patterns or matrixes on the glass itself or removing the cause of the glare.

| Acoustic Properties | | |
|--|----------------------|-----------|
| Baseline unit construction: STC Rating 28 3mm Glass/ 6.5mm Airspace/ 3mm Glass | | |
| Property | Change in STC Rating | |
| Increase air space thickness | | |
| 6.5mm to 13.0mm | +2 | |
| 13.0mm to 25.0mm | +3 | |
| Change glass thickness | One pane | Two panes |
| 3mm to 6mm | +2 | +4 |
| 6mm to 12mm | +2 | +5 |
| 3mm to 2.2mm | -2 | -3 |
| Mismatch glass thickness increased from 2:1 to 3:1 | +1 | |
| PVB laminated addition of 0.76mm | +4 | |
| Increase PVB Thickness from 0.76 to 1.52mm | +2 | |
| Replace air with Argon gas | no change | |

PRIVACY GLASS

The point of windows is to allow you to see as well as be seen. But what if you want to be shielded from prying eyes? Innoglass privacy glasses offers this optional, creating a private space at the flick of the switch. Our Polymer Assembled Liquid Crystal (PA-LC) technology allows clients to transform an ordinary, normal-looking pane of clear glass into an opaque, translucent window, ensuring optimal vision control and putting the choice of your privacy in your hands. All it takes is a simple electrical switch to activate the transparent polymers embedded into the glass to ensure that your privacy is respected.

Benefit Of Using Innoglass Privacy Glass

- Improves comfort and privacy
- Ease of use
- Protects furniture, appliances and valuable items from UV damage
- Operates on ordinary AC voltages
- Requires very little power (< 5.0 Watts per square metre)

Suitable for use in:

- Architectural windows
- Skylights
- Interior partitions
- Glass-covered products



Privacy Glass As A Rear Projection Screen

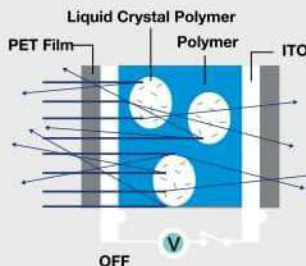
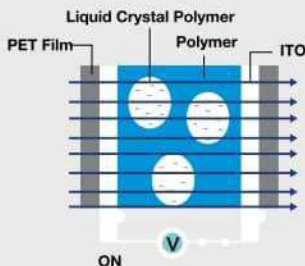
The window can be an innovative and dynamic advertising board. The interior can be open during working hours by turning the window transparent. And the window can be a dynamic advertising board by turning the window off. When this switching function can be operated automatically by timer or sensor.

Benefit:

- High resolution
- Large viewing angle
- Projection equipment is hidden behind the screen (rear projection)
- High acoustic performance : avoid noise from the projector side
- Eyecatcher screen : transparency at will (ON)
- Safety and security : laminated glass
- Easy to clean
- Cost-effectiveness relative to other display media

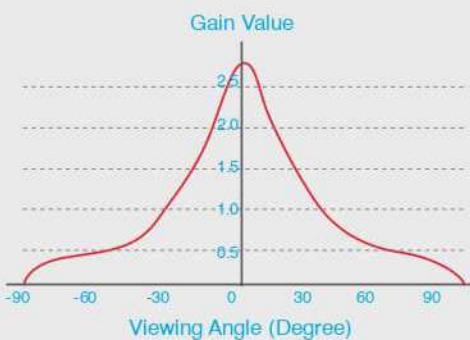
Application:

- Front shop
- Façade
- Conference Rooms
- Control Rooms
- TV studio
- Exhibitions
- Showrooms
- Boardrooms



| Product | Dimension | | Remarks |
|---------------|----------------------|---------------------|-------------------------------|
| | Glass thickness (mm) | Width x Height (mm) | |
| Privacy Glass | 6.5 | Max 980 x 1500 | Standard Colour : Milky White |
| | | Min 210 x 297 | |
| | 10.5/ 12.5 | Max 1500 x 3000 | |
| | | Min 210 x 297 | |

| Description | | Mode | Tech Data |
|-----------------------|------------------------------|-------|-------------------------------|
| Environmental | Storage & Operation | | -20°C to 60 °C |
| Optical Properties | Operation Mode | ON | Transparent |
| | | OFF | Opaque |
| | Parallel light Transmittance | ON | 75±3% |
| | | OFF | 10±1% |
| | Sunlight Transmittance | ON | 80±1% |
| | | OFF | 60±1% |
| | Haze | ON | 2±1% |
| OFF | | 80±3% | |
| | UV blocking | | More Than 98% |
| Electrical Properties | Operating Voltage | | 110VAC |
| | Frequency Range | | 50 or 60 Hz |
| | Power Consumption | | 5 W/m ² (for 110V) |
| | Switching Speed | | Tr. 100ms Td. 400ms |



Screen Properties
Peak gain = 2.75
1/2 Gain Angle = 40°
1/3 Gain Angle = 60°

| Testing Parameters | | | |
|--------------------|---------------------------------|---|--------|
| No. | Test Item | Test Condition | Result |
| 1 | Switching | On (1 sec) - Off (1 sec), 20 VAC. 3 Million Times | OK |
| 2 | High Temperature | 70° / 14 Days | OK |
| 3 | High Temperature/ High Humid | 50° / 95%RH 14 Days | OK |
| 4 | Low Temperature | -20° / 14 Days | OK |
| 5 | Heat Cycle | -20° - 70° (2 Hrs/Cycle) / 200 Cycles | OK |
| 6 | Weathering | KS L 2004 | Passed |
| 7 | Heat Resistance | KS L 2004 | Passed |
| 8 | Freefall Sphere | KS L 2004 | Passed |
| 9 | Shot Bag | KS L 2004 | Passed |

BULLET RESISTANCE GLASS

Bullet resistant glass is a laminated composite of asymmetrical glass-clad polycarbonates, specially designed to provide protection against different levels of ballistic threat, from small 9mm handgun to NATO armor piercing rifles. Bullet resistant glass is manufactured at the minimum possible thickness required to stop bullets and prevent spillage on the opposite side of the impact to ensure that persons on the protected side of the glass will not be lacerated by broken glass. Bullet resistant glass is also manufactured to have an excellent residual vision after-attack, assisting in investigations. It can also be engineered to be of different weights, allowing for use in everyday automobiles to military armoured vehicles. Typical applications includes correctional facilities, psychiatric hospitals, government buildings, jewellery stores, retail storefront and other environments where maximum security is required.

At Innoglass, we create our bullet containment glass as a laminated composite of symmetrical glass-clad polycarbonate or laminated polycarbonate, specially designed for protection against prolonged physical attack and lethal ballistic threats. Innoglass also offers a blast-resistant glass grade, a laminated composite made up of toughened glass precisely engineered to optimize the strength of the glass to withstand explosive blasts.



According to Australian Standard AS/NZS 2343-1997

| Classification of Panel | Type of Weapon | Calibre | Ammunition | Range | Number of strikes | Panel Thickness (mm) |
|-------------------------|----------------------|----------------|------------------------|-------|-------------------|----------------------|
| G0 | 9mm Handgun | 9mm Parabellum | 8.0g FMJ | 3m | 3 | 14.55 |
| G1 | 0.357 Magnum Handgun | 0.357 Magnum | 10.2g JSP | 3m | 3 | 18.15 |
| G2 | 0.44 Magnum Handgun | 0.44 magnum | 15.6g SWC | 3m | 3 | 26.76 |
| R1 | 5.56 Rifle | 5.56mm x 45 | M193 3.6g FMJ | 10m | 3 | 27.65 |
| R2 | 7.62 Rifle | 7.62mm x 51 | Nato Standard 9.3g FMJ | 10m | 3 | 38.74 |

Abbreviation : FMJ =Full Metal Jacket, JSP=Jacketed Soft Point, SWC=Semi Wadcutter



CERAMIC FRITTED GLASS

Ceramic Fritted Glass is produced to meet the architectural and industrial standards and demands. Produced by screening one layer of ceramic enamel over at glass, and treated by high temperatures, the ceramic will then fuse onto the glass surface firmly. This ceramic is chemical resistance, scratch resistance, high opacity and hardly fade.

A variety of colours and patterns are available to create a distinctive visual effect of the building. Designer normally have a customize design and colours of the pattern as an identity of the building. The ceramic enamel absorbs and reflects solar energy and cleans easily.

Lamiart™

Having design versatility and never compromise safety.

Lamiart is a decorative laminated glass brings revolutionary design expression in interior of architectural glass, creating visual texture, manipulating light and visual effects. Lamiart consist of a special decorative ornament Fitted between 2 sheet of glass or polycarbonate panel permanently bonded by a special adhesive interlayer. The lamiart exhibits the characteristics of a safety glass and enhance security. The decorative ornament are a wide variety of items such as pattern PET film, shoji paper, wire mesh, sheet metal, dried leaves, dried glass, fabrics, fibers and etc.

Please visit www.innoglass.com.my for the complete collections of all kind of decorative ornaments and colours.



Dried Lalang



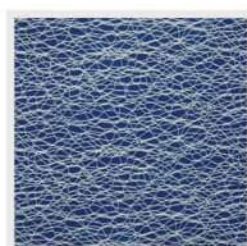
Dried Flower



Nyatoh Ribbon



Dried Leaves



Fibre Optics



Iridescent Nets



Dried Fern



Sepia Linen



Bamboo Leaf Linen



Pose On Fibre-optics



Pattern Fiber



Green Wires



Green Matrix



Wrinkle Wire-Mesh



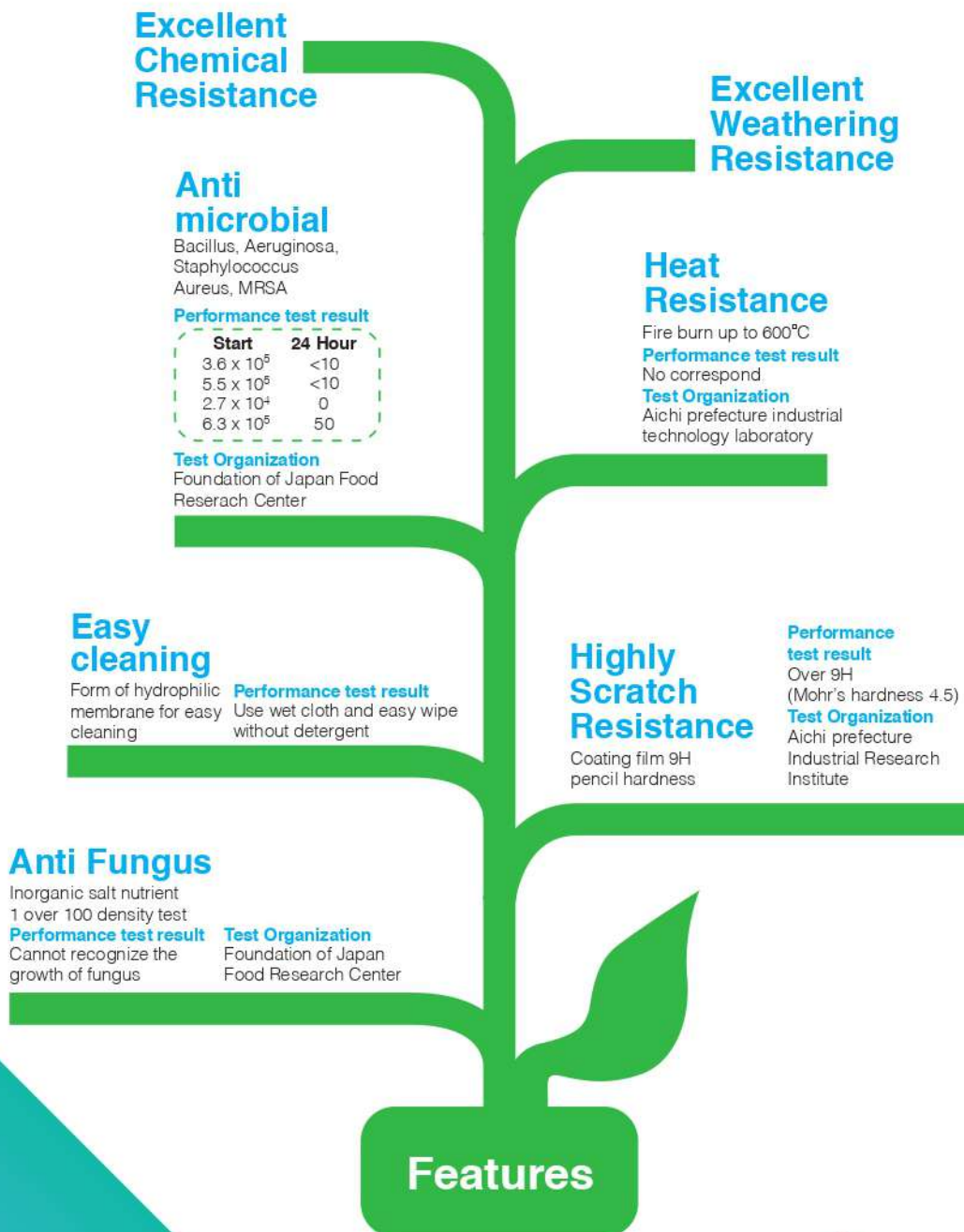
Wrinkle Fabrics

AUTOMOTIVE GLASS



Innoglass is one of the leader in Malaysia producing automotive glass for buses and trucks. The contemporary automotive design which has a modern structure characterized by glass. We engineered and produce windscreen that meet the stringent safety requirement and quality. We also customize ceramic pattern and colour-tinted for OEM coach manufacturers.

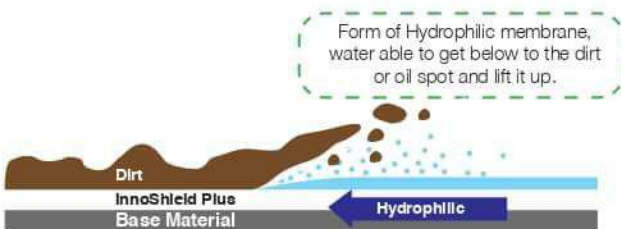
Eco-friendly solution



What is innoShield

An Eco-friendly Ceramic Coating with its main composition of SiO_2 (silicon dioxide) and Al_2O_3 (aluminium oxide), it is 100% inorganic and does not produce VOC (volatile organic compounds). InnoShield Plus forms a hydrophilic surface while hydrophilic molecules attract water molecules when they blend together, transforming a water droplet into a thin sheeting layer on top of the coating, which enables an oil spot or dirt to rinse away. As for exterior use, rainwater will spread on the coating surfaces and leave no water streak, which is also an excellent defogger. The coated surface is moist most of the time and thereby making the coated surface antistatic.

InnoShield Plus coating is also enriched with TiO_2 (Titanium Dioxide). The irradiation of TiO_2 with UV light produces the hydroxyl radical, hydrogen peroxide and superoxide anions. These reactive oxygen species can damage the structure and disrupt the biochemistry of bacteria and fungus.



Easy Cleaning

Inorganic coating has better resistance to adhere dust or stain. Our environment contains an abundance of organic substances. Once the surface of the coating is adhered to with organic stains, we can use water without any detergent to clean or wipe off easily. InnoShield Plus will be hydrophilic and form a water membrane and penetrate underneath of the organic stain and lift it off, like a peeling effect. Then we can use running water or a damp cloth to clean it.

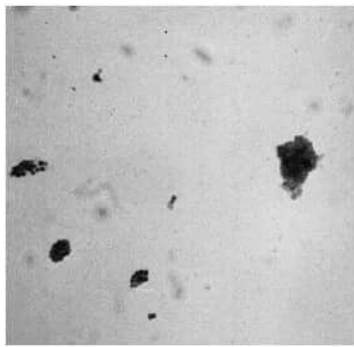
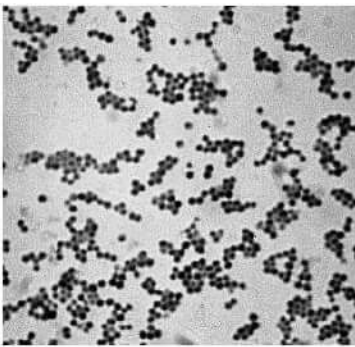
Reliable and Durable Coating

Since InnoShield Plus is an inorganic coating, it has excellent resistance properties against acid/alkaline and organic solvents. Further, most organic paints have a hardness of less than 3H, while InnoShield Plus has a hardness of over 9H, which is a high scratch resistance level. The bonding strength of Si-O and Si-OH in the coating, requires energy higher than infrared to break down, thus it is more durable and suitable for outdoor purposes. The ceramic particles in the coating also facilitate withstanding a temperature up to 600°C , making inorganic paints outlast organic paints by decades!

InnoShield

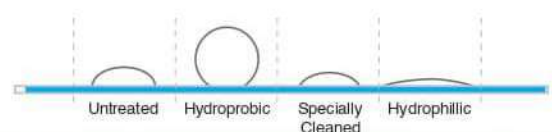
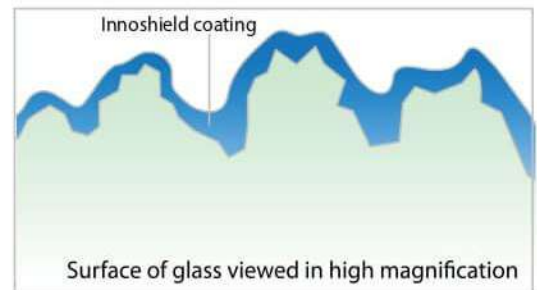
InnoShield is a special polymeric resin providing the protection on glass surfaces. It reacts chemically with the glass at a molecular level to modify its surface properties. InnoShield follows the contours of the glass and is less than a micron thick. It is also important to note that InnoShield will not bond to any surface other than vitreous. It washes off other surfaces with normal cleaning methods, such as soap and warm water.

Unprotected, high-maintenance glass is now converted into InnoShield 'Nonstick' glass. The surface of InnoShield glass is totally inert when cured. The InnoShield surface therefore acts as a barrier against the bonding of contaminants, and is more resistant than ordinary glass against the attack of moisture and alkalinity. The result is greater ease of cleaning and a durable resistance to staining. InnoShield glass also effectively resist microbial adhesion for a higher hygiene.



Characteristic of InnoShield

Hydrophobic glass (water repelling) has a higher contact angle compared to unprotected glass. The contact angle of greater than 90° indicates hydrophobicity. InnoShield is a polymeric resin that will make the surface of the glass more hydrophobic. Typically, the Contact angle on the surface of InnoShield Glass can be measured at 104°



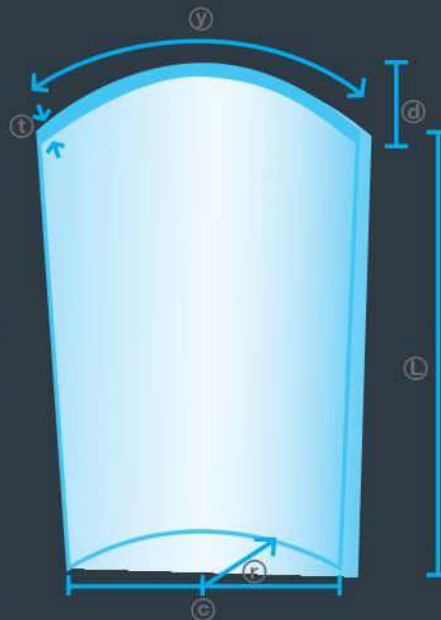
Resist to microbial

An experience was devised to study attachment and desorption of a strain of Staphylococcus Aureus, a common and strongly adhering bacterium. In conclusion the results clearly show that InnoShield firstly impeded adherence of bacteria and secondly encouraged desorption by washing.

CURVE SAFETY GLASS



Innoglass provides curved safety glass in both tempered and laminated glass. Curved safety glass is essentially a glass pane shaped into a segmented or smooth curve for aesthetic purposes. Over the past, developments in curved glass has been stimulated by creative research, technical developments, industrial specialization and design application. It is popular with architects for advancing design choices. Large curved glass surfaces are now quickly becoming an essential part of a building's structure, making close cooperation between developers, architects and glass suppliers essential to the success of any project.



Abbre:

- Ⓡ Radius
- Ⓢ Chord
- Ⓣ Thickness
- Ⓨ Girth
- Ⓛ Length
- Ⓤ Depth

To create a curved tempered glass sheet, the sheet must be heated, the curved and cool to the required shaped and finally toughened. Modern day curved glass is manufactured using movable rollers during the quenching phase, eliminating the need for expensive press moulds. Innoglass curved glass is created with a sophisticated computer system that allows each sheet to be precisely moulded to client specifications at a cost-effective price. Curved tempered glass can only be curved at a single point and at a constant radius.

Curved laminated glass is created using a stainless steel mould for each individual size and shape required. The glass sheet is then put onto the mould and heated, softening the glass to sag onto the mould by gravitational force. Once this is completed, the curved glass sheet is then laminated. Curved laminated glass offers less distortion in comparison to curved tempered glass and offers more variety in shapes, being able to be formed in multi-direction designs and at a non-constant radius, suitable for use in creating 3D profiles.

During the pass ten years curved glass has stimulated creativity, research, technical development and industrial specialization. Glass processors turn architects ideas into reality. Large curved glass surfaces are becoming an essential structural part of buildings, making close cooperation throughout the project essential. It would increase the aesthetic when a large curved glass instead of many segmented at glass joining together to form a curvature.

Segmented



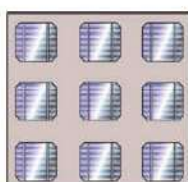
Curve



High Efficiency BIPV Glass/ Glass Solar Module

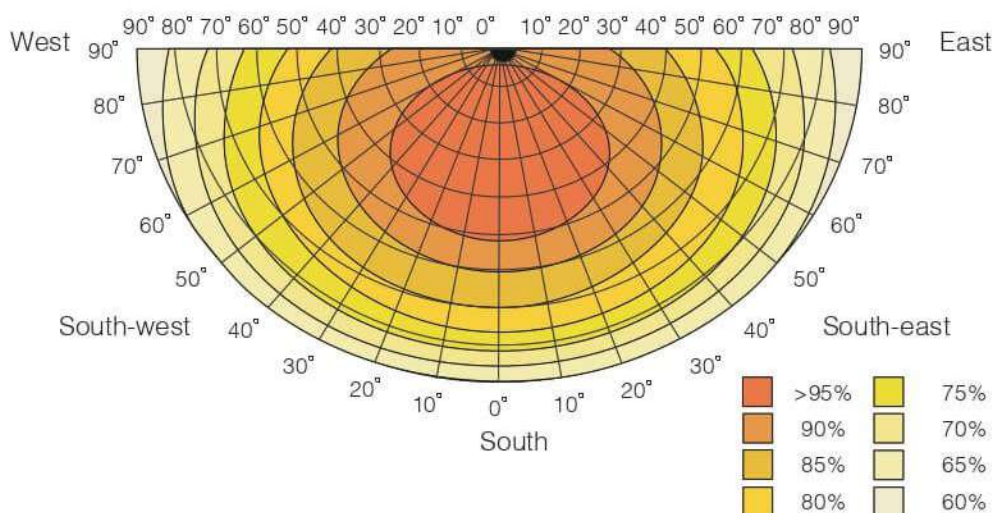
Innosolar panels are Innoglass semitransparent solar modules, acting as photovoltaic plates to generate solar energy. Created by sandwiching efficient solar cells between sheets of low-iron tempered glass using PVB, Innosolar panels can be used to harness the power of the sun during daylight, as well as act as cover for sun shade and the elements. Combining pro table, environmentally-friendly energy production with attractive design, Innosolar replaces conventional façade materials, eventually paying for itself by helping clients save energy bill costs.

Innosolar panels are customizable, giving architects and designers a choice between light transmission and power intensity by varying the distance and number of solar cells per Innosolar panel. The transparent PVB layer also makes it a sturdy, safe glass that also reduces noise and increase security. There are very few limits to the application of Innoglass, which has been used from overhead glazing in external areas to forming the semi-transparent glass façade of a building



More cells per m² increased the output generated and improve the solar protection

← **Low energy - High transparency** **High energy - Low transparency** →





InnoLED

Consisting of two sheets of glass with LEDs encapsulated between, InnoLED is a transparent Innoglass product that shines brightly. Simple and spectacular, the LEDs are connected via an invisible circuit board connected to an external power source. Produced using laminated glass, InnoLED can be used for decorative indoor applications or for external use as a curtain wall or a skylight. It also comes with optional modules, including a dash or remote controller used to manage and manipulate the visualisation.



Inno
GLASS



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