

Pilkington **Planar™**

The world's leading structural glass system

Pilkington Structural Glass Systems.

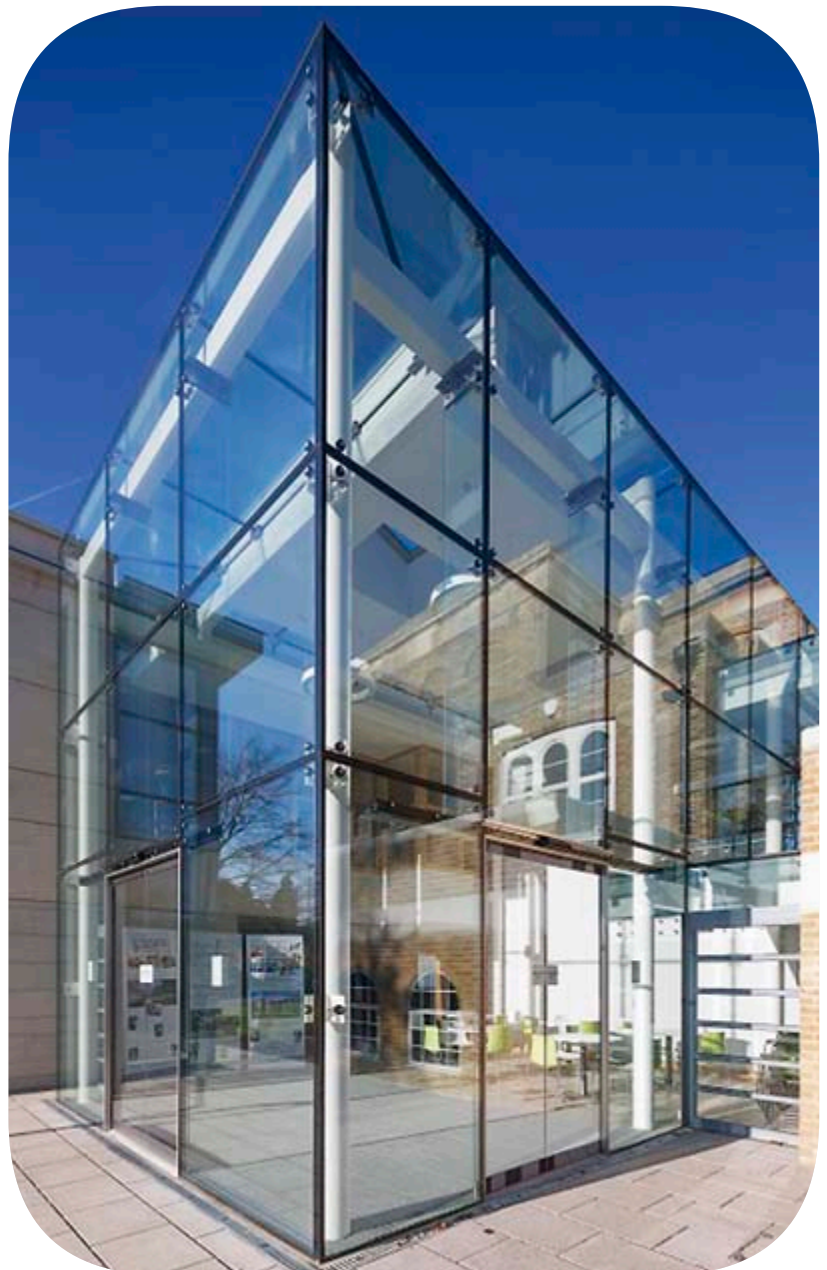
Unrivalled performance for over 45 years.

Pilkington **Planar**[™], the world's leading structural glass system has evolved from the original patch plate system pioneered by Pilkington Architectural over 45 years ago.

With a proven track record in the most demanding applications, the Pilkington **Planar**[™] system lets architects create a complete glass envelope for buildings, with façades on any plane. Which means you can build highly attractive working environments with more light and a greater feeling of space.

Support structures, located internally or externally, can be as subtle or as dominant as you require. Support can be derived from glass mullions, a conventional steel construction, or the highly versatile Pilkington **Planar**[™] Tension Structure design or even a combination of all such schemes.

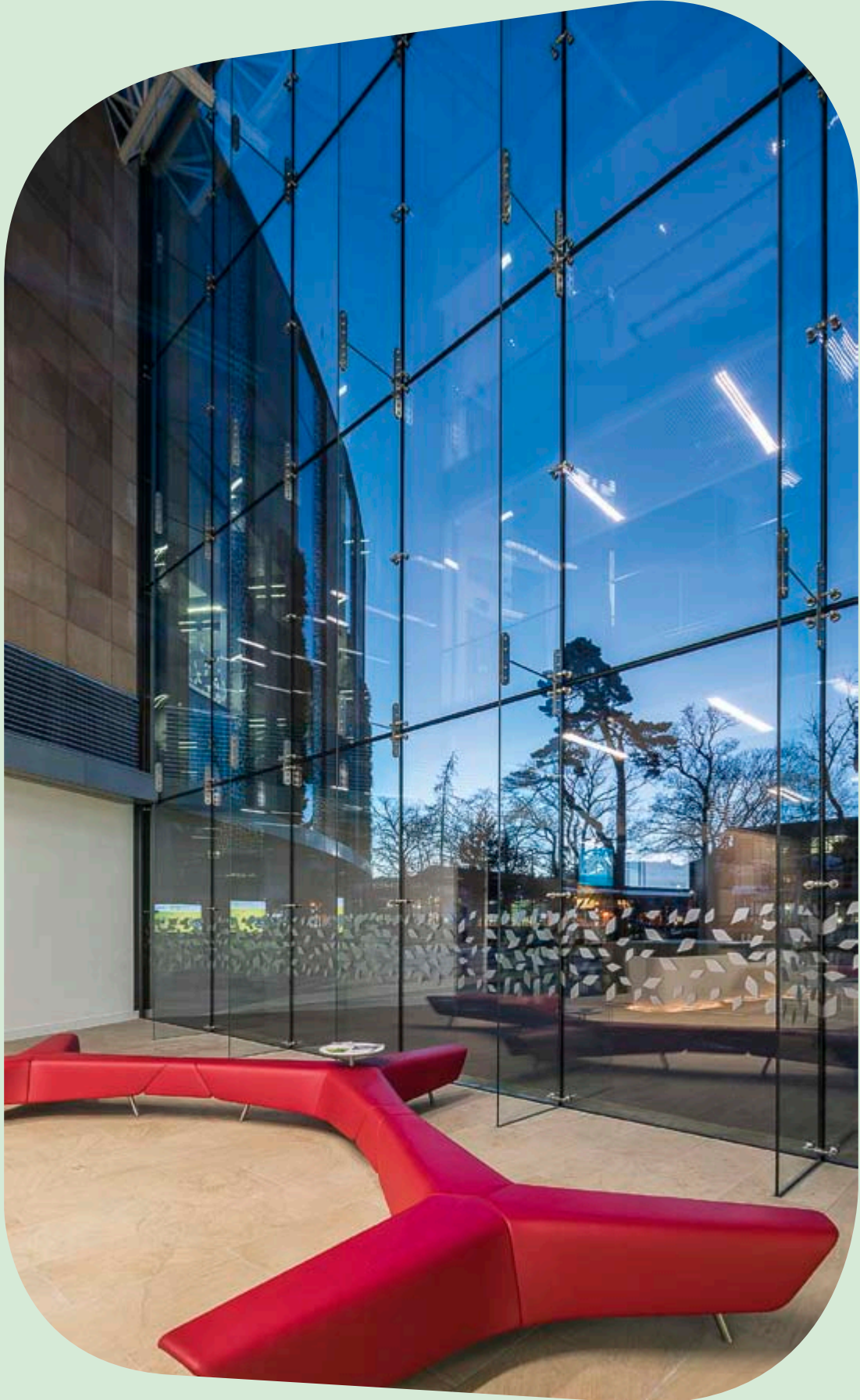
Quality is assured by the use of Pilkington glass, with fabrication and design carried out in an ISO 9001 certified manufacturing facility in St Helens, UK. Operating under the ISO 14001 environmental management system.



*Image on front cover St James's Place
– Cirencester*

*All images in brochure are in the UK
unless stated.*

St John's church – Egham.



Roslin Innovation Centre – Edinburgh.



The Materials Innovation Factory – Liverpool.

Latest developments

Pilkington Architectural continues to lead the way with new developments. In keeping with our policy of constant innovation and improvement, the following developments are now part of the Pilkington **Planar**[™] range:

Pilkington **Planar**[™] Triple

The world's first triple glazed frameless bolted system, offering improved thermal insulation, design flexibility and multiple glass combinations for better solar performance or noise control.

- U values of 0.8 W/m²K achievable
- Acoustic performance of R_w > 42 dB achievable
- Maximised load capacity for larger design modules
- Building transparency increased by larger vision areas

Pilkington **Planar**[™] Integral

By using a bolt fixing incorporated into the glass rather than an exterior fastener, this innovative method of securing laminated panels allows the use of a greater variety of glass types.

- No holes in external glass surface
- Flush exterior for easier maintenance
- Wider choice of glass improves design flexibility

Pilkington **Planar**[™] Heavy Duty

Constant improvement in Pilkington **Planar**[™] bolt fittings has increased capacity to such an extent that larger and heavier Insulating Glass Units (IGUs) can now be easily accommodated.

Pilkington Laminated Glass Fins (Mullions)

The latest development in mullions, or fins, is composite glass mullions made from laminated glass, offering the designer greater design versatility.

- Vertical and horizontal applications possible
- Enhanced structural durability – offering design solutions for ever more demanding markets and applications
- Offers the opportunity to reduce mullion depth and need for lateral bracing

Planar[™] | SentryGlas[®] System

The **Planar**[™] | SentryGlas[®] System is a high performing laminated system offering:

- Increased strength and durability
- Reduced weight of glass and structure
- Longer spans with reduced fixings
- Spectacular post glass breakage security
- Visibly improved clarity, particularly when combined with Pilkington **Optiwhite**[™] low-iron glass
- Structural glass fin and beam applications
- The opportunity to specify glass for horizontal installations when access may be required for maintenance

Pilkington **Planar**[™] Intrafix System

Fixing securely to the inner structural glass component of an insulated unit, the Intrafix System offers a thermally efficient facade in which the external glass surface is not penetrated with fittings.

- No holes in the external glass surface
- An increased range of coated and coloured glass

Pilkington **Planar**™. Most tested. Most trusted.

Our testing is a continuous process, as new projects demand higher performance. All custom applications are researched, developed and tested before they are launched into the marketplace.

Pilkington **Planar**™ is subject to on-going testing by our in-house team of dedicated product development engineers in a laboratory environment. The system has also been subject to extensive performance testing at a wide range of independently accredited test laboratories.

Specific results for everything from bomb blast loading, seismic performance, to large missile hurricane induced impact tests are used by Pilkington Architectural engineers in project design. In addition, we are prepared to carry out full size tests and scaled model analysis to prove Pilkington **Planar**™ can meet a required specification.

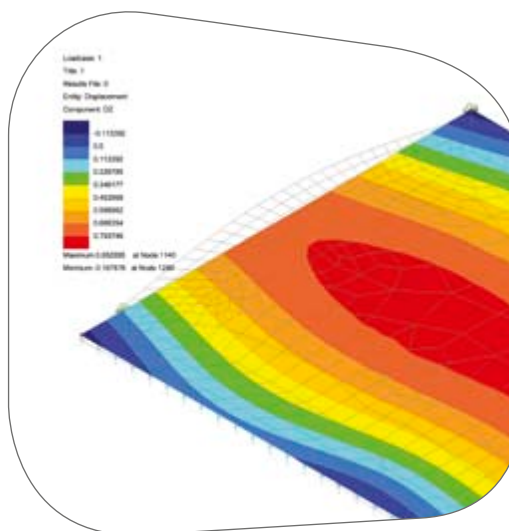
The knowledge we have acquired from testing has allowed us to develop a Code of Practice for structural glass façades. All aspects of the Pilkington **Planar**™ system are designed in accordance with this criteria. Such control means we can give Pilkington **Planar**™ a 12-year design and materials warranty via a network of independent accredited installers. This provides specifiers with total confidence that the Pilkington **Planar**™ system will meet and exceed the requirements of the project. Pilkington **Planar**™ is never sold as glass or fittings alone, only as a complete engineered system.

The in-house Finite Element Analysis (FEA) modelling capability enables the accurate structural analysis of a wide range of complex glass shapes and construction for both load capacity and deflection in service.

The highest quality and the widest range of glass

Structural glass façades depend on the quality of the glass for their performance and aesthetic effect. With Pilkington Architectural this is assured. All toughened glass will be supplied heat soaked to, or in excess of international specifications, e.g. EN 14179-1. This ensures a high quality product designed to meet the demands of the built environment.

Our expertise in glass manufacture means we can also place a vast array of glass types at your disposal. Giving you total flexibility of performance, appearance and transparency.



FEA computer modelling (finite element analysis).

Pilkington **Planar**™ Laminated Safety Glass

For greater confidence in vertical, horizontal or inclined applications, Pilkington Architectural have developed a range of toughened (or heat strengthened) laminated glass for incorporation into the Pilkington **Planar**™ system. The design process can use a combination of materials to maintain panel integrity in post breakage situations. Furthermore the Pilkington **Planar**™ system, comprising laminated safety glass, has been used in many applications including high wind load, snow load, seismic movements, blast resistance hurricane and impact resistance.



Example of external testing.

Pilkington **Planar**™ Glass Types

Insulating Glass Units

Pilkington **Planar**™ Insulating Glass Units are technically advanced, dual sealed offering excellent durability and reliability. They incorporate a custom spacer bar designed to accommodate high levels of flexibility and deflections. Pilkington **Planar**™ IGU's can incorporate a variety glass types, for example:

Pilkington **Optifloat**™ Clear

High quality clear float glass, from the world leaders and inventors of the float glass process.

Pilkington **Optiwhite**™

Pilkington **Optiwhite**™ is a true low iron glass, increasing the amount of visible light that can pass through, improving clarity and visual aesthetics.

Pilkington **K Glass**™ and

Pilkington **Optitherm**™ S1 Plus

A unique low-emissivity coating on the surface of Pilkington **Optifloat**™ gives it superb energy management properties. Insulating units incorporating Pilkington **K Glass**™ offer up to 30 percent better insulation than conventional units. Pilkington **Optitherm**™ S1 Plus is a super neutral, off-line coated, low-emissivity glass for use in Insulating Glass Units offering superior thermal insulation.



Aldi HQ, Atherstone –
Warwickshire.

Pilkington **Planar Suncool**™ Range

This range offers an exciting selection of energy management glass, for insulation and combatting solar gain, in a variety of subtle colours which can be used in Insulating Glass Units. This allows the specifier maximum flexibility in choosing the level of performance that suits the project's needs.

Pilkington Screen Printed Glass

Choose from a selection of screen printed glass, to achieve a range of stunning visual effects.

Pilkington **Planar Activ**™

This product combines Pilkington **Planar**™ with Pilkington **Activ**,™ allowing designers to create the first ever self-cleaning frameless structural glazing systems. Collaboration between Pilkington Architectural engineers and scientists at the sealant companies allowed the creation of a revolutionary sealant product compatible with Pilkington **Activ**™.

St Andrew Square – Edinburgh.

Pilkington **Planar**™ fittings

The fittings in the Pilkington **Planar**™ system offer the ideal balance between durability and appearance. All are manufactured from a minimum 316 grade stainless steel and some of the most durable engineering materials currently available. Highly engineered and tested components enable us to offer the smallest, most aesthetically pleasing fittings available, without compromising performance.

The 902 fitting

Connects indirectly to the secondary structure by means of Pilkington **Planar**™ spring plate or castings.

The 905J fitting

The most popular Pilkington **Planar**™ fitting, is machined and aesthetically pleasing allowing absorption of live loads and thermal expansion by rotation around a stainless steel rod connected to the back up structure.

Stainless Steel Castings

A range of stainless steel castings are available which can connect back to various structures.

Specially customised fittings are available subject to design assessment and approval.

Please see below some typical examples



Pilkington **Planar**™ Intrafix insulated double glazed unit with standard angle spring plates.



Pilkington **Planar**™ 905J fitting to a tubular steel support structure.



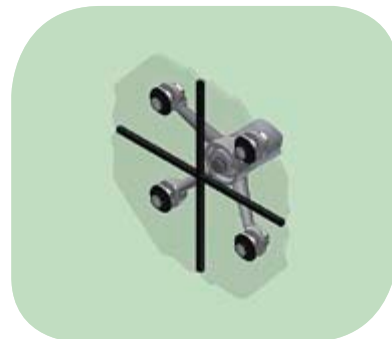
Vertical stainless steel splice plate connecting sections of a glass fin (mullion) together, incorporating Pilkington **Planar**™ 905J fittings.



Pilkington **Planar**™ custom casting connected to a glass fin (mullion) and Pilkington **Planar**™ 902 bolts to façade glass.



Pilkington **Planar**™ 905J fitting to a glass fin (mullion).



Pilkington **Planar**™ Nexus casting connected to steelwork and Pilkington **Planar**™ 902 bolts to a façade glass.

Pilkington **Planar**™ Support Structures

Glass Fin (Mullion) Systems

The use of Pilkington **Planar**™ in combination with a glass fin system creates the ultimate in transparency. Glass fins are used to transfer wind loading to the structure. Pilkington Architectural have led the way in the development and testing of this design technology.

Structures of this type can be either supported at the base (ground based) or suspended (hung) from above depending upon the height of the façade. The weight of both the panels and the fins is carried by the connection at the head or base of each fin.



Stonehenge Visitor Centre – Wiltshire.
Images Courtesy of Vitrine Systems Ltd.





Seinajoki Library – Finland.

Steel structures

Various forms of steel structures can be used to support a Pilkington **Planar**™ façade. The design of these structures can be simple, in the form of mullions, or more intricate in the form of trusses, to allow architects their freedom of design.



Pier 79, New York City – USA.



Tension Structures

A proven performance

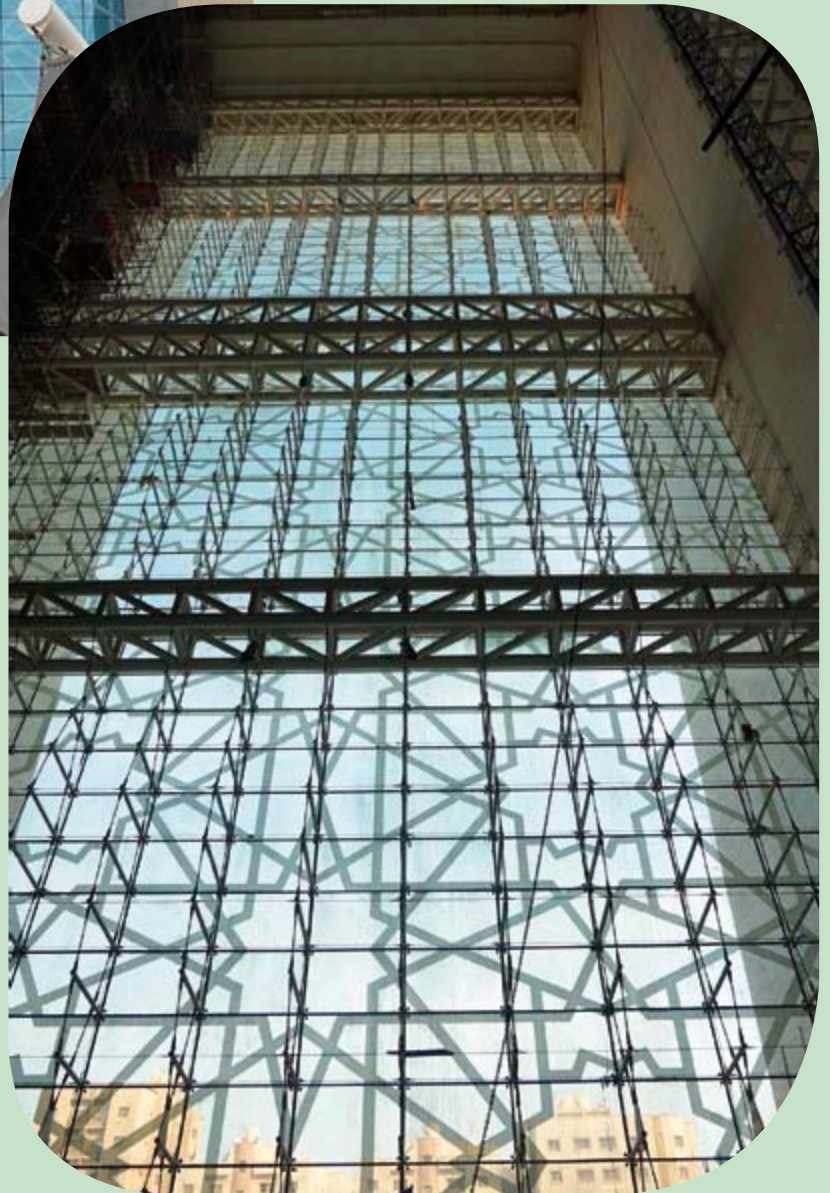
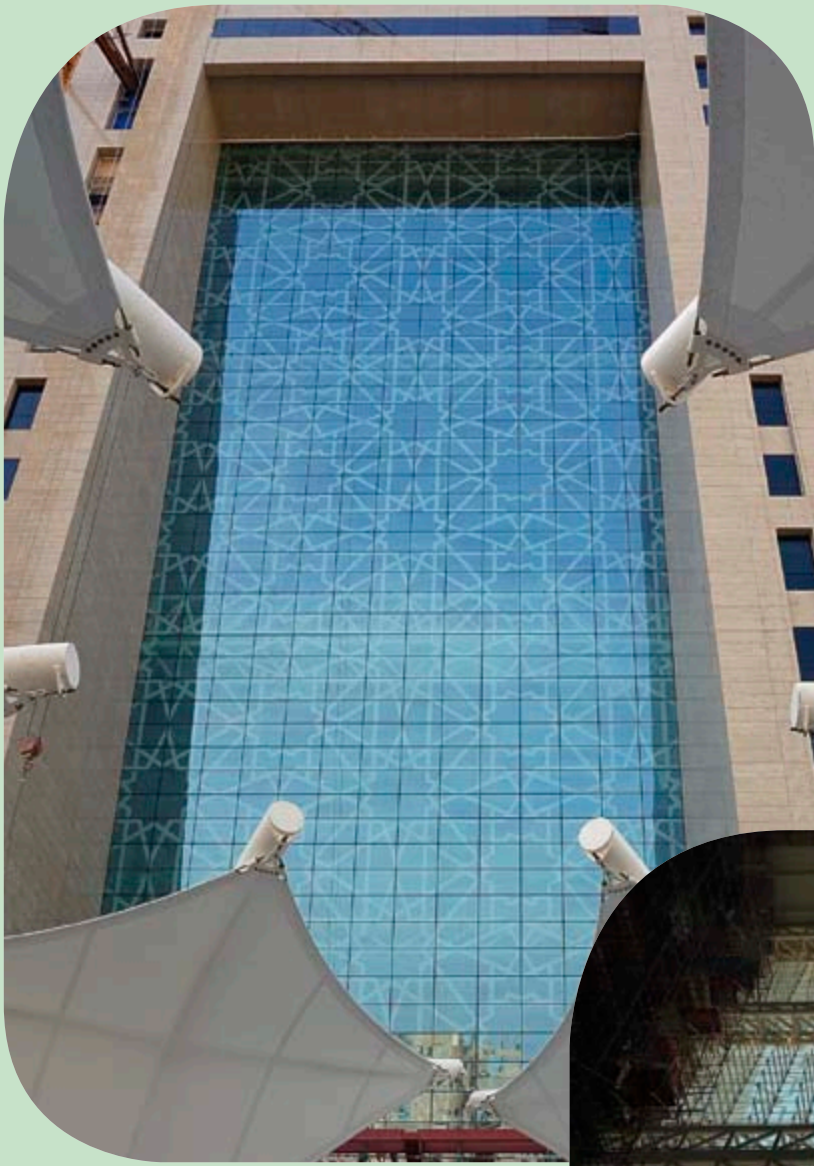
Utilising a tension structure support system, creates a aesthetically pleasing highly engineered supporting structure, bespoke engineered for each individual project, creating a unique facade.



Alice Tully Hall,
New York – USA.



St James's Place – Cirencester.



Al Farwaniya – Kuwait.

Skylights and canopies

The design flexibility of Pilkington **Planar**™ and its elimination of framing makes it ideal for overhead glazing, and can be specified with confidence for applications such as canopies and skylights.



St Thomas's Hospital, Gassiot House – London.

Images Courtesy of ME Construction LTD/Suburbia Photography.



Attingham Park – Shropshire.

Image courtesy of:
National Trust / Richard Knisley-Marpole.



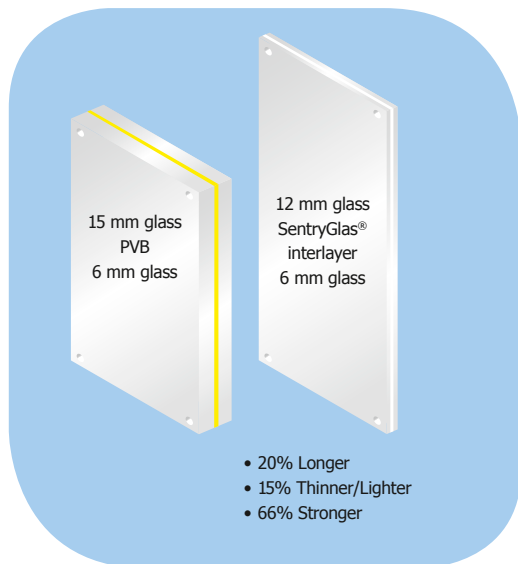
Blackfriars Station – London.



The **Planar™** | SentryGlas® System

Pilkington Architectural and Kuraray, world leaders in structural glass systems and laminate interlayers respectively, have joined forces to create the ultimate in strength, performance & safety, in laminated structural glass.

Performance comparison of Pilkington **Planar™** using SentryGlas® versus PVB interlayers*



* Based on Test Data.

Benefits

Stronger

The laminated glass in the **Planar™** | SentryGlas® System is substantially stronger than traditional PVB laminated systems. Therefore, while the system still offers the same high levels of performance synonymous with Pilkington **Planar™**, it can be made with a thinner glass.

Lighter

The use of custom-designed Pilkington **Planar™** fittings in combination with stronger laminated glass panels results in a **Planar™** | SentryGlas® System typically being much lighter than its more conventional PVB counterpart. This can result in larger panels, a reduced number of support fixings reducing their visual impact, as well as providing cost savings.

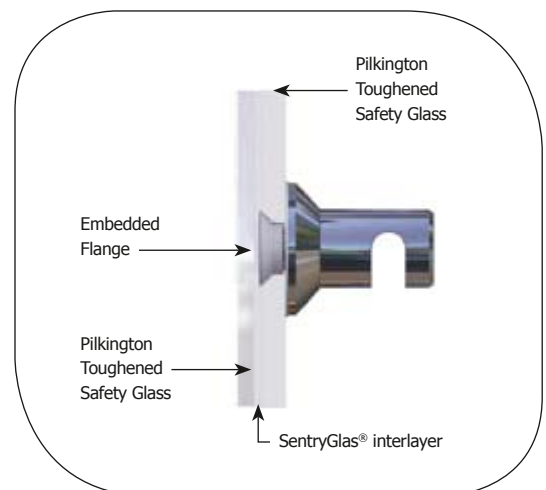
Safer

Tests have proven that the **Planar™** | SentryGlas® System has residual strength, even with both glass components broken. This brings greater peace of mind in locations subject to typhoons or hurricanes, and makes it possible to specify laminated glass for canopies and skylights with limited access for maintenance.*

* Subject to local regulations and safe working practices.

More applications

The **Planar™** | SentryGlas® System can be supplied using the revolutionary Pilkington **Planar™** Integral System, allowing a much wider choice of glass than traditional structural laminates. See diagram below.



Tulsa Library, Oklahoma – USA.





Market Walk, Newton Abbott – Devon.



What makes the **Planar™** | SentryGlas® System so efficient?

Load sharing

Specially developed Pilkington **Planar™** fittings combined with the much higher modulus of the structural interlayer (compared with traditional interlayers) allows the **Planar™** | SentryGlas® System to share applied loads between both glass components of the laminate, giving a significant increase in load bearing capacity while at the same time reducing the thickness required.

Low deflection

The **Planar™** | SentryGlas® System fully utilises the increased stiffness of the SentryGlas® interlayer (in some cases 100 times that of PVB) to reduce deflections under wind, snow and dead loads – often a limiting factor when designing structural glazing installations.

Durability

The interlayer technology delivers a low edge stability number even when subjected to severe heat and humidity tests.

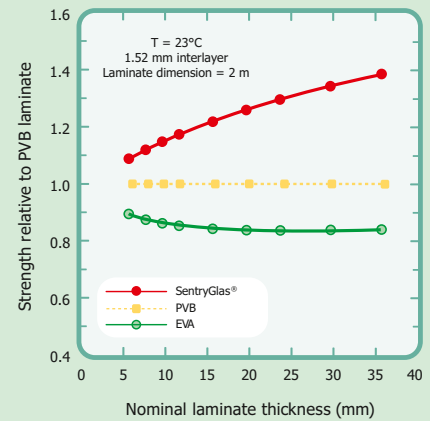


Impact testing, EN356.

Load shared between both panels of the laminate

Relative Strength (Bending)

- SentryGlas® laminates show superior strength properties.
- Up to 65% stronger than EVA laminates.
- Good opportunities to reduce glass thickness, particularly for thicker glass.



Yorkdale Shopping Centre, Toronto – Canada.



For further information please email pilkington@respond.uk.com
Or visit pilkington.co.uk/planar

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