

glass
in building

Edition No.10
The Pilkington Solar Control
Product Range: Case Studies



PILKINGTON

THE INTERNATIONAL MAGAZINE FOR GLASS AND DESIGN



THIS EDITION OF GLASS IN BUILDING focuses on Solar Control glass, the part of our product portfolio that has seen the most exciting innovations in recent years. Developments in coating technology have enabled Pilkington to produce glass which reduces solar heat gain whilst also supplying a high degree of light transmission where desired. New body-tinted glass colours have been launched and improved low E coatings allow solar control glazing to be an excellent insulator against heat loss in cold weather, as well as preventing heat build-up in summer.

Modern solar control glass does so much more than simply reduce heat gain from the sun. Its high light transmission enables full advantage to be taken of the energy and psychological benefits of daylight. Through its low U values it enables large areas of glazing to be used without the penalty of high heat losses. All these developments dramatically increase the range of design options and solutions available to today's architect.

The energy-saving properties of Solar Control glass mean that its use in Europe will inevitably increase. It is an essential component in reducing cooling loads in air-conditioned buildings and, in some cases, it can even preclude the need to install air-conditioning in the first place.

Why is its use likely to grow? The reasons are climate change and the consequent need for energy-efficiency in buildings. Some studies predict that, as a result of global warming, Europe will experience higher average ambient temperatures in the future. Research by the Centre for Energy Studies in France suggests that, unless other steps are taken to increase the energy-efficiency of buildings, the amount of air-conditioning in EU buildings could double by the year 2020. An air-conditioned building uses far more energy than an equivalent building without it, so the pressure of higher energy prices will result in far more attention being paid to reducing solar heat gain.

Even if these trends do not take place voluntarily, legislation will drive them. The EU Directive 'Energy Performance of Buildings' was required to be enacted in the laws of all 25 EU Member States by January 2006. The provisions of the Directive will result in mandatory improvements to the energy-efficiency of both new and renovated air-conditioned buildings.

For the architect, the benefit of Pilkington Solar Control glass can be summed up in the phrase 'design freedom'. Whatever the concept, it can be realised. If light, transparent façades are desired, they can now be achieved without incurring an energy penalty or sacrificing comfort. In this edition of Glass in Building, we invite you to examine and enjoy some superb case studies of Pilkington Solar Control glass in action.

Reinhard Banasch

Commercial Director
Building Products Europe





Arlington International Business Park, Marne-La-Vallée, Val d'Europe, France

Glazing the largest business centre in Europe

The Arlington group, which specialises in real estate office development, has built the largest business centre constructed to date in Europe on behalf of the world leader in business centres, Regus.

Located to the east of Paris in the new Val d'Europe international business park, Regus invested in four separate office blocks in 2003, with a total office floor space of 7,500m².



Since the façades are largely glass, high-performance solar protection glazing had to be chosen. In order to benefit from the verdant surroundings, glazing with light characteristics that would give the occupants as much natural light as possible inside the buildings, was sought.

The solar control glass Pilkington **Suncool™** Brilliant 66/33 was used to allow optimum energy management, whilst reducing the intensity of the impact of the sun on the buildings. In order to comply with safety requirements, especially in the glazed spandrels, Pilkington **Suncool™** Brilliant 66/33 was assembled in insulating glass units (IGUs) with an inner pane of Pilkington **Optilam™** 8.8mm, laminated safety glass.

Apart from aesthetic criteria, economic factors were crucial in the construction of all these buildings.

The use of this specific glass on the façade provides solar protection and thermal insulation, allowing climate control costs to be reduced whilst satisfying the architectural requirements of the designer.

The Pilkington **Suncool™** range of solar control glass fits in perfectly with current architectural trends, which favour transparency and the neutral aspect of glazed façades. The use of Pilkington **Suncool™** will ensure a comfortable working environment for the occupants throughout the year.



Project Summary

Building

Arlington International Business Park

Client

Arlington Group

Location

Marne-La-Vallée,
Val d'Europe France

Architects

Adrian Brewing, OCA Bureau,
(Aukett + Art & Build Ltd)

Contractor/Façade builder

Coframenal

Glazing products used

Pilkington **Suncool™** Brilliant 66/33
Pilkington **Optilam™**





Cosmo City, Gurgaon, India

A new development in one of India's fastest growing cities

Cosmo City is a new office building in one of the fastest growing cities in India, Gurgaon.

Built for leasing out commercial space to business establishments, this project occupies 13,935m²,

Cosmo City has been built in Gurgaon, a suburb of India's capital Delhi, by one of India's leading builders, Uppal. Cosmo City is Pilkington's biggest project in North India. As the city is growing at a fast pace, construction is booming and many corporate and commercial establishments are springing up.

Glass challenge met by Pilkington Eclipse Advantage™

A major requirement for this building was to combine good light transmission, low solar heat transmission and low reflectivity to ensure reduced glare from other buildings as well as reducing glare from Cosmo City onto other buildings. Approximately 7,430m² of glass was used for the external structural glazing.

The glass used for this building was 6mm Pilkington **Eclipse Advantage™** Arctic Blue T (toughened). Pilkington **Eclipse Advantage™** Arctic Blue was selected for its excellent light transmission properties, along with the benefit of thermal insulation provided as a result of its low U value.

Research has shown that as natural light increases, the working efficiency of the building occupants is boosted. Bearing this in mind, the architect wanted a glass that was not highly reflective but still had a low solar energy transmission, along with good light transmission. The colour was chosen as an aesthetic requirement of both the architect and the final client. Pilkington **Eclipse Advantage™** Arctic Blue has an external reflectance of only 11% and at the same time provides low solar heat transmission.

Both the architect and the final client were impressed with the glass and by the fact that it combines low E with a reflective solar control coating in one glass. As a toughened glass, it also ensures a safe environment for the occupants.

Project Summary

Building

Cosmo City

Location

Gurgaon, Delhi India

Architect

Rajiv Gandhi & Associates,
Delhi

Contractors

New Age Buildcon
Sing Song Marketing Ltd
Gold Plus Ltd

Glazing products used

Pilkington **Eclipse Advantage™**
Arctic Blue T (toughened)







Fratelli Giacomel Audi-Volkswagen Dealership, Assago, Milan, Italy

New style for an old industrial area

The project involved modernising the new Fratelli Giacomel Audi-Volkswagen Dealership in the redevelopment of an old industrial area in Assago, Milan. The overall glass surface area of the dealership is approximately 75,000m².



The design theme was elaborate, in order to comply with the client's requirements. These included;

- Creating a striking architectural-technological impact while focusing on the building's functional purposes
- Physically separating the Audi and Volkswagen buildings from each other (which have their own distinctive corporate design image)

This was achieved by inserting a central block deliberately designed to be the striking image of a dynamically evolving company at the technological cutting-edge.

Advanced technology and façades

Thermal break, semi-structural aluminium façades were designed using unitised curtain wall systems. The glass featured insulating glass units (IGUs) comprising 8mm Pilkington **Suncool™** Brilliant 50/25 T (toughened), 15mm air and Pilkington **Optilam™** safety laminated glass with different thicknesses.

The steel structure is fitted with four die-cast bearing columns and horizontal reticular roof beams. Large glass areas of Pilkington **Optitherm™** SN low emissivity glass on low-iron Pilkington **Optiwhite™** were used in different kinds of IGU compositions.

The semi-structural skylights consisted of wide rectangular bays of IGUs comprising Pilkington **Suncool™** Brilliant T 50/25 (toughened) and Pilkington **Optilam™** safety laminated glass at different thicknesses.



Project Summary

Building

Fratelli Giacomel
Audi-Volkswagen Dealership

Location

Assago, Milan, Italy

Architects

Roberto Bellotti
Corrado Catani
Debora Gianzini
Simone Speciale
Micaela Ceriani
Diego Flamenghi
Annalisa Marchioni

Façade builder

SOMECA S.p.A.
(Sossai Group)

IGU producer

SOGLASS S.r.l.
(Sossai Group)

Glazing products used

Pilkington **Suncool™** Brilliant T 50/25
Pilkington **Optilam™**
Pilkington **Optitherm™** SN
Pilkington **Optiwhite™**



MSV Arena, Duisburg, Germany

Spectacular and visually harmonious glass façade

The MSV Arena is a high-tech football stadium equipped for multi-functional use. Principally intended as the venue for MSV Duisburg's home matches, the stadium takes its architectural inspiration from Germany's many newly-built stadiums. It can hold around 31,000 spectators, but the Arena is more than just a football stadium.

Thanks to its multi-functional design, the venue can also host concerts and other social events. The open, glazed design creates a well-lit and bright foyer providing a spacious meeting place for visitors. The building adjacent to the west stand houses hospitality suites, catering facilities, restaurants, a business area, merchandise shops and MSV offices.



Modern glass design element

Glass plays an important role as a modern design element. The main entrance to the west stand has an eye-catching glass façade, 120m wide and 11m high, comprising Pilkington **Activ Suncool™ HP*** Neutral 53/40. This glass was selected due to its dual beneficial role. The solar control properties ensure maximum light transmission whilst providing essential protection from solar transmission. Incorporating Pilkington **Activ™** self-cleaning glass will result in savings incurred from glass façade cleaning costs.

The lifts linking the four levels of the main building allow an unobstructed view down into the lobby below. The open-plan design of the floors also makes it possible to look from the ground floor right up to the third floor. Access to the players' changing rooms is located opposite the entrance. A glass wall in this area makes it possible to watch the players coming out of the changing rooms on their way to the pitch. The architects have thus achieved their objective of creating an open, visible atmosphere where players appear to 'mingle' with fans.

High-tech

The functional architecture is typified by elegance and airiness, which at the same time meets spectators' needs perfectly. The main entrance to the west stand, with its glass and aluminium façade, is eye-catching. The glazing includes complex functional glass technology, combining sun and noise protection with thermal insulation and self-cleaning properties.



Transparency and natural light

The glass façade fulfils a variety of functions. From an aesthetic point of view, the glass provides transparency and natural light. Functionally, it provides solar, acoustic and heat insulation, whilst having an additional self-cleaning property. Self-cleaning Pilkington **Activ™** was selected for this application to keep costs for future façade cleaning as low as possible.

The result, in combination with the insulating glass units, is a spectacular and visually harmonious glass façade.

*HP stands for High Performance



Project Summary

Building

MSV Arena

Client

MSV Duisburg
Football Club

Location

Duisburg, Germany

Architects

Michel Stehle and
Ralf van der Kamp

Contractor

WALTER HELLMICH
GmbH building company

Façade builder

Trube & Kings
Fassadentechnik GmbH

Glazing products used

Pilkington **Activ Suncool™ HP***
Neutral 53/40





Ezeiza International Airport Buenos Aires, Argentina

A showcase of glass and steel

The Ezeiza International Airport in Buenos Aires has recently undergone an extension which has remodelled the terminal building. The new building is an amazing showcase of steel and glass, covering 60,000m² of floor space located adjacent to the old terminal.



Pilkington glass meets the challenge

The building's architectural image is to a large extent defined by the attractive green tint of its façades, glazed with high performance insulating glass units of Pilkington **Eclipse Advantage™** EverGreen glass and Pilkington **Energy Advantage™**

The striking combination of glass and metal successfully achieved provides wonderful luminosity and excellent thermal properties. The key factor in achieving this was the use of Pilkington **Eclipse Advantage™** EverGreen, which helped to increase the natural light into the building and at the same time reduced the intensity of solar heat radiation into the building.

Insulating glass units with good acoustic properties were also necessary to attenuate the ambient noise. The use of Pilkington **Optilam™** Phon with a special polyvinyl butyrl (PVB) 0.76 interlayer, with noise reduction elements achieved this.

The building design aims to improve movements and effortlessly emphasise the direction passengers are required to follow. Architectural ideas have focused on the continuous activity in the terminal, and therefore provide a pleasant environment for employees and travellers.

Project Summary

Building

Ezeiza International Airport

Location

Buenos Aires, Argentina

Architects

M-SG-S-S-S
Urgell-Fazio-Penedo-Urgell

Glazing products used

Pilkington **Eclipse Advantage™** EverGreen
Pilkington **Energy Advantage™**
Pilkington **Optifloat™** Clear
Pilkington **Optilam™** Phon







Hovfaret 4 Building, Oslo, Norway

Security with a lighter touch

Hovfaret 4 is a new commercial building in Oslo, constructed and owned by EDB Fellesdata Company. The main features of the building are glass façades and a partially glazed roof.

While a neutral glass was specified to allow as much light into the structure as possible, the most important requirement was security. The building will house the computer control centre for most of the Automated Teller Machines (ATMs) in Norway, and so security is paramount. The solution that was finally chosen was a combination of solar control glass and safety glass.



Description of products used

The product chosen for the façades was Pilkington **Suncool™** HP Neutral 70/40. For the roof, Pilkington **Suncool™** Brilliant 50/25 was used. The area of the glass roof is approximately 450m². To meet the security requirements, Pilkington **Suncool™** HP Neutral 70/40 was combined with 11mm safety glass. 4 and 6mm toughened safety glass has also been used extensively throughout the construction.

Description of construction

Various systems have been used for the façades, windows and doors of the building. Royal S65 was chosen for the windows and doors. This is an insulated system made from 65mm aluminium.

Conclusion

With this project, the architect has tried to create an exciting building with character, the central feature being the rounded glass shape of the 'towers'. The widespread use of glass has also contributed to the overall atmosphere of the building. The glass façades and glass roof provide extensive amounts of light, giving an interior feel of vast open spaces. The benefits for the users are that this building offers a great sense of security in addition to a light and spacious office environment. The solar control element of the glass will keep the climatic condition of the building balanced.



Project Summary

Building

Hovfaret 4 Building

Location

Oslo, Norway

Architect

Torstein Ramberg AS, Oslo

Contractor

Skanska

Façade builder

Bolseth Glass AS

IGU producer

Pilkington Norway

Glazing products used

Pilkington **Suncool™** HP Neutral 70/40

Pilkington **Suncool™** Brilliant 50/25



Musiktheater im Revier, Gelsenkirchen, Germany

A new face for a 20th century listed building

In an eleven-month building operation, the outer façade of the ageing Musiktheater in Gelsenkirchen has undergone a total renovation. The passage of time had certainly left its mark on the steel/glass façade of this impressive building, which was built in 1959 under the direction of architect Werner Ruhнау. As a listed building, no structural changes were allowed.

Architectural integrity

Each new component had to be tailored exactly to the existing dimensions, thereby ensuring the integrity of the original architectural concept. Renowned for its fusion of architecture and art, the theatre is numbered among the most exceptional buildings of German post-war architecture. Inspired by Bauhaus – and Mies van der Rohe in particular – the concept behind the architecture was to integrate the theatre into urban space, a goal successfully achieved through the huge steel and glass south façade. Guests perceive the theatre as an extension of the urban landscape. Through the glass façade, the piazza seems to extend into the spacious foyer. The building becomes a showcase, through which guests can be seen and indeed will wish to be seen.

With signs of corrosion on the steel façade, tarnished windows that no longer closed, low insulation single pane windows and fire protection materials containing asbestos, the case supporting a total renovation had become overwhelming. The immediate task was quickly defined: thermally separated aluminium frames were to be developed for the ageing steel façade, using state-of-the-art technology in a form that would accommodate the existing contours of the façade.



A large number of special aluminium frames was developed. This involved taking into account the various styles of cladding that characterised the theatre. A 15m-high upright cross-frame member construction measuring 2.80m by 2.70m was developed for the glass on the south façade. The side walls were installed with elements consisting of pivotal opening windows with fire-resistant panels and enamel panels on the parapet area.

Glass – optically and technically first-rate

The decision was taken to use modern solar-protective glazing with exceptional energy efficiency, particularly on the south façade, given the fact that due to the building's listed status, no structural modifications such as exterior shadings could be made.

An additional requirement was that the glass should not change the character of the building and should be almost neutral in appearance and transparency. Following the development of a full-size sample, the decision was made to

use Pilkington **Suncool™** Brilliant 66/33. While its light transmittance of 66% provided a large quantity of light in the foyer, the low total solar heat transmittance of 36% (both values in accordance with EN 410) ensured a pleasant climatic environment. The toning is equally exceptional and is hardly distinguishable from normal glass.

The parapet areas of the lateral façades were furnished with façade panels on white glass – matching the original white tone. In combination with the renovated white enamel panels, the façade has been successfully upgraded to the latest technical standard, while still maintaining its original appearance.

Wall of Glass

In the evening, the magnificent 'wall of glass' also opens up the south façade to the neighbouring piazza. The Musiktheater is eye-catching and attracts many passers by. The rejuvenated Musiktheater im Revier combines architecture and art, and now the art of glass.

Project Summary

Building

Musiktheater im Revier

Location

Gelsenkirchen, Germany

Architect

Metallbau Rupert App
GmbH & Co

Façade builder

Wiethoff Consulting
Engineers, Arnsberg

IGU producer

Flachglas Wernberg GmbH,
Flachglas Wesel GmbH

Glazing products used

Pilkington **Suncool™** Brilliant 66/33





Picture by Pentti Potkonen



Metla House – Finnish Forest Research Institute, Joensuu, Finland

An inspiration in glass and wood

Striking design

Metla House is the largest wooden office building in Finland and the biggest forest research centre in Europe. The building has three storeys and is designed to accommodate 225 people. It consists of offices, laboratories and communal spaces such as a lobby bar. Metla staff moved into the new building at the end of October 2004.

Glass & wood in fusion

The goal was to produce an inspiring working environment by using Finnish wood together with glass in an innovative way. Wood is naturally the main material in the building, from the post-beam-slab system in the structural frame to the exterior cladding. The courtyard entrance is flanked by walls made of 100-year old timber and the walls have also been protected against climatic conditions by 'terva' pine tar which is a traditional and natural wood preservative in Finland.

One of the reasons for choosing Pilkington **Suncool**[™] Brilliant 66/33 and Pilkington **Optitherm**[™] SN was for the excellent transparency & low reflectivity that both products offer which was an architectural requirement for the façades. This resulted in providing natural light to the atrium as well as creating an open spatial environment to the inside of the building without the façade visually separating the outer and inner sections of the building.

The lunch canteen is located on the ground floor with a glass façade of Pilkington **Suncool**[™] Brilliant 66/33. Due to the solar control glass used the temperature in the canteen remains pleasant during summer months.

The excellent transparency of the glass is noticeable during evening hours when internal lighting makes the wooden pillars inside the building clearly visible resulting in a fascinating view.

Overtaken boat design

The Metla meeting room, a shingled roofed conference room in the inner court of the house resembles an overturned boat split partly on the outside and partly on the inside of the building by a glass façade. The tilted wooden columns can be seen through the glass façade especially when illuminated. The idea for the tilted wooden columns was derived from fish chests used for catching lampreys.

Subsequently, the wooden construction featuring a glass façade to increase light transmittance has been promoted through various governmental programmes in Finland and several wooden constructions have already been built. One of the best known is the Sibelius Hall in Lahti – a concert and congress centre situated on the site of the old Lahti Glass Factory.

Project Summary

Building

Metla House

Client

Finnish Forest Research Institute

Location

Joensuu, North Karelia, Finland

Architect

Professor Antti-Matti Siikala, SARC Oy

Glazing products used

Pilkington **Suncool**[™] Brilliant 66/33
Pilkington **Optifloat**[™] Clear
Pilkington **Optitherm**[™] SN



Picture by Pentti Potkonen





Birmann 31, São Paulo, Brazil

Pilkington Cool™ Lite offers the solution to an exciting architectural challenge

Of the recent commercial buildings that have been constructed around the new Brigadeiro Faria Lima Avenue, in São Paulo, Birmann 31 has the most innovative design. “A jewel made of silver glass emerging from a rough stone” is how the architect describes the building, the design of which was based on a jewel. The building occupies 15 storeys. The client’s request was to produce a building that combined the elements of glass and stone in a different way to other surrounding buildings, whilst maintaining a comfortable working environment for the building’s occupants.

8,000m² of Pilkington Cool™ Lite laminated glass was used, to provide the excellent transparency and low reflectance that was required to meet the perfection essential for the prism-shaped façade. Pilkington Cool™ Lite provided the solution towards extreme solar glare that could be experienced in a high rise building. At the same time the glass façade fulfilled the requirement for maximum natural light transmission. The cool tint of the glass also resulted in a pleasing aesthetic hue.

The rough stone on the façade is strengthened on the base, which is narrow and becomes broader as the building becomes higher. This gradual change helps to exaggerate the height of the building, making it appear taller.

Above the stone grates, the large multi-faced glass façade highlights the local skyline. The entire city skyline is visible from the upper two storeys of the building. The multi-faced façade was intentionally built by the architect to be north facing as a pre-emption of the reflective interaction the building will have with other such buildings being constructed in the area.

The ground level of Birmann 31 is occupied partially by a bank agency, whose hall covers all corners. On the other side, an L-shaped room brings the multi-faced glass theme to the inside, exploiting it in a more colourful way through the wall’s coatings. With wooden laths on the roof and granite floor, the area is a pleasant surprise to those entering the building.

Pilkington Cool™ Lite is a product of a Pilkington joint venture with Saint Gobain in Brazil. It is available in North and South America. For further information on the product kindly visit www.pilkington.com

Project Summary

Building

Birmann 31

Location

São Paulo, Brazil

Architect

Mustafa Abadan, Skidmore, Owings & Merrill
Pontual Arquitetura – Davino Pontual, Paulo de Souza Pires, Ralph Lifschits, Cristina Pires da Mota and Eduardo Classo

Contractor

Matec

Glazing products used

Pilkington Cool™ Lite





Town Hall & Multifunctional Centre, Ridderkerk, Netherlands

Traditional art and culture meet modern glazing

The town of Ridderkerk, in the west of the Netherlands, is currently experiencing a surge in commercial and residential building construction. Shops, houses, offices, a Multifunctional Centre and an extension to the old Town Hall have been erected within a short time frame. The old Town Hall consists of five floors and is connected by a glass footbridge on the third floor to the new extension.

Multifunctional Centre

The Multifunctional Centre consists of public social areas such as the Grand Café, the ballroom and a meeting place on the ground floor. In addition, the School of Music has occupied various floors to provide teaching classrooms and administration offices.

Windows

Early in the project the engineering consultancy firm Arcadis contacted Pilkington requesting glass products that could be utilised to regulate the temperature of the different functional areas. The main requirement was to achieve a pleasant interior temperature, with a high level of solar control but without loss of daylight.

Solar product combinations meet various challenges

Various insulating glass unit product combinations consisting of Pilkington **Suncool™** Brilliant 50/25 have been used to meet other challenging objectives. Pilkington **Suncool™** Brilliant 50/25 combined with Pilkington **Optilam™** met the objective of providing the occupants with not only excellent natural light through the building and protection from excessive solar rays but a safe environment as well.

In combination with Pilkington **Optilam™** Phon the building benefits from reduced external noise into the building due to noise reduction polyvinyl butyrl (PVB) interlayer in the glass.

Pilkington **Pyrodur™** provides outstanding fire & safety protection by restricting the spread of flames, smoke and hot gases. It achieves up to 60 minutes integrity, together with partial heat insulation. It is suitable for both internal and external applications.



Decorated façade

The glass façade of the Town Hall council chamber, the wedding room and court room are decorated with art motifs based on the etchings of Italian architect, engraver and designer Giovanni Battista Piranesi (1720-1778). The engravings give the Town Hall a romantic character.

The glass façade is approximately 420m². An image of a classic temple has been sandblasted into the glazing of the Grand Café and the folding partitions in the central hall to recreate a design created by Piranesi just before his death.

The Ridderkerk arms, which is a motif depicting St George and the dragon has been sandblasted with green paint onto the façade above the main entrance which faces the city square. This motif was created by French artist Jean-Pierre Pincemin (1944-2005).

The windows on the ground floor are decorated with an abstract art motif by Pincemin, again sandblasted onto the glass. This has resulted in a



‘curtain’ effect providing the obscurity required to guarantee a degree of privacy.

The Ridderkerk Town Hall and Multifunctional Centre is a project in which old art and culture meet modern glazing demands in perfect harmony. The result is an artistic masterpiece in glass, providing a comfortable and safe environment through the choice of a range of high performance glass products.

Project Summary

Building name

Town Hall

Client

Ridderkerk Town Council,
ROB department

Location

Ridderkerk, western Netherlands

Architects

Charles Vandenhove Et Associes

Contractor

Visser en Smit Bouw BV

Façade builder

Van Dool Geveltechniek

Glazing products used

Pilkington **Insulight™** Sun
Pilkington **Insulight™** Therm
Pilkington **Pyrodur™** 30-351
Pilkington **Optilam™**
Pilkington **Optilam™** Phon





Novum Private Infertility Treatment Clinic, Warsaw, Poland

Maximising light and minimising noise in an urban environment

The building

The construction of the Novum Private Clinic on Bociania Street in Warsaw, Poland proves that spectacular architecture need not necessarily be associated with a prestigious location. Novum is located in the unfashionable Ursynów area of Warsaw. Not only is it located on the busy traffic-laden Pulawska Street, but the flightpath of the nearby Warsaw Airport adds to noise levels.

As a unique and unusual glazing project, Novum presented a challenge from concept to completion.



The clinic is divided into three main sections: a semi-circular reception area, surgery rooms and a laboratory towards the rear. The ground floor is covered by sandstone and concrete pillars run from the ground floor up to the roof. The expansive roof is painted with copper designs, which relate to earlier historic periods, as found in Szara Willa (Grey Villa) next to Warsaw University Library.



Products meeting needs

The main priority was to provide a pleasant environment to ensure the well-being of the patients. The requirement for large amounts of daylight to penetrate the building was to be balanced by the need to reduce solar transmission into the building during summer periods.

These objectives were met by glazing the entire first level floor corridors and staircases with a gable skylight. Highly processed Pilkington **Suncool™** Brilliant 66/33 was the glass of choice. This product has a high selectivity factor, providing high light transmittance and low solar energy transmittance.

High performance

Insulating glass units (IGUs) with good acoustic properties were necessary to attenuate the noise of heavy traffic from the street as well as that produced by aircraft movements in and out of Warsaw Airport.

High performance Pilkington **Insulight™** Sun IGUs consisting of 8mm Pilkington **Suncool™** Brilliant T 66/33 on the outer pane and Pilkington **Optilam™** 8.8mm on the inner pane were used for the skylight.



Visually, Pilkington **Suncool™** Brilliant 66/33 glass, with its low light reflectance factor and slight greenish tint, ideally complements the sandstone and concrete aspects as well as the copper painted roof.

The Novum Clinic is another example of ingenious architecture that does not follow modern design and stylistic trends, but demonstrates the vast application and features of glass craftsmanship.

Project Summary

Building

Novum Private Clinic

Location

Warsaw, Poland

Architect

Andrzej Kicinski

Contractor

Alpine Mayreder
Polska sp. z o.o.

Façade builder

Widok sp. j.

Glazing products used

Pilkington **Suncool™** Brilliant 66/33
Pilkington **Suncool™** Brilliant
T 66/33
Pilkington **Optilam™**







University of Lugano Computer Laboratories, Lugano, Switzerland

Glass meets university building challenges

The University of Lugano is a new expanding institution – a public place for culture and research. In keeping with the existing campus layout, the new computer laboratory building is constructed around a hospital built in the late 1800s.



The computer laboratories building occupies a strategic position at the junction of two main roads and the tree-lined River Cassarate. The building faces the library and is adjacent to the university park area. Being the only tall building in the university park, it has become a landmark in the city.

Two important considerations underpin the design of the building: first the layout of the computer laboratories and secondly the need for high light transparency.

The students' workstations occupy the heart of the building, with meeting areas, walkways and doorways running along the edge of the building.

The need for high light transparency was to meet the objective of creating a feel of continuity between the park on one side of the building and the tree-lined River Cassarate. To achieve this, Pilkington **Insulight™** Sun insulating glass units consisting of Pilkington **Optilam Suncool™** Brilliant 66/33 were used for the façade. The solar control glass ensured protection from glaring solar transmission during daylight hours. Approximately 1,200m² glass was supplied.

The use of glass exposed the building structure which is supported by two longitudinal pre-compressed beams that absorb the full load. The floors are open-plan resulting in greater light transmission across the floors.



Project Summary

Building
University of Lugano

Location
Lugano, Switzerland

Architect
Giraudi & Wettstein
Architetti FAS,
Lugano, Switzerland

Façade builder
Franzi Officine SA,
Barbengo, Switzerland

Glazing company
GALVOLUX SA,
Bioggio, Switzerland

IGU producer
Pilkington Glas Wikon AG,
Switzerland

Glazing products used
Pilkington **Insulight™** Sun with
Pilkington **Optilam Suncool™**
Brilliant 66/33





Avia Plaza, Moscow, Russia

Putting light to work in new offices

Avia Plaza is a new business complex comprising three buildings situated on a 6,000m² plot in the east of Moscow. The total ground area of the buildings is 37,350 m². The central building in the complex is a 17-floor office centre. Each floor has a technical space and an open space for offices split into two 400m² blocks.

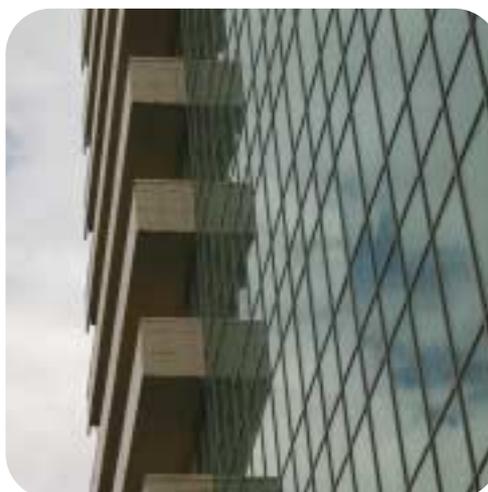
Glass products

The architects chose Pilkington **Optifloat™** Green tinted glass for the façade. Two key factors were behind the decision. First was the aesthetic appearance and appeal of the glass. Secondly, use of Pilkington **Optifloat™** Green increased the natural light streaming through the building, whilst at the same time regulating the intensity of solar heat entering the building.

The façades have been designed to be fully glazed from top to bottom. Two types of insulating glass units (IGUs) were produced:

- 6mm Pilkington **Optifloat™** Green T glass (toughened) with toughened low E glass
- 6mm Pilkington **Optifloat™** Green T glass with 6mm enamelled Pilkington **Optifloat™** Clear. Enamelled glass was used for the bottom and upper side of the floors

The total façade area glazed was approximately 5,000m² and the elaborate architecture and modern design created a unique business setting which has been successful in attracting office tenants.



Project Summary

Building

Avia Plaza

Client

Group of companies TEN

Location

Moscow

Architects

Art Graphics

Contractor

SMU OfisStroi

Façade builder

Aido-S

Glazing products used

Pilkington **Optifloat™** Green

Pilkington **Optifloat™** Clear

Pilkington T glass (toughened)





Multimaq, Santiago, Chile

A first for Pilkington Eclipse Advantage™ in Chile

Located in the industrial sector of Santiago, Chile, Multimaq is the market leader in stocking and selling or renting construction equipment. The Multimaq building consists of a consulting office for all its customers, an on-site customer service facility and a quick spares dispatch area.

Multimaq is one of the first buildings in Chile constructed with Pilkington **Eclipse Advantage™** Blue-Green since its launch in 2004.

Architectural objectives met with Pilkington glass

The objective of using Pilkington **Eclipse Advantage™** Blue-Green was to optimise the use of natural energy resources which the architect successfully accomplished. Pilkington **Eclipse Advantage™** Blue-Green was selected as the best product due to its outstanding dual solar control and thermal insulation properties.

Pilkington **Eclipse Advantage™** Blue-Green provides reduced solar transmittance by absorbing and reflecting away excessive solar radiation produced by intense sun rays. In addition the glass provides high light transmittance enabling the use of natural light.

In addition to its solar control properties, Pilkington **Eclipse Advantage™** Blue-Green has exemplary thermal insulation characteristics. The product helps to reduce cooling loads in summer and to optimise heat retention in winter, thereby ensuring a pleasant working environment throughout the year.

The dual properties of the product that significantly contribute towards current environmental challenges have been successfully harnessed.

Project Summary

Building
Multimaq

Location
Santiago, Chile

Architect
Cristián Pérez

Façade builder
Thermohauss

Glazing products used
Pilkington **Eclipse Advantage™**
Blue-Green







Community Health Centre, Huskvarna, Sweden

Built around a central glazed atrium

The Huskvarna Health Centre was built with the objective of providing the County Council's medical facilities in one central building. The size of the building is approximately 10,000m², consisting of two health centres, a maternity and child health centre, occupational therapy and psychiatry units, children's and youth centres and a pharmacy on the entrance level.



A key requirement was noise reduction from the outside traffic, specifically for the north and south facing façades. Solar control for the east and west façades was also specified. There were additional requirements for safety and security glazing.

The building contains wooden and aluminium windows, some of which were provided with outer frames of oak. Parts of the façades were installed at the end of corridors, staircases, oriels to the north and the entire glazed atrium to the south.

The atrium is the heart of the building, around which everything revolves. Visitors pass through the atrium as they make their way to the respective departments.

The Health Centre is located next to a theatre and a newly renovated square. The fact that this is a public area increased the importance of finding an attractive solution to the architecture of the atrium.

In view of the height of the structure and the immense cost associated with cleaning high glazed areas, Pilkington **Activ Suncool™** HP Neutral 70/40, with self-cleaning properties, was chosen for the whole atrium.

The aluminium façade was glazed with solar control glass, Pilkington **Suncool™** HP Clear 65/41, in combination with Pilkington **Optilam™** Phon sound insulating glass and Pilkington T glass units.

All wood and aluminium windows were glazed with Pilkington **Suncool™** HP Clear 65/41 solar control glass. The remaining windows were glazed with Pilkington **Optitherm™** SN in triple glazed units filled with argon gas.



Project Summary

Building

Huskvarna Community Health Centre

Location

Huskvarna Sweden

Architect

CREACON AB

Façade builder

Hansen Cell Glazing

IGU producer

AB Martin G Anderson

Glazing products used

Pilkington **Suncool™** HP Clear 65/41

Pilkington **Activ Suncool™**

HP Neutral 70/40

Pilkington **Optitherm™** SN

Pilkington **Optilam™** Phon

Pilkington T glass





Global Trade Centre, Beijing, China

A showcase for Pilkington Eclipse Advantage™

Over 55,000m² of Pilkington **Eclipse Advantage™** Arctic Blue, manufactured by Pilkington North America, was used in the striking Global Trade Center (Huang An Building) twin tower project in the Chinese capital, Beijing.

The building owner was originally considering an imported sputter-coated blue reflective glass when selecting the glass for this building. However, Pilkington **Eclipse Advantage™** Arctic Blue was demonstrated as a better product by emphasising how it fits with current design trends, offering increased daylight transmittance and reduced reflectivity, combined with low E properties.

Another consideration was masking capabilities, and after seeing samples and a final mock-up of Pilkington **Eclipse Advantage™** Arctic Blue, the owners selected the Pilkington product. Upon completion of the first installation, the unique and desirable blue hue of the glass helped in the successful leasing of office space in the building. The owner was also pleased with the availability of replacement glass due to the benefits of pyrolytic coatings.

As a testimony to their satisfaction with the project, the building owner and contractors have decided to use the same glass for Phase II and Phase III of the building complex.



Project Summary

Building

Global Trade Centre
(Huang An Building)

Location

Bei Sanhuan Zhong Road,
Beijing, China

Architect

ACA-TECHPAC, Canada

Façade builder

Beijing Bei Bo of
Luoyang Bei Bo Group

Glazing products used

Pilkington **Eclipse Advantage™**
Arctic Blue
Pilkington T glass (toughened)





Sysco Office Building, Cleveland, USA

New office building meets challenging design criteria

The Sysco project was a new construction office building that needed to meet several design criteria. Appearance was a fundamental factor. The client requested a blue-coloured glass with minimal reflectivity. Pilkington **Eclipse Advantage™** Arctic Blue was a perfect choice as it met both these criteria. In addition, it provided a uniform appearance both visually and in line with the Pilkington Spandrel glass.

Energy efficiency was an additional requirement. The aim was to achieve a comfortable interior temperature balanced with maximum natural light. The low solar energy transmission and U-value properties of Pilkington **Eclipse Advantage™** Arctic Blue made it the ideal choice for the outer pane.

Regulation of internal temperatures was achieved by an inner pane of Pilkington **Energy Advantage™**

To provide the building with a uniform glass appearance, spandrel panels were selected and applied on the fourth surface. This accentuated the appearance of the Pilkington **Eclipse Advantage™** Arctic Blue hue.

Approximately 3,700m² of glass was processed for the building.

Positive feedback was received from the project supervisor, who reported that the client was very pleased with the uniformity and colour of the resulting façade.

Project Summary

Building

Sysco Office Building

Location

4747 Grayton Road
Cleveland, OH, USA

Façade builder

PDC-Pittsburgh

Spandrel producer

Mid-Ohio Tempering

Glazing products used

Pilkington **Eclipse Advantage™**
Pilkington **Arctic Blue™**
Pilkington **Energy Advantage™**







The Clontarf Residence, Sydney, Australia

Bringing spaciousness and light to a complex design

On the northern escarpment overlooking The Spit and Pearl Bay, is the stunningly dramatic Clontarf residence, with views over Sydney's Middle Harbour. Despite the apparent level of design complexity by the clients, through use of glass the residence has been transformed into an architectural masterpiece.

The house is partially cut out of a sandstone cliff, with projecting terraces above a swimming pool. The terraces are secured by glass balustrades, which enhance the feeling of spaciousness and light transmittance into the house.

Built on three levels, it comprises the master bedroom suite and three bedrooms on the top level, garage space for three vehicles, the main house entrance, retreat areas and offices on the ground floor level and entertainment rooms, bedrooms, a living room, sauna and swimming pool on the lower level.

Solar control

Pilkington **Eclipse Advantage™** EverGreen glass was used to 'dress' the east and west facing walls. This increased the natural light entering the building during the day whilst at night the glass allows a warm evening spray of light.

Glass doors on the lower and ground levels contribute to a seamless interaction between the different floors and the functional rooms on those floors. Pilkington **Eclipse Advantage™** EverGreen glazing is used for the building envelope, while clear toughened glass is used on surrounding balconies and pool deck.

The north-west facing side of the house, which tends to experience sun during summer, required a combination of strategies to maximise the opportunity of natural light entering the house whilst at the same time controlling excess heat. The solution again was to glaze it with Pilkington **Eclipse Advantage™** EverGreen providing its glare, heat and UV transmission reduction qualities without compromising transparency.

Additional measures help to control the strong solar radiation during summer months.

Pilkington **Insulight™** incorporating blinds, electronically controlled insulated glass units with internal venetian blinds, reduce the amount of solar radiation into the house. Full-height glazing along the entire ground floor level draws daylight deep into the centre of the house.



Project Summary

Building

Clontarf Residence

Location

Sydney, Australia

Glazing products used

Pilkington **Eclipse Advantage™**
EverGreen
Pilkington T glass (toughened)
Pilkington **Optilam™** EverGreen
Pilkington **Insulight™**
incorporating blinds





Airiston Lumous Villa, Airisto, Parainen, Finland

New glass façade and roof transform a traditional holiday villa

The Airiston Lumous (charm of Airisto) Villa is a privately owned villa located in Airisto, Parainen, close to the southwest coast of Finland.

The villa was designed to accommodate five people. It has four rooms, a kitchen, bathroom and sauna. The villa is 169m² in size, with 25m² taken up by the sauna.

Transformed

The Villa Airiston Lumous has been transformed by the use of glass into a modern villa, whilst still maintaining the key characteristics of the old archipelago architecture as seen in the surrounding villas.

The glass chosen for the roof glazing was toughened 6mm Pilkington **Activ Suncool™** HP Neutral 70/40 outer pane with 4mm Pilkington **Optifloat™** Clear middle pane and 3+3 laminated inner pane with a 12mm cavity filled with argon gas.

The façade was constructed with Pilkington **Activ Suncool™** HP Neutral 70/40, with 4mm Pilkington **Optifloat™** clear inner pane and 6mm Pilkington **Optifloat™** clear outer pane with a 12mm cavity filled with argon gas.

Spaciousness

The glass façade and roofing have dramatically increased the light transmittance into the building, creating a feeling of spaciousness and improved visibility of the sea front.

The outstanding feature of the villa is the multipurpose spa called Hot Spring Vanguard. The spa has been fitted to accommodate six people on the terrace of the sauna. On cold days the water is heated up to approximately 37-39 degrees centigrade and on hot days reduced to 30 degrees centigrade.

Project Summary

Building

Airiston Lumous Holiday Villa

Location

Airisto, Parainen,
close to Turku on the
Southwest coast of Finland

Architect

Ari Paukio

Façade builder

Raision Metalli Oy

IGU producer

Lasiluoto Oy, Turku

Glazing products used

Pilkington **Activ Suncool™** HP
Neutral 70/40
4mm Pilkington **Optifloat™** Clear
6mm Pilkington **Optifloat™** Clear



Pilkington Solar Control Products: Technical Information

Pilkington Suncool™ Brilliant and Pilkington Suncool™ High Performance

Features/Benefits

- A range of offline coated, energy management products which combine high light transmittance with solar control performance
- Always used as part of an insulating glass unit or a Pilkington **Planar**™ system, where its coating provides the highest level of thermal insulation
- A range of colours including clear, neutral, silver and coloured tints is available, as well as a self-cleaning version – Pilkington **Activ Suncool**™
- High light transmittance, low heat transmittance with low external reflection giving a clear appearance
- Excellent thermal control (U value 1.1) therefore reducing energy consumption
- Can be supplied in toughened or laminated form for safety and security or where there is a risk of thermal breakage

	Light		Solar Energy				Shading Coefficient			U Value
	Transmittance	Reflectance	Direct Transmittance	Reflectance	Absorptance	Total Transmittance	Short Wavelength	Long Wavelength	Total	(W/m ² K)
Insulating Glass Unit Performance - (16mm argon gas filled cavity and 4mm Pilkington Optifloat ™ clear inner pane)										
6mm Suncool ™ Brilliant 66/33	0.66	0.15	0.33	0.32	0.35	0.36	0.38	0.03	0.41	1.1
6mm Suncool ™ Brilliant 50/25	0.50	0.18	0.24	0.34	0.42	0.27	0.28	0.03	0.31	1.1
6mm Suncool ™ HP Clear 65/41	0.65	0.22	0.40	0.32	0.28	0.44	0.46	0.05	0.51	1.1
6mm Suncool ™ HP Neutral 53/40	0.53	0.08	0.37	0.16	0.47	0.42	0.43	0.05	0.48	1.3
6mm Suncool ™ HP Neutral 51/37	0.51	0.17	0.34	0.21	0.45	0.39	0.39	0.06	0.45	1.3
6mm Suncool ™ HP Silver 50/30	0.50	0.39	0.28	0.43	0.29	0.32	0.32	0.05	0.37	1.1
6mm Suncool ™ HP Neutral 70/40	0.71	0.10	0.39	0.28	0.33	0.43	0.45	0.04	0.49	1.1
6mm Suncool ™ Brilliant Blue 50/27	0.50	0.19	0.25	0.35	0.40	0.29	0.29	0.04	0.33	1.1
6mm Suncool ™ Brilliant 30/17	0.30	0.26	0.16	0.37	0.47	0.19	0.18	0.04	0.22	1.1
Insulating Glass Unit Performance - (16mm argon gas filled cavity and 6mm Pilkington Optifloat ™ clear outer pane)										
6mm Optitherm ™ SN	0.77	0.11	0.49	0.21	0.30	0.61	0.56	0.14	0.70	1.2
Insulating Glass Unit Performance - (16mm argon gas filled cavity and 6mm Pilkington Optifloat ™ clear inner pane)										
6mm Suncool ™ Brilliant 66/33	0.65	0.15	0.32	0.33	0.35	0.36	0.37	0.04	0.41	1.1
6mm Suncool ™ Brilliant 50/25	0.49	0.18	0.24	0.33	0.43	0.27	0.28	0.03	0.31	1.1
6mm Suncool ™ HP Clear 65/41	0.64	0.22	0.38	0.32	0.30	0.43	0.44	0.05	0.49	1.1
6mm Suncool ™ HP Neutral 53/40	0.53	0.08	0.35	0.16	0.49	0.41	0.40	0.07	0.47	1.3
6mm Suncool ™ HP Neutral 51/37	0.50	0.17	0.33	0.20	0.47	0.39	0.38	0.07	0.45	1.3
6mm Suncool ™ HP Silver 50/30	0.49	0.39	0.28	0.42	0.30	0.31	0.32	0.04	0.36	1.1
6mm Suncool ™ HP Neutral 70/40	0.70	0.10	0.38	0.28	0.34	0.42	0.44	0.04	0.48	1.1
6mm Suncool ™ Brilliant Blue 50/27	0.49	0.19	0.25	0.35	0.40	0.29	0.29	0.04	0.33	1.1
6mm Suncool ™ Brilliant 30/17	0.30	0.26	0.15	0.37	0.48	0.19	0.17	0.05	0.22	1.1

Determined in accordance with EN 410 and EN 673
Based on 90% argon gas fill



Pilkington Activ Suncool™

	Light			Solar Energy			UV	Emissivity		U Value
	Transmittance	Reflectance (surface 1)	Reflectance (surface 2)	Direct Transmittance	Reflectance (surface 1)	Reflectance (surface 2)	Transmittance	Normal (surface 1)	Normal (surface 2)	(W/m²K)
Single Glazing Performance										
6mm Activ Suncool™ HP Neutral 70/40	0.74	0.11	0.08	0.41	0.30	0.38	0.17	0.03	0.037	3.2
6mm Activ Suncool™ HP Neutral 53/40	0.55	0.12	0.16	0.39	0.20	0.28	0.21	0.08	0.092	3.4
6mm Activ Suncool™ HP Silver 50/30	0.52	0.39	0.32	0.30	0.45	0.54	0.16	0.02	0.025	3.1
6mm Activ Suncool™ Brilliant Blue 50/27	0.52	0.22	0.10	0.27	0.38	0.42	0.08	0.02	0.025	3.1
6mm Activ Suncool™ Brilliant 30/17	0.32	0.29	0.11	0.17	0.40	0.34	0.06	0.02	0.025	3.1

Determined in accordance with EN 410 and EN 673

Insulating Glass Unit Performance

	Light		Solar Energy				Shading Coefficient			U Value
	Transmittance	Reflectance	Direct Transmittance	Reflectance	Absorptance	Total Transmittance	Short Wavelength	Long Wavelength	Total	(W/m²K)
Insulating Glass Unit Performance - (16mm argon gas filled cavity and 4mm Pilkington Optifloat™ clear inner pane)										
6mm Activ Suncool™ HP Neutral 70/40	0.71	0.10	0.39	0.28	0.33	0.43	0.45	0.04	0.49	1.1
6mm Activ Suncool™ HP Neutral 53/40	0.50	0.14	0.34	0.21	0.45	0.39	0.39	0.06	0.45	1.3
6mm Activ Suncool™ HP Silver 50/30	0.48	0.42	0.27	0.46	0.27	0.30	0.31	0.03	0.34	1.1
6mm Activ Suncool™ Brilliant Blue 50/27	0.47	0.24	0.24	0.39	0.37	0.27	0.28	0.03	0.31	1.1
6mm Activ Suncool™ Brilliant 30/17	0.29	0.30	0.15	0.40	0.45	0.18	0.17	0.04	0.21	1.1
Insulating Glass Unit Performance - (16mm argon gas filled cavity and 6mm Pilkington Optifloat™ clear inner pane)										
6mm Activ Suncool™ HP Neutral 70/40	0.70	0.10	0.38	0.28	0.34	0.43	0.44	0.05	0.49	1.1
6mm Activ Suncool™ HP Neutral 53/40	0.49	0.14	0.33	0.21	0.46	0.39	0.38	0.07	0.45	1.3
6mm Activ Suncool™ HP Silver 50/30	0.47	0.42	0.26	0.46	0.28	0.30	0.30	0.04	0.34	1.1
6mm Activ Suncool™ Brilliant Blue 50/27	0.47	0.24	0.23	0.39	0.38	0.27	0.26	0.05	0.31	1.1
6mm Activ Suncool™ Brilliant 30/17	0.28	0.30	0.15	0.40	0.45	0.18	0.17	0.04	0.21	1.1

Determined in accordance with EN 410 and EN 673

Based on 90% argon gas fill

Pilkington **Activ™** Blue

Features/Benefits

- Attractive blue colour offers excellent aesthetics and optimum performance
- Excellent solar control performance combined with good light transmittance
- The permanent Pilkington **Activ™** coating uses daylight and rainwater to break down dirt and wash away organic dirt from the exterior of the glass. The coating lasts the lifetime of the glass
- Low exterior reflection improves aesthetics
- Easily stocked and fabricated into insulating glass units in annealed and toughened forms, ensuring speedy delivery
- Can be combined with low E glass (Pilkington **K Glass™** or **Optitherm™** SN) for thermal insulation

	Light		Solar Radiant Heat				Shading Coefficient			U value (W/m ² K)	
	Transmittance	Reflectance	Direct Transmittance	Reflectance	Absorptance	Total Transmittance	Short wavelength	Long wavelength	Total		
Single Glazing Performance											
4mm Activ™ Blue	0.59	0.15	0.44	0.13	0.43	0.55	0.51	0.13	0.64	5.8	
6mm Activ™ Blue	0.49	0.14	0.33	0.13	0.54	0.47	0.38	0.16	0.55	5.7	
10mm Activ™ Blue	0.35	0.13	0.21	0.12	0.68	0.38	0.24	0.20	0.44	5.6	
Insulating Glass Unit Performance – (4mm Pilkington Activ™ Blue outer pane and 16mm airspace)										Air	Argon
4mm Optifloat™ inner pane	0.53	0.18	0.38	0.15	0.47	0.45	0.44	0.08	0.52	2.7	2.6
4mm K Glass™ inner pane	0.49	0.19	0.33	0.16	0.51	0.41	0.38	0.10	0.48	1.7	1.5
4mm Optitherm™ SN inner pane	0.52	0.17	0.30	0.17	0.53	0.37	0.35	0.08	0.43	1.4	1.2
Insulating Glass Unit Performance – (6mm Pilkington Activ™ Blue outer pane and 16mm airspace)										Air	Argon
6mm Optifloat™ Clear inner pane	0.44	0.16	0.28	0.13	0.59	0.36	0.32	0.09	0.41	2.7	2.6
6mm K Glass™ inner pane	0.40	0.17	0.24	0.14	0.62	0.32	0.28	0.09	0.37	1.7	1.5
6mm Optitherm™ SN inner pane	0.43	0.15	0.23	0.14	0.63	0.30	0.26	0.08	0.34	1.4	1.2

Determined in accordance with EN 410 and EN 673

Coating on Surface 1

Based on 90% argon gas fill



Pilkington Eclipse Advantage™

Features/Benefits

- A world leading on-line coated solar control glass that combines low emissivity with solar control, high visible light transmittance and glare control
- Design flexibility – achieve a crisp, natural colour with the subtle reflectivity, high visible light transmittance and interior glare control
- Durability – can be handled cut, fabricated into insulating glass units, laminated, heat-strengthened, tempered and bent using standard techniques
- Available in a variety of colours: Blue, Grey, Bronze, Arctic Blue, Gold, Blue-Green and EverGreen
- Heat-treatable without colour shift

	Light		Solar Energy				Shading Coefficient			U Value
	Transmittance	Reflectance	Direct Transmittance	Reflectance	Absorptance	Total Transmittance	Short Wavelength	Long Wavelength	Total	(W/m ² K)
Single Glazing Performance										
4mm Eclipse Advantage™ Clear	0.67	0.26	0.61	0.20	0.19	0.64	0.70	0.04	0.74	3.8
6mm Eclipse Advantage™ Clear	0.67	0.26	0.58	0.19	0.23	0.62	0.67	0.04	0.71	3.8
8mm Eclipse Advantage™ Clear	0.66	0.25	0.55	0.18	0.27	0.60	0.63	0.06	0.69	3.8
10mm Eclipse Advantage™ Clear	0.65	0.25	0.53	0.17	0.30	0.58	0.61	0.06	0.67	3.8
4mm Eclipse Advantage™ Arctic Blue	0.47	0.15	0.33	0.11	0.56	0.43	0.38	0.11	0.49	3.8
6mm Eclipse Advantage™ Arctic Blue	0.39	0.12	0.25	0.08	0.67	0.35	0.29	0.12	0.41	3.8
8mm Eclipse Advantage™ Arctic Blue	0.32	0.10	0.19	0.07	0.74	0.32	0.22	0.15	0.37	3.8
4mm Eclipse Advantage™ Blue-Green	0.60	0.21	0.44	0.14	0.42	0.51	0.51	0.08	0.59	3.8
6mm Eclipse Advantage™ Blue-Green	0.57	0.19	0.37	0.12	0.51	0.45	0.43	0.09	0.52	3.8
8mm Eclipse Advantage™ Blue-Green	0.53	0.17	0.31	0.10	0.59	0.41	0.36	0.11	0.47	3.8
4mm Eclipse Advantage™ Bronze	0.46	0.15	0.43	0.13	0.44	0.50	0.49	0.08	0.57	3.8
6mm Eclipse Advantage™ Bronze	0.38	0.11	0.34	0.10	0.56	0.44	0.39	0.12	0.51	3.8
8mm Eclipse Advantage™ Bronze	0.31	0.09	0.28	0.08	0.64	0.39	0.32	0.13	0.45	3.8
4mm Eclipse Advantage™ EverGreen	0.54	0.18	0.33	0.11	0.56	0.42	0.38	0.10	0.48	3.8
6mm Eclipse Advantage™ EverGreen	0.48	0.16	0.25	0.09	0.66	0.36	0.29	0.12	0.41	3.8
8mm Eclipse Advantage™ EverGreen	0.43	0.13	0.20	0.08	0.72	0.32	0.23	0.14	0.37	3.8
4mm Eclipse Advantage™ Grey	0.41	0.13	0.38	0.11	0.51	0.47	0.44	0.10	0.54	3.8
6mm Eclipse Advantage™ Grey	0.32	0.10	0.29	0.09	0.62	0.40	0.33	0.13	0.46	3.8
8mm Eclipse Advantage™ Grey	0.25	0.08	0.22	0.07	0.71	0.34	0.25	0.14	0.39	3.8

Determined in accordance with EN 410 and EN 673
Coating on surface 2

Insulating Glass Unit Performance

Glass	Light		Solar Energy				Shading Coefficient			U Value (W/m ² K)
	Transmittance	Reflectance	Direct Transmittance	Reflectance	Absorptance	Total Transmittance	Short Wavelength	Long Wavelength	Total	
Insulating Glass Unit – Outer Pane (16mm argon gas filled cavity and 6mm Pilkington Optifloat ™ clear inner pane)										
6mm Eclipse Advantage™ Clear	0.60	0.29	0.47	0.22	0.31	0.55	0.54	0.09	0.63	1.6
6mm Eclipse Advantage™ Arctic Blue	0.35	0.13	0.21	0.09	0.70	0.28	0.24	0.08	0.32	1.6
6mm Eclipse Advantage™ Blue-Green	0.51	0.21	0.31	0.13	0.56	0.38	0.36	0.08	0.44	1.6
6mm Eclipse Advantage™ Bronze	0.34	0.13	0.28	0.11	0.61	0.35	0.32	0.08	0.40	1.6
6mm Eclipse Advantage™ EverGreen	0.43	0.17	0.22	0.09	0.69	0.28	0.25	0.07	0.32	1.6
6mm Eclipse Advantage™ Grey	0.29	0.11	0.24	0.09	0.67	0.31	0.28	0.08	0.36	1.6
Insulating Glass Unit – Outer Pane (16mm argon gas filled cavity and 6mm Pilkington K Glass ™ clear inner pane)										
6mm Eclipse Advantage™ Clear	0.56	0.31	0.42	0.23	0.35	0.53	0.48	0.13	0.61	1.3
6mm Eclipse Advantage™ Arctic Blue	0.33	0.14	0.19	0.09	0.72	0.26	0.22	0.08	0.30	1.3
6mm Eclipse Advantage™ Blue-Green	0.47	0.23	0.28	0.13	0.59	0.36	0.32	0.09	0.41	1.3
6mm Eclipse Advantage™ Bronze	0.32	0.13	0.25	0.11	0.64	0.34	0.29	0.10	0.39	1.3
6mm Eclipse Advantage™ EverGreen	0.40	0.18	0.19	0.10	0.71	0.26	0.22	0.08	0.30	1.3
6mm Eclipse Advantage™ Grey	0.27	0.11	0.21	0.09	0.70	0.29	0.24	0.09	0.33	1.3
Insulating Glass Unit – Outer Pane (16mm argon gas filled cavity and 6mm Pilkington Ophitherm ™ SN inner pane)										
6mm Eclipse Advantage™ Clear	0.58	0.27	0.37	0.26	0.37	0.47	0.43	0.11	0.54	1.1
6mm Eclipse Advantage™ Arctic Blue	0.34	0.13	0.18	0.09	0.73	0.25	0.21	0.08	0.29	1.1
6mm Eclipse Advantage™ Blue-Green	0.49	0.20	0.26	0.14	0.60	0.33	0.30	0.08	0.38	1.1
6mm Eclipse Advantage™ Bronze	0.33	0.12	0.22	0.12	0.66	0.30	0.25	0.09	0.34	1.1
6mm Eclipse Advantage™ EverGreen	0.42	0.16	0.19	0.10	0.71	0.25	0.22	0.07	0.29	1.1
6mm Eclipse Advantage™ Grey	0.28	0.10	0.19	0.10	0.71	0.26	0.22	0.08	0.30	1.1

Determined in accordance with EN 410 and EN 673

Coating on surface 2

IGUs based on 90% argon gas fill



Pilkington Suncool™ Pro T

Features/Benefits

- Toughenable version of Pilkington Suncool™
- Greater mechanical strength, durability, appearance and better technical performance
- Appearance and technical characteristics are dependent upon a thermal toughening process, prior to application

	Light			Solar Energy				Shading Coefficient			U Value
	Transmittance	Reflectance (external)	Reflectance (internal)	Direct Transmittance	Reflectance	Absorptance	Total Transmittance	Short Wavelength	Long Wavelength	Total	(W/m ² K)
Single Glazing Suncool™ Pro T											
8mm Suncool™ Pro T S010 silver-blue	0.61	0.33	0.36	0.57	0.23	0.20	0.62	0.66	0.05	0.71	5.7
10mm Suncool™ Pro T S010 silver-blue	0.60	0.32	0.36	0.55	0.22	0.23	0.61	0.63	0.07	0.70	5.6
12mm Suncool™ Pro T S010 silver-blue	0.59	0.32	0.36	0.51	0.21	0.28	0.58	0.59	0.08	0.67	5.5
8mm Suncool™ Pro T S020 silver	0.55	0.40	0.43	0.54	0.27	0.19	0.59	0.62	0.06	0.68	5.7
10mm Suncool™ Pro T S020 silver	0.54	0.39	0.43	0.52	0.25	0.23	0.58	0.60	0.07	0.67	5.6
12mm Suncool™ Pro T S020 silver	0.53	0.38	0.43	0.49	0.23	0.28	0.56	0.56	0.08	0.64	5.5
6mm Suncool™ Pro T S011 silver-green	0.52	0.26	0.36	0.34	0.14	0.52	0.47	0.39	0.15	0.54	5.7
8mm Suncool™ Pro T S011 silver-green	0.49	0.23	0.36	0.28	0.13	0.59	0.44	0.32	0.19	0.51	5.7
10mm Suncool™ Pro T S011 silver-green	0.46	0.21	0.36	0.25	0.11	0.64	0.41	0.29	0.18	0.47	5.6
6mm Suncool™ Pro T S021 green-silver	0.47	0.30	0.43	0.32	0.16	0.52	0.46	0.37	0.16	0.53	5.7
8mm Suncool™ Pro T S021 green-silver	0.44	0.28	0.43	0.27	0.14	0.59	0.42	0.31	0.17	0.48	5.7
10mm Suncool™ Pro T S021 green-silver	0.42	0.25	0.42	0.24	0.12	0.64	0.40	0.28	0.18	0.46	5.6

Determined in accordance with EN 410 and EN 673

Coating on surface 2

Insulating Glass Unit Performance

	Light			Solar Energy				Shading Coefficient			U Value
	Transmittance	Reflectance (external)	Reflectance (internal)	Direct Transmittance	Reflectance	Absorptance	Total Transmittance	Short Wavelength	Long Wavelength	Total	(W/m ² K)
Insulating Glass Unit – Pilkington Suncool™ Pro T Outer Pane - (16mm argon gas filled cavity and 6mm Pilkington K Glass™ inner pane)											
8mm Suncool™ Pro T S010 silver-blue	0.52	0.37	0.36	0.40	0.27	0.33	0.51	0.46	0.13	0.59	1.5
8mm Suncool™ Pro T S020 silver	0.47	0.43	0.41	0.38	0.30	0.32	0.49	0.44	0.12	0.56	1.5
8mm Suncool™ Pro T S011 silver-green	0.41	0.26	0.35	0.21	0.14	0.65	0.29	0.24	0.09	0.33	1.5
8mm Suncool™ Pro T S021 green-silver	0.38	0.30	0.40	0.20	0.15	0.65	0.28	0.23	0.09	0.32	1.5
Insulating Glass Unit – Pilkington Suncool™ Pro T Outer Pane - (16mm argon gas filled cavity and 6mm Pilkington Optitherm™ SN inner pane)											
8mm Suncool™ Pro T S010 silver-blue	0.53	0.35	0.33	0.35	0.32	0.33	0.44	0.40	0.11	0.51	1.2
8mm Suncool™ Pro T S020 silver	0.48	0.41	0.37	0.33	0.35	0.32	0.43	0.38	0.11	0.49	1.2
8mm Suncool™ Pro T S011 silver-green	0.42	0.24	0.33	0.20	0.14	0.66	0.27	0.23	0.08	0.31	1.2
8mm Suncool™ Pro T S021 green-silver	0.38	0.28	0.38	0.20	0.15	0.65	0.26	0.23	0.07	0.30	1.2

The above performance data is applicable to Pilkington **Suncool™** Pro T, after toughening.

Determined in accordance with EN 410 and EN 673

Coating on surface 2

IGUs based on 90% argon gas fill



Pilkington Arctic Blue™

Features/Benefits

- Rich blue colour is cool and distinctive, offering unique aesthetics and innovative design properties
- Excellent solar characteristics when compared with traditional tinted float glass, without sacrificing daylight transmittance
- High visibility means Pilkington Arctic Blue™ provides a crisp, undistorted, natural view from the interior
- Low exterior reflectance makes Pilkington Arctic Blue™ ideal for use when low glare is a priority
- Low UV transmittance blocks most of the sun's damaging UV rays
- Easily fabricated into insulating glass units in annealed and toughened forms

	Light		Solar Radiant Heat				Shading Coefficient			U value (W/m²K)	
	Transmittance	Reflectance	Direct Transmittance	Reflectance	Absorptance	Total Transmittance	Short wavelength	Long wavelength	Total	Air	Argon
Single Glazing Performance											
4mm Arctic Blue™	0.64	0.06	0.48	0.06	0.46	0.60	0.55	0.14	0.69	5.8	n/a
6mm Arctic Blue™	0.54	0.06	0.37	0.05	0.58	0.52	0.43	0.17	0.60	5.7	n/a
8mm Arctic Blue™	0.46	0.05	0.29	0.05	0.66	0.46	0.33	0.19	0.52	5.7	n/a
10mm Arctic Blue™	0.38	0.05	0.23	0.05	0.72	0.42	0.26	0.22	0.48	5.6	n/a
Insulating Glass Unit Performance – (6mm Pilkington Arctic Blue™ outer pane and 16mm cavity)											
6mm Optifloat™ inner pane	0.48	0.08	0.31	0.06	0.63	0.40	0.36	0.10	0.46	2.7	2.6
6mm K Glass™ inner pane	0.44	0.09	0.27	0.07	0.66	0.36	0.31	0.10	0.41	1.7	1.5
6mm Optitherm™ SN inner pane	0.47	0.07	0.26	0.07	0.67	0.33	0.30	0.08	0.38	1.4	1.2

Determined in accordance with EN 410 and EN 673
IGUs based on 90% argon gas fill

Pilkington Optifloat™ Tinted

Features/Benefits

- Range of solar control performance options
- Range of colours: Green, Blue, Bronze and EverGreen
- Low reflection
- Can be toughened or laminated
- Can be used in both single glazing and insulating glass units

	Light		Solar Energy				Shading Coefficient			U Value
	Transmittance	Reflectance	Direct Transmittance	Reflectance	Absorptance	Total Transmittance	Short Wavelength	Long Wavelength	Total	(W/m ² K)
Single Glazing Performance										
4mm Optifloat™ Green	0.80	0.07	0.56	0.06	0.38	0.66	0.64	0.12	0.76	5.8
5mm Optifloat™ Green	0.78	0.07	0.51	0.06	0.43	0.62	0.59	0.12	0.71	5.8
6mm Optifloat™ Green	0.75	0.07	0.46	0.06	0.48	0.59	0.52	0.16	0.68	5.7
8mm Optifloat™ Green	0.71	0.07	0.40	0.05	0.55	0.54	0.46	0.16	0.62	5.7
10mm Optifloat™ Green	0.67	0.07	0.35	0.05	0.60	0.51	0.40	0.19	0.59	5.6
3mm Optifloat™ Bronze	0.68	0.07	0.66	0.06	0.28	0.73	0.75	0.09	0.84	5.8
4mm Optifloat™ Bronze	0.61	0.06	0.59	0.06	0.35	0.68	0.68	0.10	0.78	5.8
5mm Optifloat™ Bronze	0.55	0.06	0.53	0.06	0.41	0.64	0.61	0.12	0.73	5.8
6mm Optifloat™ Bronze	0.50	0.06	0.47	0.06	0.47	0.60	0.54	0.15	0.69	5.7
8mm Optifloat™ Bronze	0.40	0.05	0.38	0.05	0.57	0.53	0.44	0.17	0.61	5.7
10mm Optifloat™ Bronze	0.33	0.05	0.31	0.05	0.64	0.47	0.36	0.18	0.54	5.6
3mm Optifloat™ Grey	0.65	0.06	0.65	0.06	0.29	0.72	0.75	0.08	0.83	5.8
4mm Optifloat™ Grey	0.57	0.06	0.57	0.06	0.37	0.67	0.66	0.11	0.77	5.8
5mm Optifloat™ Grey	0.50	0.06	0.51	0.05	0.44	0.62	0.59	0.12	0.71	5.8
6mm Optifloat™ Grey	0.44	0.05	0.45	0.05	0.50	0.58	0.52	0.15	0.67	5.7
8mm Optifloat™ Grey	0.35	0.05	0.36	0.05	0.59	0.51	0.41	0.18	0.59	5.7
10mm Optifloat™ Grey	0.27	0.05	0.28	0.05	0.67	0.46	0.32	0.21	0.53	5.6
6mm Optifloat™ EverGreen	0.66	0.06	0.36	0.05	0.59	0.51	0.41	0.18	0.59	5.7

Determined in accordance with EN 410 and EN 673



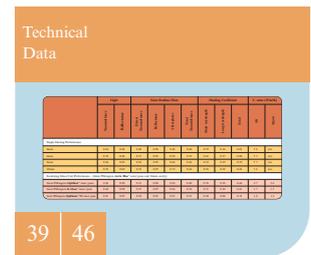
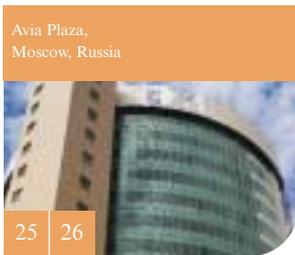
Editor: Catherine Musyimi

Contributors: Chris Barker, Victoria Borisova, Phil Brown, Laretta Lora, Philippe Grell, Rachel Hepner, Marit Jordre, Birgit Kernebeck, Daniela Lemanczyk, Jolanta Lessig, Prateek Maglani, Juliana Correia Monteiro, Mervi Paappanen, David Parkes, Alf Rolandsson, David Roycroft, Kristy Seiger, Lea Stadelmann, Claudia Utsch

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For more information please contact:

- Austria: + 43 (0) 6462 4699 2300
- Australia: + 1 800 810 403
- Argentina: +5411 4239 5000
- Benelux: + 31 (0) 53 48 35 835
- Brazil: +55 11 6955 3000
- Chile: +56-2 369 7694
- China: +852-25225031
- Denmark: + 45 43 96 72 02
- Finland: + 358 3 8113 11
- France: + 33 (0) 1 55 53 57 57
- Germany: + 49 (0) 180 30 20 100
- India: + 91 11 5180 5500
- Italy: + 39 041 533 4918
- Norway: + 47 23 33 59 00
- Poland: + 48 (0) 22 640 29 88
- Russia: +7 (495) 980 5027
- Sweden: + 46 35 15 30 00
- Switzerland: + 41 (0) 62 752 12 88.
- UK/Ireland: + 44 (0) 17 44 69 2000
- USA: +1 800-221-0444



CE marking confirms that a product complies with its relevant harmonised European Norm.
The CE marking label for each product, including declared values, can be found at www.pilkington.com/CE.
The CE marking standards for laminated glass and IGUs are effective from March 2006.



PILKINGTON

Building Products - UK

Prescot Road St Helens WA10 3TT United Kingdom
Telephone 01744 692000 Fax 01744 692880
pilkington@respond.uk.com
www.pilkington.com

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