



Pilkington North America Architectural Glass Solutions



Changing our surroundings, improving our world Company Overview

As a leading global glass manufacturer, the NSG Group provides the broadest range of glass products available in the world today. Continuous product innovation ensures the development of the most appropriate products for North America and the global marketplace.

Glass plays a significant role in reducing energy consumption and greenhouse gas emissions. Glass is the only transparent building material that helps control the flow of heat, UV rays, and glare while letting light into a building, increasing the overall comfort and productivity of its occupants. The NSG Group is committed to being at the forefront of these developments.

The Pilkington brand is synonymous with Flat Glass manufacturing excellence and innovation, with a reputation for leading many important technological advances in the glass industry, including the Float process, now the world standard for high quality glass production.

The selection of glass products has become more complex since Pilkington invented the float glass process in 1952. The properties of glass have become increasingly multifaceted with the ability to perform a wide variety of functions. The key to these developments has been glass's unique attributes of transmitting daylight and mediating the environment to provide a better place in which to live and work.





Float Glass Manufacturing

Sir Alastair Pilkington's invention of the float glass process established the world standard for the production of high quality glass. Float Glass is manufactured by melting sand, soda ash, dolomite and limestone, along with other minor batch material, produce a continuous 12-foot wide glass ribbon. The molten glass flows from the furnace and "floats" over a bed of molten tin. It is then carefully cooled to anneal the glass – a process that minimizes the internal stresses enabling it to be cut.

The Pilkington float glass process is renowned for flatness and optical clarity. Our glass products are available in clear, tinted, high performance tinted, coated, low iron and rolled glass.

Coated Glass

On-line pyrolytic coatings are produced by depositing microscopically thin layers of metallic oxides by the chemical vapor deposition (CVD) process during float glass manufacturing. This process produces extremely durable coated products that can easily be handled, transported and processed. These products typically combine low emissivity, solar control, low reflection and self-cleaning properties. Pilkington North America is the industry leader in pyrolytic coating technology.

Coating Technology

The Pilkington Pyrolytic Advantage

Whether you select one of our solar control low-e glasses (Pilkington **Eclipse Advantage™**, Pilkington **Solar-E™**, Pilkington **Solar-E™** Plus), or our thermal control low-e glass

(Pilkington **Energy Advantage**[™]), you'll have the benefits of our patented pyrolytic technology and the very practical advantages that it brings to every project.

Pilkington North America's brand of low-e glass products are produced by a patented pyrolytic process that exposes hot glass to chemical vapors during the actual float glass production, where they bond to the glass at the molecular level.

Having a hard "pyrolytic" surface fired on at over 640°C (1200°F) make these pyrolytic products durable, bendable and post-temperable. In addition, because the pyrolytic surface doesn't degrade like a sputtered coating, it can be warehoused locally for availability, reducing project lead times across the country and around the world.

NSG Sustainability

NSG Sustainability Initiative

The NSG Group has been proud to be a technological leader in glass manufacturing for many years. Whether it's improving the float glass manufacturing process which produces more than 95 percent of glass worldwide, advancing coating technologies, or our wide range of Solar and Thermal Control glass products, the NSG Group is proud to lead in areas of environmental concern, sustainability, and green building initiatives.

By applying a science-based approach, we can set the best pathway possible to make**change**[™].

We are actively working to switch to renewable energy and decrease CO_2 emissions in our manufacturing processes. We're committed to reducing our Scope 1, Scope 2 (Greenhouse Gas CO_2e), and Scope 3 emissions by 30% by 2030*.

We want to achieve carbon neutrality by 2050. These targets along with developing more innovative and sustainable products form the basis of our climate change strategy.

For more information on NSG Group approach to sustainability, visit www.nsg.com/en/sustainability.

1.4 MW Solar Array Pilkington North America Rossford Plant Rossford, Ohio NSG TECTM Glass Noah's Ark Hotel and Casino Cyprus Pilkington **Eclipse Advantage™** Blue-Green

Energy Management

Energy management is a key decision in determining the performance and appearance of the building envelope. This section outlines the various attributes and performances of glass.

Visible Light Transmittance

The percentage of visible light transmitted through the glass. The higher the number, the greater the amount of light that passes though the glass, regardless of its color.

SHGC (solar heat gain coefficient)

A combination of the directly transmitted solar and radiant energy and the proportion of the absorbed solar energy that enters into the building's interior. The lower the number the greater the solar control. w

U-factor (U-value)

This is the measurement of air-to-air thermal conductance or insulation between indoors and outdoors through the glass. The lower the number the better the insulation or thermal control.

Performance Values Comparison

To assist in comparing products, we have developed tables of performance values: visible light, solar control and insulation (tables can be found in the back of this product guide).

What is Low Emissivity?

Emissivity measures how strongly a product emits or radiates absorbed heat. The lower the number, the more efficiently the object reduces radiative heat gain or heat loss, which means a lower U-factor and better insulation.

Alfardan Twin Towers Doha, Qatar Pilkington **Eclipse** Advantage™ Photo compliments of Intraco

Product Range and Information

Thermal Insulation

Pilkington **Optifloat™** Clear 6 Pilkington Energy Advantage™ 7 Pilkington Spacia™ 8



Solar Control

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Pilkington OptAR™
Pilkington Mirropane™
Pilkington MirroView™
NSG TEC™ Glass
Pilkington AviSafe™
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Pilkington **Optifloat™** Clear glass

Pilkington **Optifloat**[™] sets the standard for quality and vision. It is the name we give our base products that are manufactured using the float glass process that was invented by Pilkington and has revolutionized the manufacturing of glass.

Pilkington **Optifloat™** Clear glass offers excellent optical properties, transmitting up to 90 percent of the sun's visible spectrum to reduce artificial lighting needs.

Pilkington **Optifloat**[™] heavy clear glass, is available from 8 mm (5/16") to 19 mm (3/4") thick for a wide variety of commercial glazing possibilities. It offers easier cutting, superior strength, greater spans, reduced deflection, high daylight transmittance and enhanced noise suppression. Ideal for large, frameless expanses of glass in lobby and entrance area applications.

Features and Benefits

- High daylight transmittance
- High clarity
- Low distortion
- Wide range of thicknesses



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Pilkington **Energy Advantage™** Thermal Control low-e glass

Pilkington **Energy Advantage**[™] is the low-e glass of choice for residential and commercial applications in a heating dominated climate.

Pilkington **Energy Advantage™** is one of the clearest and the most durable low-e technologies available today. With a scratch resistant surface, superior thermal performance, and high solar heat gain, it is an energy saving solution.

Pilkington **Energy Advantage™** is the leading passive solar glazing product in the market. The pyrolytic low-e coating provides thermal insulation by reducing heat loss. Most sputter coated low-e products reflect solar infrared heat, lowering the solar heat gain and minimizing the benefits of passive solar heat.

The Pilkington **Energy Advantage™** pyrolytic coating saves energy by allowing solar energy to pass through the glazing and enter into the home or building, while reducing heat loss. To further improve thermal control, add a second low-e coating to the #4 surface of an insulating glass unit.

Available Tints

- Clear
- Low-iron

Available Thickness

- 3 mm (1/8")
- 4 mm (5/32")
- 5 mm (3/16")
- 6 mm (1/4")
- 8 mm (5/16")
- 10 mm (3/8")
- 12 mm (1/2")

- Durable pyrolytic coating
- · Enhanced clarity
- Energy efficient
- Passive solar heat gain
- · Easy to temper, bend and laminate



Pilkington Spacia™

Standard IGU

Pilkington **Spacia™** Vacuum Insulated Glazing

Pilkington **Spacia**[™] offers the thermal performance of conventional double glazing in the same thickness as a single glass pane. It balances historical preservation with modern comfort and environmental requirements.

How it works

Pilkington **Spacia**[™] is different than conventional double glazing. The air between the two panes of glass is extracted, creating a vacuum. It offers the same thermal performance as conventional double glazing in one quarter of the thickness and two thirds the weight.

A vacuum, even a small one, is much more effective at minimizing conduction and convection heat losses, so the gap between the two panes can be reduced to just 0.2 mm, giving an overall thickness of just over 6 mm (1/4"). Heat flow through radiation is limited through one of the glass panes having a low-emissivity coating, similar to that used in modern conventional double glazing.

Pilkington **Spacia**[™] is a double glazed unit with a low-e coating for improved thermal control.

Pilkington **Spacia**[™] Cool is a double glazed unit with a solar control low-e coating to reduce solar heat gain. This also provides an improved u-factor.

Pilkington **Super Spacia**[™] offers the same sputter collar control low-e as Pilkington **Spacia**[™] Cool in a slightly thicker profile and provides the lowest U-factor of all Pilkington **Spacia**[™] products. The thicker profile allows for a wider pillar array which results in less conductive heat loss. Pilkington **Spacia**[™] Shizuka is double glazed unit with a laminated lite of clear glass for added safety performance and improved sound reduction. This unit provides thermal insulation and almost 100% UV absorption.

Applications

- Ideal for use in historic buildings
- Sliding windows
- Secondary glazing
- As one pane of a triple glazed "super-window"

- High thermal performance in a traditional monolithic profile
- Easily retrofitted into existing single glazed frames
- Improved acoustic performance over single glazing
- · Custom sizes available





Pilkington **Optifloat™** Tints and High Performance Tints

Pilkington **Optifloat**[™] tinted glass is aesthetically pleasing and performance driven, with significantly reduced solar heat and UV light transmittance as compared to uncoated clear glass products.

High Performance Tints provide significant improvements in solar performance compared to normal tinted glass. The colors are richer while views from the interior are maintained with low exterior reflectance. They can be processed and fabricated similarly to normal float glass to provide an economical choice for reducing air-conditioning loads and costs.

Available Tints

- Green
- Blue-Green
- Bronze
- Grey
- Pilkington EverGreen™*

An uncoated tinted float glass with high daylight transmittance and solar control, offers 20 percent better solar performance than other green tints, with reduced glare and UV transmission.

- Pilkington Arctic Blue™*
 A unique blue tinted float glass, engineered for good daylight transmittance and solar control.
- Pilkington SuperGrey™*

Provides the best solar control of any uncoated float glass. The deep grey color also provides daytime privacy from the outside. This glass significantly reduces glare, making it appropriate for use in skylight.

* Denotes a High Performance Tinted Glass

- Range of color choices
- · Low external and internal reflectance
- Reduces need for air conditioning
- Easy to temper, bend and laminate
- Can be used in monolithic form or incorporated in insulating glass units
- Available in a wide range of sizes from 3 mm (1/8") to 12 mm (1/2") thicknesses (depending on the tint)

Pilkington **Solar-E™** Solar Control low-e glass

Pilkington **Solar-E**[™] is a low-e glass that offers the perfect solution for meeting cooling load requirements while also maintaining natural daylight transmittance in warm climate regions.

The Pilkington **Solar-E**[™] coating, preferably situated on surface #2, works through absorption of solar radiation, and thereby reducing solar heat gain into your room.

Available Tints

- Clear
- EverGreen

Available Thickness

- 3.2 mm (1/8") *
- 4 mm (5/32") *
- 5 mm (3/16") *
- 6 mm (1/4")
- 8 mm (5/16")
- * Only available in Clear



- Durable pyrolytic coating
- · Low U-factor
- Low SHGC
- Low UV (ultraviolet) transmittance
- Can be used on internal exposed surface (#4 surface) of a laminate
- For further improved thermal control, add Pilkington Energy Advantage[™] low-e to an insulated unit (coating on the #4 surface)





Pilkington **Solar-E™** Plus Solar Control low-e glass

Pilkington **Solar-E^m** Plus is a low-e glass that is ideal for warm climate regions.

The Pilkington **Solar-E**[™] Plus coating, preferably situated on surface #2, offers enhanced solar absorption when compared to Pilkington **Solar-E**[™]. As such, this product is the perfect solution for glazing in hot, high solar radiation environments, softening the impact of harsh direct sunlight on your window.

Available Tints

- Clear
- Blue-Green
- Arctic Blue
- Grey

Available Thickness

- 6 mm (1/4")
- 8 mm (5/16")

- Durable pyrolytic coating
- Low U-factor
- Low SHGC values
- Low internal and external reflection
- Low UV (ultraviolet) transmittance.
- Can be used on internal exposed surface (#4 surface) of a laminate
- For further improved thermal control, add Pilkington Energy Advantage[™] low-e to an insulated unit (coating on the #4 surface)

Pilkington **Eclipse Advantage™** Solar Control low-e glass

Pilkington **Eclipse Advantage**[™] is the world's first reflective pyrolytic low-e glass. It is designed for buildings that require both solar control performance and the insulating benefits of a low-e coating.

Available Tints

- Clear
- Blue-Green
- Bronze
- Grey
- EverGreen[™]
- Arctic Blue[™]

Available Thickness

- 6 mm (1/4")
- 8 mm (5/16")

Features and Benefits

- Durable pyrolytic coating
- Low U-factor
- Low SHGC values
- Low UV (ultraviolet) transmittance
- Can be used on internal exposed surface (#4 surface) of a laminate
- For further improved thermal control, add Pilkington Energy Advantage[™] low-e to an insulated unit (coating on the #4 surface)

X Cluster Dubai Pilkington **Eclipse Advantage™** Arctic Blue

FireKeepers Casino Battle Creek, Michigan Pilkington **Eclipse Advantage™** ; Pilkington **Eclipse™** Sunset Gold

Pilkington **Eclipse™** Gold and Sunset Gold Reflective Solar Control glass

The Pilkington **Eclipse**[™] Gold family enhances visual performance and is suitable for monolithic use or use within an insulated glass unit.

FIREKE

Pilkington **Eclipse**[™] Gold is coated on a clear substrate providing brighter gold reflection and Pilkington **Eclipse**[™] Sunset Gold is coated on a bronze substrate providing a richer gold tone.

Available Thickness

- 6 mm (1/4")
- 8 mm (5/16") Pilkington **Eclipse**[™] Gold only

- Durable pyrolytic coating
- Easy to temper, bend and laminate
- Can be used on internal exposed surface (#4 surface) of a laminate
- For further improved thermal control, add Pilkington Energy Advantage[™] low-e to an insulated unit (coating on the #4 surface)



Special Applications

Toledo Museum of Art Glass Pavillion™ Toledo, Ohio Pilkington **Optiwhite**™

Photograph © Floto + Warner

Pilkington **Optiwhite™** Low Iron glass

Pilkington **Optiwhite**[™] is an extra-clear, low iron float glass; it is practically colorless, and the green cast inherent to clear glasses is reduced. It is therefore ideal for use where glass edges are visible or where a neutral color is desired. As its light transmission is higher than clear float glass, it is perfect for applications where transparency and purity of color are desired.

Available Thickness

- 3 mm (1/8")
- 4 mm (5/32")
- 5 mm (3/16")
- 6 mm (1/4")
- 8 mm (5/16")
- 10 mm (3/8")
- 12 mm (1/2")
- 12 1111 (1/2)
- 16 mm (5/8")
- 19 mm (3/4")

Features and Benefits

- High light transmittance
- Purity of color
- High Daylighting
- Pale blue edge color
- High solar heat transmittance
- Easy to temper, bend and laminate
- Can be painted or silk-screened for spandrel or decorative applications.

Clear

Pilkington Optiwhite™

Egyptian Museum of Turin Italy Pilkington **OptiView™** Photo: Pino & Nicola Dell'Aquila.

Pilkington **OptiView™** Anti-reflective glass

Pilkington **OptiView**[™] is a color-neutral, anti-reflective, pyrolytic coating that maximizes visible light transmittance by reducing the coated surface reflectance. When used on both exposed surfaces in a laminated configuration, visible light reflectance is less than 2 percent as compared to clear glass which is 8 percent.

Available Tints

- Clear
- Low-iron
- **Available Thickness**
- 3 mm (1/8")
- 4 mm (1/6")
- 6 mm (1/4")
- 10 mm (3/8")

Applications

- Shop fronts and Showrooms
- Museum display cases
- Zoo exhibits
- Sports facilities
- Digital Signage
- Touch panel displays
- Specialty vehicle windshields and instrument panels

Features and Benefits

- Durable pyrolytic coating
- Low reflection, less than 1% from coated surface
- High light transmittance

Kauffman Stadium

Pilkington OptiViev

Kansas City, MO

• Easy to temper, bend, and laminate



Pilkington **OptAR™** Plus Anti-reflective glass

Pilkington **OptAR** [™] Plus is a high performance, anti-reflective glass for use in computer screens, aircraft transparencies, televisions, flat panels, and as the cover glass for digital displays. It is ideally suited for projected capacitive and other touch screen technologies. This high performance glass reduces reflection to ~0.7% from the coated surface, while providing high light transmittance. As a result, visual acuity is increased and displays are easier to read.

Available Thickness

- 3.2 mm (1/8")
- 4 mm (1/6")
- 6 mm (1/4")

Applications

- Digital displays
- Aircraft transparencies
- Touch screens
- Flat-panel LCD monitors
- Televisions
- Specialty vehicle windshields and instrument panels
- Specialty electronic applications

Total Reflectance (from coated surface) of Pilkington **OptAR**[™] Plus compared to Clear Glass



- Durable pyrolytic coating
- High light transmittance
- · Low reflection
- · Easy to temper, bend and laminate
- Available on clear and low iron substrates





Pilkington **Mirropane™** One-way mirror

Pilkington **Mirropane**[™] is an observation mirror offering high quality, one-way vision that effectively provides discreet, unobtrusive monitoring for interior applications. It has the appearance of a mirror on the subject side, while providing privacy to observers on the other side.

Design Considerations

- Orientation
- Type of lighting
- Background colors
- Distances and light levels
- 8:1 light ratio is recommended with subject side brightly lit, and observer side dimly lit.

Available Thickness

• 6 mm (1/4")

Applications

- Security
 - Retail stores
 - Supermarkets
 - Airport security
 - Workplace monitoring
 - Banks or cash offices
 - Medical facilities
 - Schools
 - Marketing focus group monitoring
 - Any area requiring observation

- Durable pyrolytic coating
- Low transmission, Grey substrate
- High reflectivity
- Ideal for surveillance
- Easy to temper and laminate



Pilkington **MirroView™** and Pilkington **MirroView™** 50/50 Semi-transparent mirror

Pilkington **MirroView™** and Pilkington **MirroView™** 50/50 provide a highly reflective mirror coating on a clear substrate. They are ideal to give digital displays and video screens a modern, high-tech look.

Pilkington **MirroView™** is perfect for concealing digital displays and video screens for commercial and residential applications with low ambient light.

Pilkington **MirroView™** 50/50 offers higher transmission than the original product, making it optimal for use in applications with high ambient light.

When the screen is turned 'off' Pilkington **MirroView™** and Pilkington **MirroView™** 50/50 maintain a mirrored appearance while concealing the screen. When the screen is turned 'on' the screen image shows through.

Pilkington **MirroView**[™] and Pilkington **MirroView**[™] 50/50 have the capability to work with all touch screen technologies, including projected capacitive, while maintaining a smoother surface for a better touch experience.

Applications

- Hotel rooms
- Lobbies and salons
- Retail
- Digital signage
- Touch screens
- Bars and restaurants
- Bathrooms
- Smart mirrors

Available Thickness

- 3.2mm (1/8")
- 4 mm (1/6")
- 6 mm (1/4")
- 0 11111 (1/4)

- Durable pyrolytic coating
- Higher transmission, Clear substrate
- · Easily handled and transported
- High reflectivity
- No edge deletion required
- Easy to temper and laminate

NSG **TEC™** Glass Special Applications

Whether your application involves heated glass for commercial refrigeration, heat reflection, electrochromics, home aplliances, computer screens, touch screens, static control, thin film photovoltaics*, EMI/RFI shielding or other electro-optical and insulating applications, there is a durable pyrolytic NSG **TEC[™]** Glass product to meet your specific performance requirements.

NSG **TEC[™]** Glass offers a wide range of thermal and heated glass performance properties and optimizes electrical conductivity.

There are a variety of NSG **TEC[™]** Glass products to meet your specific needs, including:

NSG **TEC™** 15

The best choice for applications requiring passive condensation control and thermal performance with low emissivity and color-neutral appearance.

NSG **TEC**™ 7

Offers the lowest resistivity value in the NSG **TEC[™]** Glass range. Combined with low haze, it can be used for a wide range of applications including electrochromics and electromagnetic shielding. NSG **TEC[™]** 35, 50, 70, 100, 160, 250 and 450 For use in heated glass applications, these products combine thermal control with superior electro-optical properties.

NSG **TEC**™ SB

Uses barrier layer to block sodium migration into the deposited film, particularly at elevated temperatures. As such, the performance of an off-line coating is enhanced with the use of NSG **TEC[™]** SB as the substrate.

- Durable pyrolytic coating
- Electrically conductive
- Electrostatic dissipation
- Reduced transmittance of electromagnetic radiation.
- Color neutral, minimizing reflected color.
- Easy to temper and laminate
- Scratch and abrasion resistant.
- · Available on clear, low iron and grey substrates
- Available in a variety of glass thicknesses and sheet resistances ranging from 7 ohms/sq. up to several hundred ohms/sq.





Pilkington **AviSafe™** Bird-friendly glass

Unlike humans, birds do not see building elements, such as window frames, as visual markers to identify glass as a physical barrier. Instead, birds see a clear line of sight to what is on the other side of the glass, or an uninterrupted reflected image of natural surroundings on the glass surface. As a result, birds perceive an unobstructed flight path to vegetation or open skies leading to collisions with windows.

Pilkington **AviSafe™** creates a more bird-friendly environment through a combination of our glass coating innovation with an understanding of bird vision. It is an award-winning solution that is proven to save birds' lives.

How it Works

Birds can see light in the ultraviolet spectrum. Pilkington **AviSafe™** uses a unique patterned UV reflective coating that provides a visible marker to birds and prevents collisions.

The Pilkington **AviSafe™** coating pattern uses the industry accepted 2x4 rule making the glass more visible to birds while remaining aesthetically appealing on both the interior and exterior surfaces to humans.

Pilkington **AviSafe**[™] has been tested by the American Bird Conservancy (ABC) and provides a product leading threat factor of 12 when the coating is glazed on the exterior surface.

COMPARISON OF HUMAN AND AVIAN VISION



- Highly durable surface #1 coating
- Easy to temper, bend and laminate
- Can be combined with other products for additional benefits such as thermal insulation, solar control and noise control



Pilkington **OptiShower™** Glass for high-humidity environments

Pilkington **OptiShower™** is an excellent solution for high-humidity environments like showers.

Water stains in high-humidity environments can be a significant challenge. This occurs when the water starts to pull sodium from the glass and deposits a soda-rich scale on the glass. These water stains are an eyesore to the crisp aesthetics of a glass enclosure and are often difficult to clean.

Pilkington **OptiShower™** mitigates this by preventing sodium leaching. This on-line coating is durable enough to withstand tough and even outdoor environments. The coating blocks the water and sodium interactions, effectively eliminating the mechanism that leads to this type of stain formation. Now you can maintain a cleaner glass surface with minimal upkeep by using Pilkington **OptiShower™**.

Due to its durable and transparent coating, Pilkington **OptiShower™** can also be used in other high-humidity environments such as indoor pools, balustrades, car washes etc.

Features and Benefits

- Durable pyrolytic coating
- Easy to clean
- Available on Clear and Pilkington **Optiwhite™**
- No special handling
- Easy to temper, bend and laminate
- Never needs retreating



Aging tests at high temperatures and humidity demonstrate that Pilkington **OptiShower™** limits the corrosive process and limescale deposits compared to untreated glass.





Self-cleaning glass

A revolutionary glass that uses the power of the sun to clean itself. Pilkington Activ™ can dramatically reduce or eliminate window cleaning, while providing a crisp unspoiled exterior aesthetic.

With the coating glazed on the exterior surface, Pilkington Activ[™] uses UV energy from the sun, abundant even on cloudy, overcast days, to keep windows naturally clean with:

- A photocatalytic process that loosens dirt and gradually breaks down organic residue so it doesn't adhere to the glass.
- A hydrophilic action that causes rain to sheet on the glass, carrying dirt away with minimal spotting or streaking.

Under most conditions, rain is sufficient to keep the window clean, and a quick spray with a hose will achieve the same result even in prolonged dry weather.

Available Thickness

- 3 mm (1/8") •
- 4 mm (5/32") •
- 6 mm (1/4") •

- Durable pyrolytic coating
- Self-cleaning properties •
- Never needs re-treating
- Color neutral
- Easy to temper, bend and laminate
- Available in various glass thickness •
- Ideal for glass roofs and canopies •



America, Plant 21 Northwood, Ohio NSG **TEC™** Glass

NSG **TEC™** Photovoltaics

Thin Film Photovoltaic Applications

NSG Transparent Electrically Conductive (**TEC**[™]) Glass products make a great choice for thin film photovoltaic (PV) applications.

We produce a range of transparent conductive oxides that have been specifically tuned to meet the requirements of the thin film PV industry.

NSG **TEC**[™], by acting as the superstrate in a PV module, is designed to maximize the light transmittance and optimize module efficiency for each of the thin film technologies.

The manufacturing process provides a high degree of flexibility. Consequently, properties such as sheet resistance, haze and light transmittance can be optimized to meet individual customer's needs in thin film technologies such as: cadmium telluride, dye-sensitized solar cells, perovskites etc.

The PV range of NSG **TEC** $\mbox{^{TM}}$ products may be heat strengthened and fully tempered without any shift in sheet resistance.

- Durable pyrolytic coating
- High light transmittance
- High conductivity
- Coating properties remain durable and unaffected under very high fabrication temperatures.
- Easy to heat strengthen and temper
- Available on standard clear or low iron glass





Pilkington SaniTise™ Antimicrobial glass

Pilkington **SaniTise**[™] is a transparent pyrolytic coated antiviral and antibacterial glass developed as our commitment to creating a healthier, cleaner, safer world.

Features and Benefits

- Durable pyrolitic coating
- Easy to temper and bend
- Compatible with harsh commercial grade cleaning products



All samples pre-exposed to UV light before deposition of pathogens at 0 minutes; 'Dark' samples then kept in darkness, 'Light' samples continuously exposed to UV.

How it works

The glass is produced with a titania based coating deposited directly onto its surface. When exposed to UV radiation through natural daylight the Pilkington **SaniTise™** coating is activated. It then reacts with water vapor within the atmosphere resulting in a photocatalytic process that inactivates (destroys) the viruses and bacteria on the glass surface.

Once Pilkington **SaniTise**[™] reaches full activation, it will maintain its antimicrobial properties during natural UV exposure and then for an additional 2 hours, even after the UV radiation has ceased.





Pilkington **Optiphon™** Acoustic control glass

Pilkington **Optiphon**[™] is the ideal choice of glass in situations where there is excess noise from road, rail or air traffic, or various other sources, for example factories or nightclubs.

By using a special PVB (polyvinyl butyral) interlayer, Pilkington **Optiphon™** is a high quality acoustic laminated glass that offers excellent noise reduction without compromising on light transmittance or impact performance.

The desired acoustic performance can be achieved through combining various thicknesses of glass with the PVB interlayer.

Available Thickness

- 8.5 mm laminate
- 10.5 mm laminate

etropolitan Office Building Warsaw, Poland Pilkington **Optiphon™**



Pilkington Texture Glass

Pilkington Texture Glass is manufactured by passing a continuous molten glass ribbon between two rollers, one of which has a pattern that creates a permanent impression.

Privacy with Translucency

Privacy is an important design consideration. Pilkington Texture Glass is appropriate for areas requiring both obstruction and privacy, without sacrificing any natural light. Pilkington Texture Glass provides degrees of privacy through light diffusion and obstruction.

Applications

- Windows for privacy and decoration
- Shower and bath enclosures
- Interior partitions
- Door inserts
- Wall panels and wall features
- Furniture
- Backsplashes
- Exterior glazing

Wide Range of Texture Options

Available in more than 20 different textures to suit almost any design need. For more information, contact your sales representative.



Autumn™



Charcoal Sticks[™]



Cotswold™



Everglade™



Flemish™



Minster™



Reeded™



Stippolyte™



Taffeta™

Pilkington **Optifloat™** Opal

Pilkington **Optifloat™** Opal offers all the diffused natural light of a translucent glass, but with none of the drawbacks. This product suitable for internal or external use and it creates an attractive finish for windows, partition walls, glass doors, furniture, shelving, wall cladding and more.

Pilkington **Optifloat**[™] Opal is a great solution for applications where privacy is desired but the outside light is still able to be let in such as meeting rooms, offices and bathrooms.

Pilkington **Optifloat™** Opal can be stored and processed in the same way as standard float glass and can be tempered, bent and laminated.

- Acid etched glass
- High light transmittance
- Diffuses light to give a uniform natural look
- Smooth durable surface
- Can be used internally and externally
- Etched surface provides diffused reflection
- Creates excellent privacy while allowing light in
- Easy to temper and laminate





Pilkington **Pyrostop**[®] Fire-resistant glass

Specifically designed to provide high levels of fire protection, Pilkington **Pyrostop**® fire resistant glass offers a full range of properties traditionally associated with glass.

The Pilkington **Pyrostop**[®] range limits conductive and radiative heat transfer with product performances ranging from 20 to 120 minutes. These products must always be used as part of an approved fire resistance or fire protected framing assembly.

Pilkington **Pyrostop**[®] consists of multiple laminates of float glass and a special transparent intumescent interlayer, which is totally compatible and optically homogeneous with the glass. When exposed to fire, the pane facing the flames fractures but remains in place. As the heat penetrates the glass, the interlayers, one after the other, react by foaming to form a thick, opaque, resilient and tough insulating shield that blocks the conductive and radiant heat of the blaze.

Pilkington **Pyrostop**® is available through Technical Glass Products (TGP). Please contact Technical Glass Products at (800)-426-0279 for further details

- Allows natural light and unobstructived views for fire rated walls, openings and doors.
- Reduces fire damage to property and valuables.
- Restricts the spread of heat, smoke, flames and hot gases.
- Excellent sound reduction properties.
- Designed to be combined with the full range of Pilkington glass products.
- Security, bullet and hurricane resistant configurations available with Pilkington **Pyrostop**[®].
- Pilkington Pyrostop[®] passes the hose stream test required in the USA and Canada.
- All products classified with Underwriters Laboratories (UL) and accepted for use in NYC by Dept. of Buildings.
- Human impact safety rated category II.
- Available in short lead times for internal or



Martin Braun KG, Hannover Pilkington **Pyrostop**®



Los Angeles International Airport

California Pilkington **Profilit**™



Pilkington Profilit™ Channel glass

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Pilkington **Profilit**[™] is a self-supporting glazing system of U-shaped channel glass and is supplied as a glass and framing system for facades and internal partitions. This highly durable product allows diffused light to enter the building while presenting a translucent external appearance. Pilkington **Profilit**[™] can be installed as a single wall unit or a double wall for additional sound and thermal insulation. The system can be configured vertically or horizontally.

Pilkington **Profilit**[™] is an elongated "u-shaped" cast glass providing structural properties beyond normal flat glass.

Perimeter frame and self-supporting channels offer excellent flexibility to meet many radii and a wide range of design options.

This system is an excellent alternative to glass block and other translucent materials for use in commercial and residential applications, both interior and exterior. The Pilkington **Profilit**[™] Glazing System has been widely used in Europe for many years.

The channels are manufactured in single lengths of up to 23 ft. Please consult with TGP for details on spans and safety requirements. The appearance of the glass presents a subtle texture providing light diffusion and privacy. The joints between the panels are silicon sealed.

Features and Benefits

- Available in channel lengths up to 23 feet.
- Allows natural light in while maintaining privacy.
- Wired channels available for increased impact safety.
- Can be utilized in curved walls.
- Installs vertically or horizontally.
- Channels can be fully tempered.
- Aluminum perimeter frame provides structural strength.
- Excellent light transmission.
- Minimal maintenance.
- Energy efficient.
- Proven performance.
- Sound insulation.

Engineering, installation and technical support for Pilkington **Profilit**[™] glass is coordinated by Technical Glass Products (TGP). For more information visit **www.fireglass.com**, or contact TGP.

Technical Glass Products

8107 Bracken Place SE Snoqualmie, WA 98065 Phone (800) 426-0279 Fax (800) 451-9857

Warranty Information

This warranty is provided by the NSG Group Affiliate (as defined below) that you have a contractual relationship with. Any reference to Pilkington below shall be a reference to that NSG Group Affiliate. "Pilkington Affiliate" shall mean any Person who directly or indirectly, controls, is controlled by, or is under the common control with the NSG Group. The term "control" is used in the sense of the possession by a Person or a group of Persons acting in concert, directly or indirectly, of the right to direct or cause the direction of the management and policies of another Person, whether through the board of directors or ownership of voting rights by such other Person, by the Articles of Association or Bylaws, contract or otherwise. A Person or a group of Persons acting in concert shall be deemed to be in control of a body corporate if such Person or group of Persons is in a position to appoint or appoints the majority of the directors of such body corporate. "Person" shall mean and include any individual, legal entity, partnership firm, company, association, or body corporate.

This warranty covers:

Pilkington Activ™, Pilkington Arctic Blue™, Pilkington AviSafe™, Pilkington Eclipse™ Gold, Pilkington Eclipse™ Sunset Gold, Pilkington Eclipse Advantage™, Pilkington Energy Advantage™, Pilkington EverGreen™, Pilkington K Glass™, Pilkington Mirropane™, Pilkington MirroView™, Pilkington Optimirror™, Pilkington Optiphon™, Pilkington Optifloat™, Pilkington OptiView™, Pilkington Optifloat™, Pilkington Pyroshield™ 2, Pilkington Reflite™, Pilkington SaniTise™, Pilkington Solar-E™, Pilkington SunShade™ Silver,

GLASS WARRANTY

Pilkington warrants that, with proper handling and maintenance, each of its above named glass building products (or in the case of coated glass products, the glass to which the coating is applied) will meet Pilkington's own published standards, which can be found at www.pilkington.com (current as of the date of original factory shipment by Pilkington) and specification details in the relevant external standards for glass and building (such as ASTM C1036 and/or EN572 for flat glass). A full list of standards can be found within the Pilkington Glass Handbook 2010 – BP Global Exports (or the Pilkington Glass Handbook in force from time to time). This warranty shall extend for a period of ten (10) years from the date of original factory shipment.

COATING WARRANTY

Pilkington further warrants that, with proper handling and maintenance, the Pilkington applied coating on each of its above named coated glass building products will not peel under normal conditions for a period of ten (10) years from the date of original factory shipment. Pilkington further warrants that, with proper handling and maintenance, the applied coating on its Pilkington Activ™ Self-Cleaning Glass will not be defective under normal conditions for a period of ten (10) years from the date of original factory shipment. For the purpose of this paragraph, a coating defect means only (i) failure of the special hydrophilic features of the Pilkington **Activ™** Self-Cleaning Glass that is evidenced by the fact that the contact angle of the water on the pane is more than 25 degrees in the manually cleaned and activated condition providing the handling and processing instructions with respect to the sealant recommendations have been followed or (ii) the complete de-lamination of the special coating that does not arise from any improper cleaning, handling or processing and is evident within ten (10) years from the date of original factory shipment.

WARRANTY CLAIMS; CONFIRMATION OF DEFECT;

Notwithstanding other provisions of the Pilkington warranties, any warranty claim will be void unless:

(a) such claim is made in writing and is received by Pilkington within thirty (30) days of the Discovery Date (as defined below). The Discovery Date is defined as the earlier of the date that an alleged defect is actually discovered or the date when such alleged defect should have been discovered (in Pilkington's sole opinion), and

(b) such alleged defect, has been confirmed as a defect on examination and/or laboratory analysis by a qualified representative from Pilkington (in Pilkington's sole opinion). Any waiver of the foregoing, including Pilkington's right to confirm defective products through inspection or laboratory testing, must be in writing and signed by Pilkington to be binding against Pilkington.

Notwithstanding other provisions of the Pilkington warranties, any warranty claim will be void unless written notice of it is received by Pilkington before expiration of the warranty period.

REQUIREMENTS FOR PROPER HANDLING AND MAINTENANCE; COPIES OF INSTRUCTIONS

Each of the foregoing warranties is subject to the products having been fabricated, transported, installed, used, cleaned and maintained, all in accordance with Pilkington's published instructions. It is essential that fabricators, glazing contractors, providers of cleaning services and end-users be familiar with such instructions. Copies of such instructions are available at www.pilkington.com.

ALL OTHER WARRANTIES ARE DISCLAIMED

THE FOREGOING ARE THE ONLY WARRANTIES FOR THE ABOVE NAMED PRODUCTS. EXCEPT FOR THE FOREGOING LIMITED WARRANTIES AND NOTWITHSTANDING ANY WARRANTIES THAT MAY BE MADE BY FABRICATORS, ASSEMBLERS OR DISTRIBUTORS TO THIRD PARTIES UPON ANY RE-SALE OF THE ABOVE NAMED PRODUCTS, PILKINGTON HEREBY DISCLAIMS ALL REPRESENTATIONS OR WARRANTIES OF ANY KIND TO ANY PERSON, WHETHER EXPRESS OR IMPLIED, IN FACT OR IN LAW, INCLUDING WITHOUT LIMITATION THE WARRANTY OF MERCHANTABILITY OR THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, REGARDLESS OF PILKINGTON'S KNOWLEDGE (IF ANY) OF THE INTENDED USE OF THE PRODUCTS.

LIMITATION OF REMEDY: LIMITATION OF LIABILITY

Exclusive Remedy: Pilkington's sole liability under either of the foregoing warranties shall be limited to replacement of the Pilkington glass product that is confirmed to be defective with the same delivery terms as applied to the original shipment, or, at Pilkington's option, to refund the purchase price. If Pilkington elects to replace the product, the product furnished as such replacement will carry the same warranties for the balance of the original warranty period, and the same delivery terms that applied to the original shipment. Such replacement or refund is the sole and exclusive remedy provided under each of the foregoing warranties.

LIMITATION OF LIABILITY:

In no event shall Pilkington or its directors, officers, employees or agents be liable (a) for glass breakage, for glass degradation, or coating damage caused by seal failure in an insulating unit or incompatible ceramic frits fired onto either surface of the glass, or in any case for any costs of removal, installation, or refabrication and reinstallation, for loss of use, or for incidental, consequential, or other damages of any kind; (b) for any costs of glass removal, installation or refabrication and reinstallation; (c) for direct damages in excess of the monetary amounts set forth in the exclusive remedy above; or (d) for any incidental, consequential, or other damages of any kind.

> 601 Massachusetts Avenue Boston, MA Pilkington **Optiwhite**™



Pilkington **OptiShower™** Limited Lifetime Warranty

Pilkington North America, Inc. ("Pilkington") warrants that, with proper handling and maintenance, the Pilkington applied coating on Pilkington **OptiShower™** coated glass product will not peel or corrode under normal conditions for as long as the original end-user owns the shower in the original property where the shower enclosure was installed. Liability is limited only to the delamination or orrosion of the coating that does not arise from any improper cleaning, handling and processing thatdirectly leads to corrosion of the exposed surface. This limited lifetime warranty is only provided for Pilkington **OptiShower™** products installed in North America. Except where prohibited by state law, this warranty extends to the original end-user customer and is non-transferable. The original end-user customer is the original purchaser of Pilkington **OptiShower™** who installs the product in the purchaser's property, or one who contracts through a remodeler or contractor for the original purchase and installation of Pilkington OptiShower™ for their property, or the first buyer of a property that contains Pilkington **OptiShower™** glass as a new installation.

WARRANTY CLAIMS; CONFIRMATION OF DEFECT;

Notwithstanding other provisions of the Pilkington warranties, any warranty claim will be void unless: (a) proof of purchase is provided to verify warranty coverage, and(c) such claim is made in writing and is received by Pilkington within thirty (30) days of the Discovery Date (as defined below). The Discovery Date is defined as the earlier of the date that an alleged defect is actually discovered or the date when such alleged defect should have been discovered (in Pilkington's sole opinion), and (b) such alleged defect, has been confirmed as a defect on examination and/or laboratory analysis by a qualified representative from Pilkington (in Pilkington's sole opinion). Any waiver of the foregoing, including Pilkington's right to confirm defective products through inspection or laboratory testing, must be in writing and signed by Pilkington to be binding against Pilkington. Notwithstanding other provisions of the Pilkington warranties, any warranty claim will be void unless written notice of it is received by Pilkington before expiration of the warranty period.

REQUIREMENTS FOR PROPER HANDLING AND MAINTENANCE; COPIES OF INSTRUCTIONS

Each of the foregoing warranties is subject to the products having been fabricated, transported, installed, used, cleaned and maintained, all in accordance with Pilkington's published instructions. It is essential that fabricators, glazing contractors, providers of cleaning services and end-users be familiar with such instructions. Copies of such instructions are available at www.pilkington.com.

ALL OTHER WARRANTIES ARE DISCLAIMED

THE FOREGOING ARE THE ONLY WARRANTIES FOR THE ABOVE NAMED PRODUCTS. EXCEPT FOR THE FOREGOING LIMITED WARRANTIES AND NOTWITHSTANDING ANY WARRANTIES THAT MAY BE MADE BY FABRICATORS, ASSEMBLERS OR DISTRIBUTORS TO THIRD PARTIES UPON ANY RE-SALE OF THE ABOVE NAMED PRODUCTS, PILKINGTON HEREBY DISCLAIMS ALL REPRESENTATIONS OR WARRANTIES OF ANY KIND TO ANY PERSON, WHETHER EXPRESS OR IMPLIED, IN FACT OR IN LAW, INCLUDING WITHOUT LIMITATION THE WARRANTY OF MERCHANTABILITY OR THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, REGARDLESS OF PILKINGTON'S KNOWLEDGE (IF ANY) OF THE INTENDED USE OF THE PRODUCTS.

LIMITATION OF REMEDY: LIMITATION OF LIABILITY

Exclusive Remedy: Pilkington's sole liability under either of the foregoing warranties shall be limited to replacement of the Pilkington glass product that is confirmed to be defective with the same delivery terms as applied to the original shipment, or, at Pilkington's option, to refund the purchase price. If Pilkington elects to replace the product, the product furnished as such replacement will carry the same warranties for the balance of the original warranty period, and the same delivery terms that applied to the original shipment. Such replacement or refund is the **sole and exclusive remedy** provided under each of the foregoing warranties.

LIMITATION OF LIABILITY:

In no event shall Pilkington or its directors, officers, employees or agents be liable (a) for glass breakage, for glass degradation, or coating damage caused by seal failure in an insulating unit or incompatible ceramic frits fired onto either surface of the glass, or in any case for any costs of removal, installation, or refabrication and reinstallation, for loss of use, or for incidental, consequential, or other damages of any kind; (b) for any costs of glassremoval, installation or refabrication and reinstallation; (c) for direct damages in excess of the monetary amounts set forth in the exclusive remedy above; or (d) for any incidental, consequential, or other damages of any kind.



Monolithic Glass Standards and Sizes

Nominal Glass Thickness		Approxima	ate Weight		Thickness To	9	Maximum Standard Size		
in.	mm	lb/ft²	kg/m²	i	n.	n	ım	in.	mm
				min.	max.	min.	max.		
Pilkington O	otifloat ™ Clear								
3/32	2.5	1.2	6	0.085	0.101	2.16	2.57		
1/8	3	1.6	8	0.115	0.134	2.92	3.40	96 x 130	2438 x 3302
5/32	4	2.1	10.1	0.149	0.165	3.78	4.19		
3/16	5	2.5	12.2	0.180	0.199	4.57	5.05	130 v 204	3302 v 5182
1/4	6	3	14.9	0.219	0.244	5.56	6.20	130 × 201	JJ02 X J102
Pilkington O	otifloat ™ Heavy	Clear							
5/16	8	4.1	20.1	0.292	0.332	7.42	8.43		
3/8	10	5	24.5	0.355	0.406	9.02	10.31		
1/2	12	6.6	32.1	0.469	0.531	11.91	13.49	130 x 204	3302 x 5182
5/8	16	8.2	40.2	0.595	0.656	15.11	16.66		
3/4	19	9.9	48.2	0.719	0.781	18.26	19.84		
Pilkington O	otifloat ™ Grey o	or Bronze							
1/8	3	1.6	8	0.115	0.134	2.92	3.40	96 x 130	2438 x 3302
3/16	5	2.5	12.2	0.180	0.199	4.57	5.05	120 × 204	2202 × 5102
1/4	6	3	14.9	0.219	0.244	5.56	6.20	130 X 204	3302 X 5182
Pilkington O	otifloat ™ Heavy	Grey or Bronze	5						
5/16	8	4.1	20.1	0.292	0.332	7.42	8.43		
3/8	10	5	24.5	0.355	0.406	9.02	10.31	130 x 204	3302 x 5182
1/2	12	6.6	32.1	0.469	0.531	11.91	13.49		
Pilkington O	otifloat ™ Blue-G	Green, Green, Pi	ilkington EverG	reen™, and Pil	kington SuperG	Grey™			
1/8	3	1.6	8	0.115	0.134	2.92	3.40	96 x 130	2438 x 3302
3/16	5	2.5	12.2	0.180	0.199	4.57	5.05	120 204	2202 5102
1/4	6	3	14.9	0.219	0.244	5.56	6.20	130 X 204	3302 X 5182
Pilkington O	otifloat ™ Heavy	Blue-Green							
5/16	8	4.1	20.1	0.292	0.332	7.42	8.43	120 × 204	2202 v E102
3/8	10	5	24.5	0.355	0.406	9.02	10.31	130 X 204	3302 X 5182
Pilkington Ar	rctic Blue™ High	n Performance T	Fint						
5/32	4	2.1	10.1	0.149	0.165	3.78	4.19	130 x 180	3302 x 4572
1/4	6	3	14.9	0.219	0.244	5.56	6.20	120 × 204	2202 1 5102
3/8	10	5	24.5	0.355	0.406	9.02	10.31	130 X 204	3302 X 5182
Pilkington O	otiwhite™								
1/8	3.2	1.6	8	0.115	0.134	2.92	3.40	96 x 130	2438 x 3302
3/16	5	2.5	12.2	0.180	0.199	4.57	5.05		
1/4	6	3	14.9	0.219	0.244	5.56	6.20		
5/16	8	4.1	20.1	0.292	0.332	7.42	8.43		
3/8	10	5	24.5	0.355	0.406	9.02	10.31	130 x 204	3302 x 5182
1/2	12	6.6	32.1	0.469	0.531	11.91	13.49		
5/8	16	8.2	40.2	0.595	0.656	15.11	16.66		
3/4	19	9.9	48.2	0.719	0.781	18.26	19.84		
Pilkington Te	xture Glass (all p	roducts except	as noted below	ı)					
5/32	4	2.1	10.1	0.143	0.172	3.63	4.37	52 04	1220 2140
1/4	6	3.2	15.4	0.224	0.256	5.69	6.50	52 X 84	1320 X 2140
Pilkington Te	xture Glass Reed	ded™							
5/32	4	2.1	10.1	0.143	0.172	3.63	4.37	52 x 84	1320 x 2140
Pilkington Te	xture Glass Aust	ral™ and Mori	SCO™						
5/32	4	2.1	10.1	0.143	0.172	3.63	4.37	63 x 98	1600 x 2500
Pilkington Te	xture Glass Raya	ado™, Sparkel	and Yacare	P™					
5/32	4	2.1	10.1	0.143	0.172	3.63	4.37	57 x 98	1450 x 2500
3/16	5	2.5	12.4	0.173	0.213	4.39	5.41	63 x 98	1600 x 2500

Standard quality level is ASTM C1036 Q3 with an exception of Pilkington Textures (EN572-5). Other thicknesses and sizes may be available upon request

Coatings applied on select substrates above.

Uncoated Monolithic Performance Data

	Nomina Thick	al Glass kness	Glass Visible Light (%)		Sola	r Energy	(%)	(В	U-Factor tu/hr•ft²•°	°F)	ŧ	ient	
	in.	mm	Transmittance	Refle ontside O	ctance episul	Transmittance	Reflectance	UV Transmittance	Summer	Winter	European	Solar Heat Gain Coefficie	Shading Coeffic
Pilkington Opt	ifloat ™ Cl	ear											
	3/32	2.5	91	8	8	89	8	82	0.95	1.05	5.8	0.90	1.03
	1/8	3	91	8	8	88	8	80	0.94	1.04	5.8	0.89	1.02
	5/32	4	90	8	8	86	8	78	0.94	1.04	5.8	0.88	1.01
	3/16	5	89	8	8	80	7	65	0.93	1.03	5.7	0.83	0.96
	1/4	6	88	8	8	77	7	63	0.93	1.03	5.7	0.82	0.94
	5/16	8	87	8	8	73	7	57	0.92	1.01	5.6	0.79	0.91
	3/8	10	86	8	8	70	7	54	0.91	1.00	5.6	0.77	0.88
	1/2	12	84	8	8	64	6	49	0.89	0.98	5.5	0.73	0.84
	5/8	16	83	8	8	59	6	45	0.88	0.97	5.4	0.70	0.81
	3/4	19	81	7	7	55	6	41	0.86	0.95	5.3	0.67	0.78
Pilkington Opt	iwhite™ l	ow iron											
	1/8	3	91	8	8	91	8	88	0.94	1.04	5.8	0.91	1.05
	5/32	4	91	8	8	90	8	87	0.93	1.04	5.8	0.91	1.04
	3/16	5	91	8	8	90	8	86	0.93	1.03	5.7	0.91	1.04
	1/4	6	91	8	8	90	8	85	0.92	1.02	5.7	0.90	1.04
	5/16	8	91	8	8	89	8	84	0.91	1.01	5.6	0.90	1.03
	3/8	10	91	8	8	88	8	83	0.91	1.00	5.6	0.89	1.03
	1/2	12	90	8	8	88	8	81	0.89	0.99	5.5	0.89	1.02
	5/8	16	90	8	8	87	8	79	0.88	0.97	5.4	0.88	1.02
	3/4	. 19	90	8	8	86	8	78	0.86	0.95	5.3	0.88	1.01
Pilkington Opt	ifloat™ II	nts	76	-	-	16	-		0.00	4 00		0.64	0 70
Green	1/4	6	/6	/	/	46	5	29	0.93	1.03	5./	0.61	0.70
Plue Creen	1/4	0	75	7	/	48	6	32	0.92	1.02	5./	0.62	0.72
blue-Green	2/10	0	70	6	6	40	 Г	25	0.91	1.01	5.0	0.57	0.00
	3/8	10	69	6	6	30 65	5	21	0.91	1.00	5.0	0.55	0.03
	3/16	5	50	6	6	55	6	28	0.94	1.07	5.7	0.74	0.07
	1/4	6	51	6	6	48	5	20	0.95	1.05	5.7	0.07	0.77
Bronze	5/16	8	44	5	5	30	5	16	0.52	1.02	5.6	0.02	0.72
	3/8	10	39	5	5	34	5	13	0.91	1.01	5.6	0.57	0.61
	1/2	12	29	5	5	25	4	8	0.89	0.98	5.5	0.48	0.55
	1/8	3	61	6	6	59	6	35	0.94	1.04	5.8	0.69	0.80
	3/16	5	50	6	6	48	5	26	0.93	1.03	5.7	0.62	0.71
	1/4	6	44	5	5	41	5	21	0.92	1.02	5.7	0.58	0.66
Grey	, 5/16	8	33	5	5	31	5	14	0.91	1.01	5.6	0.51	0.59
	3/8	10	28	5	5	26	5	11	0.91	1.00	5.6	0.48	0.55
	1/2	12	19	4	4	17	4	7	0.89	0.98	5.5	0.43	0.49
Pilkington Eve	rGreen™	High Perfo	rmance Tin	t									
	1/4	6	66	6	6	33	5	14	0.92	1.02	5.7	0.53	0.61
Pilkington Arc	tic Blue™	High Perfo	rmance Tir	nt									
	5/32	4	65	6	6	45	5	31	0.93	1.04	5.8	0.61	0.70
	1/4	6	53	6	6	33	5	20	0.92	1.02	5.7	0.52	0.60
	5/16	8	42	5	6	25	5	13	0.91	1.01	5.6	0.47	0.54
	3/8	10	41	5	5	21	5	13	0.91	1.00	5.6	0.45	0.52
Pilkington Sup	erGrey™	High Perfo	rmance Tin	t									
	1/8	3	25	5	5	23	4	6	0.94	1.04	5.8	0.46	0.52
	3/16	5	12	4	4	11	4	2	0.93	1.03	5.7	0.38	0.44
	1/4	6	9	4	4	8	4	1	0.93	1.03	5.7	0.36	0.41

U-Factor (Btu/hr•ft²•°F) is based on NFRC/ASTM standards. All performance values are center-of-glass values calculated using the LBNL Window 7.7 program.

Coated Monolithic Performance Data

Nominal Glass Thickness		Visil	ble Light	(%)	Sola	r Energy	(%)	(Bi	U-Factor tu/hr•ft²•	°F)	. <u>e</u>	ient	
	in.	mm	smittance	Reflec	ctance	smittance	lectance	UV smittance	ummer	Ninter	Iropean	olar Heat Ga Coefficient	ding Coeffic
			Tran	Outs	Insi	Tran	Ref	Tran	Ŵ	-	Ē	Ň	Sha
Pilkington Energy A	dvantage	therma™	l control lo	w-e (coati	ng on #2	surface)							
	1/8	3	84	11	11	74	11	66	0.50	0.65	3.7	0.77	0.88
	5/32	4	84	11	11	73	11	64	0.50	0.65	3.7	0.76	0.87
	3/16	5	83	11	12	68	10	53	0.49	0.65	3.7	0.71	0.82
Clear	1/4	6	82	10	11	66	10	49	0.49	0.64	3.7	0.70	0.81
	5/16	8	81	10	11	62	9	45	0.49	0.64	3.6	0.67	0.77
	3/8	10	80	10	11	59	9	42	0.49	0.63	3.6	0.65	0.75
	1/2	12	79	10	11	56	8	42	0.49	0.63	3.6	0.63	0.73
Optiwhite	1/4	6	83	11	12	75	12	68	0.49	0.64	3.6	0.77	0.89
Pilkington Solar-E ™	solar cont	rol low-e	(coating or	n #2 surfa	ce)								
	1/8	3	60	8	9	46	8	48	0.50	0.66	3.7	0.54	0.63
	5/32	4	60	8	9	45	8	46	0.50	0.65	3.7	0.54	0.62
Cloar	3/16	5	60	7	9	44	7	44	0.50	0.65	3.7	0.53	0.61
Clear	1/4	6	60	8	9	44	7	44	0.50	0.65	3.7	0.53	0.61
	5/16	8	59	8	9	42	7	41	0.49	0.64	3.7	0.52	0.59
	3/8	10	60	8	9	40	7	38	0.49	0.64	3.6	0.5	0.58
Ever Creen IM	1/4	6	45	6	9	20	5	8	0.50	0.65	3.7	0.35	0.40
EverGreen	5/16	8	40	7	9	16	5	5	0.50	0.64	3.7	0.32	0.37
Pilkington Solar-E™	Plus solar	control lo	w-e (coatir	ng on #2 s	surface)								
Blue-Green	1/4	6	41	6	9	24	5	19	0.50	0.65	3.7	0.38	0.44
Arctic Blue™	1/4	6	30	5	8	17	5	11	0.50	0.65	3.7	0.32	0.37
Grey	1/4	6	24	5	9	19	5	12	0.50	0.65	3.7	0.34	0.39
Pilkington Eclipse A	dvantage	™ solar co	ontrol low-e	e (coating	on #2 sur	face)							
Clear	1/4	6	67	25	28	58	19	30	0.53	0.67	3.7	0.62	0.72
Blue-Green	1/4	6	56	19	27	35	11	16	0.53	0.67	3.7	0.46	0.53
EverGreen™	1/4	6	48	15	27	23	8	7	0.53	0.67	3.7	0.37	0.43
Arctic Blue™	1/4	6	39	12	27	23	8	10	0.53	0.67	3.7	0.37	0.43
Bronze	1/4	6	38	11	27	35	10	11	0.53	0.67	3.7	0.46	0.53
Grey	1/4	6	32	10	27	29	8	10	0.53	0.67	3.7	0.42	0.48
Pilkington Eclipse ™	Gold (coat	ing on #2	surface)										
	1/4	6	40	36	45	45	25	9	0.92	1.02	5.7	0.54	0.62
	5/16	8	40	34	44	42	23	8	0.91	1.01	5.6	0.53	0.61
Pilkington Eclipse ™	Sunset Go	ld (coating	g on #2 su	irface)									
	1/4	6	24	16	44	30	12	3	0.92	1.02	5.7	0.48	0.55
Pilkington Activ™ se	elf-cleaning	(coating	on #1 surf	ace)									
	1/8	3	84	15	15	80	12	49	0.94	1.04	5.8	0.82	0.95
	5/32	4	83	15	15	79	12	47	0.93	1.04	5.8	0.81	0.94
	1/4	6	82	15	15	75	12	44	0.92	1.02	5.7	0.79	0.90

U-Factor (Btu/hr•ft2•°F) is based on NFRC/ASTM standards. All performance values are center-of-glass values calculated using the LBNL Window 7.7 program.

Insulating Glass Unit Performance for Uncoated Float Glass

Visible Light (%)		Sola	r Energy	(%)	U-Factor (Btu/hr•ft²•°F)						ie	ient		
	8	Reflec	tance	8	a	e	Sum	mer	Wir	nter	Eur	ope	it Ga ient	effic
	Transmittan	Outside	Inside	Transmittan	Reflectanc	UV Transmittan	Air	Argon	Air	Argon	Air	Argon	Solar Hea Coeffic	Shading Co
Pilkington Uncoated Float Glass outer lite and Pilkington Optifloat™ Clear inner lite														
Clear	78	15	15	61	12	47	0.50	-	0.47	-	0.28	-	0.71	0.81
Green	68	12	14	38	8	23	0.50	-	0.47	-	0.28	-	0.49	0.56
Blue-Green	67	12	14	39	8	26	0.50	-	0.47	-	0.28	-	0.51	0.58
Bronze	45	8	12	38	7	18	0.50	-	0.47	-	0.28	-	0.50	0.58
Grey	39	7	12	32	6	17	0.50	-	0.47	-	0.28	-	0.45	0.52
EverGreen™	58	10	13	28	6	11	0.50	-	0.47	-	0.28	-	0.40	0.46
Arctic Blue™	47	8	13	27	6	17	0.50	-	0.47	-	0.28	-	0.40	0.46
SuperGrey™	8	4	11	6	4	1	0.50	-	0.47	-	0.28	-	0.22	0.25
Pilkington Uncoated	d Float Gla	ass outer	lite and P	ilkington I	Energy A	dvantage	e ™ low-e	(coating c	on #3 surf	ace) inne	r lite			
Clear	73	17	16	52	14	37	0.33	0.28	0.33	0.29	1.8	1.5	0.67	0.77
Green	63	13	15	33	9	18	0.33	0.28	0.33	0.29	1.8	1.5	0.44	0.50
Blue-Green	62	13	15	34	9	21	0.33	0.28	0.33	0.29	1.8	1.5	0.46	0.52
Bronze	42	8	14	32	8	14	0.33	0.28	0.33	0.29	1.8	1.5	0.45	0.52
Grey	36	7	14	27	7	13	0.33	0.28	0.33	0.29	1.8	1.5	0.40	0.46
EverGreen™	54	11	14	24	7	9	0.33	0.28	0.33	0.29	1.8	1.5	0.35	0.40
Arctic Blue™	43	9	14	23	7	13	0.33	0.28	0.33	0.29	1.8	1.5	0.34	0.39
SuperGrey™	7	4	13	5	4	1	0.33	0.28	0.33	0.29	1.8	1.5	0.16	0.18

An insulating unit consists of two lites of 1/4" (6mm) glass and a 1/2" (12.7mm) spacer width

U-Factor (Btu/hr•ft²•°F) is based on NFRC/ASTM standards. All performance values are center-of-glass values calculated using the LBNL Window 7.7 program.



Insulating Glass Unit Performance for Coated Float Glass

	Visible Light (%)		Solar	· Energy	(%)	U-Factor (Btu/hr•ft²•°F)						t		
	e	Reflec	ctance	e		e,	Sum	mer	Wir	nter	Eur	оре	Sain It	icie
	Transmittanc	Outside	Inside	Transmittanc	Reflectance	UV Transmittano	Air	Argon	Air	Argon	Air	Argon	Solar Heat (Coefficier	Shading Coeff
Pilkington Glass (coating on #2 surface) outer	lite and	Pilkingto	n Optif l	oat ™ Cl	ear inne	r lite							
Energy Advantage™	73	16	17	52	13	37	0.33	0.28	0.33	0.29	1.8	1.5	0.62	0.71
Solar-E™	53	11	15	35	9	33	0.33	0.28	0.33	0.29	1.8	1.5	0.45	0.51
Solar-E [™] on EverGreen [™]	40	8	15	17	6	7	0.33	0.28	0.33	0.29	1.8	1.5	0.26	0.30
Solar-E [™] Plus on Grey	21	6	15	16	6	10	0.33	0.28	0.33	0.29	1.9	1.6	0.26	0.30
Solar-E [™] Plus on Blue-Green	37	8	15	20	6	15	0.33	0.28	0.33	0.29	1.9	1.6	0.30	0.34
Solar-E [™] Plus on Arctic Blue	27	6	14	14	5	9	0.33	0.28	0.33	0.29	1.9	1.6	0.24	0.28
Eclipse Advantage™	60	29	31	46	21	24	0.35	0.30	0.35	0.30	1.9	1.4	0.55	0.63
Eclipse Advantage [™] on Blue-Green	51	21	29	29	12	13	0.35	0.30	0.35	0.30	1.9	1.4	0.38	0.44
Eclipse Advantage [™] on EverGreen [™]	43	17	30	20	9	6	0.35	0.30	0.35	0.30	1.9	1.4	0.29	0.34
Eclipse Advantage [™] on Arctic Blue [™]	35	13	30	19	9	9	0.35	0.30	0.35	0.30	1.9	1.4	0.29	0.33
Eclipse Advantage [™] on Bronze	34	13	29	28	11	9	0.35	0.30	0.35	0.30	1.9	1.4	0.38	0.44
Eclipse™ Gold	36	38	45	35	27	7	0.50	0.47	0.47	0.45	1.9	1.4	0.45	0.52
Eclipse™ Sunset Gold	22	16	44	24	13	3	0.50	0.47	0.47	0.45	1.9	1.4	0.36	0.42
Pilkington Glass (coating on #2 surface) outer	lite and	Pilkingto	n Energ	y Adva	ntage™	low-e (o	coating o	on #4 su	rface) in	ner lite			
Energy Advantage™	68	17	18	47	14	29	0.24	0.21	0.26	0.23	1.5	1.3	0.58	0.66
Solar-E™	49	11	17	32	9	26	0.24	0.22	0.26	0.23	1.6	1.3	0.41	0.47
Solar-E [™] on EverGreen [™]	37	8	17	16	6	5	0.24	0.22	0.26	0.23	1.6	1.3	0.24	0.27
Solar-E [™] Plus on Grey	20	6	17	14	6	8	0.24	0.22	0.26	0.23	1.6	1.3	0.23	0.27
Solar-E [™] Plus on Blue-Green	34	8	17	18	6	12	0.24	0.22	0.26	0.23	1.6	1.3	0.27	0.31
Solar-E [™] Plus on Arctic Blue [™]	25	6	16	13	5	7	0.24	0.22	0.26	0.23	1.6	1.3	0.21	0.25
Eclipse Advantage™	56	30	30	41	22	19	0.25	0.23	0.27	0.24	1.6	1.4	0.51	0.58
Eclipse Advantage [™] on Blue-Green	48	22	29	26	12	10	0.25	0.23	0.27	0.24	1.6	1.4	0.35	0.40
Eclipse Advantage [™] on EverGreen [™]	40	18	30	18	9	5	0.25	0.23	0.27	0.24	1.6	1.4	0.26	0.30
Eclipse Advantage [™] on Arctic Blue [™]	33	14	29	17	9	7	0.25	0.23	0.27	0.24	1.6	1.4	0.26	0.30
Eclipse Advantage [™] on Bronze	32	13	29	24	11	7	0.25	0.23	0.27	0.24	1.6	1.4	0.34	0.39
Eclipse™ Gold	34	38	43	29	28	5	0.33	0.32	0.35	0.33	1.6	1.4	0.39	0.45
Eclipse™ Sunset Gold	21	16	42	19	14	2	0.33	0.32	0.35	0.33	1.6	1.4	0.30	0.35

An insulating unit consists of two lites of 1/4" (6mm) glass and a 1/2" (12.7mm) spacer width U-Factor (Btu/hr•ft²•°F) is based on NFRC/ASTM standards. All performance values are center-of-glass values calculated using the LBNL Window 7.7 program.

Anti-reflective Performance Data

Nomina Thick	Nominal Glass Thickness Visible Light (%)		(%)	Sola	ar Energy ((%)	U-Factor (Btu/hr•ft²•°F)			E	ent	
		e	Reflec	ctance	e		e				: Gai	iffici
in. mm Pilkington OptiView	mm	Transmittar	Outside	Inside	Transmittano	Reflectance	UV Transmittano	Summer	Winter	European	Solar Heat Coeffici	Shading Coe
Pilkington	OptiView™	[•] laminates	(coating on	surface #1	and #4)							
1/4	6.8	92	2	2	70	4	<1	0.68	0.80	4.6	0.77	0.88
5/16	8.8	90	2	2	67	4	<1	0.67	0.79	4.5	0.75	0.86
1/2	12.8	88	2	2	62	3	<1	0.66	0.77	4.4	0.71	0.82
Pilkington	Optifloat™	' Clear (for c	comparitive	purposes)								
1/4	6	88	8	8	77	7	63	0.93	1.03	5.7	0.82	0.94
5/16	8	87	8	8	73	7	57	0.92	1.01	5.6	0.79	0.91
1/2	12	84	8	8	64	6	49	0.89	0.98	5.5	0.73	0.84

Laminates consists of two lites of equal glass thickness, and a 0.030 in. (0.8 mm) $\ensuremath{\mathsf{pvb}}$

U-Factor (Btu/hr•ft²•oF) is based on NFRC/ASTM standards. All performance values are center-of-glass values calculated using the LBNL Window 7.7 program.

One-Way Mirror Performance Data

Nominal Gla	ss Thickness		Visible Light (%)		۵)	-	
		e	Reflec	tance	trat	war	
in.	mm	Transmittan	Coated Surface	Uncoated Surface	Glass Subs	Glaze Mir Coating To	
Pilkington Mirropan	le™						
1/4	6	10	74	19	Grey	Subject Side	
Pilkington MirroVie	W TM						
1/8	3	24	66	58	Clear	Viewer Side	
1/4	6	22	66	57	Clear	Viewer Side	
Pilkington MirroVie	w ™ 50/50						
1/8	3	39	50	47	Clear	Viewer Side	
1/4	6	37	50	46	Clear	Viewer Side	

Typical values of Pilkington production are provided.

U-Factor (Btu/hr+ft2+oF) is based on NFRC/ASTM standards. All performance values are center-of-glass values calculated using the LBNL Window 7.7 program.

Vacuum Insulated Glazing Unit Performance Data

Nominal Glass Thickness Visible Light (%)			%)	So	lar Energy (%)		E			
		e	Reflec	ctance	e	Ð	e	Btu/h	•ft²•°F	W/m²•K	t Gai ent
in.	mm	Transmittan	Outside	Inside	Transmittan	Reflectanc	UV Transmittan	Summer	Winter	European	Solar Hea Coeffici
Pilkington S	pacia™										
1/4	6.2	77	17	17	66	16	55	0.27	0.25	1.4	0.69
5/16	8.2	76	17	17	60	16	47	0.26	0.25	1.4	0.68
3/8	10.2	74	17	17	55	14	41	0.26	0.25	1.4	0.63
Pilkington S	pacia ™ Cool										
1/4	6.2	70	23	21	47	36	43	0.18	0.18	1.0	0.49
5/16	8.2	69	23	20	43	36	37	0.18	0.18	1.0	0.49
3/8	10.2	68	22	20	40	30	33	0.18	0.18	1.0	0.46
Pilkington Super Spacia™											
3/8	10.2	68	22	20	40	30	33	0.12	0.12	0.6	0.45

U-Factor (Btu/hr•ft2•°F) is based on NFRC/ASTM standards. All performance values are center-of-glass values calculated using the LBNL Window 7.7 program.



NSG TEC[™] Glass Performance Data

	Thickness (mm)	Visible Light Transmittance (%)	Sheet Resistance (Ω/□)	Typical Sheet Resistance (Ω/□)	Typical Haze (%)
NSG TEC ™ 7	2.2, 3.0, 3.2	80.0 - 82.0	<8	7	1.5
NSG TEC ™ 8	2.2, 3.2	80.0 - 81.5	<9	8	12.0
NSG TEC ™ 10	4.0, 6.0	81.5 - 84.4	<11	10	0.6
NSG TEC™ 15	2.2, 3.0, 3.2, 4.0, 5.0, 6.0	81.5 - 84.5	<14	13	0.4
NSG TEC ™ 20	4.0, 6.0	82.3 - 85.2	<20	19	0.4
NSG TEC ™ 35	3.2, 6.0	82.0 - 84.0	<48	40	0.5
NSG TEC ™ 50	3.2, 4.0	82.0 - 84.5	<53	48	0.5
NSG TEC ™ 70	3.2, 4.0	82.0 - 84.7	<75	65	0.3
NSG TEC™ 100	3.2, 4.0	82.0 - 84.5	<120	110	0.5
NSG TEC™ 160	3.2	82.0 - 84.5	<200	170	0.4
NSG TEC ™ 250	3.2, 4.0	84.0 - 87.0	<325	240	0.3
NSG TEC ™ 450	3.2	82.0 - 84.0	<600	550	0.7
NSG TEC ™ SB	2.2, 3.2	91.0 - 92.0	-	-	0.1

The technical data are calculated according to EN 410, EN 673, and EN 12898.

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The above performance data should be considered representative. There may be differences within a single production run or from one production run to another, but these are subject to manufacturing tolerances.

The data presented in this table is related to the as-supplied product. Some values, such as sheet resistance, may change after the toughening process depending on toughening/ tempering conditions.

Please note that not all NSG TEC™ glass types are available in all markets. Please contact your local NSG Group representative to check the available offer.

The low-emissivity properties of NSG **TEC[™]** Glass are used in household appliances, for oven doors, to insulate the high temperatures inside from the external glass surface. The low-emissivity coating of NSG **TEC[™]** Glass protects the user from the risk of burns thanks to the thermal insulation

The glass types mainly used for oven doors are: NSG **TEC™** 10 and NSG **TEC™** 15.

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Pilkington North America 811 Madison Ave Toledo, Ohio 43604-5684 buildingproducts.pna@nsg.com

buildingproducts.pna@nsg.com 800 221 0444 • Fax 419 247 4573 www.pilkington.com/na