

# Glass in Architecture





Glass  
in Architecture



# Glass in Architecture

## Contents

Cantina Antinori Winery, Italy	4
The Department of Computing and Information Science, Cornell University, USA	12
Community Church Knarvik, Norway	16
Stonehenge Visitor Centre, United Kingdom	22
The glass platform "Le Pas dans le Vide", France	30
Helsinki University Main Library Kaisa-talo, Finland	36
McDonald's pavilion, The Netherlands	42
Museo Egizio of Turin, Italy	48
Academy of Fine Arts in Warsaw, Poland	54
City Library in Seinäjoki, Finland	62
LW Bogdanka S.A. Head office, Poland	66
Fire Station in Doetinchem, The Netherlands	70
International Education Centre, University of Information Technology and Management in Rzeszów, Poland	76



## Introduction,

Of all available building materials, glass is the only one that has the unique property of light transmission. Greater light transmission creates a more comfortable working and living environment – one of the most important demands of contemporary architecture, but not possible without the development of glass.

While this light transmitting quality remains of primary importance, nowadays glass is used in ways that go well beyond the simple window. Thanks to substantial technological developments in production, processing and design, glass offers many additional functions. It can now fulfil not only aesthetic but also thermal, solar control, safety and even self-cleaning functions. It enables architects to achieve their artistic vision as well as other client requirements.

Glass plays a vital role in improving energy efficiency. It can help to reduce buildings' capital outlay, running costs and associated CO<sub>2</sub> emissions. As a result, it makes a positive contribution to their sustainability and allows them to meet the requirements of international multi-criteria accreditation systems, such as LEED or BREEAM, that confirm that a building is environmentally friendly.

In this second edition we present some of the latest and most impressive office and public building projects, where architects have combined functionality and sustainability with interesting design using modern glass solutions. We hope to give you some inspiration and a better understanding of one of the most fascinating materials used in 21<sup>st</sup> Century architecture.

Dr Kevin Sanderson



---

## ITALY

---

### Cantina Antinori Winery, 2012

Pilkington **Optiwhite™** T

Pilkington **Optilam™** OW

Pilkington **Optilam™** Therm S3 OW

arch. Studio Archea Associati

photo: © Pietro Savorelli

Antinori Winery located in Bargino, Tuscany one of the most beautiful regions of Italy, is a unique example of how a building can merge harmoniously with the surrounding rural scenery. The multi-layered roof, covered with soil and vines, was designed to blend into the undulating landscape. Only two rows of glass, extending horizontally along the slope, suggest the presence of any underground structures.

To showcase the panoramic views of the surrounding countryside, designers chose Pilkington **Optiwhite™**, a true low-iron glass, for the façade and skylights, allowing the picturesque landscape to blend seamlessly with the vineyard.

*Floor-to-ceiling glazing, used on both levels of the building, allows the connection to be made between the winemaking traditions inside and the vines in the vineyard beyond.*





*The use of natural materials such as glass and wood allows the winery to blend seamlessly with the stunning Tuscan landscape.*



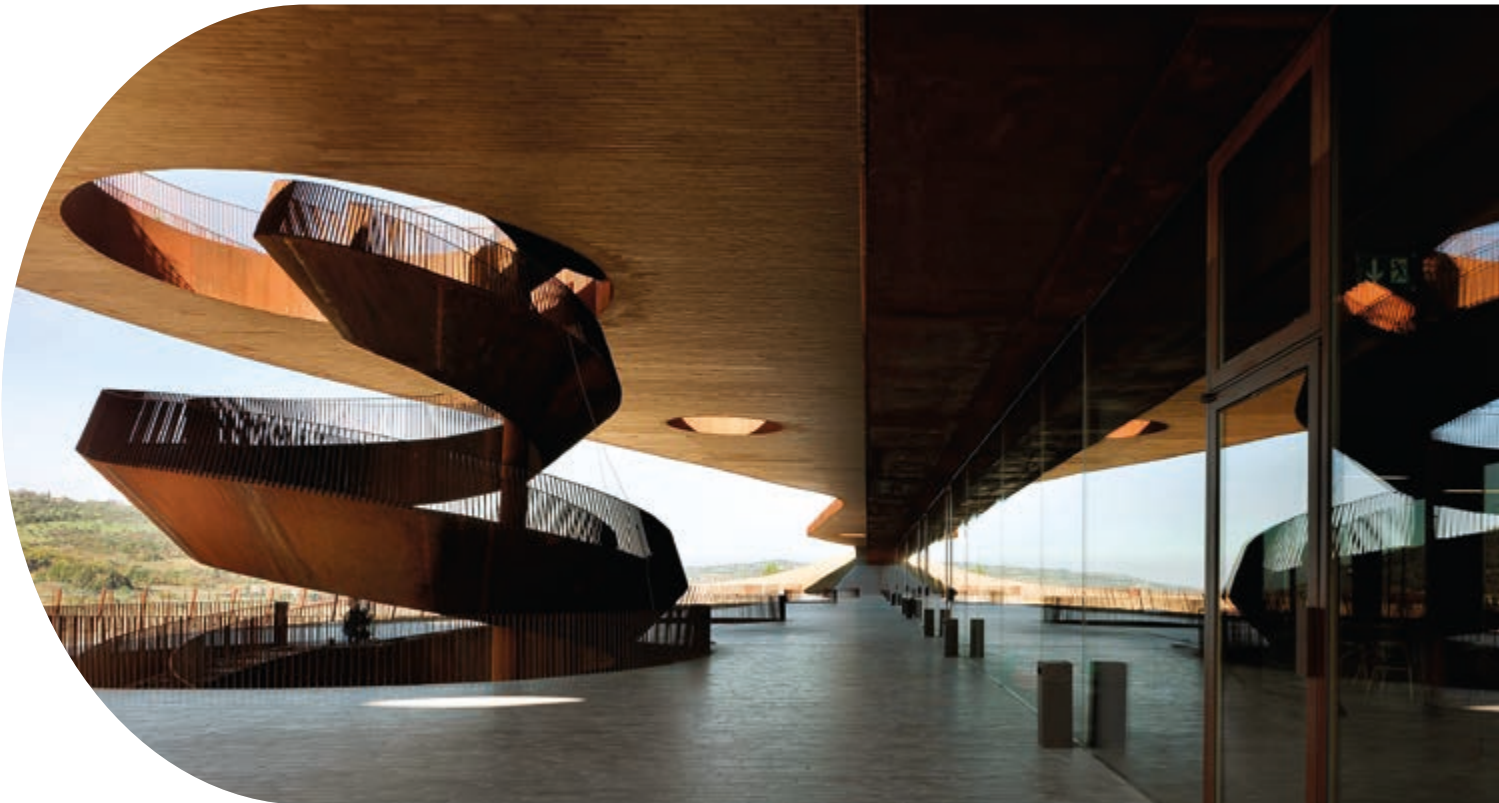


*Extra clear Pilkington **Optiwhite**<sup>™</sup>, a true low-iron glass, enhances the spectacular views of the beautiful surroundings.*



*Subtle underground lighting creates a mystical ambience.*

*The interior of the winery is divided into two main storeys. The upper level hosts visitor facilities and a wine tasting area.*





*The architects used extra clear Pilkington **Optiwhite™** glass for both the interior and the exterior to create a pleasing illusion of boundless space.*



*Glazing in the office area allows light to fill the room creating a bright and spacious working environment.*

*Despite its height and breadth, the glass façade constructed of laminated Pilkington **Optilam**™ OW, offers high light transmission as well as protection from wind and accidental damage.*



## USA

---

### The Department of Computing and Information Science, Cornell University, 2014

Pilkington **Optiwhite™**

arch. Morphosis Architects

photo: © Roland Halbe Fotografiffe

The Department of Computing and Information Science located in Ithaca, New York, known as Bill and Melinda Gates Hall, incorporates a sleek design of stainless steel panels together with an innovative twist on digitally printed glass to create a building complete with outstanding visual clarity and views. The new hall has a two layer façade specifically designed to meet particular aesthetic and performance purposes, which were easily obtained through the use of Pilkington **Optiwhite™**, a low-iron glass with excellent light transmittance.

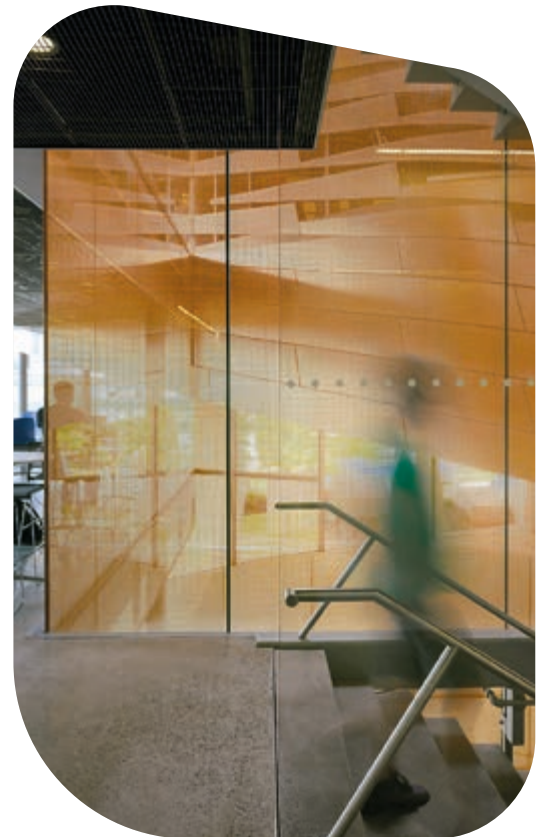
*The main façade of the university is made of glass partially covered by steel panels giving the impression of movement.*







*The building is designed to inspire creative thinking by information technology students.*



*A four-floor-high atrium with a full-height glass façade, provides the interiors with outstanding light, encouraging people to have constructive meetings and relaxing get-togethers.*





Pilkington **Optiwhite™** extra clear low-iron float glass  
was chosen by the architect for its clean and colourless qualities,  
and its versatility.



---

## NORWAY

---

Community Church Knarvik, 2014

Pilkington **Optilam**™ Therm S3

Pilkington **Optitherm**™ S3

arch. Reiulf Ramstad Arkitekter

photo: © Hundven-Clements Photography

The Community Church in Knarvik stands on a hilltop located on the scenic west coast of Norway. Designed by architects from Reiulf Ramstad Arkitekter, it is an outstanding example of a contemporary sacred building. The glazing consists of laminated Pilkington **Optilam**™ Therm S3 and Pilkington **Optitherm**™ S3, a low-e coated glass, which helped designers to meet the specific safety, lighting and thermal insulation requirements.

*Sharp geometric shape of the church resembling a star was inspired by the surrounding landscape.*



*The wooden uniformity of the building is broken  
by regularly-spaced vertical glass panes.*



*Laminated glass was used for extra strength given the building's mountain location and the shape of the high windowpanes that are narrow at the base.*



*Vertical glazing combined with pine conveys a contemporary feel to the interior of the church.*



## UNITED KINGDOM

---

Stonehenge Visitor Centre, 2013

Pilkington **Planar**™ Intrafix

Pilkington **Optiwhite**™

Pilkington **K Glass**™ OW

arch. Denton Corker Marshall

installer: Vitrine Systems Ltd.

photo: © Vitrine Systems Ltd.

Stonehenge Visitor Centre, located near the prehistoric stone circle, a world heritage site, is the embodiment of artistic craftsmanship combined with the mystical atmosphere of Stonehenge. Supported on irregularly spaced columns, it blends inconspicuously with the historic surroundings. Integration is enhanced by the glass façade made of Pilkington **Planar**™ Intrafix, a structural glazing system, using an extra clear Pilkington **Optiwhite**™ glass and a low-e glass, Pilkington **K Glass**™ OW.





*The glass façade creates a seamless connection  
between the inside of the Visitor Centre  
and the world outside.*





*The centre is designed to blend into its surroundings by using narrow columns to evoke a copse of trees.*



*The façades have been installed using a frameless structural glazing system, Pilkington **Planar**™ Intrafix, where the external glass is not penetrated with fittings, which ensures an overall uncluttered, clean aesthetic appearance.*

*To withstand the frequent high winds on Salisbury Plain as well as offering excellent thermal performance that maintains a comfortable environment for visitors, the double glazing is made of Pilkington **K Glass**™ OW as the outer pane, combined with extra clear Pilkington **Optiwhite**™ as the inner pane.*





*At night, the surrounding area is illuminated by internally lit windows creating a spectacular visual display.*



*The concept behind the glazed pavilion – which contains a café, a gift shop and an educational area – was to connect the interior of the building with the striking landscape that surrounds it on all sides. The structure allows uninterrupted views and keeps visitors in close contact with the landscape even when inside.*





Where's Stone?  
↑ 1.00 ↓ 1.00 ↓ 1.00

*The modern visitor centre works harmoniously with the mystical surroundings of the historic stone circle.*





---

FRANCE

---

The glass platform "Le Pas dans le Vide", 2013

Pilkington **Optiwhite™**

arch. ER2i INGENIERIE, IMPLICITE

photo: © Bertrand Delapierre

The viewing platform "Le Pas dans le Vide" is located at the top of the Aiguille du Midi in the French Alps. The glass-box, suspended at an altitude of almost 3,842 meters above sea level, is constructed from Pilkington **Optiwhite™**, an extra clear, true low-iron glass with very high light transmission and superb visual clarity. The frameless glazing of the glass box ensures that nothing distracts the viewer from the breathtaking landscape.

*Stepping onto the viewing platform, visitors are surrounded by a virtually invisible ceiling, floor and walls, creating an extraordinary sensation of floating above the 1,000-metre precipice.*





Highly transparent extra clear Pilkington **Optiwhite™** glass  
allows viewers to experience the true majesty  
of the Mont Blanc massif.

*Proven glass processing and installation techniques were essential for the construction of the Alpine viewing platform to ensure that the whole structure can withstand wind speeds of up to 220 km/h.*

*Each of the three walls, ceiling and floor of the glass-box is made of three panes of 12 mm toughened Pilkington **Optiwhite™** laminated with two SentryGlas® interlayers.*



*Suspended at the top of the  
Aiguille du Midi sheer rocky spire,  
the glass platform provides  
awe-inspiring views that both  
impress and thrill at the same time.*





HELSINKIN YLIOPISTO

OASIS OF SCIENCE

OASIS OF SCIENCE



---

## FINLAND

---

Helsinki University  
Main Library Kaisa-talo, 2012

Pilkington **Suncool Optilam™** 70/35 OW

Pilkington **Suncool™** 66/33 OW

Pilkington **Optiphon™** OW

arch. Anttinen Oiva Arkkitehdit Oy

photo: © Mika Huisman

The new building of the Helsinki University Main Library Kaisa-talo is located in the historic area of the city. The curved brick façade is integrated with the surroundings by its height, materials used and design. A large area of arched glazing meets the highest requirements of modern "green" architecture and energy efficiency with sun and noise protection providing users with a real gateway to the new information age.


*The brick façade with evenly spaced small square windows blends perfectly with neighbouring buildings. The array of windows is broken by a large area of curved glazing that is several floors high.*

*A properly selected acoustic laminated glass, Pilkington **Optiphon**™ OW, provides excellent noise reduction and a peaceful environment that allows readers to work and study in comfortable conditions.*



*The concept of the façade is reflected in the interior architecture of the building, which is based on arches.*





*All the glazing was designed with extraordinary attention to detail in order to maximise access to natural light. With this aim in mind the architects chose the extra clear low-iron glass Pilkington **Optiwhite™** as a substrate.*



MUSIIKKI

MUSIIKKI

MUSIIKKI

*The large amount of glass provides maximum transparency from the outside making this monumental structure look less dominant than one might expect from a building on this scale.*





---

## THE NETHERLANDS

---

McDonald's pavilion, 2015

Pilkington **Optilam™** OW

Pilkington **Optiwhite™**

arch. Mei architects and planners

photo: © Jeroen Musch

The McDonald's pavilion located in the heart of Rotterdam is an excellent example of modern glass architecture. The glazed façade opens up views of the monumental historical building located behind it. A fully transparent façade, designed by Mei architects and planners, makes it seem as if the life of the city flows through the building.

*The building blends well with the historic area of Coolingsel.*

*Extra clear low-iron Pilkington **Optiwhite™** allows passers-by to admire the clean functional interior featuring a white spiral staircase leading from the lobby to the seating area on the first floor.*



*Large glass panels provide visitors with a beautiful panoramic view overlooking Cooolsingel.*

*The interior wall decoration consists of gilded anodized, perforated aluminum sheets representing a group of Rotterdam residents.*





*At night the spectacular pavilion shines,  
arousing curiosity and delight.*







*For additional security, the designers opted to use the laminated safety glass Pilkington **Optilam**™ OW. If broken, this glass will remain in place, avoiding injury and making the glass façade vandal proof.*

## ITALY

---

Museo Egizio of Turin, 2015

Pilkington **OptiView™** Protect OW

arch. Isolarchitetti

photo: © Pino & Nicola Dell'Aquila

The Museo Egizio of Turin houses the world's second largest collection of Egyptian antiquities after Cairo. More than 30 thousand exhibits are showcased in almost 200 purpose-built exhibition display cases designed by Isolarchitetti. They were made from the extra clear anti-reflective laminated glass, Pilkington **OptiView™** Protect OW, which emphasises the beauty and splendor of the ancient collection and preserves it for future generations.

*Due to the anti-reflection coating placed on both surfaces of the glass, ancient artefacts are clearly visible, giving visitors the uninterrupted attention the exhibits deserve.*







*Ancient artefacts are placed in tall display cases that are up to four meters wide.*



*To protect Egyptian antiquities against theft or damage, the architects from Isolarchitetti chose laminated safety glass.*



Pilkington **OptiView™** Protect OW, used for the display cases fully protects the valuable collection from the harmful effects of UV radiation, which over a long period, may accelerate the harmful processes of colour-fading, fabric destruction and paper yellowing.

IMAGING PER  
L'OUTRETOURBA  
IMAGES FOR  
THE HERITAGE

Textual information panel, likely describing the artifacts or the exhibition theme.



Small informational label at the bottom left of the display.

Small informational label at the bottom right of the display.



Display case glazing consists of an extra clear substrate providing perfect visibility and allowing visitors to observe the colours and details of the exhibits as they really are.



P O L A N D

---

Academy of Fine Arts in Warsaw, 2014

Pilkington **Optilam**™ Therm S3

Pilkington **Optifloat**™ Clear T

arch. JEMS Architekci

photo: Wojciech Kryński

The Academy of Fine Arts in Warsaw is a result of the recent expansion of the historic university building, which was built more than 100 years ago. The open courtyard combined with a large area of full-height glazing harmoniously blends historic architecture with the modern form of an artistic institution. Appropriately selected glass, Pilkington **Optilam**™ Therm S3 and Pilkington **Optifloat**™ Clear T, allowed the architects to achieve the desired visual effect, while meeting the functional requirements of energy standards, safety and noise protection.

*From the vantage point of the courtyard, reflections of the historic  
façade of the building are visible on the uniform glass wall.*









*The building façade consistently follows the line of the surrounding buildings. The street frontage is interrupted by the courtyard that is formed between the historic university building and its new wing.*



*In order to meet the highest safety requirements toughened glass with increased resistance to mechanical and thermal stresses was used, as well as laminated glass, which doesn't fragment upon impact thus reducing the risk of injury.*





*Simple, monochrome interiors provide a suitable background for the dynamic, varied artistic creations. The floor-to-ceiling glazing fills the space with natural light providing a pleasing environment for visitors.*



*The role of the glazing was to achieve an unimpeded view of the Vistula River and the greenery of the boulevards.*



*The old building and the new structure are separated by a narrow gap leading to the courtyard of the building, which in turn opens out into the Powiśle district.*

*Light reflections appearing on the courtyard façades  
create an intimate space with blurred borders.*







---

FINLAND

---

City Library in Seinäjoki, 2012

Pilkington **Planar**™ Triple

Pilkington **Optiwhite**™

Pilkington **Optitherm**™ S3

arch. JKMM Architects

photo: © Tuomas Uusheimo

The City Library in Seinäjoki, Finland is designed by the world famous architect Alvar Aalto. After almost five decades, it has recently been expanded to meet current demands. JKMM Architects' key aim was to initiate a dialogue between the old and the new part of the building as well as to maximise both the environmental and aesthetic requirements.

The library consists of three sculptured units that comprise a variety of shapes orientated in different directions. Pilkington **Planar**™ Triple structural glazing system was used for the large area of glazing to display boarded-formwork concrete interiors.

*Minimising the energy consumption and maximising both the environmental and aesthetic requirements were the architect's main priorities.*



*The use of Pilkington **Planar**™ Triple in combination with a glass mullion system – the last word in transparency.*

*The interior lighting floods through the large glazed surfaces allowing passers-by to admire the concrete interiors that feature a ceiling with an unusual, up and down zigzag decoration.*





*The structural glazing system allowed the architects to create bright and highly attractive library interiors, with more light and a greater feeling of space.*

P O L A N D

---

LW Bogdanka S.A. Head office, 2011

Pilkington **Activ**™ Blue

arch. Biuro Usług Architektonicznych PROFIL Sp. z o.o.

photo: Wojciech Kryński

The architectural concept envisioned by the management board of the Bogdanka coal mine office building, was the natural appearance of blocks of coal. The aim was realised through the use of black matt structural panels in combination with glazing made of Pilkington **Activ**™ Blue, self-cleaning body-tinted solar control glass in a unique blue colour. Delicate light reflections contrasting with the material used in the façade, remind the visitor of coal in its natural state.

*The architects chose Pilkington **Activ**™ Blue because of the original colour, which enhances the effect of the reflected blue sky with clouds shifting through it.*







*The façade of the building is a direct reference to the main architectural idea, which was to represent a "coal block" with all its complexity and uneven surface similar to formations in natural rock.*



*Self-cleaning properties make the glass an ideal choice for use in hard-to-reach places.*



*The unique blue tinted glass helps to keep internal temperatures cool while still maintaining excellent light transmittance, low light reflection and high energy absorption, which is necessary especially on the front elevation of the building that is exposed to the sun.*

## THE NETHERLANDS

---

Fire Station in Doetinchem, 2014

Pilkington **Suncool**<sup>™</sup> 70/35

Pilkington **Pyrodur**<sup>®</sup>

arch. Bekkering Adams Architecten

photo: © Ossip van Duivenbode

The fire station located by a major avenue in Doetinchem is embedded in green surroundings. It was designed as a villa with offices, meeting rooms, training facilities, living and sleeping areas, as well as a sheltered area for the fire engines. The building is dominated, inside and out, by transparency obtained through the huge area of glazing. Due to safety regulations some parts of the glazing were made of laminated fire-protection glass, Pilkington **Pyrodur**<sup>®</sup>.





*Glazing reveals the dynamic environment of the fire station, operational 24 hours a day.*



*A spacious staircase located in the centre of the fire station connects all floors and functional areas.*

*The building features solar control glass Pilkington **Suncool™** 70/35 that offers benefits in summer and in winter due to its combined solar control and low-emissivity energy-efficient properties.*



*The fully glazed sheltered area for the fire engines stands under huge cantilevers.*





*The building is located on the main street  
in Doetinchem, the shady street is lined with trees.*





---

P O L A N D

---

International Education Centre,  
University of Information Technology  
and Management in Rzeszów, 2010

Pilkington **Profilit™** Clear

arch. Urszula Pomianek

photo: Wojciech Kryński

The International Education Centre, located in the University of Information Technology and Management campus in Kielnarowa, is a cylindrical building housing an amphitheatre style auditorium and a multi-media library. Pilkington **Profilit™** Clear, used in the profiled glass, separates vertical narrow windows spaced at equal intervals along the façade. The glass provides excellent interior lighting and a panoramic view of Pogórze Dynowskie.

*The profiled glass gives the interior an intriguing look,  
providing it with a soft, diffused light.*



Pilkington **Profilit™** Clear  
has a smooth surface,  
without typical ornament.



Pilkington **Profilit**™ Clear with low-e coating provides good thermal insulation.



*Profiled glass is easy to install and therefore perfect for the arched aluminium sections.*

Publisher:

**Pilkington Group Limited**

European Technical Centre  
Hall Lane – Lathom Nr Ormskirk L40 5UF – United Kingdom  
marketing.communications@nsg.com

Contacts:

Pilkington Austria GmbH,  
Werksgelände 24, 5500 Bischofshofen, Austria, [www.pilkington.at](http://www.pilkington.at)

Pilkington Benelux B.V.,  
De Hoeveler 25, 7547 SB Enschede, The Netherlands, [www.pilkington.nl](http://www.pilkington.nl)

Pilkington Czech spol. s r.o.,  
Noviny pod Ralskem čp. 136, PSČ 471 24, Czech Republic, [www.pilkington.cz](http://www.pilkington.cz)

Pilkington Lahden Lasitehdas Oy,  
Niemenkatu 73, FIN-15140 Lahti, Finland, [www.pilkington.fi](http://www.pilkington.fi)

Pilkington Polska Sp. z o.o.,  
18 Wołoska Str., 02-675 Warsaw, Poland, [www.pilkington.pl](http://www.pilkington.pl)

Pilkington United Kingdom Limited,  
European Technical Centre, Hall Lane – Lathom, Nr Ormskirk L40 5UF, United Kingdom, [www.pilkington.co.uk](http://www.pilkington.co.uk)

Pilkington Glass Service,  
Zone Portuaire de Limay Porcheville, 620 avenue Dreyfous Ducas, 78520 Limay, France, [www.pilkington.fr](http://www.pilkington.fr)

Pilkington Italia S.p.A.,  
Via delle Industrie 46, 30175 Porto Marghera VE Italia, [www.pilkington.it](http://www.pilkington.it)

Pilkington Floatglas AB,  
Karl XI:s väg 61, SE-30296, Halmstad, Sweden, [www.pilkington.se](http://www.pilkington.se)

Pilkington North America,  
811 Madison Avenue, Toledo, Ohio 43604, [www.pilkington.us](http://www.pilkington.us)

*To the fullest extent permitted by applicable laws, Nippon Sheet Glass Co. Ltd. and its subsidiary companies disclaim all liability for any error in or omission from this publication and for all consequences of relying on it.*





[www.pilkington.com](http://www.pilkington.com)

2016

