Glasshape®

ARCHITECTURAL GLASS SOLUTIONS

Delivering Bent & Specialist Glass with Excellence

TemperShield®
TOUGHENED BENT GLASS - BY GLASSHAPE

glasshape.com

Delivering Bent & Specialist **GLASS with Excellence**

Residential Home
Houston, Texas, USA


NATASHA
MEENADA
HUNTER
JOCELYN
KLAGES
LORD, WHO AM I
AND WHAT IS
MY FAMILY
THAT YOU HAVE
BLESSED US
1 CHRON. 17:16

Glasshapes world-leading **architectural glass solutions** come in a wide variety of forms and options.

Overview

Glasshape® offer a comprehensive portfolio of fully certified internal and external specialist architectural glass for a wide range of applications. The range includes toughened glass, safety and security laminated glass (including cyclonic, flood, ballistic, attack and impact resistant) and digitally printed ceramic-ink solutions. Many of these can be combined and supplied on simple or complex curves, as well as flat panels.

Our mission is to deliver high-quality bent toughened and laminated glass to our glass, metal and fabrication customers with excellence.

We add value to our customers projects by going the extra mile, offering services to reduce risk and increase customer satisfaction. Our digital site-measure service utilises the latest scanning hardware to produce electronic templates with unmatched accuracy, doing away with the need for the cumbersome and time-consuming measure, production, transportation and storage of physical templates. Delivering our bent and specialist glass to our customer's door anywhere globally, fully insured with the additional option to have us remove risk during glazing by using our NsureGlaze® premium, we add value where our customers benefit most.

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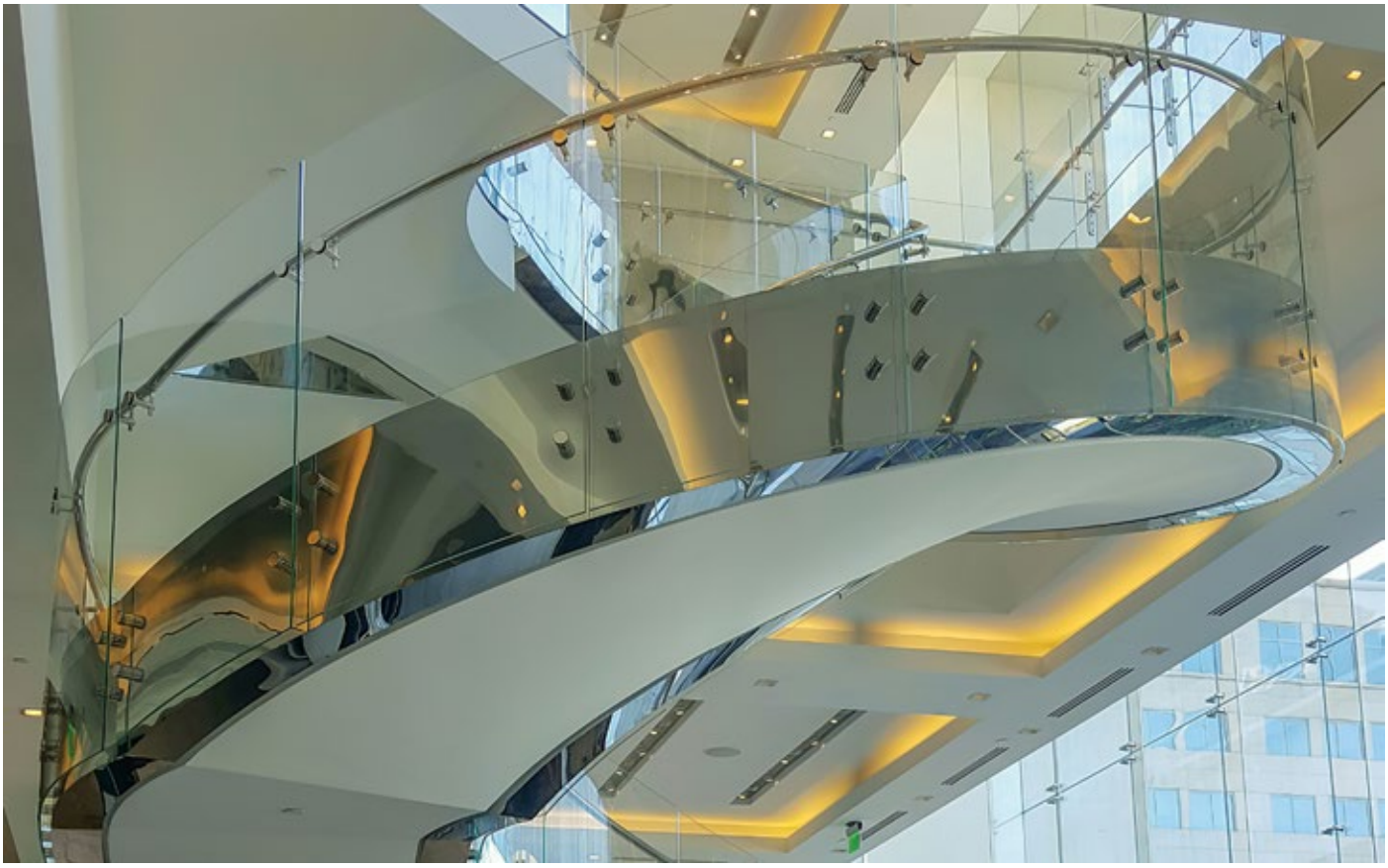
Commercial

ROLLS ROYCE - Houston Showroom

The Post Oak Hotel at Uptown Houston, Texas, is the city's first elite destination for elegant accommodations, masterfully blended with extensive conference facilities, prominent office space, designer fashion, signature dining and sophisticated amenities all in one tower.


ROLLS
ROYCE

Rolls Royce Showroom
Houston,TX, USA



LOCATION: Houston, TX, USA

GLASS MAKE UP: 12mm Toughened Glazed Frameless Spiral Staircase

HIGHLIGHT:

12mm Toughened Low-Iron bent glass with highly polished edges, attached to the structure with stainless steel stand-offs. With glass on both sides of the staircase, it allowed the 3-level storefront windows to encase the showroom with light and space.

Special attention to detail, saw the architectural team at Gensler, design a custom grand staircase, spiralling up from the ground to the second floor, to grace the Rolls Royce showroom, which is located in the hotel's lobby and conference area.

Glasshapes involvement in the project included laser scanning the staircase once in place on site and further providing 3D CAD design services. The scanned data was then used to fabricate the stainless steel cladding and the bent glass railing.

CONTINENTAL CARS - Ferrari Showroom

The Ferrari brand and the incredible automobiles that wear its marque are the epitome of performance, luxury and design... qualities that are inherent in Continental Cars Ferrari's state of the art showroom in the heart of Auckland.


ferrari.com
PIRELLI

Ferrari Showroom
Auckland, New Zealand

LOCATION: Auckland, New Zealand

GLASS MAKE UP: 22.28mm Bent and Flat Laminated Low-Iron Glass

HIGHLIGHT:

Glasshapes signature TemperShield® bent and flat laminated Low-Iron glass was chosen to enclose the impressive, yet beautifully simplistic entrance to this world-class facility, providing an unobstructed view to the automotive works of art displayed within.

TESTIMONIAL:

In the words of the Architects, *"Ferrari is now represented prominently in the heart of Auckland's automotive business district with an instantly recognisable façade. The entire customer journey is about confidence-building, assisted by world-class facility design, and highlighted through exquisite materials and style".*

EBBETT AUDI and VOLKSWAGEN SHOWROOM

The eye-catching facade features Glasshapes toughened bent glass which maximises light and visibility for the car dealership. TemperShield® bent glass is specifically designed to maximise the use of space and light without compromising on design, quality or safety.


Audi

Ebbett Audi and Volkswagen Showroom
Hamilton, New Zealand

Large Format Bent Glass in the Award-Winning Commercial retail design of Ebbett Audi and Volkswagen Showroom, New Zealand

LOCATION: Hamilton, New Zealand

GLASS MAKE UP: 10mm Toughened Low-E Glass

HIGHLIGHT:

Showcasing luxury products such as high-end European vehicles, requires super-premium display solutions, made all the more crucial in this case, given the high-profile corner site at the southern entrance to Hamilton.

The large bent and toughened 10mm low-emissivity TemperShield® panels measure nearly 3m x 1.8m. This maximises light and visibility while minimising solar heat-gain.

Glasshape® supplied its specialty large format bent glass to the winner of the Commercial Architecture Category in the 2016 Waikato–Bay of Plenty Architecture Awards – Chow Hill Architects and Ebbett Audi and Volkswagen in Hamilton, New Zealand.

STRANGES BUILDING - Christchurch, New Zealand

This is an unusual and difficult site; the corner of the building is at a very sharp angle because High Street slices diagonally through the intersection of Lichfield and Manchester Streets. Architects Sheppard & Rout have made this a prominent architectural feature. Offering a graphic perspective from the street where the steel and bent glass intersect at a tight angle, the curve however softening the flow.

Stranges Building
Christchurch, New Zealand

LOCATION: Christchurch, New Zealand

GLASS MAKE UP: 26mm Bent Double Glazed Units

HIGHLIGHT:

TemperShield® bent, toughened glass, with panels up to 3900 x 2440mm, provide unfettered design opportunities. Hundreds of configurations are possible and can be curved to your specification. Whether it is enhancing a sweeping shopfront display, creating a distinctive entrance with revolving doors or contrasting straight lines with smooth curves, TemperShield® is a versatile solution.

TemperShield® can be used as a structural component in modern design—in some instances the use of bent toughened glass can mean 'thinner', lighter stock is used whilst still meeting the required wind-loading parameters. Its use will also increase natural light and the feeling of space.

DOW PLANETARIUM

When Vitrerie RD were invited to bid on an extensive remodel of the Dow Planetarium in Montreal, they knew who to turn to for their bent glass requirements. Specifications called for over 460m^2 of bent glass, which included bent toughened insulated glass units, and bent toughened laminated panels with pieces up to 4585mm tall – so naturally Glasshape® was a perfect partner to collaborate with.

Dow Planetarium
Downtown Montreal, QC, Canada

LOCATION: Downtown Montreal, QC, Canada

GLASS MAKE UP: Bent Toughened IGU's, Bent Toughened Laminated panels with pieces up to 4585mm tall.

QUANTITY: 460m^2 of Bent Glass

TESTIMONIAL:

"Our experience with Glasshape was really more than satisfying. The Planetarium project was a first in Quebec, for these interior structural partitions as well as two curved curtain walls. Glasshape was the key supplier of this project. Their service and the quality of the products manufactured were above our expectations. With 35 years' of experience, Vitrerie RD has never known a North American supplier with such quality of product."

"The Glasshape team knew how to meet our schedule even with the distance that separates us. Including sea and air transport. I can add that following a glass break incident in Montreal, they have even been able to reproduce non-standard screen-printed glass in record time."

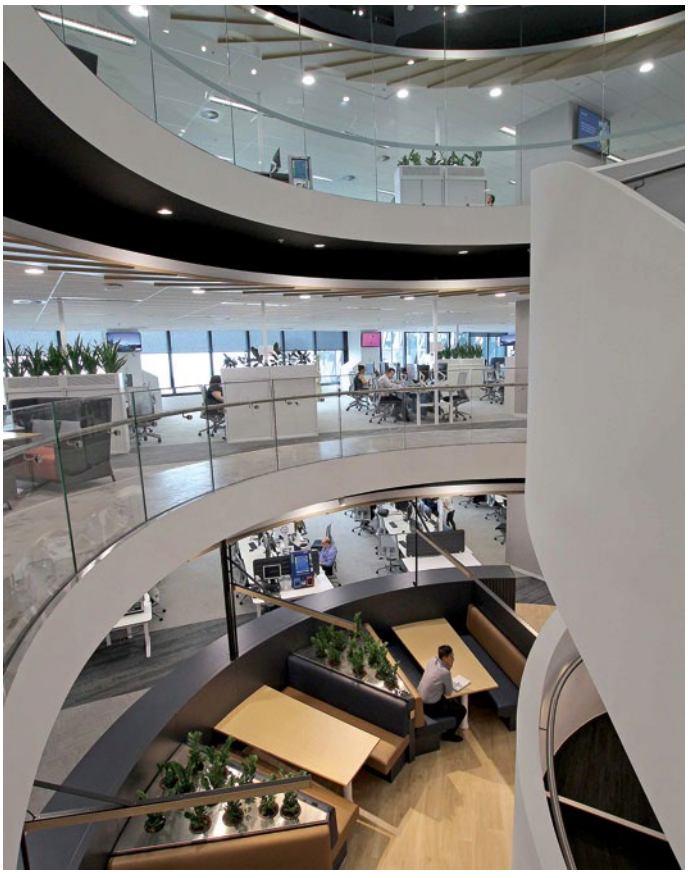
"Thanks again to the Glasshape team for your support in this project."

P.Deguire

Tabcorp OFFICES

A unique feature of this fit-out was the requirement to internally connect levels 18 and 19, something that was achieved by installing an interconnecting stairwell between the floors. This required cutting out the concrete slab between these floors, installing over 11 tonne of structural steel and the unique spiral staircase you can see in these images. The staircase linked to the existing inter-tenancy stairs, thus creating a five-storey void from level 17 to 21, all of which were enclosed by slab-to-ceiling bent glass panels.

Tabcorp Offices
Melbourne, VIC, Australia



LOCATION: Melbourne, VIC, Australia

GLASS MAKE UP: 12mm Bent Low-Iron Glass

QUANTITY: 45 panels, 3200 x 1210mm Girth

HIGHLIGHT:

Tabcorp's new office represented a major workplace transformation for the firm. With a stunning central staircase, outdoor terrace, technology showcase and over 87 rooms and collaboration spaces over five floors, enhancing the productivity and connectivity of its workforce.

The completed Collins Square fit-out will provide Tabcorp with an environment that promotes business efficiency, modern technology, environmental sustainability and workplace health and well-being.

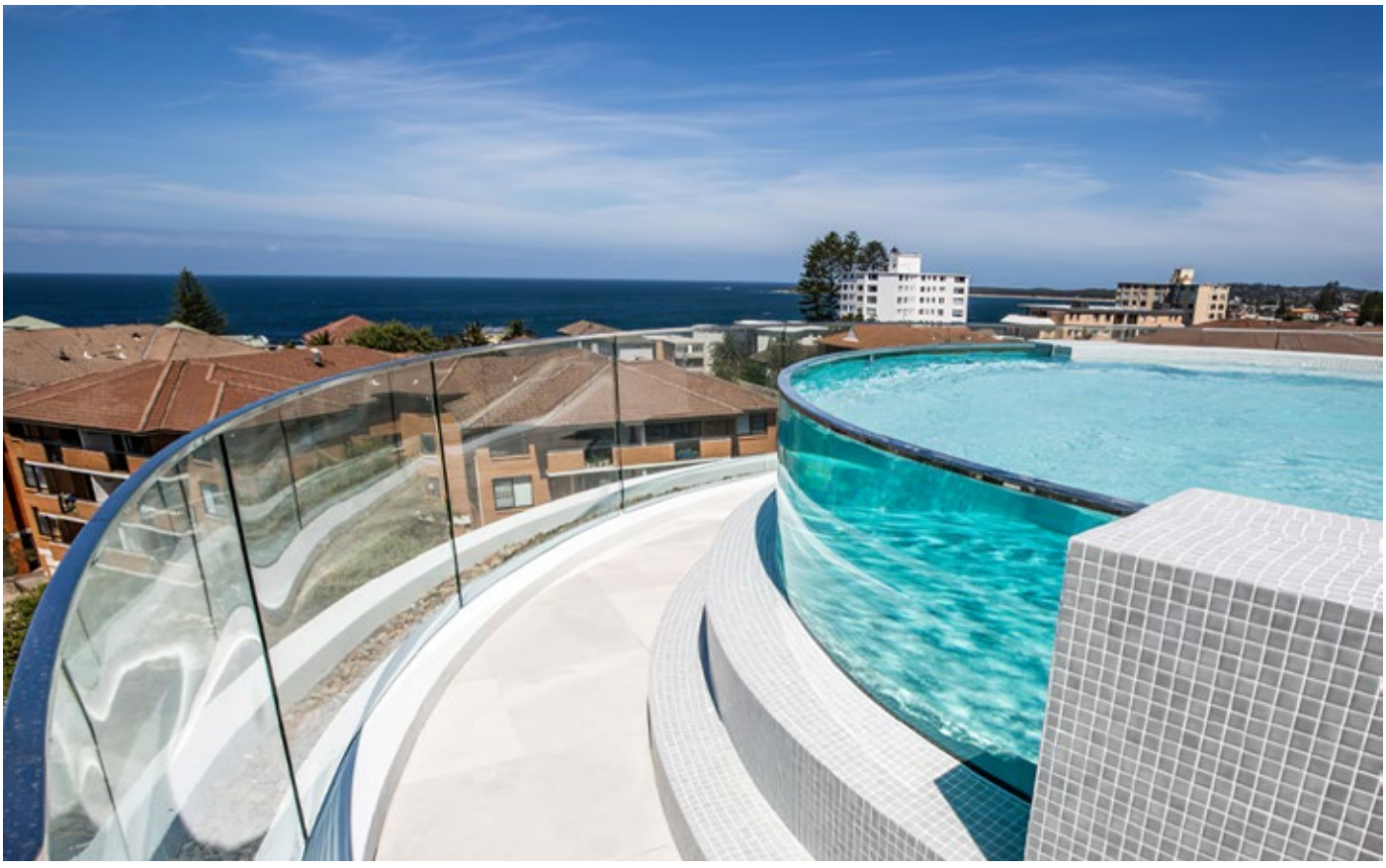
Glasshapes contribution to the project started with the digital scanning process, measuring the floor-to-ceiling voids created, using our Faro laser scanning technology. This allowed us to determine the exact floor-to-ceiling panel height as well as establish the radius required for the bent glass panels.

SOUL APARTMENTS - Australia

A curved masterpiece located in the heart of Cronulla NSW, Australia. Glasshape® was privileged to supply six levels of bent, toughened, heat-soaked windows and balustrades, including engineered bent pool glass for the rooftop luxury pools.

Photo: Bronxx Construction

Soul Apartments
Cronulla, NSW, Australia



LOCATION: 133 Gerrale Street, NSW, Australia

GLASS MAKE UP: Bent, Toughened, Heat-soaked Windows & Balustrades, Engineered Laminated Bent Pool-Glass

HIGHLIGHT:

Glasshape® was engaged at an early stage to digitally site-measure the curved window frames, and concrete balustrade channels. Using this precision electronic data, we were able to custom-design curved window and balustrade requirements to suit these frames & channels whilst ensuring glass panels on each level were evenly split and lined up when viewed from the street.

Crowned with two sparkling blue luxury pools, SOUL offers its residents a refreshing rooftop pool experience whilst enjoying the spectacular ocean views. Thanks to Glasshapes final touch to this majestic project: bent, engineered, toughened, structurally laminated pool-windows.

TESTIMONIAL:
"Glasshape did a fantastic job from site measure to delivery which makes our life on site installing a breeze."

D. Poole

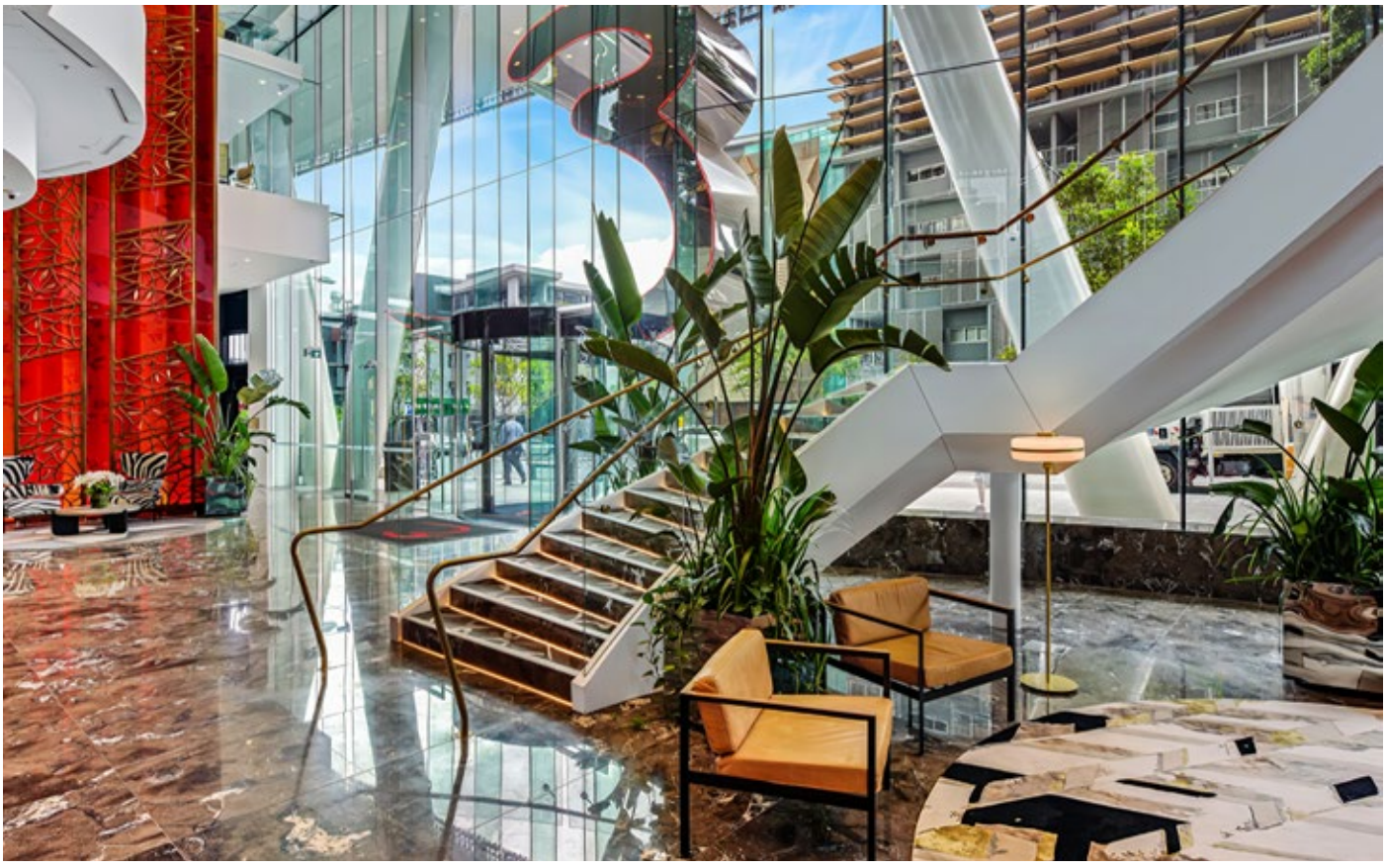
Photos: Bronxx Construction

EMPORIUM HOTEL - South Bank

The WOW factor is immediate from the moment you enter the foyer, through the use of bent glass in the sweeping staircase and void balustrade area. Creating the feeling of light and space, yet ensuring all the features and materials used to create this unique and opulent space remain visible from all angles in a way that only glass can.


WELCOME

Emporium Hotel South Bank
Brisbane, QLD, Australia



LOCATION: 267 Grey Street, South Bank, QLD, Australia

GLASS MAKE UP: 15mm Clear Toughened Bent Glass

HIGHLIGHT:

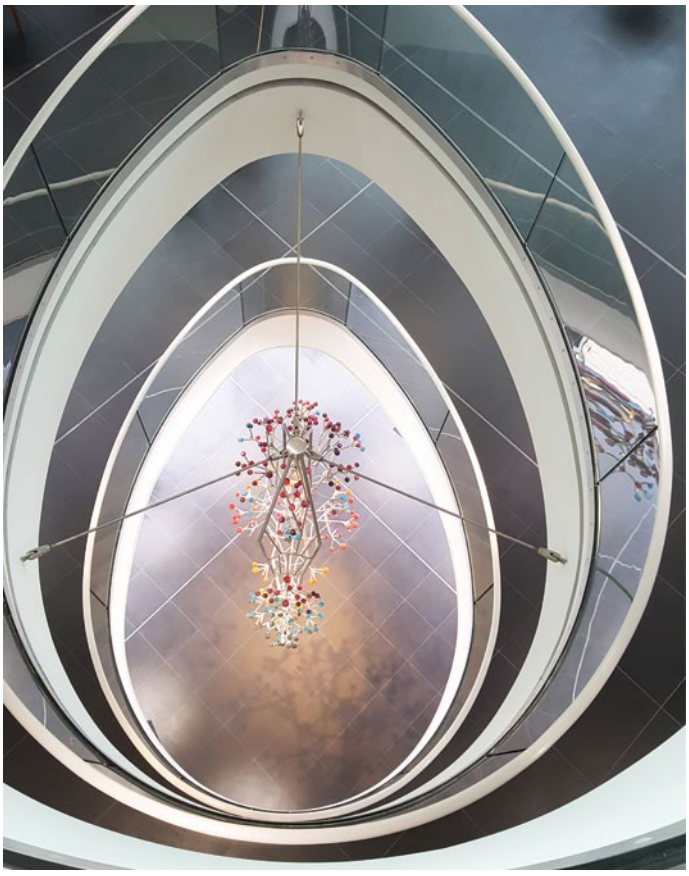
An exciting new chapter in iconic style and exquisite service began with the new flagship Emporium Hotel South Bank at Southpoint. Predecessor, the original Emporium Hotel in Fortitude Valley, was Queensland's first luxury boutique hotel and during its time, won many awards as the most luxurious boutique luxury hotel in Australia, as well as acclaim around the world.

Created and designed by the AJ Group, but executed by Cairns-based client, this monumental staircase took on a life of its own with the help of Glasshape® who was contracted to site measure the areas requiring bent toughened glass in the foyer area, and then produce all the flat and bent glass required for this one-of-a-kind creation.

The RALPH AND PATRICIA SARICH - Neuroscience Research Institute

Glasshape® was contracted to digitally measure and produce bent frameless glass required for the project. In all, 24 even radius pieces of glass were produced for the project. All were seamlessly installed, and the results speak for themselves.

The Ralph and Patricia Sarich - Neuroscience Research Institute
Perth, WA, Australia



LOCATION: Perth, WA, Australia

GLASS MAKE UP: 12mm Clear Toughened Bent Glass

HIGHLIGHT:

The Ralph and Patricia Sarich Neuroscience Research Institute in Perth, Western Australia is a five-level, 8900m^2 building, costing $37.7 million to construct and was officially opened on the 26th of April 2017.

It was developed to accommodate four of the State's premier neurological research organisations, the Alzheimer's Research Foundation, Curtain University Neuroscience Research, Ear Science Institute and Perron Australia. While it has been tailored to suit their requirements, it can be readily adapted to future changes in occupancy and research requirements.

Designed by Bateman Architects and constructed by Cockrams, the defining architectural feature externally is an aluminium composite screen that folds back on itself, and a glass façade screen-printed to represent a neural network. Internally, the design and construction of defining features continues with several egg-shaped voids that feature frameless bent glass.

COLORADO STATE UNIVERSITY - Health & Medical Centre

Glasshape® was contracted to scan the staircase structure during the construction phase and create an as-built 3D CAD model. The CAD model was then further developed by adding in the client's 'Vista' railing design to obtain final bent glass sizes and radii. In total, over 250 pieces of glass were custom fabricated by Glasshape®, including the bent glass smoke baffles, and delivered to site ready for installation.

Colorado State University – Health & Medical Center
Fort Collins, CO, USA

LOCATION: Fort Collins, CO, USA

GLASS MAKE UP: 12mm Clear Bent Toughened Glass

QUANTITY: Over 370m^2

HIGHLIGHT:

Having paid special attention to keep the building's atmosphere 'light and spacious', BWG Architects created an open and colourful centre that doctors, counsellors and other staff members have described as "a dream come true!".

TESTIMONIAL:

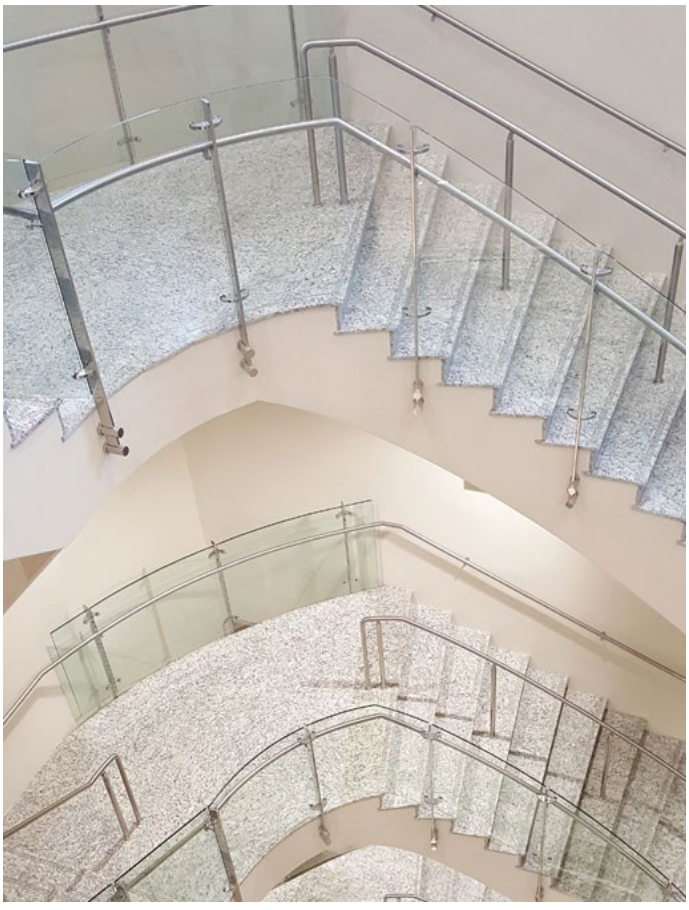
"We contracted Glasshape to laser scan this project, and subsequently provide the glass. Glasshape scanned the project and provided us with a cleaned up 3D Model for us to design our post mounted guardrail system into. The project ended up being extremely successful for all parties involved."

C. Ogren

FLORIDA NATIONAL UNIVERSITY

An Illinois-based custom railing fabricator partnered with Glasshape® to provide a strong and safe 12mm toughened railing glass system. Each glass piece was a custom size and shape, providing a perfect match to the precast concrete structure forming the stairway.

Florida National University
Miami, FL, USA



LOCATION: Miami, FL, USA

GLASS MAKE UP: 12mm Toughened Railing Glass System

HIGHLIGHT:

The state-of-the-art facility marks a new era in FNU's history as the first major expansion of the Hialeah Campus. The addition of the building will help the university continue its mission of providing the highest quality of education and service to the community. The Dr. Jose Regueiro Building stands at 6 stories tall and over 12000m^2. The central entranceway is graced with a striking spiralling staircase, winding up openly from the ground floor to the 6th floor.

BP HEAD OFFICE

BP's new head office in Auckland is located across two floors of an existing building. The challenge for the designers, was to connect the spaces so there was good cross-functional interaction between floors, and the space felt energised and light. The steel, glass and timber spiral staircase became the central connecting element of the design, enabling interactions and linking the business units.

BP Head Office
Auckland, New Zealand

LOCATION: Auckland, New Zealand

GLASS MAKE UP: 15mm Clear Toughened Staircase Balustrade

TESTIMONIAL:

"BP worked with Unispace to design their new head office in Auckland. The new space was to incorporate the functions and staff from the existing head office in Wellington, and from the existing Auckland office in Ellerslie.

The spiral staircase became the central connecting element of the design, enabling interactions and linking the business units. All of the elements directly off the spiral also shared this language and radial forms reference the central source. The glass balustrade held both the handrail and the decorative organic timber bands. Glasshape worked with ourselves and Woods Glass to bring this challenging, unique concept to life in an extremely short timeframe and under huge pressure of precision and co-ordination. The result is a tribute to fantastic people working together brilliantly."

S. Langford

ATRIUM HOMES

This bent glass staircase at the head office of leading Perth-based custom home builder Atrium Homes – is a good example of advanced glass manufacturing delivering a spectacular end result. Glass can be bent and manipulated to suit a variety of architectural situations – but just how tight a curve can go has often been a limiting factor. However, with the right manufacturer, the options are greater.

Atrium Homes
Perth, WA, Australia

LOCATION: Perth, WA, Australia

GLASS MAKE UP: 12mm Bent Spiral Glass

HIGHLIGHT:

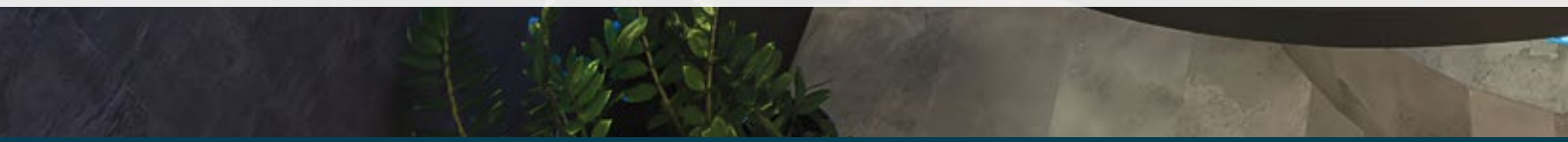
Glasshapes ability to produce a very tight radius bend is something that sets us apart from other manufacturers. The internal panels for this project were bent to a 700mm radius, which created a dramatic central axis for this showcase stairwell.

Glasshapes TemperShield® toughened glass is perfect for exactly these sorts of projects.

Our depth of experience and manufacturing capabilities helped in other ways too: significant benefits were gained in economies of scale, by supplying 25 panels in just three different radii. This meant three set-up costs were spread across multiple panels, greatly reducing the cost per unit.

ZORZI BUILDERS HEAD OFFICE

TemperShield® glass from Glasshape® was specified for the balustrading, to provide frameless, 12mm bent toughened glass. With the glass mounted into a channel system, a clean look with no visible fixings was achieved. The resulting precise bent glass panels were a perfect fit for the staircase.



Zorzi Builders Head Office
Perth, WA, Australia

LOCATION: Perth, WA, Australia

GLASS MAKE UP: 12mm Toughened Bent Laminated Glass

HIGHLIGHT:

This stunning spiral staircase is installed at the head office of Perth-based leading luxury home builder Zorzi. It's a great example of how specialty bent glass can enhance unusual and disruptive installations and features.

As you'd expect for a leading luxury home building firm, the head office provides plenty of WOW factor. Taking it one step further, the design team introduced a giant vertical aquarium. The subsequent challenge was to ensure all the drama unfolding in the aquarium could be observed with unobstructed views, safely from the staircase that wrapped around it.

RUNDLE PLACE MALL

Utilising TemperShield® 19mm toughened bent glass, the architects on this mall project achieved exactly what the design brief required—open space and sense of freedom for shoppers while maintaining safety for crowd loading.


UTIQUE

Rundle Place Mall
Adelaide, SA, Australia

LOCATION: Adelaide, SA, Australia

GLASS MAKE UP: 19mm Toughened Balustrading

HIGHLIGHT:

Commercial interior design continually evolves as offices, shops, malls, restaurants and cafés respond to demands from their customers, tenants and staff. Maximising natural light creates work and entertainment spaces that people enjoy being in. Advances in glass technology have enabled us to provide design solutions such as VisionInk® to vastly extend the applications of this remarkable substrate.

TemperShield® can be used for internal partitioning, stair and atrium balustrades, skylights, frameless doors and glass floors, to name just a few of its applications. With panels up to 3900 x 2440mm TemperShield® provides unfettered design opportunities.

GEORGE PLACE

The landmark project which created a super lobby, combining the ground floor levels of 345 and 363 George Street, as well as 24 York Street, was designed by Fender Katsalidis Mirams, and delivered by FDC, with the client supplying the revolving doors.

George Place
Sydney, NSW, Australia

LOCATION: Sydney, NSW, Australia

GLASS MAKE UP: 17.52mm Low-Iron Toughened Laminated VisionInk® Safety Glass. Bent Low-E Toughened Laminated TemperShield® Safety Glass

HIGHLIGHT:

Bent Low-E toughened laminated TemperShield® safety glass was used for the door side-lites. The glass roofs were supplied in Low-Iron toughened laminated VisionInk® safety glass with a custom white dot frit pattern on the lower glass face and a solid white frit on the upper face, creating a stunning effect with LED strip lighting installed to its edges.

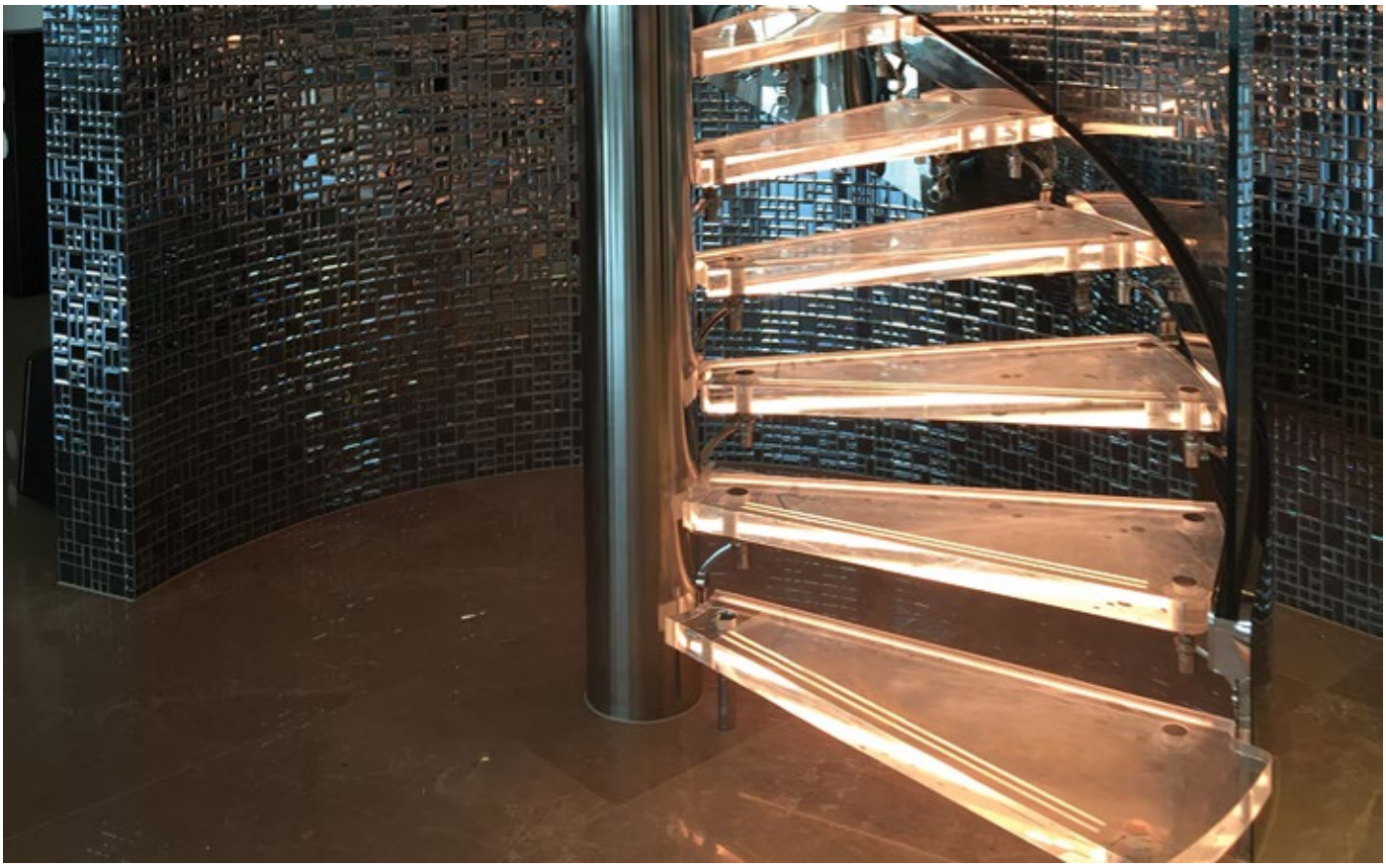
George Place now features impressive 3200mm diameter x 3400mm high Diamond Series revolving doors. The client made the right choice again by selecting curved TemperShield® and custom printed VisionInk® by Glasshape®, adding a WOW factor to their project at George Place.

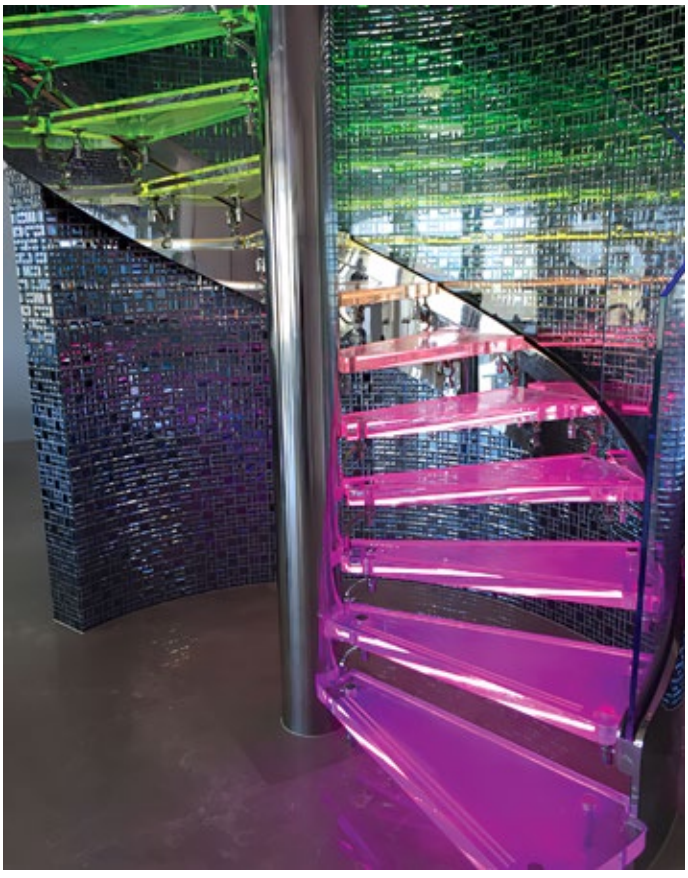
Curved & Spiral Staircases

PRIVATE RESIDENCE

Glass, light and vibrant colours come together to bring a dramatic and fun element to this Cairns penthouse apartment. With LED lighting in the stair treads, stainless steel stringer and Low-Iron glass balustrade, this spiral staircase certainly makes a statement.

Private Residence
Cairns, QLD, Australia





LOCATION: Cairns, QLD, Australia

GLASS MAKE UP: 15mm Low-Iron Glass

HIGHLIGHT:

Glasshape® was able to digitally measure the staircase on site to ensure each panel of 15mm Low-Iron glass was manufactured to fit perfectly when installed by the customer.

TESTIMONIAL:

"Excellent work guys" is what we love to hear from our customers and a great example of how our customer service is executed from start to finish, resulting in our customer being *"over the moon"* with the completed install.

SORRENTO RESIDENCE

This impressive beachfront home exudes luxury in every detail, with extensive glazing work featured throughout. Notably the glazed frameless spiral staircase with floor-to-ceiling bent glass windows, frame the feature staircase and allows light to fill the expansive entranceway to the home.

Photo: Spadaccini Homes

Sorrento Residence
Perth, WA, Australia

LOCATION: Perth, WA, Australia

GLASS MAKE UP: 12mm Bent Toughened Glass

TESTIMONIAL:

"The building's unique shape involved retaining a perfectly uniform radius all the way around its perimeter. Consistently maintaining that level of precision was very involved work. All the bent glass for the task was specially ordered and shipped from Glasshape. Representatives from Glasshape worked with us to ensure a precise measure; the panels were then made and freighted to us for installation."

"While the result may look seamless, the design and construction process involved in such a significant project took approximately three years from start to finish,' says Corey. 'Yet it only takes one look at the luxurious result to appreciate the stunning results of that mammoth effort."

C. Wilson

Photos: Spadaccini Homes

RESIDENTIAL HOME

Being the craftsmen behind this spectacular staircase, the client, engaged Glasshape® to produce and supply the 12mm bent Low-Iron glass to complement their architectural masterpiece.


MAISHA
MEEKADA
HUNTER
JOCELYN
KLAGES
AND WHAT IS
MY FAMILY

Residential Home
Houston, TX, USA

LOCATION: Houston, TX, USA

GLASS MAKE UP: 12mm Bent Low-Iron Glass

HIGHLIGHT:

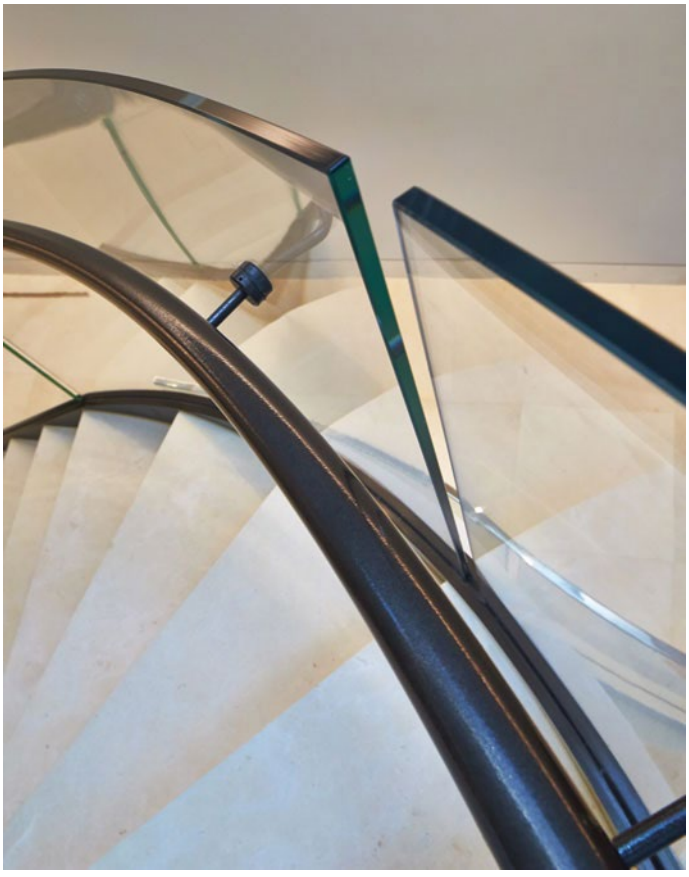
Nestled in a prestigious gated community in Houston, this beautifully designed, grand circular staircase is now the focal point of the home and very much the pride and joy of its owners.

Since our architectural bent glass, in most situations, forms part of a larger installation, we seldom have the pleasure of meeting with and talking to the end client. However, the opportunity to do so was granted and graciously accepted. In talking to the owners, it was apparent that the expectation of "quality" was clearly articulated from the outset of this project and that what the client and Glasshape®, ultimately delivered met that requirement. Needless to say, the owners are delighted with the end result.

PRIVATE RESIDENCE

From its road access down to the private jetty on the harbour, this spectacular private residence on Sydney's North Shore plummets six stories . The staircase connecting all six involved a complex digital site measure, with outstanding results.

Private Residence
Killara, Sydney, NSW, Australia



LOCATION: Killara, Sydney, NSW, Australia

GLASS MAKE UP: 12mm Bent Toughened Glass

HIGHLIGHT:

Glasshapes digital site measure service allowed us to produce the large number of panels of assorted shapes and curves for this project without the need for physical templates – saving significant time and expense. A challenging install, but perfectly executed and another project we are immensely proud to have been involved with.

Curved Balustrades & Bay Windows

PRIVATE RESIDENCE

Million-dollar views deserve being showcased. Ahead of moving in, the new owners of this stunning Auckland property seized the opportunity to make the most of their great views of the Hauraki Gulf, replacing faceted windows and stainless steel hand rails with beautifully bent glass for unobstructed visibility.

Retrofit Curved Balustrades & Bay Window
Red Beach, Auckland, New Zealand

LOCATION: Red Beach, Auckland, New Zealand

GLASS MAKE UP: 12mm Toughened Bent Laminated Glass

HIGHLIGHT:

Our ability to bend large format glass like this meant that floor-to-ceiling curved bay windows could be realised, maximising space and light for this easterly outlook.

Bent glass bay windows can add flair to the facade of contemporary dwellings. Bending the glass allows projects, to break the mould and use long swooping curves for distinctive designs and panoramic views. The generous expanse of glass in a bent glass bay window, enhances the feeling of openness and freedom whilst also letting in plenty of light.

Rooflites & Awnings

PRIVATE RESIDENCE

Maximise the natural light coming into a room through curved, toughened, laminated rooflites, or provide protection from the elements for footpaths and entranceways surrounding commercial properties.

Private Residence
Christchurch, New Zealand

Private Residence
Christchurch, New Zealand

LOCATION: Christchurch, New Zealand

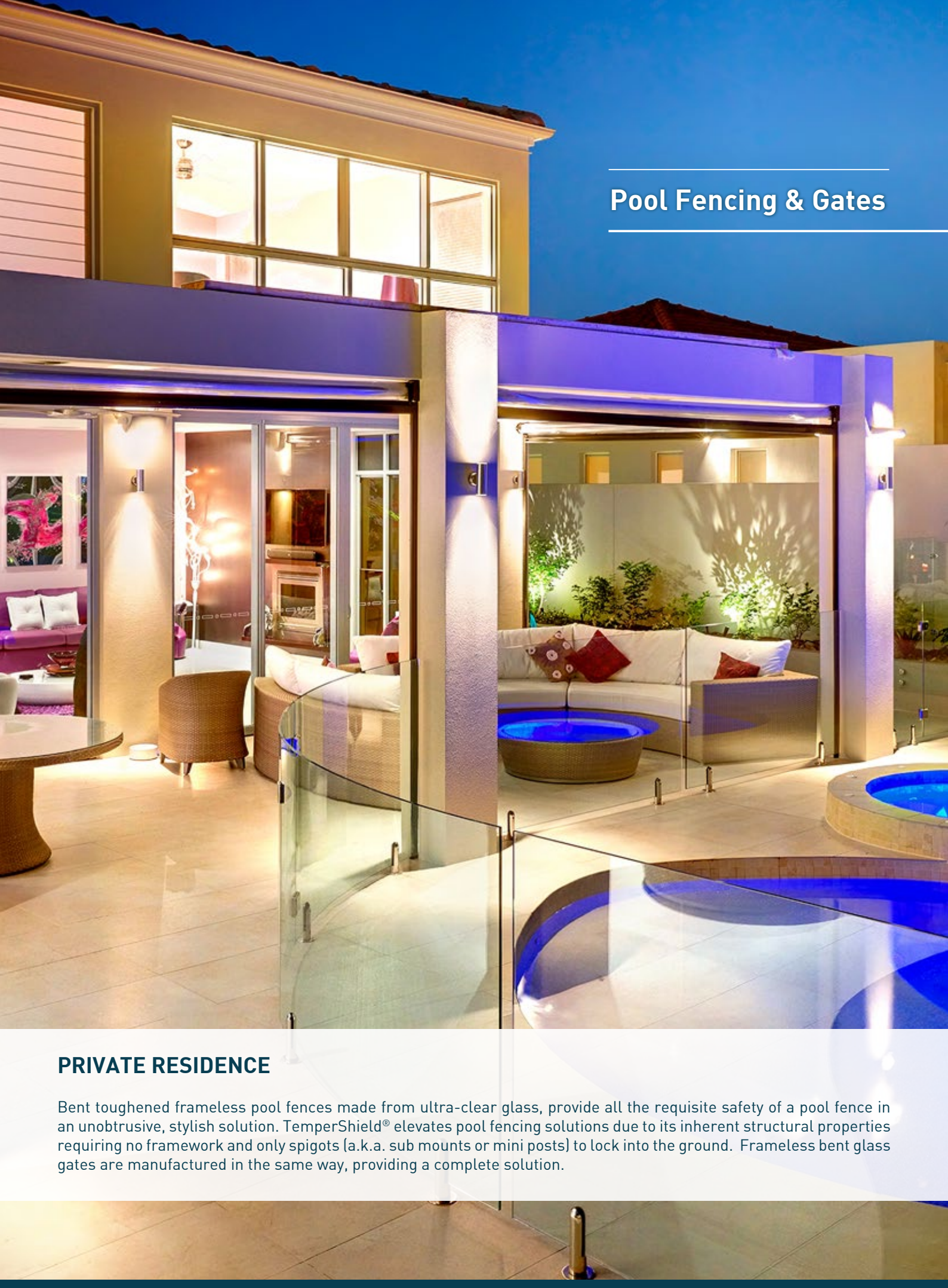
GLASS MAKE UP: 26mm Curved Double Glazed

HIGHLIGHT:

There is no better way to bring natural light into a room than by incorporating curved, toughened, laminated rooflites into your building design. Curved rooflites manufactured by Glasshape® can be easily installed above atrium spaces, entranceways and individual rooms. Whatever their application, their function remains the same: more natural light, an increased sense of space and an improved sense of well-being for the occupants.

With Glasshapes VisionInk® product, these can be digitally printed with ceramic inks, to offer unrivalled resistance from scratch and UV deterioration and allow the rooflites to be designed to mask dirt and debris.

Pool Fencing & Gates



PRIVATE RESIDENCE

Bent toughened frameless pool fences made from ultra-clear glass, provide all the requisite safety of a pool fence in an unobtrusive, stylish solution. TemperShield® elevates pool fencing solutions due to its inherent structural properties requiring no framework and only spigots (a.k.a. sub mounts or mini posts) to lock into the ground. Frameless bent glass gates are manufactured in the same way, providing a complete solution.

Private Residence
Noosa, QLD, Australia

LOCATION: Noosa, QLD, Australia

GLASS MAKE UP: 12mm Clear Toughened Bent Glass

TESTIMONIAL:

"The GAAQ awards night was a great success as we were nominated and won the award for the 'Glass Glazing Residential' award, featuring the bent glass balustrade and pool fence that you supplied to us on time with minimum fuss. I thanked Glasshape amongst other suppliers to the project."

"The project wowed the judges, and gobsmacked everyone else, I would like to personally thank you for your contribution towards the Project."

"I will never hesitate to use your company for any future projects requiring your services."

P. Deverall

SWITCHABLE GLASS SOLUTIONS

What is SwitchShield® Glass?

Switchable glass is an innovative glass product that is ideal for areas where privacy may be required at certain times.

Windows normally allow you to see as well as to be seen. However, it is sometimes desirable to be hidden from prying eyes. SwitchShield® Switchable Glass offers you this privacy at the flick of a switch. A unique technology of SwitchShield® allows it to be switched from an ordinary-looking clear glass to a opaque glass, ensuring optimal vision control. All it takes is a humble switch that makes it as simple as turning the lights on.

Applicable to windows, vision panels in doors, interior partitioning, and rooflites. SwitchShield® natural state is fully opaque. When turned on, the switchable glass becomes completely clear, and with the use of a standard dimmer any level of translucency can be achieved.

Benefits

- Change from clear to opaque instantly and uniformly over the entire surface area
- More privacy
- Protection of interior furniture and other valuable items from UV damage
- Safety and security
- Requires very little power (less than 4.0 watts per m^2)
- Superior optical qualities relative to other privacy glass products

Applications

- Architectural windows
- Rooflites
- Interior partitions
- Glass covering products
- Boardrooms

Switchable Privacy Glass

SwitchShield® as a Rear Projection Screen

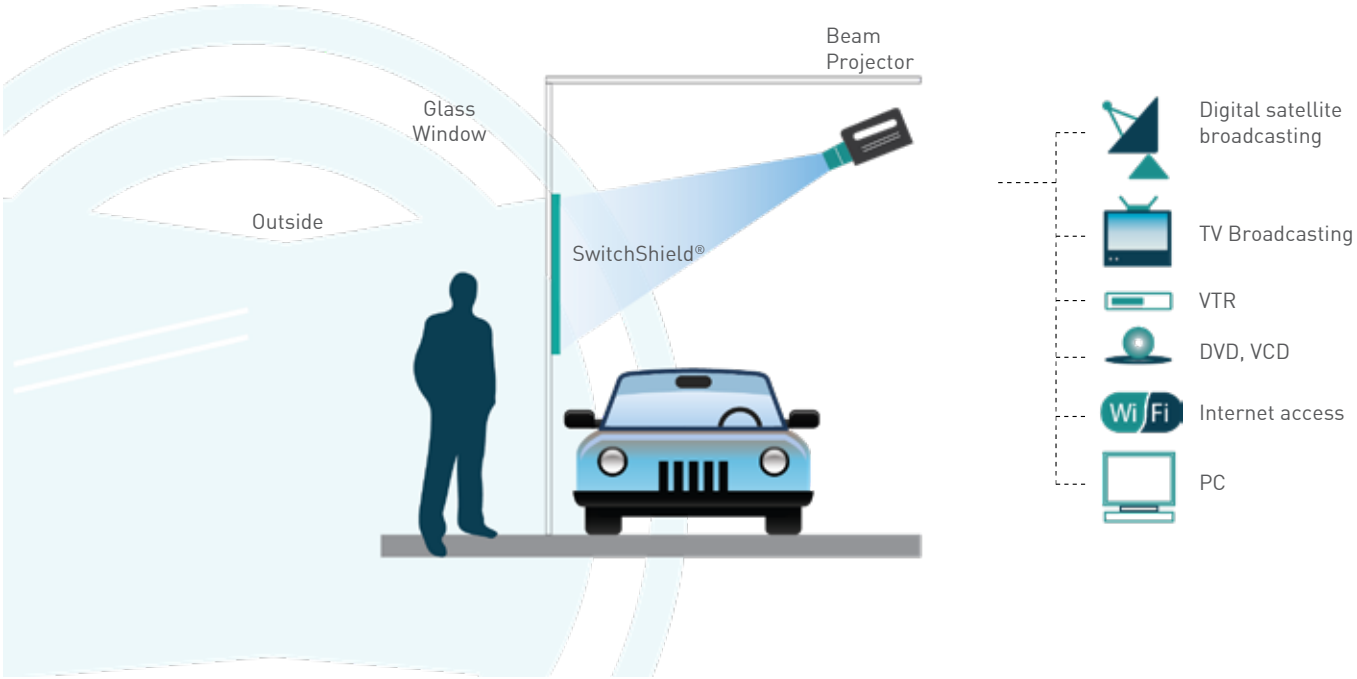
SwitchShield® can be used as an innovative and dynamic advertising display. The interior can be open during working hours by turning the window transparent (on). It can then be used for advertising display by turning the window off. The switching function can be controlled automatically by using a timer or light sensor.

Benefits

- High resolutions
- Large viewing angle
- Projection equipment is hidden behind the screen (rear projection)
- High acoustic performance: avoiding noise from the projector
- Eye catching screen: transparency at will (ON)
- Safety and security: laminated glass
- Easy to clean
- Cost-effective relative to other display media

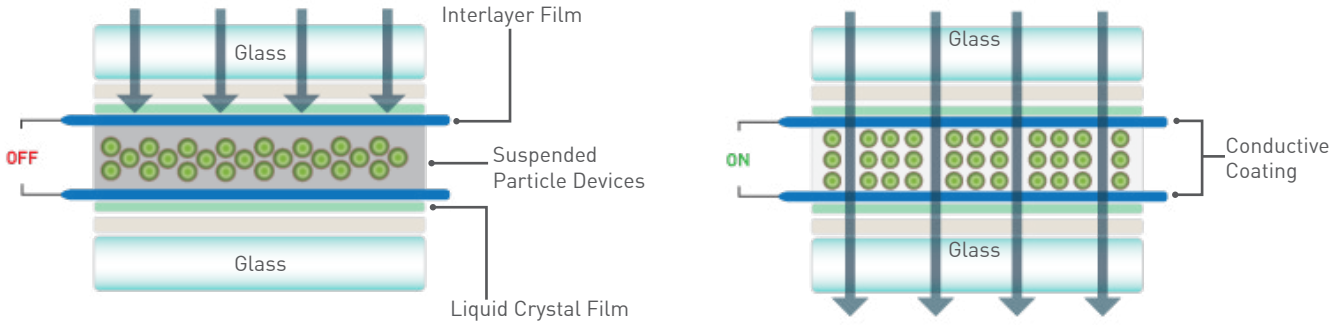
Applications

- Shop Fronts
- Facades
- Conference rooms
- Control rooms
- TV Studios
- Exhibitions
- Showrooms
- Boardrooms



Technical Specifications

SwitchShield® Glass



Sizes	Available Colours	Environmental	
Flexible minimum and maximum size of: - Min 300mm x 300mm - Max 1800mm x 3600mm	– Clear (Milky White) – Bronze – Green – Blue	Storage and operation: Warranty:	-20°C to +60°C Five years

SwitchShield® Specification	
Operating Voltage	65 Volts AC
Operating Frequency	50-60 Hz
Max/Min Voltage	+/- 5 Volts
Power Consumption On	3.7 Watts per m^2
Power On	Transparent
Power Off	Opaque
Transmittance On	82%
Transmittance Off	4%
Haze Power On	2-4%
View Angle	165 Degrees
Maximum Width/Girth	1800mm ((Other limits may apply for bent glass)
Maximum Height	3600mm (Other limits may apply for bent glass)
Switch Time On	200ms
Switch Time Off	600ms
Operating Temperature	-20 to +60 Degrees C
UV Block	99%

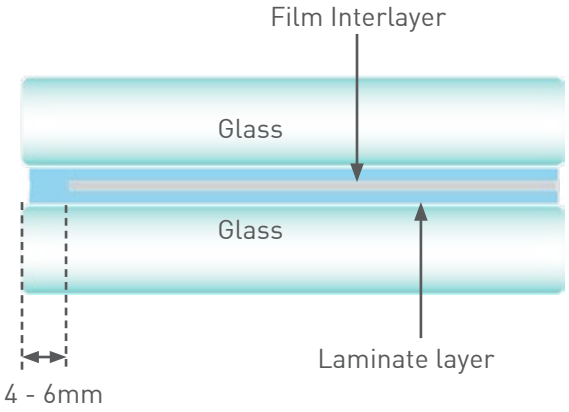
SwitchShield® Durability			
No	Test Item	Test Condition	Result
1	Switching	On (1 sec) Off (1sec), 110VAC, 3 Million Times	Passed
2	High Temperature	70^0 C/14 Days	Passed
3	High temp/ High Humid	50^0 C/95%RH, 14 Days	Passed
4	Low Temperature	-20^0 C/14 Days	Passed
5	Heat Cycle	-20^0 C 70^0 (2Hrs/Cycle), 200 Cycles	Passed
6	Weathering	KS L 2004 (Laminated Glass)	Passed
7	Heat Resistance	KS L 2004 (Laminated Glass)	Passed

Glazing SwitchShield®

Product Name	Thickness	Max Size
SwitchShield® 07	6.5mm (1/4")	980 x 1500mm (38 5/8" x 59 1/16")
SwitchShield® 11	10.5mm (3/8")	1820 x 3100mm (71 5/8" x 122 1/16")
SwitchShield® 13	12.5mm (1/2")	1820 x 3100mm (71 5/8" x 122 1/16")

1. Clear Edges

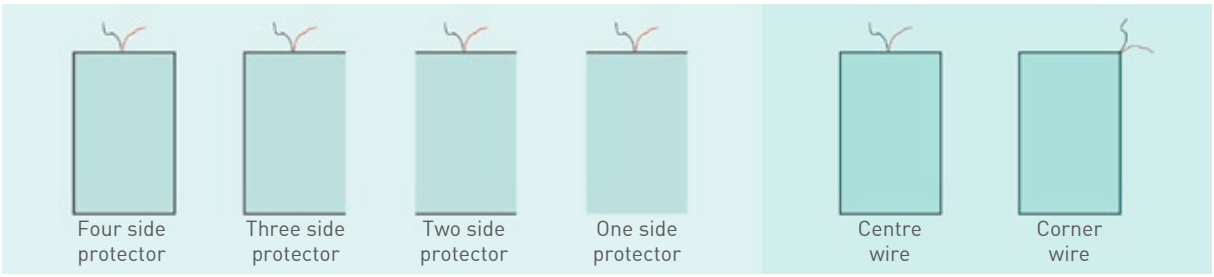
Please note that the Switchable film laminated inside the glass will stop approximately 4-6mm short of the edge of the glass. This needs to be taken into consideration when glazing with butt joins and when not fully framed. We have to stop the film short of the edge to ensure no possible contact with the film from the frame and to also ensure suitable lamination between the glass.

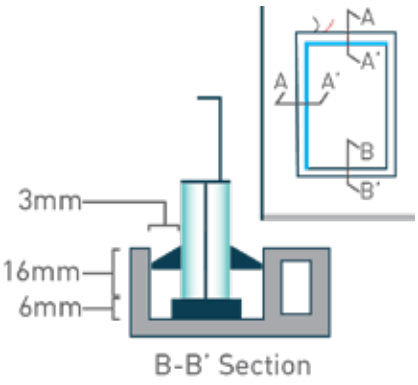


2. Electrical Wires

Electrical wires come out from either the corner or the centre of an edge. When ordering, please indicate the position you require. The standard length of electrical wires is one metre.

3. Glazing in a frame





The drawing on the left shows the minimum rebate requirements. Frames used for traditional curtain walls can be used. The metal frame should be electrically grounded and no moisture allowed to enter it.

To fix SwitchShield®, the installer must check that the limits of the dimensions are adhered to. Any pressure increase on the glazing is to be strictly avoided. The electrical wires from SwitchShield® should be placed at the upper edges of the SwitchShield® panel.

Glasshape® recommends that SwitchShield® panels be wet glazed using a structural sealant such as Dow Corning 995 of 795. Sealants must be non-acidic and non-solvent based.

Warranty - 5 year Limited Warranty

Important Note

1. Remove all spurs around all electrical wires and be sure that their coverings are not broken.
2. Do not load wires into the sash and also ensure that the edge protectors are not damaged.
3. When making holes in the sash for the wires to pass through, ensure rubber bushings are inserted into the holes.
4. When SwitchShield® is installed in a metal sash frame, ensure that the frame is electrically grounded.

VISIONINK®
GLASS PRINT TECHNOLOGY

DIGITAL CERAMIC PRINTED GLASS

The VisionInk® digital ceramic ink glass printer is the most advanced and versatile machine available for printed glass. Combined with our glass curving capabilities it is ideal for both external and internal architectural and transportation glass applications, together with stunning Point of Sale (POS) displays.

Carmel Campus, Haifa, Israel
Spiral

Printed Glass Canopy

Tradewinds Hotel
Cairns, QLD, Australia

LOCATION: Cairns, QLD, Australia

GLASS MAKE UP: 13.78mm & 17.78mm Toughened Laminated VisionInk®

QUANTITY: 1300m^2

HIGHLIGHT:

With pinpoint accuracy up to 720dpi and inks, that once toughened, become a part of the glass itself, VisionInk® represents the cutting edge of glass print technology and provides the most powerful resistance to scratching, UV light & weather deterioration and an easily maintained surface that withstands the test of time.

VisionInk® can replicate any image, design or pattern with brilliant accuracy, vibrant colours and sharp resolution. From simple lines to full colour photos, VisionInk® allows architects, engineers and designers to explore new possibilities in modern and sustainable design in interior and exterior marine applications.

Zebra Design
Spiral

Private Home - Splashback
Rakla

VisionInk® removes all the limitations of screen printing:

- Print any design, from simple lines to detailed imagery
- Six spot colours combine to create an unrivalled colour palette; bespoke premixed colours can be created too
- Complete predictability, repeatability & durability
- Extend black-out borders to include your brand/insignia (in colour if you wish)

VisionInk® combines the durability of ceramic ink with the versatility of digital printing:

- Precision control of ink thickness for prediction & manipulation of Visible Light Transfer and Solar Heat Gain variables
- Surface can be cleaned as per normal glass with no impact on the graphic
- Perfectly suited to both interior and exterior applications, with 10 year warranty against fading

Graphic Limitations (almost none!)

VisionInk® can replicate any image, design or pattern with brilliant accuracy, vibrant colours and sharp resolution. From simple lines to full colour photos, VisionInk® allows architects, engineers and designers to explore new possibilities in modern and sustainable design in interior and exterior applications.

Printed Bent Railing Glass

SW Adventist Church
Glasshape®

Digital Processing

1. Initial Graphics Preparation
   Acceptable File Formats:
   jpg, png, dxf, dwg, pdf & tiff

2. RIP - Raster Image Process
   Convert Design to BGWORK

3. Send .tiff files to Print
   Colour Separation

4. Printing Process

Albert Park - Fiji
Glasshape®

Gulf Harbour Marina - Auckland, New Zealand
Glasshape®

SECURITY GLASS SOLUTIONS

Australian Embassy
Jakarta, Indonesia

AUSTRALIAN EMBASSY

In situations where security is a primary consideration, the difficulty between maximising space and light without compromising security, is amplified. Our experience in this field has meant we can respond to clients' designs and dreams with workable solutions – in many cases having to innovate and invent to meet the brief.

LOCATION: Australian Embassy, Jakarta, Indonesia

GLASS MAKE UP: Custom developed AmmoShield® 62mm thick. Max size window 3200 x 2200mm

QUANTITY: 3100m² Bullet, Blast, Intruder Resistant

HIGHLIGHT:

The Australian Embassy in Jakarta is a prime example of delivering on excellence. The tropical, humid climate brought specific challenges when designing a building that requires high levels of security. Allowances had to be made to ensure operational functionality whilst addressing the client's desire for national expression. This had to be achieved without compromising an extremely challenging security and thermal resistance requirement.

We were able to design, test and manufacture an innovative, certified solution that spanned the large windows in the design and met the clients' demands in terms of blast, intruder and ballistic attack resistance. At more than 60mm thick and weighing up to 1000kg per window, no other supplier in the global tender was able to deliver. In the words of the architects Denton Corker Marshall, *"The design is bold, elegant, innovative, practical and dignified."* We're naturally humbled that our glass has played such a pivotal role in this project.

Mt Eden Prison
Auckland, New Zealand

What is Security Glass?

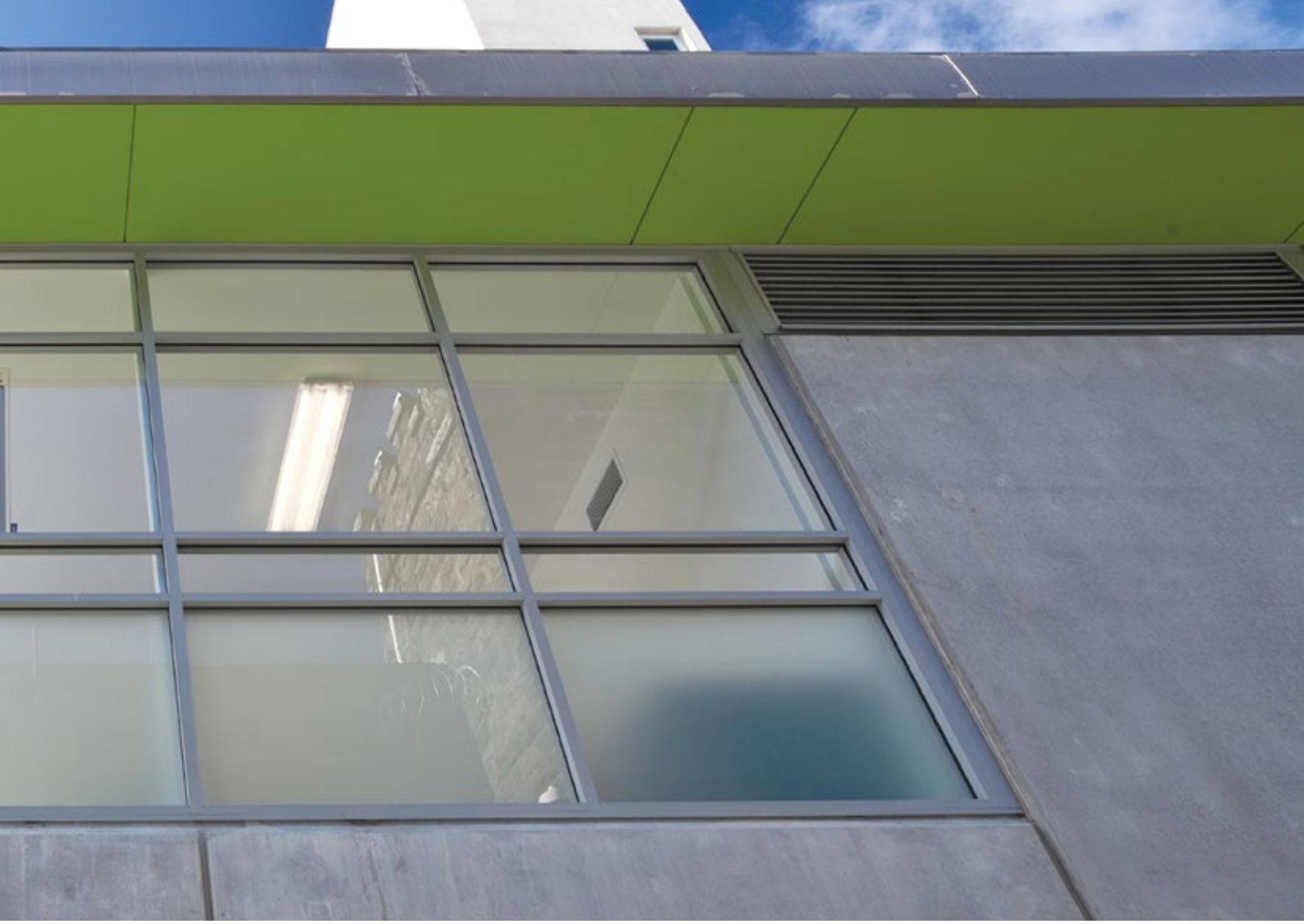
Security glass is specifically designed to provide additional safety for personnel and protect critical areas in buildings, safe houses, detention centres, prisons and marine vessels. Even when broken, the tough inner-core of poly-composite will lock the exterior glass layers to enable greater attack resistance. Ideal for doors and windows that maintain the appearance of normal glass. It is specially designed and constructed to remain resistant under attack. This attribute causes attack weapons to simply bounce off the security window, making penetration all but impossible.

Our custom laminated range of security glass is available in a large number of different compositions for protection from deliberate attack, ranging from low level smash and grab through to ballistic and blast protection. Toughened (tempered), annealed, toughened and annealed poly-composite layers, and varying glass and interlayer thicknesses all provide the perfectly specified solution. In many cases, bent options are available too.

A customised approach to meet our Clients' needs.

At Glasshape® we take a customised approach. We work with clients to confirm their needs and establish the appropriate glass solutions. Selecting and specifying the correct security glass product to suit your requirements is important to ensure that the performance expectations of the glass are met. Our experienced team can help you make the right decision with our fully certified range.

Our products have many years of proven effectiveness in embassies, residential properties, commercial buildings, retail outlets, prisons, remand centres, police stations and courtrooms. We can develop a custom glass solution to meet your particular requirements whether it is intruder, bullet, blast or debris impact resistance.



BanditShield® - Low risk anti-bandit glass solution providing up to one minute intruder resistance to deter smash and grab thieves.

BanditShield *Ultra*® - Low risk anti-bandit glass solution providing up to two minutes intruder resistance to provide increased security.

ArmourShield® - High risk intruder resistant glass solution providing up to 30 minutes resistance e.g. prisons, banks.

AmmoShield® - Bullet resistant glass solution providing protection from threats from hand guns through to military rifles.

BlastShield® - Blast resistant glass solutions custom designed to meet specified threat levels.

CareShield® - Safe and reliable secure healthcare glass solutions for use in mental health facilities.

Risk Analysis of Security Areas

Areas Of Use:

- Low Risk Smash & Grab
- Front of Store Displays
- High End Luxury Homes
- Liquor Store Windows
- Low Security Detention Centres
- Pharmacies

Threat:
Intrusion

Up to **2** Minutes Intruder Resistance

Rocks
Screw Drivers
Hammers

Crowbars
Baseball Bats
Small Hand Tools

Recommended Product:

Bandit Shield®
ANTIBANDIT GLASS - BY GLASSHAPE

Bandit Shield Ultra®
ULTRA ANTIBANDIT GLASS - BY GLASSHAPE

Areas Of Use:

- Museums, Art Galleries
- Medium Risk Offenders Cell Vision Panels
- Court Houses
- Customs Detention Rooms
- High Risk Mental Health Wards
- Police Station Public Areas

Threat:
Planned Intrusion

Up to **30** Minutes Intruder Resistance

Hammers
Axes
Crowbars

Baseball Bats
Chisels
Bolt Cutters

Recommended Product:

Armour Shield®
POLY-COMPOSITE SECURITY GLASS - BY GLASSHAPE

Areas Of Use:

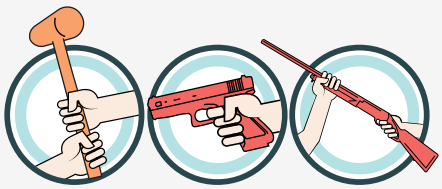
- Medium and Maximum Security Prisons
- Youth Detention Centres
- Government Intelligence Offices
- Police Station - Cell Windows, Bail Cells
- Court House - Cells
- Staff Attack Retreat Rooms

Threat:
Equipped with Heavy Tools

Up to **60** Minutes Intruder Resistance

Sledgehammers
Axes
Crowbars

Picks
Chisels
Bolt Cutters



Recommended Product:

Ammo Shield®
BULLET RESISTANT GLASS - BY GLASSHAPE

Areas Of Use:

- Panic Room - Refuge Rooms
- Foreign Embassies
- Cash Handling - Banks, Foreign Exchange
- Courtrooms
- Armoured Vehicles
- VIP and Diplomat Housing

Threat:
Equipped with Firearms & Explosives

Up to **60** Minutes Intruder Resistance

Multiple Attackers
Pistols
Shotguns

Shotguns (slugs)
Rifles
Explosives

Recommended Product:

Blast Shield®
BLAST RESISTANT GLASS - BY GLASSHAPE

Bandit Shield®
ANTIBANDIT GLASS - BY GLASSHAPE

Thickness Range: 7.52mm - 13.9mm
Construction: Toughened or Annealed Laminated

Anti-Bandit Glass Solutions

BanditShield® has been specifically developed to resist manual attack and delay access to protected areas such as jewellery stores where items of high value can be easily accessed. Unlike standard laminated glass, the BanditShield® Anti-Bandit Glass range does not fall away when broken, preventing access. With the BanditShield® range, the bonded glass and laminate make it challenging and time consuming to smash through. The laminate holds on to the broken layers of glass making separation a difficult process.

The extra time and noise generated whilst attempting to create a suitable opening usually attracts the attention of neighbours or inhabitants in the area, this serves as a deterrent and thwarts further attempts of would-be burglars or opportunist smash and grab criminals.

Area Specific Requirements

Smash & Grab
Slowing or delaying an intruder who is attempting this will deter them from successfully taking any goods

Front of Store Display (Retail)
Preventing quick entry will deter criminal from successfully stealing goods

High Class Luxury Homes
Delaying or forcing the intruder to make more noise can deter them from ever entering and gives you more time to escape or alert authorities

Liquor Store
Preventing quick entry will deter criminal from successfully stealing liquor

Low Security Detention Centres
Slowing an attempt to break out can give staff the time needed to respond to the incident

Pharmacies
Protecting drugs from opportunist smash and grab burglars

Attack Resistance

BanditShield® Anti-Bandit Glass has been specially designed and constructed from incredibly robust laminated glass to achieve a higher level of resistance to physical attack in low risk security situations.

Under attack with common hand tools such as hammers, pliers, screwdrivers, axes and bricks, BanditShield® will resist penetration for up to 1 minute. Where a greater level of security is required we would recommend using or specifying BanditShield *Ultra*® or ArmourShield®

BanditShield *Ultra*®
ULTRA ANTIBANDIT GLASS - BY GLASSHAPE

Thickness Range: 15.7mm - 18.0mm Triplex
Construction: Toughened or Annealed Laminated

Low Risk Intruder Resistant Glass Solutions

BanditShield *Ultra*® has been specifically developed for when greater attack resistance over and above BanditShield® Anti-Bandit Glass is required.

Ideal for high-end residential homes, luxury retail display windows and mental health facilities, BanditShield *Ultra*® is designed to resist an attack long enough for an opportunist attacker to give up their efforts after realising BanditShield *Ultra*® is not standard glass.

Area Specific Requirements

Smash & Grab
Slowing or delaying an intruder who is attempting this will deter them from successfully taking any goods

Front of Store Display (Retail)
Preventing quick entry will deter criminal from successfully stealing goods

High Class Luxury Homes
Delaying or forcing the intruder to make more noise can deter them from ever entering and give you more time to escape or alert authorities

Mental Health Units
Slowing an attempt to break out can give staff the time needed to respond to the incident

Low Security Police Detention Centres
Slowing an attempt to break out can give staff the time needed to respond to the incident

Pharmacies
Protecting drugs from opportunist smash and grab burglars

Attack Resistance

BanditShield *Ultra*® is a specially designed triple laminated glass to achieve a higher level of resistance to physical attack in low risk security situations.

Under attack with common hand tools such as hammers, pliers, screwdrivers, axes and bricks, BanditShield *Ultra*® will resist penetration for up to 2 minutes. Where a greater level of security is required, we would recommend using ArmourShield® which provides longer resistance times.

ArmourShield®
POLY-COMPOSITE SECURITY GLASS - BY GLASSHAPE

Thickness Range: 14mm - 26mm
Construction: Toughened with poly-composite core

High Risk Intruder Resistant Glass Solutions

ArmourShield® is specifically designed to provide additional safety for personnel and protect critical areas in buildings, safe houses, detention centres, prisons and marine vessels. ArmourShield® slows down and restricts intruder entry. Even when broken, the tough inner-core of poly-composite will lock the exterior glass layers to enable greater attack resistance. Ideal for doors and windows that maintain the appearance of normal glass, ArmourShield® is specially designed and constructed to remain resistant under attack. This attribute causes attack weapons to simply bounce off the ArmourShield® window, making penetration all but impossible.

Area Specific Requirements

Medium and Maximum Prison Security
Prevention of break-out and protecting wardens from attack.

Youth Detention Centres
Prevention of escape and protecting staff from attack.

Intelligence Offices
To create a secure facility that can't be penetrated, protecting internal information and staff.

Guard House
Provide protection against attack from assailants with hand weapons.

Police Station
Used in external windows of facilities to protect police and in high risk containment cells to resist attempts to escape.

Courthouse
Prevention of attempted escape from commonly perceived lower security facility.

Testing and Certification

ArmourShield® comes in a range of thicknesses to provide the required protection from physical attack for up to 30 minutes (as detailed under AS3555.1 Level 2) when used in an approved framing system.

The table on page 121 provides a guide to which thickness may best suit your requirements, or you can contact our product specialists who will help you select the correct product for your application.

Tested and certified in independent laboratories, ArmourShield® has passed the requirements of AS3555.1 Level 2 in a number of approved framing systems to provide specifiers with solutions that meet their requirements.

AmmoShield®
BULLET RESISTANT GLASS - BY GLASSHAPE

Thickness Range: 20mm - 65mm
Construction: Multi-lam with poly-composite core

Bullet Resistant Glass Solutions

AmmoShield® is specifically designed for use in areas of high risk or where the threat of firearms is prevalent. AmmoShield® bullet resistant glass encapsulates exceedingly high velocity projectiles without allowing penetration through the panel. AmmoShield® is a special glass poly-composite panel, custom-constructed to meet clients specified level of protection. Levels of protection include gunfire, bomb-blast and physical attack with tools and equipment.

Area Specific Requirements

Cash Handling - Banks, Foreign Exchange
Protect staff and assets from the threat of armed robbery.

Panic Room - Personal Protection, Refuge Rooms
Secure rooms in luxury homes or buildings in high risk areas to protect the occupants from armed attack.

Foreign Embassies
Protect staff and information in the event of a terrorist attack.

Courtrooms - Judges Chambers, Witness Boxes
Provide protection in the event of attack with firearms.

VIP and Diplomat Housing
Protect VIPs from armed robbery or terrorist attack.

Armoured Vehicles (certified for road use)
Protection of operators in cash handling, police or military operations.

AmmoShield® Range

AmmoShield® is manufactured in a range of thicknesses and make-ups to meet the specified threat level and conditions required. Our range includes glass designed to stop bullets from hand guns through to high powered rifles and shotguns.

AmmoShield® has been tested in NATA accredited laboratories to cover all the requirements of AS/NZS2343:1997 and NIJ0108.01:1985, and we can test customised glass make-ups to these standards or other applicable standards if required.

BlastShield®
BLAST RESISTANT GLASS - BY GLASSHAPE

Thickness Range: 22mm - 65mm
Construction: Multi-lam with poly-composite core

Blast Resistant Glass Solutions

BlastShield® has been specifically designed to reduce the risk of injury in the event of a blast attack. BlastShield® blast resistant glass typically uses a multiple layered combination of incredibly robust laminated glass and poly-composites to reduce the risk of flying glass debris in the event of an explosion.

BlastShield® unique design allows the flexibility of the interlayer and the adhesion between layers of laminated glass to continue to resist blast after the glass layers fracture. This gives protection from significantly higher blast loads when compared to a monolithic pane of glass.

Area Specific Requirements

Foreign Embassies
Protect staff and information in the event of a terrorist attack.

Military
Protection of military facilities from attack.

VIP and Diplomat Housing
Protect occupants from armed robbery or terrorist attack.

Guard House
Provide protection against attack from terrorists.

BlastShield® Range

BlastShield® thicknesses range from 22mm to over 65mm depending on the level of blast being protected against. Full-scale open-air blast tests are rarely performed these days, so the use of latest technology in blast modelling is used to determine the performance of different make-ups of BlastShield® being designed for specific projects.

Foreign Embassy Solutions

With buildings such as embassies and other government buildings, there is often a requirement for the glass to be able to resist multiple threats, such as intruder, bullet and blast, which requires a specialised solution for each application.

Glasshape® have designed, tested and certified customised glass solutions which incorporate the unique properties of ArmourShield®, AmmoShield® and BlastShield® to provide an answer to these specific requirements. A fine example of our customised approach was the recently completed Australian Embassy in Jakarta, Indonesia.

CareShield®
SECURE HEALTHCARE SAFETY GLASS - BY GLASSHAPE

Thickness Range: 10mm - 26mm
Construction: Standard & Double Glaze Unit

Mental Health Facilities Solutions

With CareShield®, gone is the possibility of patients harming themselves with glass if a window is broken. Families are assured their loved ones are in a safe zone where self-harm is all but eliminated. CareShield® has a glass exterior surface that is glazed to the staff side, or the outside of the building, to provide a tough glass exterior for weathering. If glazed in a passageway, it provides an easy-to-clean surface. The interior surface is a hardened poly-composite, providing a safe surface on the patients side, greatly reducing the risk of patients injuring themselves.

Corrections, Holding and Detention Facility Solutions

When designing correctional institutions and specifying security glass, there are a large number of factors to consider to ensure that it meets the level of protection required. The weapons that may possibly be available to assailants, staff response times, and risk to staff or others are all important factors in selecting glass which can resist attack for the time required to respond to the incident.

Other areas, such as holding cells in police stations and courthouses, are areas commonly overlooked, and security can be compromised if the glass specification does not provide sufficient protection.

Glasshape® has extensive experience in working with architects, correction departments and security window manufacturers to provide solutions which meet the specific requirements of each physical space within correctional facilities.

Testing of Security Glass

Intruder / Forced Entry Resistance Testing

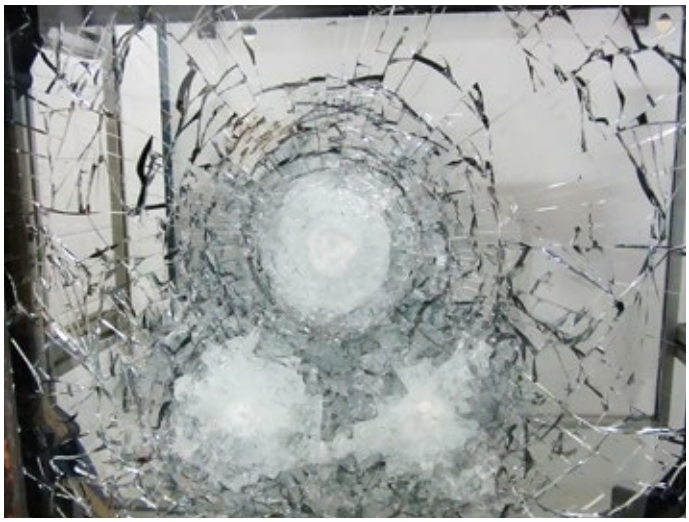
Glasshape® have carried out extensive testing of our intruder resistant glass to AS3555.1 Level 2 in independent laboratories in both New Zealand and Australia.

Testing to AS3555.1 Level 2 requires the glass to be attacked by two men using common hand tools, such as chisels, punches, wedges, screwdrivers, pliers, bolt cutters, hammers, axes, sledgehammers, pry bars and ripping tools—none of which exceeds 1.5m in length, nor 3.6kg in mass. The glass is then rated according to the time required to create an opening in it of no more than 620cm².

Bullet Resistance Testing

Glasshape® has carried out extensive testing of our AmmoShield® glass to both the AS/NZS2343:1997 and NIJ0108.01:1985 standards.

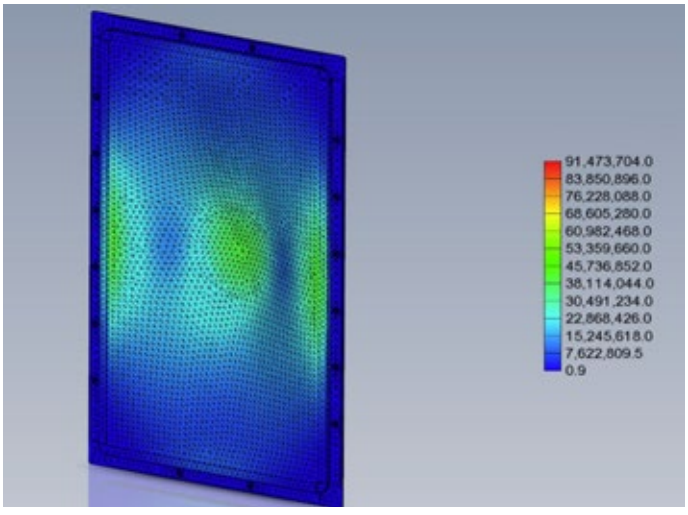
Testing to AS/NZS2343:1997 requires the test panel to be shot three times with the shot centres 100mm apart forming an equilateral triangle. A witness card is mounted 450mm from the rear of the glass and the glass panel is deemed to satisfy the ballistic classification if no projectile passes through and no particles from the panel or projectile perforate the witness card.

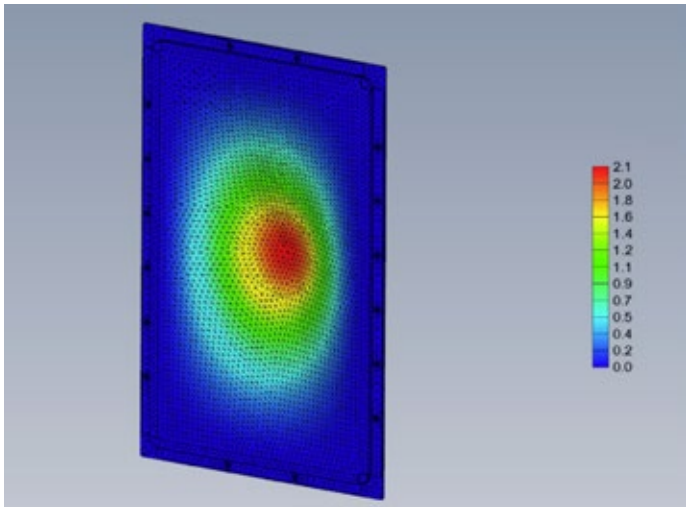


Blast Resistance Testing

Full-scale open-air blast tests are rarely performed these days, so the use of latest technology in blast modelling is used to determine the performance of different make-ups of BlastShield® being designed for specific projects.

Glasshapes technical team works with blast engineers on specific project designs to ensure that complete systems will withstand the required blast requirements.





BanditShield® ANTIBANDIT GLASS - BY GLASSHAPE

BanditShield Ultra® ULTRA ANTIBANDIT GLASS - BY GLASSHAPE

Product Code	Description	Thickness	Weight m²	Security Attack Rating* (Approx)	Light Trans. %	Reflect (out). %	Reflect (in). %	Solar Trans. %	Solar Reflect. %	SC	SHGC	U Value (W/m2K) Summer	U Value (W/m2K) Winter
					LIGHT			SOLAR		THERMAL			
BanditShield® Clear													
AB752	Annealed	7.52mm (1/4")	16kg	20 seconds	89	8	8	74	7	0.91	0.79	5.04	5.57
AB952	Annealed	9.52mm (3/8")	21kg	20 seconds	88	8	8	71	7	0.89	0.78	5	5.52
BS7ABG	Annealed	7.9mm (5/16")	17kg	30 seconds	89	8	8	73	7	0.91	0.79	4.99	5.52
BS9ABG	Annealed	9.9mm (3/8")	22kg	30 seconds	88	8	8	70	7	0.89	0.77	4.95	5.46
AB1352	Annealed	13.52mm (9/16")	31kg	50 seconds	87	8	8	66	7	0.86	0.74	4.9	5.41
BS11ABG	Annealed	11.9mm (7/16")	27kg	60 seconds	88	8	8	68	7	0.87	0.76	4.91	5.42
BS14TABG	Toughened	13.9mm (9/16")	32kg	60 seconds	87	8	8	66	7	0.86	0.74	4.89	5.40
BanditShield® Grey													
AB7ABG	Annealed	7.9mm (5/16")	17kg	30 seconds	43	5	5	47	5	0.71	0.62	4.99	5.52
AB9ABG	Annealed	9.9mm (3/8")	22kg	30 seconds	42	5	5	45	5	0.7	0.61	4.95	5.46
BS13ABG	Annealed	13.9mm (9/16")	32kg	60 seconds	87	8	8	65	7	0.85	0.74	4.86	5.36
BanditShield® Obscure													
BS7OB	Annealed	7.9mm (5/16")	17kg	30 seconds	82	8	8	67	7	0.87	0.75	4.99	5.52
BS9OB	Annealed	9.9mm (3/8")	22kg	30 seconds	82	8	8	65	7	0.85	0.74	4.95	5.46
AB1152	Annealed	11.52mm (1/16")	26kg	50 seconds	88	8	8	69	7	0.88	0.76	4.96	5.47
BanditShield *Ultra*® Clear													
BS15AUltra	Annealed	15.7mm (5/8")	33kg	60-120 seconds	87	8	8	63	7	0.84	0.73	4.72	5.2
BS15Ultra	Toughened	15.7mm (5/8")	33kg	60-120 seconds	87	8	8	63	7	0.84	0.73	4.72	5.2
BS16Ultra	Toughened	16.7mm (11/16")	36kg	60-120 seconds	86	8	8	62	6	0.83	0.73	4.7	5.17
BS18A Ultra	Annealed	18.04mm (11/16")	41kg	90-120 seconds	86	8	8	61	6	0.82	0.71	4.67	5.13
BanditShield *Ultra*® Grey													
BS15GRUltra	Toughened	15.7mm (5/8")	33kg	60-120 seconds	54	6	6	43	5	0.69	0.6	4.72	5.2
BS16GRUltra	Toughened	16.7mm (11/16")	36kg	60-120 seconds	54	6	6	43	5	0.69	0.6	4.7	5.17
BanditShield *Ultra*® Obscure													
BS15OBUltra	Toughened	15.7mm (5/8")	33kg	60-120 seconds	80	8	8	59	6	0.81	0.7	4.72	5.2
BS16OBUltra	Toughened	16.7mm (11/16")	36kg	60-120 seconds	80	8	8	58	6	0.8	0.69	4.7	5.17

* Attack rating is based on AS3555.1 level 1, attack conditions. Custom options available on all products for tints or additional features or specifications.

ArmourShield® POLY-COMPOSITE SECURITY GLASS - BY GLASSHAPE

Product Code	Description	Thickness	Weight m²	Attack Rating* (Approx)	AS 3555.1 Level 2 Pass	Light Trans. %	Reflect (out). %	Reflect (in). %	Solar Trans. %	Solar Reflect. %	SC	SHGC	U Value (W/m2K) Summer	U Value (W/m2K) Winter
				SECURITY		LIGHT			SOLAR		THERMAL			
ArmourShield® Clear (optional colour/tints on Custom Products)														
AS14T	Toughened	14.8mm (9/16")	28kg/m²	Up to 5 minutes	PASS 5 minutes	84	7	7	66	6	0.87	0.75	4.33	4.73
AS17T	Toughened	17.9mm (11/16")	34kg/m²	Up to 10 minutes	PASS 10 minutes	83	8	8	60	6	0.83	0.72	4.16	4.54
AS22T	Toughened	22.6mm (7/8")	44kg/m²	Up to 15 minutes	PASS 10 minutes	80	8	8	56	6	0.8	0.69	3.99	4.34
AS26T	Toughened	25.6mm (1")	51kg/m²	Up to 20 minutes	PASS 10 minutes	79	8	8	53	6	0.78	0.68	3.94	4.29

* Attack rating is based on AS3555.1 level 2, attack conditions. Custom options available on all products for tints or additional features or specifications.

AmmoShield®

BULLET RESISTANT GLASS - BY GLASSHAPE

Product Code	Description	Thickness	Weight m²	AS/NZS 2343:1997	Other Standards	Light Trans. %	Reflect (out). %	Reflect (in). %	Solar Trans. %	Solar Reflect. %	SC	SHGC	U Value (W/m2K) Summer	U Value (W/m2K) Winter
				SECURITY		LIGHT			SOLAR		THERMAL			
AmmoShield® Clear (optional colour/tints on Custom Products)														
AS20P	Glass, Poly-composite	20.4mm (13/16")	40kg/m²	G0 9mm Handgun	NIJ 0108.01	80	7	7	57	6	0.81	0.7	4.1	4.45
AS24P	Glass, Poly-composite	24.4mm (15/16")	50kg/m²	G1 357 Magnum	-	78	7	7	53	6	0.78	0.68	4.04	4.38
AS25P	Glass, Poly-composite	25.5mm (1")	54kg/m²	G2 44 Magnum	-	81	7	7	52	6	0.77	0.67	3.95	4.28
AS37	All Glass	37.0mm (1 7/16")	84kg/m²	G2 44 Magnum	-	76	8	9	41	6	0.69	0.6	4.22	4.58
AS44P	Glass, Poly-composite	44.5mm (1 3/4")	97kg/m²	R1 5.56mm Rifle R2 7.62mm Rifle S1 12gauge Shotgun-slug	NIJ 0108.01 Level 3	76	6	6	40	5	0.7	0.61	3.58	3.85

CareShield®

SECURE HEALTHCARE SAFETY GLASS - BY GLASSHAPE

Product Code	Description	Thickness	Weight m²	Security Attack Rating* (Approx)	Light Trans. %	Reflect (out). %	Reflect (in). %	Solar Trans. %	Solar Reflect. %	SC	SHGC	U Value (W/m2K) Summer	U Value (W/m2K) Winter
					LIGHT			SOLAR		THERMAL			
CareShield® Clear													
CS10CL	Standard	10.5mm (7/16")	17kg	5 minutes	86	7	7	71	6	0.9	0.78	4.61	5.04
CS12CL	Standard	12.5mm (1/2")	22kg	5 minutes	85	7	7	68	6	0.88	0.77	4.57	4.99
CS14CL	Standard	14.5mm (9/16")	27kg	10 minutes	84	7	7	65	6	0.86	0.77	4.53	4.95
CS24CLCP	Low-E DGC	24.5mm (15/16")	27kg	5 minutes	73	16	15	55	15	0.77	0.67	1.96	1.89
CS25CLCP	Low-E DGC	25.5mm (1")	29kg	5 minutes	72	16	15	54	15	0.77	0.67	1.96	1.88
CS26CLCP	Low-E DGC	26.5mm (1 1/16")	32kg	10 minutes	72	15	15	53	15	0.76	0.66	1.95	1.88
CareShield® Neutral													
CS24NCP	Low-E DGU	24.5mm (15/16")	27kg	5 minutes	52	10	14	35	9	0.52	0.45	1.96	1.89
CS25NCP	Low-E DGU	25.5mm (1")	29kg	5 minutes	51	10	14	34	9	0.52	0.45	1.96	1.89
CS26NCP	Low-E DGU	26.5mm (1 1/16")	32kg	10 minutes	51	51	14	33	9	0.52	0.45	1.95	1.88
CareShield® Grey													
CS10GR	Standard	10.5mm (7/16")	17kg	5 minutes	53	6	5	48	5	0.74	0.64	4.61	5.04
CS12GR	Standard	11.5mm (7/16")	22kg	5 minutes	43	5	4	39	5	0.67	0.58	4.57	4.99
CS14GR	Standard	14.5mm (9/16")	27kg	10 minutes	34	5	4	30	5	0.61	53	4.52	4.95
CS24GRCP	Low-E DGU	24.5mm (15/16")	27kg	5 minutes	45	14	9	38	14	0.72	0.63	1.96	1.89
CS25GRCP	Low-E DGU	25.5mm (1")	29kg	5 minutes	41	14	8	34	14	0.71	0.62	1.96	1.89
CS26CLCP	Low-E DGU	26.5mm (1 1/16")	32kg	10 minutes	37	14	8	30	14	0.7	0.61	1.95	1.88
CareShield® Acid Etch Obscure													
CS24OB	DGU	24.5mm (15/16")	27kg	5 minutes	76	14	13	59	12	0.84	0.73	2.73	2.6
CS25OB	DGU	25.5mm (1")	29kg	5 minutes	75	14	13	57	12	0.83	0.72	2.72	2.59
CS26OB	DGU	26.5mm (1 1/16")	32kg	10 minutes	75	14	13	57	12	0.83	0.72	2.72	2.58

NB: Conditions and calculation of the above optical and solar performance data are based on ASHRAE Standard.
Performance data is based on representative value from software tabulation and information available at the time of preparation of this document which is subject to changes without notice. Actual value may vary slightly due to variations in the production process. Other glass manufacturers and coaters may use different instruments and measurement techniques. Therefore, reported performance values may vary on identical products by others.

CYCLONE RESISTANT WINDOW SOLUTIONS

The Pearl Resort
Fiji


Storm Shield®
CYCLONE RESISTANT GLASS - BY GLASSHAPE

Cairns Aquarium
Australia

Overview

Protecting your family, staff and property during cyclones, hurricanes and severe storm conditions means resisting excessive wind speeds and penetration from flying debris. In the event the glass is damaged by flying storm debris, windows need to remain weather tight without a breach or the buildings structural integrity could be compromised.

StormShield® uses specially formulated ultra-high grade laminate in the manufacturing process. Engineered so the glass can expand and contract up to five times its normal rate before breaking, providing protection from wind-borne debris.

E-zone® Glass is a thermal resistant cyclone rated glass, boasting the same ultra-high grade laminate with additional thermal advantages and flood resistance.

Fully certified for use in Regions C and D in Australia and the Pacific Islands, StormShield® has been extensively tested at our IPENZ certified in-house testing facility as well as other NATA accredited testing facilities including the James Cook University cyclone testing station.

Flag Ship Storm Glass Projects:

- MHCC Shopping Mall: Suva Fiji Islands: 650m^2 StormShield® Glass
- ANZ Tower: Suva Fiji Islands: 600m^2 StormShield® Glass
- ICON Apartments: Port Hedland, Western Australia: 1200m^2 StormShield® Glass
- Baynton Apartments: Karratha, Western Australia: 1000m^2 StormShield® Glass
- Shreedah Motors Building: Suva, Fiji Islands: 200m^2 StormShield® Glass
- Westpac Bank: Suva, Fiji Islands: 200m^2 StormShield® Glass
- Continental Hotel: Denarau, Fiji Islands: 200m^2 StormShield® Glass
- Townsville Apartments: Townsville, Queensland, Australia: 800m^2 StormShield® Glass
- Darwin Medical Centre: Darwin, Northern Territory, Australia: 200m^2 StormShield® Glass IGU
- Lizard Island Resort: Queensland, Australia: 360m^2 StormShield® Glass
- Palmerston Hospital, Northern Territory, Australia: 750m^2 StormShield® Glass
- Cairns Aquarium, Cairns, North Queensland, Australia: 160m^2 StormShield® Glass
- Palmerston Police Station, Northern Territory, Australia: 80m^2 StormShield® Glass
- Momi Bay Resort, Fiji Islands: 3000m^2 StormShield® Glass
- Pearl Resort, Fiji Islands: 1200m^2 StormShield® Glass
- Sun Insurance Tower, Suva, Fiji Islands: 550m^2 StormShield® Glass
- Nadi International Airport, Nadi, Fiji Islands: 2000m^2 StormShield® Glass

Cyclone Debris Impact Resistance & Wind Loading

Wind-borne debris is a major threat in extreme cyclone conditions. These missiles can be anything from branches to parts of other damaged buildings. If these penetrate the building envelope, including the windows, the risk of injury to occupants or damage to contents is extremely high.

In the event of a breach of the buildings envelope during a storm, the likelihood of complete destruction is greatly increased. When subjected to high wind loads, buildings which are adequately sealed develop a negative internal pressure which helps to counteract the wind pressures acting on the roof and walls of the building. If the building envelope is penetrated in these conditions, the sudden change to a positive internal pressure can result in the failure of the roof or, in the worst case, the whole building structure.

Negative Internal Pressure
Windows intact, building remains structurally safe.

Positive Internal Pressure
Windows breached, structural integrity compromised.

Debris Impact Testing

StormShield® has been designed to resist the impact of flying debris without any penetration or perforation of the laminated interlayer protecting buildings and the occupants from the risk of injury or damage. This means the window isn't compromised which keeps the structural integrity of the building intact.

StormShield® has been tested by a fully accredited third party cyclone testing station and has exceeded the test described in AS/NZS1170.2:2011, clause 5.3.2. This test involved a 4kg piece of timber (100 x 50mm cross section) projected at up to 45m/sec (162km/h).

Storm Shutters

Traditional structures have required secondary protection such as storm shutters or storm screens to meet the required impact standards. These additions obscure vision and compromise the design aesthetics.

StormShield® when installed in a certified framing system provides a complete solution which meets the demands of AS/NZS1170.2:2011 without the need of any additional protective measures.

Window Systems

The glazing frame that StormShield® is glazed into is just as important as the glass itself. A weak frame will dramatically affect the performance of the glass.

StormShield® has been tested and certified in a large range of framing suites available in Australia and the Pacific Islands. A list of fully certified window suites is available on request.

Glasshape® recommends full window suites be live-tested to prove their compliance to the AS/NZS1170.2:2011 impact requirements, as performance varies depending on the window system, the sealant, edge cover of glass into the frame, and the beading system being used. Fixing details of the frame to the building are equally important, and are clearly noted on StormShield® test reports.

Glasshape® offers full testing and certification to customers using StormShield® in their own aluminium window systems. Fully documented test reports are provided with high speed video files for further R&D requirements if needed.

Storm Shield®
CYCLONE RESISTANT GLASS - BY GLASSHAPE

Certified Cyclone Resistant Glass Solutions

Specifically developed to resist excessive wind speeds and penetration from flying debris, StormShield® is a certified debris impact resistant glass ideal for protecting your family, staff and property during cyclones.

The secret is the specially formulated ultra-high grade laminate used in the manufacturing process, which absorbs the impact of the debris without tearing or breaching the window envelope. This means even in the event the glass is damaged by flying storm debris, StormShield® remains weather-tight to protect the structural integrity of the building and ensure the safety of the occupants.

Testing & Certification

Major insurance companies and Local Shire Councils have approved StormShield® for use in North Western Australia, Queensland, Fiji and other Pacific regions.

Certified to AS/NZS1170.2:2011 (Cyclone Impact Resistance), AS4040.2:1992, AS4040.3:1992 (Static & Cyclic Wind loading) and AS/NZS2208:1996 (Safety glazing materials in buildings), StormShield® ticks all the boxes for compliance and certification.

Benefits

- Protects your family, staff and property from cyclone and hurricane winds and debris penetration
- Proven to withstand extreme test pressures of more than 12kPa, which equates to wind gusts in excess of 500km/h (10mm StormShield®)
- No need for secondary protection such as storm shutters or screens, allowing excellent clear vision
- No perforation: resists impact from 4kg piece of timber 100 x 50mm at over 45m/sec (162km/h) travelling lengthways with no perforation
- Fully certified for use in Regions C & D in Australia and the Pacific Islands
- Excellent noise reduction
- Increased security - impact resistant interlayer provides increased resistance to intruders

Features

- Grade A Safety Glass conforming to all human impact safety requirements
- Available in many types of high performance Low-E glass and tints to enhance thermal and solar performance characteristics
- Available cut to size or in stock sheets
- Range of thicknesses available, enabling full compliance with wind loadings and deflection standards as in AS1288 glass selection and installation, regardless of window size
- Evaluated at the world-class James Cook University cyclone testing station with excellent results

ilac-MRA IANZ ACCREDITED LABORATORY

NATA WORLD RECOGNISED ACCREDITATION

Telarc. Registered Quality ISO 9001

Nadi International Airport
Fiji

E-zone Glass®
THERMAL RESISTANT CYCLONE RATED GLASS - BY GLASSHAPE

Thermal Efficient Cyclone Rated Glass Solutions

Specifically developed for thermal performance, energy efficiency and durability, E-zone® Glass is engineered to perform in the most challenging storm conditions.

In the event the glass is damaged by flying storm debris, E-zone® Glass remains weather-tight without tearing or breaching the window envelope.

The pyrolytic process used in the manufacture of E-zone® Glass embeds invisible heat-reflective materials to the glass. This allows light to enter, but reflects much of the inbound heat, increasing comfort. Conversely, in cool climates we can configure E-zone® Glass to maximise heat retention.

Additionally, E-zone® Glass has been subjected to a series of hydrostatic pressure tests—taking cyclone resistant glass to a completely new level, setting yet another benchmark as an industry leader. E-zone® Glass is not only serious protection from wind and storm damage but is also flood resistant.

Benefits

- Decreased solar heat gain providing a cooler environment for improved working conditions and comfort levels
- Retains high levels of visual light transmission
- Can reduce HVAC requirements with positive impact on systems size requirements for cooling and heating
- No need for secondary protection such as storm shutters or screens, allowing excellent clear vision
- Protects your family, staff and property from cyclone and hurricane winds and debris penetration
- Customised solution with certified glass tailored for your individual project

Features

- Grade A Safety Glass conforming to all Human Impact Safety requirements
- Available in a range of high-performance Low-E glass and tints to enhance thermal and solar performance characteristics
- Available cut to size or in stock sheets
- Range of thicknesses available, enabling full compliance with wind loadings and deflection standards as in AS1288 glass selection and installation, regardless of window size

StormShield®
CYCLONE RESISTANT GLASS - BY GLASSHAPE

Technical Specifications

"Region D" - 44m/s Impact Resistance (AS/NZS1170.2.2011 Cyclone Impact Resistance)

Product Code	Thickness	Weight m²	Light Trans. %	Reflect (out). %	Reflect (in). %	Solar Trans. %	Solar Reflect. %	SC	SHGC	U Value (W/m2K) Winter
			LIGHT			SOLAR		THERMAL		
StormShield® Gen3 Clear										
SSCL141D	14.1mm (9/16")	31kg	87	7	7	65	6	0.85	0.74	5.28
SSCL161D	16.1mm (5/8")	36kg	85	7	7	61	6	0.82	0.71	5.22

"Region D" - 39m/s Impact Resistance (AS/NZS1170.2.2011 Cyclone Impact Resistance)

StormShield® Gen2 Clear										
SSCL124D	12.4mm (1/2")	25kg	87	7	7	65	6	0.85	0.74	5.40
SSCL144D	14.4mm (9/16")	30kg	85	7	7	61	6	0.82	0.71	5.34
SSCL164D	16.4mm (5/8")	35kg	84	7	7	58	6	0.80	0.69	5.28
SSCL184D	18.4mm (3/4")	40kg	83	7	7	54	6	0.77	0.67	5.22
StormShield® Gen2 Grey										
SSGR124D	12.4mm (1/2")	25kg	42	5	5	41	5	0.67	0.58	5.40
SSGR144D	14.4mm (9/16")	30kg	41	5	5	38	5	0.65	0.56	5.34
SSGR164D	16.4mm (5/8")	35kg	40	5	5	36	5	0.63	0.54	5.28
SSGR184D	18.4mm (3/4")	40kg	39	5	5	34	5	0.61	0.52	5.22
StormShield® Gen2 Obscure Arctic										
SSOB124D	12.4mm (1/2")	25kg	66	6	6	50	5	0.74	0.64	5.40
SSOB144D	14.4mm (9/16")	30kg	66	6	6	45	5	0.71	0.61	5.37
SSOB164D	16.4mm (5/8")	35kg	66	6	6	41	5	0.68	0.58	5.34
SSOB184D	18.4mm (3/4")	40kg	66	6	6	38	5	0.65	0.56	5.31

Custom options available on all products for tints or additional features or specifications.

Get It Right!

- Confirm Cyclonic region of your project.
- Confirm the Ultimate Limit State (ULS) for your project.
- Use the online StormShield® Calculator to confirm thickness requirements based on window sizes and ULS.
- Reference these tables to confirm specifications for the correct StormShield® or E-zone® product for your project.
- Specify using the correct product code.
- Have the peace of mind that your project will perform in the demanding conditions of cyclonic activity.

Technical Specifications

"Region C" - 30m/s Impact Resistance (AS/NZS1170.2.2011 Cyclone Impact Resistance)

Product Code	Thickness	Weight m²	Light Trans. %	Reflect (out). %	Reflect (in). %	Solar Trans. %	Solar Reflect. %	SC	SHGC	U Value (W/m2K) Winter
			LIGHT			SOLAR		THERMAL		
StormShield® Gen2 Clear										
SSCL114C	11.4mm (7/16")	24kg	87	7	7	65	6	0.85	0.74	5.46
SSCL134C	13.4mm (1/2")	29kg	85	7	7	61	6	0.82	0.71	5.40
SSCL154C	15.4mm (5/8")	34kg	84	7	7	58	6	0.80	0.69	5.34
SSCL174C	17.4mm (11/16")	39kg	83	7	7	54	6	0.77	0.67	5.28
StormShield® Gen2 Grey										
SSGR114C	11.4mm (7/16")	24kg	42	5	5	41	5	0.67	0.58	5.46
SSGR134C	13.4mm (1/2")	29kg	41	5	5	38	5	0.65	0.56	5.40
SSGR154C	15.4mm (5/8")	34kg	40	5	5	36	5	0.63	0.54	5.34
SSGR174C	17.4mm (11/16")	39kg	39	5	5	34	5	0.61	0.52	5.28
StormShield® Gen2 Obscure Arctic										
SSOB114C	11.4mm (7/16")	24kg	66	6	6	50	5	0.74	0.64	5.46
SSOB134C	13.4mm (1/2")	29kg	66	6	6	45	5	0.71	0.61	5.43
SSOB154C	15.4mm (5/8")	34kg	66	6	6	41	5	0.68	0.58	5.4
SSOB174C	17.4mm (11/16")	39kg	66	6	6	38	5	0.65	0.56	5.37

15m/s Impact Resistance (AS/NZS1170.2.2002 Cyclone Impact Resistance)

StormShield® Gen1 Clear										
SSCL08	8mm (5/16")	22kg	88	8	8	70	7	0.89	0.77	5.52
SSCL10	10mm (3/8")	27kg	87	7	7	65	6	0.85	0.74	5.46
SSCL12	12mm (1/2")	32kg	85	7	7	58	6	0.82	0.71	5.40
SSCL14	14mm (9/16")	37kg	84	7	7	58	6	0.80	0.69	5.34
SSCL16	16mm (5/8")	42kg	83	7	7	54	6	0.77	0.67	5.28
StormShield® Gen1 Grey										
SSGR08	8mm (5/16")	22kg	42	5	5	45	5	0.70	0.61	5.52
SSGR10	10mm (3/8")	27kg	42	5	5	41	5	0.67	0.58	5.46
SSGR12	12mm (1/2")	32kg	41	5	5	38	5	0.65	0.56	5.40
StormShield® Gen1 Arctic Obscure										
SSOB08	8mm (5/16")	22kg	66	6	6	55	6	0.77	0.67	5.52
SSOB10	10mm (3/8")	27kg	66	6	6	50	5	0.74	0.64	5.46

Custom options available on all products for tints or additional features or specifications.

E-zone Glass®
THERMAL RESISTANT CYCLONE RATED GLASS - BY GLASSHAPE

Technical Specifications

Thermal and Solar Efficient Options

"Region D" - 44m/s Impact Resistance (AS/NZS1170.2.2011 Cyclone Impact Resistance)

Product Code	Thickness	Weight m²	Light Trans. %	Reflect (out). %	Reflect (in). %	Solar Trans. %	Solar Reflect. %	SC	SHGC	U Value (W/m2K) Summer
			LIGHT			SOLAR		THERMAL		
Ezone® Gen3 Clear										
EZCL141D	14.1mm (9/16")	25kg	80	11	10	57	7	0.75	0.65	2.57
EZCL161D	16.1mm (5/8")	30kg	78	11	10	52	7	0.70	0.61	2.53
EZCL181D	18.1mm (23/32")	35kg	77	10	9	50	7	0.68	0.59	2.52
Ezone® Gen3 Neutral										
EZNCP141D	14.1mm (9/16")	25kg	57	9	7	36	6	0.57	0.49	2.57
EZNCP161D	16.1mm (5/8")	30kg	56	9	7	35	6	0.55	0.48	2.56
ENZCP181D	18.1mm (23/32")	35kg	56	9	7	34	5	0.55	0.48	2.54
Ezone® Gen3 Grey										
EZGRCP141D	14.1mm (9/16")	25kg	40	9	6	36	5	0.57	0.49	2.57
EZGRCP161D	16.1mm (5/8")	30kg	39	9	6	32	5	0.53	0.46	2.53
EZGRCP181D	18.1mm (23/32")	35kg	39	8	5	31	5	0.52	0.45	2.52

Thermal and Solar Efficient Options

"Region D" - 39m/s Impact Resistance (AS/NZS1170.2.2011 Cyclone Impact Resistance)

Product Code	Thickness	Weight m²	Light Trans. %	Reflect (out). %	Reflect (in). %	Solar Trans. %	Solar Reflect. %	SC	SHGC	U Value (W/m2K) Summer
			LIGHT			SOLAR		THERMAL		
Ezone® Gen2 Clear										
EZCL124D	12.4mm (1/2")	25kg	80	11	10	58	8	0.75	0.65	2.62
EZCL144D	14.4mm (9/16")	30kg	78	11	10	52	7	0.70	0.61	2.58
EZCL164D	16.4mm (5/8")	35kg	77	10	9	50	7	0.69	0.60	2.57
EZCL184D	18.4mm (3/4")	40kg	76	10	9	47	6	0.66	0.57	2.55
Ezone® Gen2 Neutral										
EZNCP124D	12.4mm (1/2")	25kg	59	7	9	38	6	0.59	0.50	2.57
EZNCP144D	14.4mm (9/16")	30kg	58	7	9	36	6	0.57	0.49	2.56
EZNCP164D	16.4mm (5/8")	35kg	57	7	9	35	6	0.56	0.48	2.54
EZNCP184D	18.4mm (3/4")	40kg	57	7	9	34	6	0.55	0.47	2.53
Ezone® Gen2 Grey										
EZGRCP124D	12.4mm (1/2")	25kg	39	6	9	39	6	0.59	0.51	2.55
EZGRCP144D	14.4mm (9/16")	30kg	39	5	9	36	6	0.57	0.49	2.52
EZGRCP164D	16.4mm (5/8")	35kg	38	6	9	32	5	0.53	0.46	2.50
EZGRCP184D	18.4mm (3/4")	40kg	38	5	8	30	5	0.52	0.45	2.47

Custom options available on all products for tints or additional features or specifications.

Technical Specifications

Thermal and Solar Efficient Options

"Region C" - 30m/s Impact Resistance (AS/NZS1170.2.2011 Cyclone Impact Resistance)

Product Code	Thickness	Weight m²	Light Trans. %	Reflect (out). %	Reflect (in). %	Solar Trans. %	Solar Reflect. %	SC	SHGC	U Value (W/m2K) Summer
			LIGHT			SOLAR		THERMAL		
Ezone® Gen2 Clear										
EZCL114C	11.4mm (7/16")	24kg	81	11	10	61	8	0.76	0.67	2.68
EZCL134C	13.4mm (1/2")	29kg	80	11	10	58	7	0.71	0.65	2.62
EZCL154C	15.4mm (5/8")	34kg	79	10	9	55	7	0.70	0.61	2.58
EZCL174C	17.4mm (11/16")	37kg	78	10	9	52	6	0.68	0.59	2.57
Ezone® Gen2 Neutral										
EZNCP114C	11.4mm (7/16")	24kg	59	7	9	38	6	0.59	0.50	2.60
EZNCP134C	13.4mm (1/2")	29kg	58	7	9	36	6	0.57	0.49	2.58
EZNCP154C	15.4mm (5/8")	34kg	57	7	9	35	6	0.56	0.48	2.55
EZNCP174C	17.4mm (11/16")	37kg	57	7	9	34	6	0.55	0.47	2.52
Ezone® Gen2 Grey										
EZGRCP114C	11.4mm (7/16")	24kg	39	6	9	39	6	0.59	0.51	2.58
EZGRCP134C	13.4mm (1/2")	29kg	39	5	9	36	6	0.57	0.49	2.55
EZGRCP154C	15.4mm (5/8")	34kg	38	6	9	32	5	0.53	0.46	2.53
EZGRCP174C	17.4mm (11/16")	37kg	38	5	8	30	5	0.52	0.45	2.50

Thermal and Solar Efficient Options

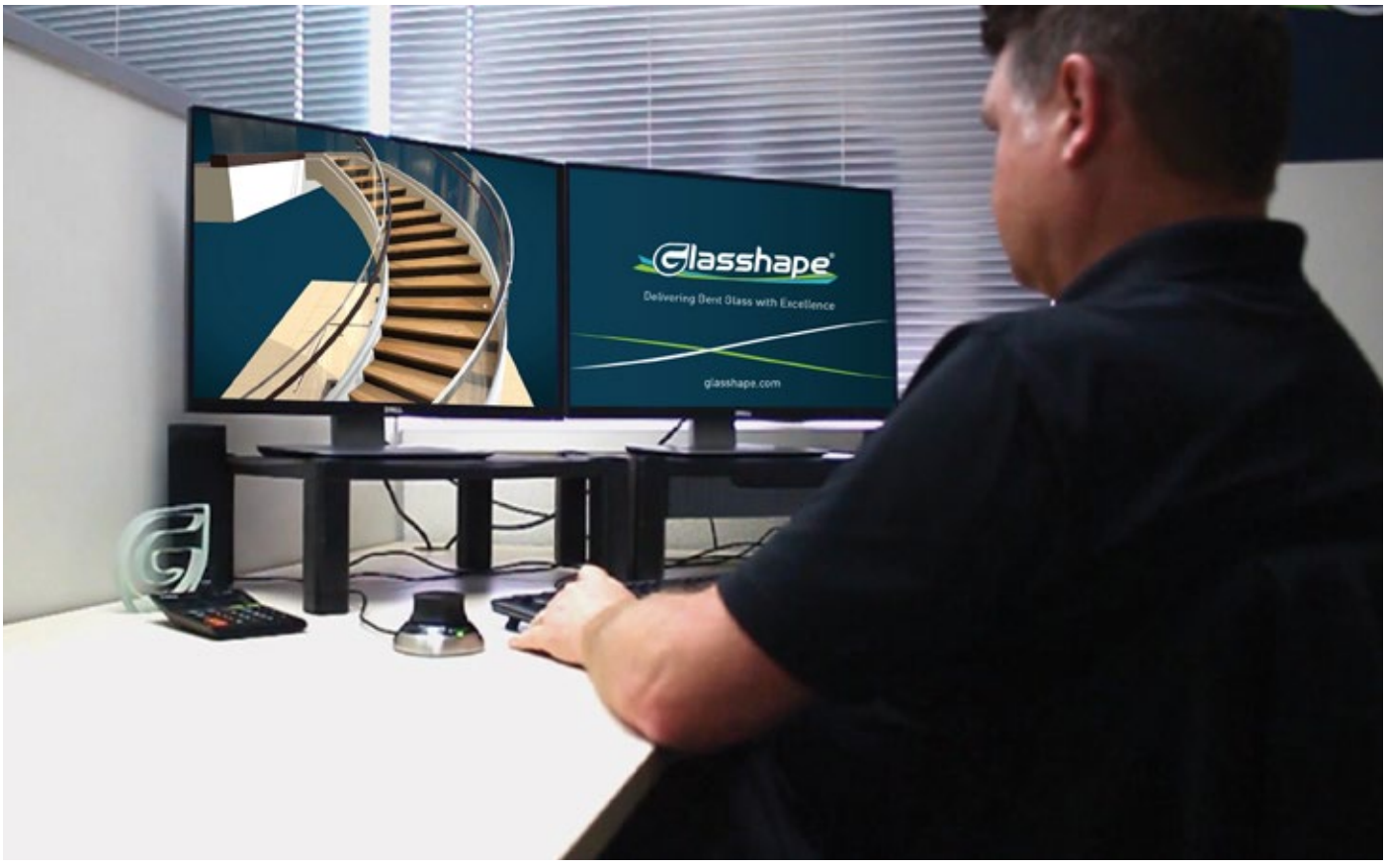
15m/s Impact Resistance (AS/NZS1170.2.2002 Cyclone Impact Resistance)

Product Code	Thickness	Weight m²	Light Trans. %	Reflect (out). %	Reflect (in). %	Solar Trans. %	Solar Reflect. %	SC	SHGC	U Value (W/m2K) Summer
			LIGHT			SOLAR		THERMAL		
Ezone® Gen1 Clear										
EZCL08	8mm (5/16")	22kg	82	11	10	64	8	0.79	0.69	2.74
EZCL10	10mm (3/8")	27kg	81	11	10	61	7	0.77	0.67	2.72
EZCL12	12mm (1/2")	32kg	80	10	9	59	7	0.71	0.62	2.69
EZCL14	14mm (9/16")	37kg	80	9	9	57	7	0.70	0.61	2.67
Ezone® Gen1 Neutral										
EZNCP08	8mm (5/16")	22kg	59	9	7	40	6	0.58	0.51	2.75
EZNCP10	10mm (3/8")	27kg	58	9	7	38	6	0.57	0.49	2.73
EZNCP12	12mm (1/2")	32kg	57	9	7	36	6	0.55	0.48	2.72
EZNCP14	14mm (9/16")	37kg	57	9	7	35	6	0.55	0.48	2.70
Ezone® Gen1 Grey										
EZGRCP08	8mm (5/16")	22kg	41	9	6	41	6	0.59	0.52	2.74
EZGRCP10	10mm (3/8")	27kg	41	9	6	39	6	0.57	0.49	2.71
EZGRCP12	12mm (1/2")	32kg	40	9	6	34	5	0.54	0.47	2.69
EZNCP14	14mm (9/16")	37kg	40	8	5	33	5	0.52	0.47	2.67

NB: Conditions and calculation of the above optical and solar performance data are based on ASHRAE Standard.
Performance data is based on representative value from software tabulation and information available at the time of preparation of this document which is subject to changes without notice. Actual value may vary slightly due to variations in the production process. Other glass manufacturers and coaters may use different instruments and measurement techniques. Therefore, reported performance values may vary on identical products by others.

Technical Details

Onsite Measure Service & CAD Service



3D Laser Scanning

Digital Site Measure Services

Our digital site measure service utilises the latest scanning hardware to produce electronic templates with unmatched accuracy, doing away with the need for cumbersome and time-consuming physical template measure and production. These templates convert into 3D renders that can be approved by the client ahead of production. This added layer of checks and balances means inaccurate measurements and human error are practically eliminated from the process.

In the event that at a later stage, a replacement piece of glass is required, we have the exact record of what was produced and can reproduce it precisely.

With Glasshapes on site digital measure service, our specialist technicians visit your site, with state-of-the-art scanning hardware to produce electronic templates with unparalleled accuracy. This is then turned into a 3D model for review and approval saving significant time and expense. Furthermore, electronic files are easily stored and retrieved should replacement panels ever be required in the future.

3D Laser Scanning & Digitising: We can use your measurements, or come to the site and generate them from existing structures, whether architectural or marine, glass balustrades, windows, doors or even components unrelated to glass.

Mesh Creation: Specialised CAD software translates the data into a 'mesh', providing an accurate representation of the project.

3D Computer Modelling: 3D CAD models are generated from the mesh geometry to ensure a perfect fit to framework. We are happy to take your existing 2D CAD files to turn into 3D models, should you require them.

Engineering Drawing: Engineering drawings for production and quality control are subsequently generated and approved by the client.

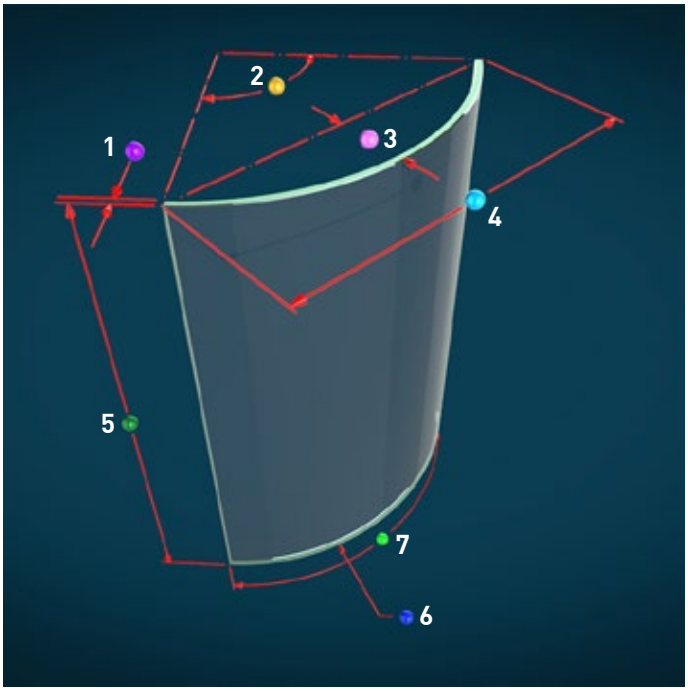
Computer Rendering: Should you require, we are able to produce photorealistic 'renders' of a finished project in situ to help visualise the end result for you or your clients.

Working with Bent Glass

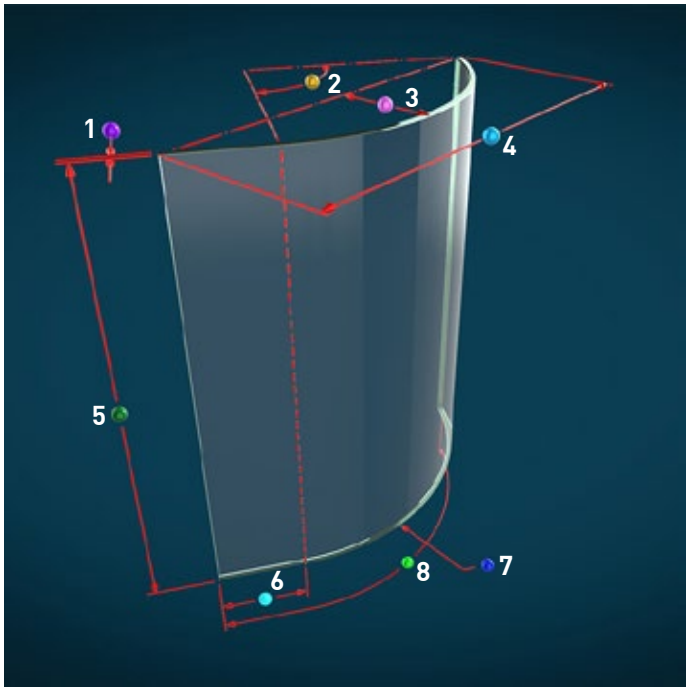
Frameless bent glass balustrades

Bent glass by Glasshape® can be used for bay windows, balustrades, barrel vault entrances, partitioning, reception areas, cabinetry, furniture and much, much more. In fact, with a little imagination, you can turn seemingly impossible dreams into exciting realities. The use of bent glass can turn just about any project into an upmarket masterpiece.

Even Radii Bend

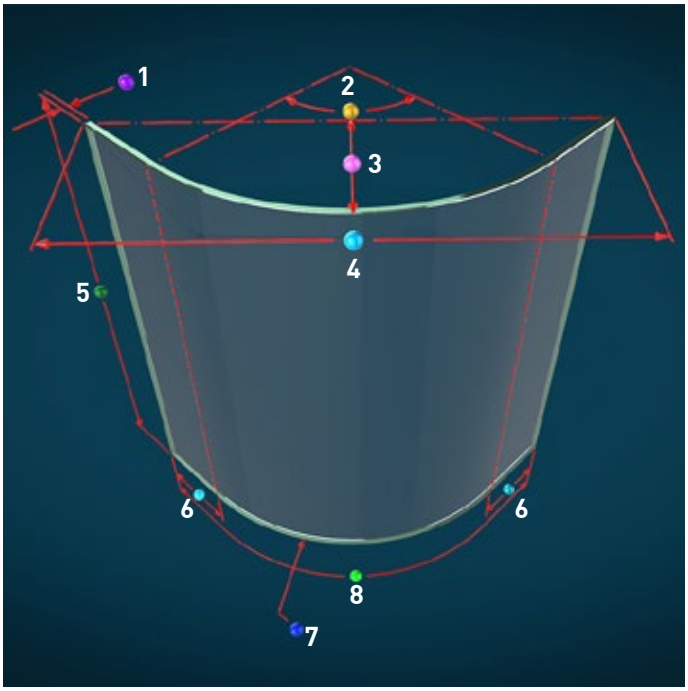


Even Radii Bend + Single Tangent



Even Radii Bend + Double Tangents

To enable accurate quoting, measuring and ordering, you need to know what technical information we require.



Please see diagrams that explain the basic terminology of glass bending.

1	**Thickness:**	Glass thickness.
2	**Bend Angle:**	Angle at which glass panel is to be bent.
3	**Drop:**	Height from the highest point of the bend, to a horizontal line between the start and end points of the panel, inclusive of the flat tangent.
4	**Chord:**	Outside surface chord measurement, from the start to the end points of the bend inclusive of the flat tangent.
5	**Height:**	Overall height or length of the glass panel.
6	**Tangent:**	Length of flat tangent.
7	**Bend Radii:**	Outside surface bend radii measurement.
8	**Girth:**	Length of outside surface girth measurement of the bend inclusive of the flat tangent.

Barangaroo — Revolving Door
Sydney, NSW, Australia

Small Bend Even Radius

TemperShield® - Even Radius Small Panels					
Glass Thickness (mm & inches)	**Girth** (mm & inches)	**Minimum Radius** (mm & inches)	**Length** (mm & inches)	**Maximum Depth** (mm & inches)	**Max Angle⁰** (degrees)
4mm	350mm to 1000mm	450mm	100mm to 2440mm	250mm	127⁰
(1/8")	(13 3/4" to 39 3/8")	(17 3/4")	(3 7/8" to 96 1/8")	(9 7/8")	
5mm	350mm to 1050mm	450mm	100mm to 2440mm	273mm	135⁰
(3/16")	(13 3/4" to 41 3/8")	(17 3/4")	(3 7/8" to 96 1/8")	(10 3/4")	
6mm	350mm to 1100mm	450mm	100mm to 2440mm	296mm	140⁰
(1/4")	(13 3/4" to 43 1/4")	(17 3/4")	(3 7/8" to 96 1/8")	(11 5/8")	
8mm	350mm to 1150mm	500mm	100mm to 2440mm	296mm	132⁰
(5/16")	(13 3/4" to 45 1/4")	(19 5/8")	(3 7/8" to 96 1/8")	(11 5/8")	
10mm	350mm to 1200mm	550mm	100mm to 2440mm	296mm	125⁰
(3/8")	(13 3/4" to 47 1/4")	(21 5/8")	(3 7/8" to 96 1/8")	(11 5/8")	
12mm	350mm to 1250mm	650mm	100mm to 2440mm	278mm	110⁰
(1/2")	(13 3/4" to 49 1/4")	(25 5/8")	(3 7/8" to 96 1/8")	(11")	
15mm	350mm to 1300mm	750mm	100mm to 2440mm	264mm	99⁰
(5/8")	(13 3/4" to 51 1/8")	(29 1/2")	(3 7/8" to 96 1/8")	(10 3/8")	

Large Bend Even Radius

TemperShield® - Even Radius Large Panels					
Glass Thickness (mm & inches)	**Girth** (mm & inches)	**Minimum Radius** (mm & inches)	**Length** (mm & inches)	**Maximum Depth** (mm & inches)	**Max Angle^0** (degrees)
5mm	650mm to 2440mm	1000mm	350mm to 3900mm	656mm	140^0
(3/16")	(25 5/8" to 96 1/8")	(39 3/8")	(13 3/4" to 153 1/2")	(25 53/64")	
6mm	650mm to 2440mm	1000mm	350mm to 3900mm	656mm	140^0
(1/4")	(25 5/8" to 96 1/8")	(39 3/8")	(13 3/4" to 153 1/2")	(25 53/64")	
8mm	650mm to 2440mm	1000mm	350mm to 3900mm	656mm	140^0
(5/16")	(25 5/8" to 96 1/8")	(39 3/8")	(13 3/4" to 153 1/2")	(25 53/64")	
10mm	650mm to 2440mm	1000mm	350mm to 3900mm	656mm	140^0
(3/8")	(25 5/8" to 96 1/8")	(39 3/8")	(13 3/4" to 153 1/2")	(25 53/64")	
12mm	650mm to 2440mm	1200mm	350mm to 3900mm	569mm	117^0
(1/2")	(25 5/8" to 96 1/8")	(47 1/4")	(13 3/4" to 153 1/2")	(22 3/8")	
15mm	650mm to 2440mm	1500mm	350mm to 3900mm	469mm	93^0
(5/8")	(25 5/8" to 96 1/8")	(59 1/6")	(13 3/4" to 153 1/2")	(18 1/2")	
19mm	650mm to 2440mm	1900mm	350mm to 3900mm	378mm	74^0
(3/4")	(25 5/8" to 96 1/8")	(74 3/4")	(13 3/4" to 153 1/2")	(14 7/8")	

Uneven Radius Panels & 3D*

TemperShield® Uneven Radius Panels & 3D*					
Glass Thickness (mm & inches)	**Girth** (mm & inches)	**Minimum Radius** (mm & inches)	**Length** (mm & inches)	**Maximum Depth** (mm & inches)	**Max Angle⁰** (degrees)
6mm	100mm to 950mm	200mm	100mm to 950mm	150mm	90⁰
(1/4")	(3 7/8" to 76 3/4")	(7 7/8")	(3 7/8" to 37 3/8")	(5 5/8")	
8mm	100mm to 1950mm	200mm	100mm to 2950mm	250mm	90⁰
(5/16")	(3 7/8" to 76 3/4")	(7 7/8")	(3 7/8" to 116 1/8")	(9 7/8")	
10mm	100mm to 1950mm	200mm	100mm to 2950mm	290mm	90⁰
(3/8")	(3 7/8" to 76 3/4")	(7 7/8")	(3 7/8" to 116 1/8")	(11 3/8")	
12mm	100mm to 1950mm	250mm	100mm to 2950mm	290mm	90⁰
(1/2")	(3 7/8" to 76 3/4")	(9 7/8")	(3 7/8" to 116 1/8")	(11 3/8")	
15mm	100mm to 1950mm	250mm	100mm to 2950mm	290mm	90⁰
(5/8")	(3 7/8" to 76 3/4")	(9 7/8")	(3 7/8" to 116 1/8")	(11 3/8")	
19mm	100mm to 1950mm	250mm	100mm to 2950mm	290mm	90⁰
(3/4")	(3 7/8" to 76 3/4")	(9 7/8")	(3 7/8" to 116 1/8")	(11 3/8")	

'J' Curves, Even and Uneven Radius Panels*

Annealed & Laminated - 'J' Bends, Even and Uneven Radius Panels*					
Glass Thickness (mm & inches)	**Girth** (mm & inches)	**Minimum Radius** (mm & inches)	**Length** (mm & inches)	**Maximum Depth** (mm & inches)	**Max Angle⁰** (degrees)
2mm	80mm to 900mm	50mm	50mm to 1200mm	266mm	160⁰
(1/16")	(3 1/8" to 35 3/8")	(1 15/16")	(1 15/16" to 47 1/4")	(10 1/2")	
3mm	100mm to 1600mm	80mm	50mm to 2400mm	474mm	160⁰
(1/8")	(3 7/8" to 63')	(3 1/8")	(1 15/16" to 94 1/2")	(18 5/8")	
4mm	150mm to 1800mm	100mm	50mm to 2800mm	533mm	160⁰
(5/32")	(5 7/8" to 70 7/8")	(3 7/8")	(1 15/16" to 110 1/4")	(20 31/32")	
5mm	180mm to 2250mm	150mm	50mm to 3150mm	650mm	154⁰
(3/16")	(7 1/8" to 88 5/8")	(5 7/8")	(1 15/16" to 124 1/32")	(25 5/8")	
6mm	200mm to 2350mm	150mm	50mm to 3250mm	650mm	145⁰
(1/4")	(7 7/8" to 92 1/2")	(5 7/8")	(1 15/16" to 127 15/16")	(25 5/8")	
8mm	200mm to 2350mm	200mm	50mm to 3250mm	650mm	145⁰
(5/16")	(7 7/8" to 92 1/2")	(7 7/8")	(1 15/16" to 127 15/16")	(25 5/8")	
10mm	200mm to 2350mm	200mm	50mm to 3250mm	650mm	145⁰
(3/8")	(7 7/8" to 92 1/2")	(7 7/8")	(1 15/16" to 127 15/16")	(25 5/8")	
12mm	200mm to 2350mm	200mm	50mm to 3250mm	650mm	145⁰
(1/2")	(7 7/8" to 92 1/2")	(7 7/8")	(1 15/16" to 127 15/16")	(25 5/8")	
15mm	200mm to 2350mm	300mm	50mm to 3250mm	650mm	145⁰
(5/8")	(7 7/8" to 92 1/2")	(11 3/4")	(1 15/16" to 127 15/16")	(25 5/8")	
19mm	200mm to 2350mm	350mm	50mm to 3250mm	650mm	145⁰
(3/4")	(7 7/8" to 92 1/2")	(13 3/4")	(1 15/16" to 127 15/16")	(25 5/8")	

Private Residence
Auckland, New Zealand

Compound shapes, uneven radii, tangents

Please contact one of the Glasshape® team to calculate and test what the possibilities are as there are restrictions in some cases. It is recommended that you supply a CAD file with the desired curve, if you don't have a CAD file, one can be produced for you.

Oversize Capabilities:

For non-bent panels we are able to offer a maximum size of 7600 x 3300mm. This reduces to 7200mm if heat soak is required. It is possible to manufacture flat toughened laminated and printed panels up to 15000 x 3200mm – we can work with you to supply to your specification.

* Some "J" shape and uneven panels may not be able to be toughened. Please enquire directly.

Bent Glass Tolerances*

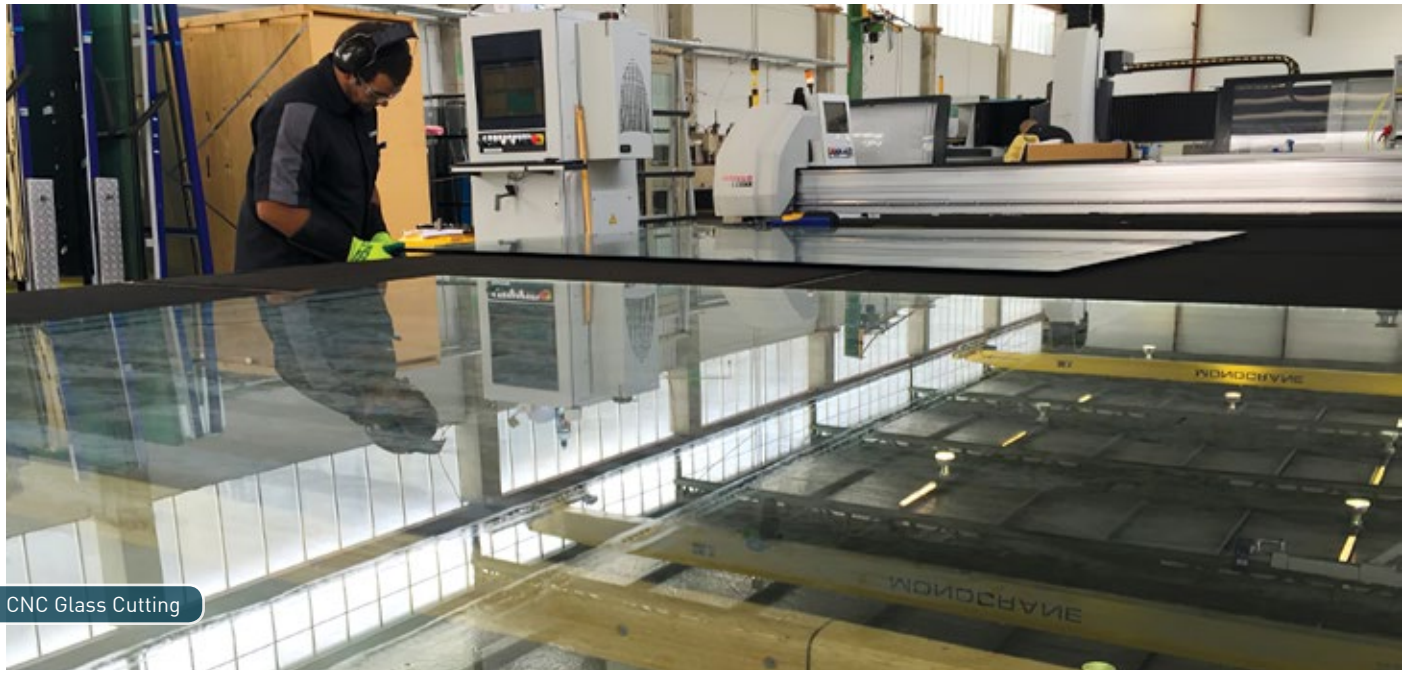
Overall measurement	Twisting	Edge Flatness	Deviation of Curve	Glass Thickness	Edge Alignment
+/- 2mm over 1m	+/- 3mm over 1m	+/- 2mm over 1m	+/- 2mm	+/- 0.7mm	+/- 2mm

*For more specific and detailed quality tolerances, please view the Glasshape® Quality Manual for Processed Glass — https://glasshape.com/technical-info-download/

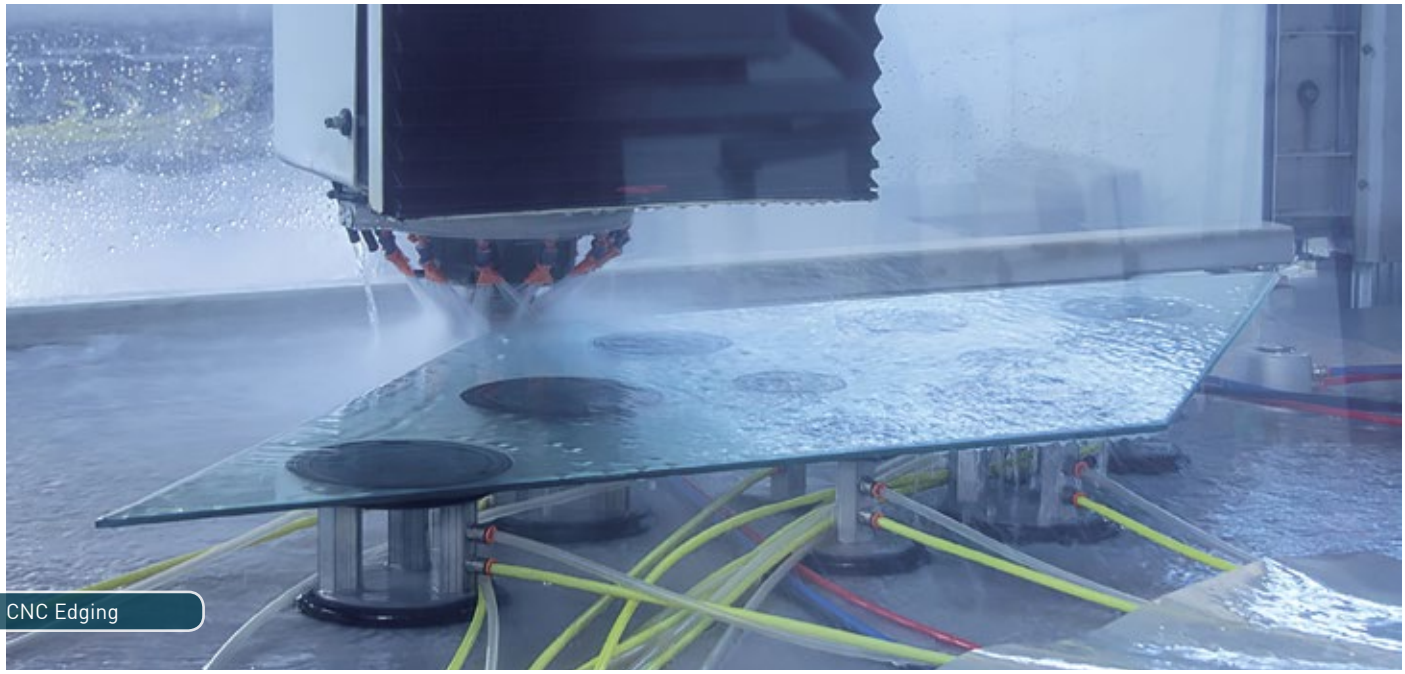
Production Facilities

Glass Stocks

Glass Stock Loading



CNC Glass Cutting



CNC Edging

Washing & QC

VisionInk® Printer

Printing Process

CNC Bending & Tempering

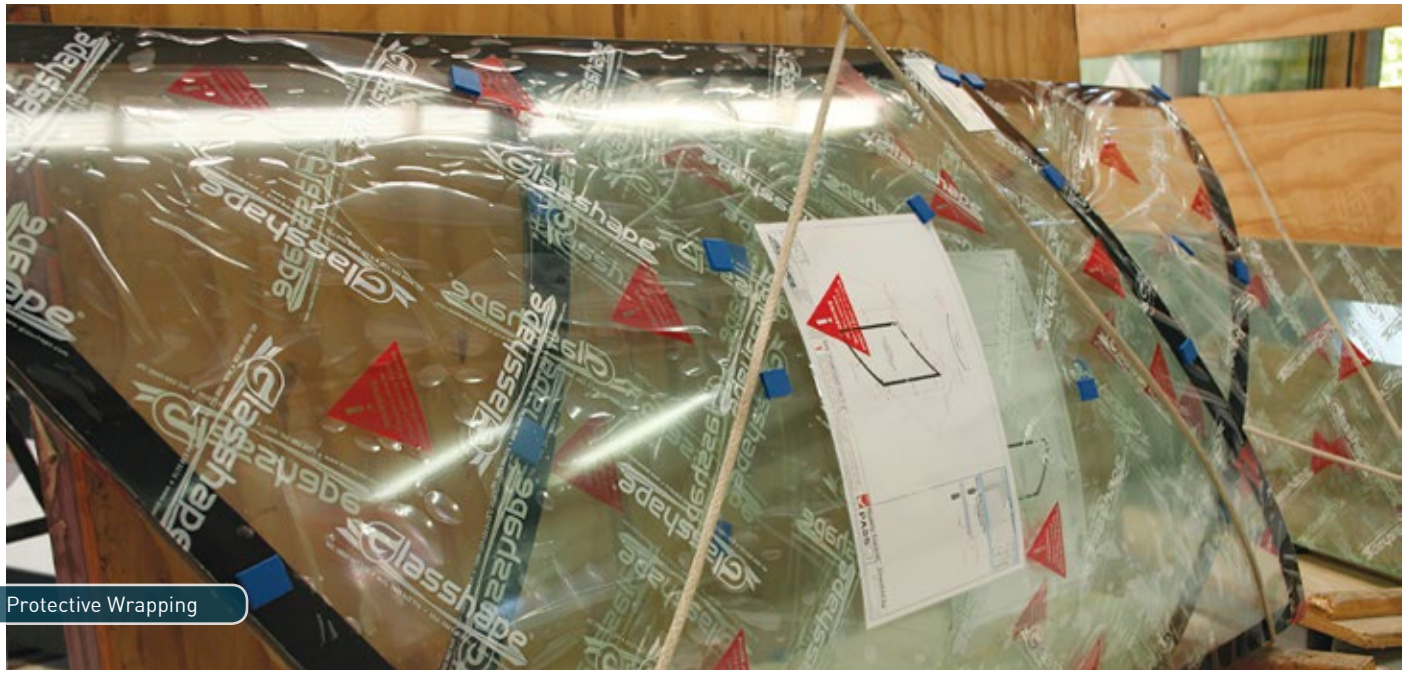
CNC Bending &Tempering

CNC Bending & Tempering

Wash & QC Scanning

Custom Laminating

Quality Control Inspection



Protective Wrapping

Crating Process

Global Delivery

About Us

Complete Architectural Glass Solutions

When it comes to glass, Glasshape® understands that quality, performance, durability and safety standards are paramount to designers, builders and owners of residential and commercial buildings.

Combining 30 years of industry knowledge and technical expertise Glasshape® have developed unique proprietary manufacturing processes addressing the specific needs of the architectural sector and provide premium bent and specialist glass solutions.

At Glasshape®, we take a customised approach. We work with clients to confirm their needs and establish the appropriate glass solutions. Our complete service includes consultation, digital measurement, CAD design, certification, and manufacturing. With the Glasshape® tailored approach, clients are assured their glass solutions are effortlessly fulfilled.

About Us

Established in 1986, we are a leading innovator, designer and manufacturer of bent, toughened, laminated and digital ceramic print specialty glass. Family owned, based in Auckland, New Zealand, with offices in Australia and the US, Glasshapes philosophy of growth through innovation, ingenuity and customer service sees it deliver best-in-class glazing solutions in a variety of categories, with notable success in marine, architectural (residential and commercial), high security and heavy machinery projects.

We're driven to exceed our client's design and performance requirements using our extensive industry knowledge and technical expertise to provide the perfect solution. Glasshape® provides customised turnkey solutions from initial consult through to installation, with proven global success backed by comprehensive warranties and validated by international accreditation.

The family spirit underpins the delivery of excellence at Glasshape®. Mark Forrest and his four sons combine more than 100 years of combined experience in bent and specialist glass technology. It's always the people behind the message who deliver on the promises.

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TemperShield® TOUGHENED BENT GLASS - BY GLASSHAPE

AmmoShield® BULLET RESISTANT GLASS - BY GLASSHAPE

ArmourShield® POLY-COMPOSITE SECURITY GLASS - BY GLASSHAPE

BanditShield® ANTIBANDIT GLASS - BY GLASSHAPE

E-zoneGlass® THERMAL RESISTANT CYCLONE RATED GLASS - BY GLASSHAPE

StormShield® CYCLONE RESISTANT GLASS - BY GLASSHAPE

VisionInk CERAMIC PRINTED GLASS - BY GLASSHAPE

SwitchShield® SWITCHABLE GLASS - BY GLASSHAPE

CareShield® SECURE HEALTHCARE SAFETY GLASS - BY GLASSHAPE

Version: ARC - 20.06.19