





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

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We're making a difference to our world through glass technology.

## 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.



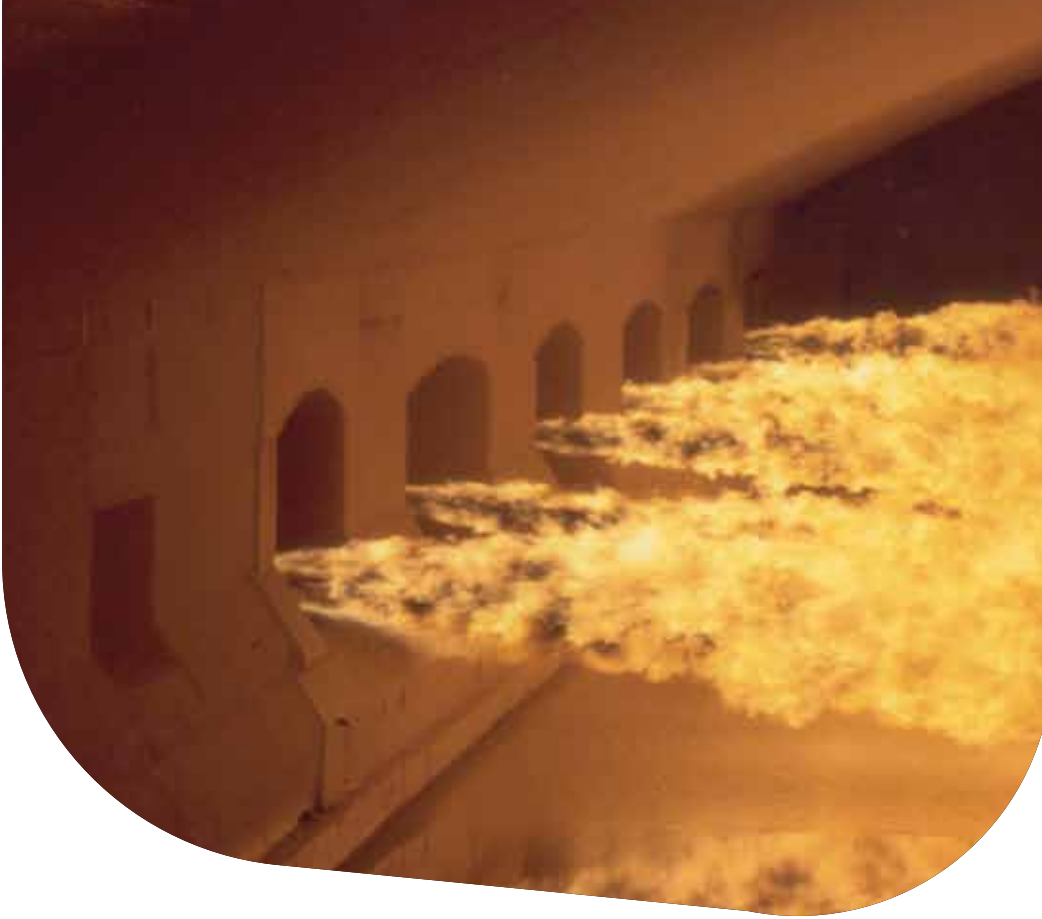
### Float Glass Manufacturing

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 is the industry leader in pyrolytic coating technology.



## Glass Fabrication

### **Insulating Glass Units**

Insulating units are two or more panels of glass bonded to a perimeter spacer material with a hermetically sealed airspace. The primary benefit is insulation and solar control. Most types of glass can be incorporated into an insulating glass unit.

### **Laminated Safety Glass**

Laminated glass comprises two or more layers of glass bonded together with a plastic or resin interlayer. If broken, the interlayer is designed to hold the glass together. Virtually all glass types can be laminated and the thickness and types of interlayer can be varied to provide ballistic, bomb or physical attack resistance. Laminated glass can typically be cut and further processed.

### **Tempered Glass**

Tempered glass is at least four times stronger than annealed glass. When broken, it shatters into many small fragments which reduce major injuries. This type of glass is intended for glass facades, sliding doors, building entrances, bath and shower enclosures, and other uses requiring superior strength and safety properties.

### **Heat Strengthened**

Annealed glass is subjected to a special heat-treatment in which it is heated to about 680°C (1256°F) and afterwards cooled. When it is cooled slower than tempered glass, the glass is twice as strong as annealed glass, and the fragments of the broken glass are larger and more likely to remain in the frame. Heat strengthened glass is not recognized as a "safety glass" by typical building codes.

## Glass Selection

### Technical Bulletins

#### ATS 104

Protecting Glass

#### ATS 112

Preventing Stain

#### ATS 113

Applied Plastic Films

#### ATS 114

Butt Joint Edges

#### ATS 116

Glass & Energy

#### ATS 122

Glass Selection

#### ATS 124

Spandrel Panels

#### ATS 126

Lawn Sprinklers

#### ATS 141

Fading Control

Glass plays a unique and important role in building design and the environment. It affects design, appearance, thermal performance and occupant comfort. The selection of the right glass is a crucial component of the design process.

By identifying key issues at the design stage, glass products can be selected to match your specific application. NSG sales managers and engineers are available for specific project questions and issues at any critical design phase as well as throughout the entire project.

### Product Selection and Application

Pilkington brand products are categorized by benefit-led category. Each category is identified by a symbol/icon representing the application.

### Specifying

Some key factors need to be considered in the selection of glass in facades, interiors and glass systems. Solar and thermal performance will often be a high priority decision along with appearance (color, transparency and reflectivity). This information will lead to a glass product type with additional attributes such as safety, security, decoration, noise control and self-cleaning.

### Breakage and Risk Considerations

How glass behaves in the case of accidental or intentional breakage must be considered, and while glazing codes and regulations provide the minimum requirements, they do not necessarily constitute fitness for purpose.

### Technical Bulletins

Technical Bulletins (ATS) are additional tools that have been developed to assist you in all aspects of specifying Pilkington glass. These bulletins will be referenced in the margins throughout this brochure and can be downloaded from our website, [www.pilkington.com/na](http://www.pilkington.com/na)

### Not All Energy is the Same

To understand how revolutionary Pilkington brand products really are, you need to know a little bit about energy and heat as it applies to glass.

- Heat gain comes from both the sun's direct short-wave radiation and the transfer of energy from the exterior environment.
- Solar Control is a key issue in terms of energy savings. In hot conditions or for buildings with high internal loads, solar control glass is used to minimize solar heat gain by rejecting solar radiation and help control glare. In more temperate conditions, it can be used to balance solar control with high levels of natural light.
- Glass can provide solar control by either absorbing a portion of this energy (such as tinted glass) or reflecting a portion of it (reflective glass). In the case of Pilkington **Eclipse Advantage™** solar control low-e, there is a combination of the two.
- In cold climates, Low-e glass will redirect energy (room heat) back into a building, to achieve much lower heat loss than ordinary float glass. Different types of low-e glass allow different amounts of free energy from the sun, passive solar heat gain, helping to reduce heating requirements and costs, especially in colder months.



Emirates Industrial Bank, Dubai  
Pilkington **Eclipse Advantage™** EverGreen  
Pilkington **Optifloat™** Blue-Green

## Coating Technology and Sustainability

### 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 Initiative

The NSG Group has been proud to be a technological leader in glass manufacturing for many years. Whether it's improving processes such as the float glass manufacturing; which produces more than 95 percent of glass worldwide, advancing coating technologies (pyrolytic or "hard-coat" coatings that require significantly less energy to make), 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.

One of the most recognized architectural standards in green or sustainable building design is the Leadership in Energy and Environmental Design (LEED®) Green Building Rating System, administered by the United States Green Building Council (USGBC).

LEED® was developed to define "green building" by establishing a common standard of measurement and recognize environmental leadership in the building industry. The certification process for buildings is based on a point system.

While LEED® does not certify specific building products (glass), it does recognize the benefit glass products play in fulfilling LEED® point requirements. Pilkington brand products can help architects achieve LEED® certification for their projects in a number of areas such as energy performance, regional materials, daylight and views.

Contact the NSG Group for information regarding products that can help you achieve your LEED® certification.

For many years, Pilkington energy efficient products have shown a commitment to the environment by carrying the ENERGY STAR label. With our most recent Green Building Partnership, Pilkington North America will ensure its float glass manufacturing facilities that produce energy efficient products are also operated with concern for the environment.



One acre solar field  
Pilkington Research & Development Center,  
Northwood, Ohio  
NSG **TEC™** Glass



Owens-Illinois Headquarters  
Perrysburg, Ohio  
Pilkington **Eclipse Advantage™** Arctic Blue  
Pilkington **Energy Advantage™**  
Pilkington **Solar-E™** Clear  
USGBC LEED® Silver



## 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 through 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.

### 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 conductive heat gain or heat loss, which means a lower U-factor and better insulation.



### Low-e Glass

These coated glasses provide thermal control and enhanced insulation, as well as additional solar control when combined with a solar control glass in either a monolithic or insulating glass unit.

Low-e coatings reduce the emissivity of the glass surface. This means the glass provides greater insulation by reflecting heat generated from heating and other sources back inside a building.

A second line of defense is improved solar control. Heat absorbed by the solar control glass is driven back out by the low emissivity coating to provide even better solar and thermal control. Low-e coatings are useful for reducing solar heat gains and heat loss.

For comparison, uncoated glass has an emissivity of 0.84 and Pilkington **Energy Advantage™** is 0.15, which means only 15 percent of heat absorbed is re-emitted from the coated side. This feature is useful as it reflects energy back

towards where it came from. If a solar control glass is used, then adding a lite of low-e on the room side acts as a barrier to the absorbed heat in the glass passing to the inside of the building.

### Passive Solar Heat Gain

Passive solar heat gain is radiant energy generated from the sun. For buildings that require passive heat gains, a low emissivity coating with clear glass allows direct solar radiation to pass through the glass and then traps it inside the building.

Thermal control low-e glazing products like Pilkington **Energy Advantage™** reduce energy usage by allowing passive solar heat to easily pass through the glazing. The pyrolytic low-e coating provides thermal insulation by reducing heat loss. That is why Pilkington **Energy Advantage™** is known as a leading passive solar glazing product in the market.



Al Sahel Towers, Abu Dhabi  
Pilkington **Eclipse Advantage™** Arctic Blue  
Pilkington **Optifloat™** Blue-Green  
Pilkington **Eclipse Advantage™** EverGreen

## Pilkington Online Resources at [www.pilkington.com/na](http://www.pilkington.com/na)

### **Pilkington Sun Management Calculator**

This interactive tool allows you to take glazing selection to a new level.

- Compare different glazing options and performance data.
- Review the interactive insulating unit graphic.
- Explore the related project references.
- Develop a custom specification.

### **Pilkington Thermal Stress Calculator**

Not sure when you need to heat treat different kinds of glass under different conditions? Then the interactive Pilkington Thermal Stress Calculator will help you determine that, too.

Just answer a few simple questions, and the Thermal Stress Calculator will do all the hard work for you.

### **Pilkington Wind Load Calculator**

The Wind Load Calculator allows you to quickly check short duration loads for monolithic annealed glass, against ASTM E1300 Standard Practice for Determining Load Resistance.

### **Project References**

Explore the interactive Pilkington project references section, and find an array of inspiring projects using Pilkington glass in North America and around the world.

### **Resource Library**

Take time to browse our online library where you'll find a wealth of resources, including our online Architectural Product Catalog, warranty information, full performance data, LEED information and much more.

### **ATS Technical Bulletins**

Browse our extensive catalog of ATS Technical Bulletins online for comprehensive information on our cleaning, handling, inspecting and fabricating our products. You'll also find helpful information on specific glazing topics.



Michigan State Federal Credit Union  
East Lansing, Michigan  
Pilkington **Eclipse Advantage™** EverGreen  
USGBC LEED® Gold project

## Pilkington Brand Products



Toronto City Hall  
Ontario, Canada  
Pilkington **Eclipse Advantage™** Grey

**Solar Control**



**Thermal Insulation**



**Fire Protection**



**Self-Cleaning**



**Decoration**



**Special Applications**



**Solar Energy**



**Glass Systems**



**Noise Control**





## Pilkington Optifloat™ Tints

Pilkington tinted glasses reduce unwanted heat gain while admitting high natural daylight to enhance visual performance and lower artificial lighting needs. Available in Green, Blue-Green, Bronze, and Grey.

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.

## Pilkington High Performance Tints

This line of tints provide significant improvements in solar performance compared to normal tinted glass. The colors are richer, however natural views from the interior are maintained with low exterior reflectance. They are readily available and can be processed and fabricated similarly to normal float glass to provide an economical choice for reducing air-conditioning loads and costs.

- Pilkington **Graphite Blue™**  
Our newest tinted product, is an original blue-grey color, with good daylight transmittance and solar control.

- 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.
- Pilkington **Arctic Blue™\***  
A unique blue tinted float glass, engineered for good daylight transmittance and solar control. It also provides a soft, undistorted natural view from the interior.
- Pilkington **SuperGrey™\***  
Provides the best solar control of any uncoated float glass. The deep grey color provides daytime privacy from the outside and reduced see-through. The glass softens bright daylight and reduces glare with 9 percent light transmittance making it appropriate for use in skylights or near computer monitors.

\* Denotes a High Performance Tinted Glass

### Features and Benefits

- Range of color choices.
- Low external and internal reflectance.
- Solar control, reducing the need for air conditioning.
- Can be laminated, toughened, bent and enamelled using standard techniques.
- Can be used in monolithic form or incorporated in insulating glass units.
- Available in a wide range of sizes from 3 mm to 12 mm thicknesses (depending on the color).

### Applications

- Low, mid and hi-rise buildings
- Medical/Hospital
- Educational/Schools
- Office
- Retail

### Technical Bulletins

#### ATS 141

Glazing Choice Can Affect  
Fading of Home Furnishings





DALBY BUILDING

Dalby Building at Phoenix College  
Phoenix, Arizona  
Pilkington **EverGreen™**



## Pilkington **Solar-E™** solar control low-e glass

### Technical Bulletins

#### ATS 133

Machine Cleaning Low-e

#### ATS 143

Hand Cleaning Low-e

#### ATS 148

Plant Growth Behind Low-e

#### ATS 162

Single Glazing  
Pilkington **Solar-E™**

#### ATS 163

Handling, Inspecting,  
and Fabrication

#### ATS 164

How Pilkington **Solar-E™**  
Works

#### ATS 190

Handling, Inspection, and  
Fabrication

A superior low-e coating, Pilkington **Solar-E™** is the perfect solution for meeting cooling load requirements and other energy code programs. Pilkington **Solar-E™** offers natural daylight transmittance, energy conservation, and contributes to the sustainability of your project.

### Features and Benefits

- The low-e coating reduces the emissivity of glass and lowers the U-factor.
- Low SHGC values can result in significant savings in utility costs.
- Available in natural colors, without reflectivity.
- Low UV (ultraviolet) transmittance. Reducing UV rays means less fading.
- Can help to achieve LEED® or other green certifications.
- For further improved thermal control, add Pilkington **Energy Advantage™** low-e to an insulated unit (coating on the #4 surface).

### Available Colors

- Clear
- Grey
- EverGreen

### Applications

- Commercial buildings requiring solar and thermal control
- Low, mid and hi-rise buildings
- Medical/Hospital
- Educational/Schools
- Office
- Retail
- Residential

Manufactured using a unique chemical vapor deposition method, Pilkington **Solar-E™** features an integral pyrolytic surface which provides superior fabricating and handling qualities. As a result, the glass can be handled, cut and tempered, and offers unlimited shelf-life. In addition, no edge deletion or special handling is required.

### 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





## Pilkington **Solar-E™** Plus solar control low-e glass

The new Pilkington **Solar-E™** Plus coating offers the same benefits and pyrolytic advantages as our classic low-e coating, with enhanced solar and thermal control and richer transmitted color.

Pilkington **Solar-E™** Plus offers natural daylight transmittance, energy conservation, and contributes to the sustainability of your project. It can help achieve LEED® or other green certification.

Manufactured using a unique chemical vapor deposition method, Pilkington **Solar-E™** Plus features an integral pyrolytic surface which provides superior fabricating and handling qualities. As a result, the glass can be handled, cut and tempered, and offers a virtually unlimited shelf-life. In addition, no edge deletion or special handling is required.

### **Pilkington Low-e 4<sup>th</sup> Surface Technology**

See page 21 for information on how Pilkington Low-e 4<sup>th</sup> Surface Technology can enhance the performance of Pilkington **Solar-E™** Plus.

### **Available Thickness**

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

### **Available Colors**

- Blue-Green
- Arctic Blue
- Graphite Blue

### **Features and Benefits**

- The low-e coating reduces the emissivity of glass and lowers the U-factor.
- Low SHGC values can result in significant savings in utility costs.
- Available in natural colors, without reflectivity.
- Provides good visible light transmittance, helping to reduce the need for interior lighting.
- Low internal and external reflection, reducing uncomfortable glare from the sun and diminishing the need for blinds and shades.
- Low UV (ultraviolet) transmittance. Reducing UV rays means less fading.
- Ideal for new commercial construction and replacement applications.
- For further improved thermal control, add Pilkington **Energy Advantage™** low-e to an insulated unit (coating on the #4 surface).

Telesure Headquarters  
South Africa  
Pilkington **Solar-E™** Arctic Blue



Chamber of Commerce  
Saudi Arabia  
Pilkington **Solar-E™** Arctic Blue



## Pilkington **Eclipse Advantage™** solar control low-e glass

### Technical Bulletins

**ATS 123**  
Thermal Stress

**ATS 124**  
Spandrel Panel Glazing

**ATS 176**  
Handling, Inspecting,  
Fabricating & Glazing

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.

Pilkington **Eclipse Advantage™** is manufactured by the NSG Group pyrolytic process. In this on-line chemical vapor deposition process, a gas reacts with the semi-molten surface of the float glass to form a subtle reflective coating on clear and tinted glass. The result is a product that combines solar and thermal performance, subtle reflectivity and glare control.

### **Pilkington Low-e 4<sup>th</sup> Surface Technology**

See page 21 for information on how Pilkington Low-e 4<sup>th</sup> Surface Technology can enhance the performance of Pilkington **Eclipse Advantage™**.

### **Available Colors**

- Clear
- Grey
- Bronze
- Blue-Green
- EverGreen
- Arctic Blue

### **Available Thickness**

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

### **Applications**

- Commercial buildings requiring solar and thermal control
- Low, mid and hi-rise buildings
- Medical/Hospital
- Educational/Schools
- Office
- Retail
- Residential

### **Features and Benefits**

- The low-e coating reduces the emissivity of glass and lowers the U-factor.
- Low SHGC values can result in significant savings in utility costs.
- Available in natural, colors with subtle reflectivity.
- Provides good visible light transmittance, helping to reduce the need for interior lighting.
- Low internal and external reflection, reducing uncomfortable glare from the sun and the need for blinds and shades.
- Low UV (ultraviolet) transmittance. Reducing UV rays means less fading.
- Ideal for new commercial construction and replacement applications.
- For further improved thermal control, add Pilkington **Energy Advantage™** low-e to an insulating unit (coating on the #4 surface).

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



## Pilkington **Eclipse™** Gold and Sunset Gold reflective solar control glass

Here's your golden opportunity to make your project stand apart from the rest. These stylish products balance daylight transmittance with solar and glare control.

Perfect as an accent color or to glaze an entire building, Pilkington **Eclipse™** Gold and Pilkington **Eclipse™** Sunset Gold offer any project a sense of distinguished style and elegance.

With good natural daylight transmittance, the Pilkington **Eclipse™** Gold family enhances visual performance and lowers artificial lighting requirements. Combine Pilkington **Eclipse™** Gold or Pilkington **Eclipse™** Sunset Gold with Pilkington **Energy Advantage™** to improve the U-factor and further reduce solar heat gain coefficient.

The Pilkington **Eclipse™** Gold family of products does not require edge deletion for insulating glass unit manufacture and can also have a ceramic frit or silk screen pattern applied to the coated surface. The products will not oxidize or change color over time.

### Available Thickness

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

### Features and Benefits

- Good daylight transmittance.
- Suitable for monolithic use or use within an insulated glass unit (#2 surface).
- Reduced lead times.
- Virtually unlimited shelf-life.
- Durable pyrolytic surface - can be handled, cut, insulated, laminated, heat-strengthened, tempered and bent using standard techniques.

### Applications

- Commercial buildings
- Low, mid and hi-rise buildings
- Financial institutions/banks
- Office and retail
- Medical/Hospital
- Interior designs

(Note: Laminating with the coating touching the pvb interlayer will reduce reflectivity and increase transmittance.)



Stephen Hawking Centre at the  
Perimeter Institute  
Waterloo, Ontario Canada  
Pilkington **Eclipse™** Gold



New Orleans Saints Training Facility  
New Orleans, Louisiana  
Pilkington **Eclipse™** Sunset Gold





Manchester United Training Ground  
Manchester, UK  
Pilkington **Optifloat™** Clear,

## Pilkington **Optifloat™** Clear glass

### Technical Bulletins

#### ATS 144

Cleaning Clear and Tinted  
Glass

#### ATS 149

Interference Fringes

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™** provides ease of cutting and is ideal for further processing into a range of products available for general glazing, laminating, high performance coating, mirrors and decorative paint finishes.

Pilkington **Optifloat™** heavy clear glass, the only complete range of heavy float product manufactured in the U.S., is available from 8 mm (5/16") to 19 mm (3/4") thick for a wide variety of commercial glazing possibilities. It offers 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

- Clear glass to maximize daylight transmittance.
- High clarity, low distortion with brilliant flat surfaces.
- Wide range of sizes and thicknesses for optimum utilization.

### Applications

- Low, mid and hi-rise buildings
- Medical/Hospital
- Educational/Schools
- Office
- Retail
- Residential



Yale New Haven Hospital  
New Haven, Connecticut  
Pilkington **Optifloat™** Clear  
Pilkington **Planar™**

## Pilkington **Spacia**™ vacuum 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 **Spacia**™ 21 is a triple glazed "super window," consisting of two low-e coatings in the unit along with argon filling. The result is a highly energy efficient unit with a similar thickness to a conventional double insulating glass unit.

### Applications

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

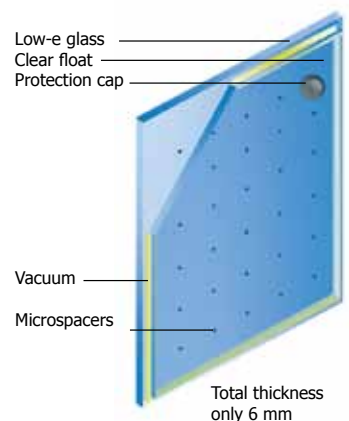
### Features and Benefits

- Better thermal performance than modern double glazing in the same thickness as single glass, offering the opportunity to improve energy efficiency in older traditional buildings.
- Minimum disruption, can be retro-fitted into existing frames designed for single glazing.
- Cost effective method of improving the energy efficiency of older homes where glazing choice is restricted or where the original frames are a desirable feature.
- Improved acoustic performance over single glazing, enhancing the living and working environment.
- Has been successfully used in Japan for over fifteen years and is a proven solution.
- Significantly weighs less than traditional insulating glass units.



The Hermitage Museum  
Amsterdam  
installed approximately 900  
Pilkington **Spacia**™ units

### Pilkington **Spacia**™ vacuum glazing unit construction



## 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 heat 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 known as a 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™** patented pyrolytic coating saves energy by allowing solar energy to pass through the glazing and enter into the home or building, while reducing heat loss.

Pilkington **Energy Advantage™** is often referred to as a "passive solar" glass product because it allows much of the direct solar heat gain through the glazing. The passive solar energy easily passes through the high clarity glazing, providing free heat. To further improve thermal control, add a second low-e coating to the #4 surface of an insulating glass unit.



### Available Thickness

- 2.5 mm (3/32")
- 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")

### Features and Benefits

- Enhanced clarity
- Durable pyrolytic surface
- Energy efficient
- Easily fabricated
- Improved design flexibility
- Excellent availability
- Reduced lead times

### Applications

- Commercial and residential buildings requiring solar and thermal control
- Low, mid and hi-rise
- Medical/Hospital
- Educational/Schools
- Office
- Retail
- Residential

The Barnes Foundation Museum  
Philadelphia, Pennsylvania  
Pilkington **Energy Advantage™**  
Pilkington **Optiwhite™**

### Technical Bulletins

#### **ATS 133**

Machine Cleaning Low-e

#### **ATS 135**

Handling, Inspection and  
Fabrication of Low-e

#### **ATS 137-4**

Improvements in  
Appearance of Low-e

#### **ATS 138**

How Low-e works

#### **ATS 138D**

Window Energy Efficiency  
with Multiple Low-e  
Coatings

#### **ATS 143**

Hand Cleaning Low-e

#### **ATS 148**

Plant Growth Behind Low-e

#### **ATS 162**

Single Glazing Low-e

#### **ATS 193**

4<sup>th</sup> Surface Technology





## Low-e 4<sup>th</sup> Surface Commercial Technology

**Lower U-factor • Improved Clarity • Greater Energy Savings.**

### Here's how it works.

Pilkington **Energy Advantage™** Low-e coatings applied to the #2 and #4 surfaces of an insulating unit reduce the center of glass U-factor by about 20%, compared to an IGU with a pyrolytic low-e and an uncoated clear lite. This proven technology improves thermal performance in a new or reglazed commercial building.

Durability is critical for coatings applied to the 4th surface of an insulating unit. Pyrolytic coatings are extremely durable and difficult to damage. Pilkington pyrolytic coating technology has been used on exposed surfaces successfully for over 20 years globally.

With superior clarity, unrivaled by any other pyrolytic glass, Pilkington **Energy Advantage™** has been used for more than 10 years in North America as a 4th Surface Low-e product.

### Enhanced thermal performance without investing in triple-pane windows.

- Fewer low-e products to inventory, with installation on #2 and #4 surfaces.
- No additional raw materials required.
- No additional capital investments necessary.
- Easily integrated into current fabrication process.
- Lighter construction.
- Less reflection than with triple glazing.
- Durability of a pyrolytic.
- No edge deletion required for an IGU.
- Easily handled, tempered, cut, bent, laminated, insulated and heat-strengthened
- Virtually unlimited shelf-life.

Pilkington **Energy Advantage™** Low-e is coated using a pyrolytic process, which allows for the coating to be chemically-bonded to the glass at a molecular level. This process produces a coating which is extremely durable and will not scratch or degrade over time (under typical circumstances).

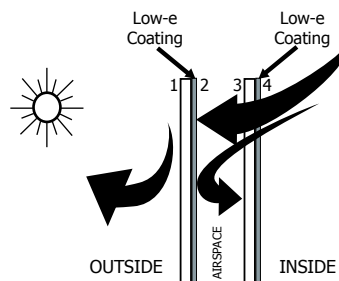
### Features and Benefits

- Durability of a pyrolytic
- Low U-factor and reduced solar heat gain
- Superior thermal control
- Improved clarity
- High light transmittance
- Energy savings
- Easy to clean surface with standard techniques
- Superior aesthetics for any building
- Can help projects achieve LEED® credit
- No additional SKUs

### How is glazing performance improved?

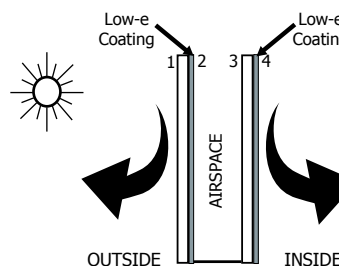
#### Cold Weather Conditions

The coating on the #2 surface reduces room heat (or far IR energy) loss by reflecting it back toward the space. By adding a second low-e coating to the #4 surface the thermal insulation is further improved. More infrared heat (room heat) is reflected back into the building.



#### Warm Weather Conditions

The low-e coating on the #4 surface reflects more solar heat than one lite of low-e glass, reducing cooling loads.





## 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.

### Technical Information

For Technical Inquiries and  
Sales Information, please  
contact  
Technical Glass Products  
(TGP) at (800)-426-0279

Chicago Art Museum  
Chicago, Illinois  
Pilkington **Pyrostop**®



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.

### Features and Benefits

- Allows natural light and unobstructed 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 external applications.
- Available with integral blinds.

### Applications

- Interior and exterior glazing
- Low, mid and hi-rise buildings
- Medical/Hospital
- Educational/Schools
- Office
- Retail

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

## Pilkington **Activ™** self-cleaning glass

A revolutionary glass that uses the power of the sun to clean itself. Pilkington **Activ™** Clear and Blue can dramatically reduce or eliminate window cleaning, while providing crisp, clear vistas and an unspoiled exterior aesthetic.

Pilkington **Activ™** uses UV energy from the sun, abundant even on cloudy, overcast days, to keep windows clean naturally 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, natural 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.

Since pyrolytic coatings are an integral part of the glass surface, they aren't susceptible to peeling, separation or disintegration over time. In addition, they are not damaged by liquid glass cleaners.

Combined in an insulating unit with an inboard lite of either Pilkington **Energy Advantage™** low-e or Pilkington **Solar-E™** low-e for excellent energy performance.

### Available Colors

- Clear
- Blue (only available in 6 mm)

### Available Thickness

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

### Features and Benefits

- Self-cleaning properties
- Durable pyrolytic surface
- Never needs re-treating
- Color neutral
- Easily fabricated
- Available in various glass thickness

### Applications

- Exterior applications
- Low, mid and hi-rise buildings
- Medical/Hospital
- Educational/Schools
- Office
- Retail
- Residential

### Technical Bulletins

#### ATS 166

Maintenance and Hand  
Cleaning of  
Pilkington **Activ™**

#### ATS 168

Handling, Inspection and  
Fabrication of  
Pilkington **Activ™**

#### ATS 169

Glazing Pilkington **Activ™**



GE Plaza  
Vancouver, British Columbia, Canada  
Pilkington **Activ™** Clear  
Pilkington **Energy Advantage™** low-e





## Pilkington Texture Glass

Pilkington Texture Glass comprises a range of textured styles and visual effects providing opportunities for modern design or the faithful re-creation of decor from a by-gone era. It is suitable for both windows and interiors.

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.

Pilkington Texture Glass has all the attributes of glass – durability, ease of cleaning and resistance to scratching and marking. It is stocked by most distributors and is a low-cost decorative option.

### Privacy with Translucency

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

Visit [www.pilkington.us/texture](http://www.pilkington.us/texture) for available sizes and thicknesses.

### Wide Range of Texture Options

Available in more than 20 different textures to suit almost any design need. Refer to the following page to view all the options.

### Features and Benefits

- Contemporary Range – Stocked for ease of availability
- Economical method of providing permanent privacy and decoration
- Diffused daylight
- Unique visual effects
- Creative Designs
- Multiple thicknesses available
- High light transmittance

### Applications

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

### Technical Bulletins

#### ATS 158

Pilkington Texture Glass  
Strength

For more information on available sizes and thicknesses, please visit our website at [www.pilkington.com/na](http://www.pilkington.com/na)



**Arctic™**



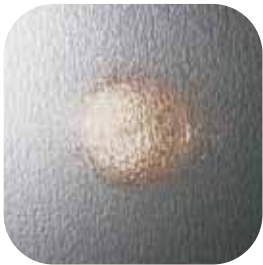
**Autumn™**



**Chantilly™**



**Charcoal Sticks™**



**Contora™**



**Cotswold™**



**Digital™**



**Everglade™**



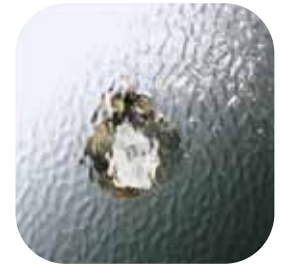
**Flemish™**



**Florielle™**



**Mayflower™**



**Minster™**



**Oak™**



**Pelerine™**



**Reeded™**



**Stippolyte™**



**Sycamore™**



**Taffeta™**



**Warwick™**



**Austral™**



**Morisco™**



**Rayado™**



**Sparkel™**



**Yacare™**



## Pilkington **OptiView™** anti-reflective glass

### Technical Bulletins

#### ATS 182

Hand Cleaning  
Pilkington **OptiView™**

#### ATS 183

Handling, Inspection and  
Fabrication of  
Pilkington **OptiView™**

#### ATS 184

Glass Selection and Design

Pilkington **OptiView™** anti-reflective glass combines two proprietary pyrolytic surfaces into a single laminated glass to minimize visible light reflectance to less than 2 percent compared to clear glass which is 8 percent; this will allow more visible light to pass through.

In addition to its anti-reflective properties, laminated Pilkington **OptiView™** glass blocks more than 99 percent of transmitted UV to protect interiors and contents. At the same time it also offers the traditional benefits of laminated glass, including enhanced security, improved safety, damage protection, and superior acoustic control. The result is a unique fabricated glass that combines the strength, security and sound reduction of laminated glass with the anti-reflectivity of a high-end specialty glass product.

Coupled with large size capability and the fact that it can be tempered, insulated and bent like ordinary glass, Pilkington **OptiView™** glass is not only ideal for typical anti-reflective uses, but it's a practical and economic choice for insulated units.

The Pilkington **OptiView™** coating contains emissivity properties that provide a U-factor comparable to that of an insulated glass unit with our thermal performance low-e.

### Available Thicknesses\*

- 6.8 mm laminated lites
- 8.8 mm laminated lites
- 12.8 mm laminated lites
- 19.8 mm laminated lites

### Features and Benefits

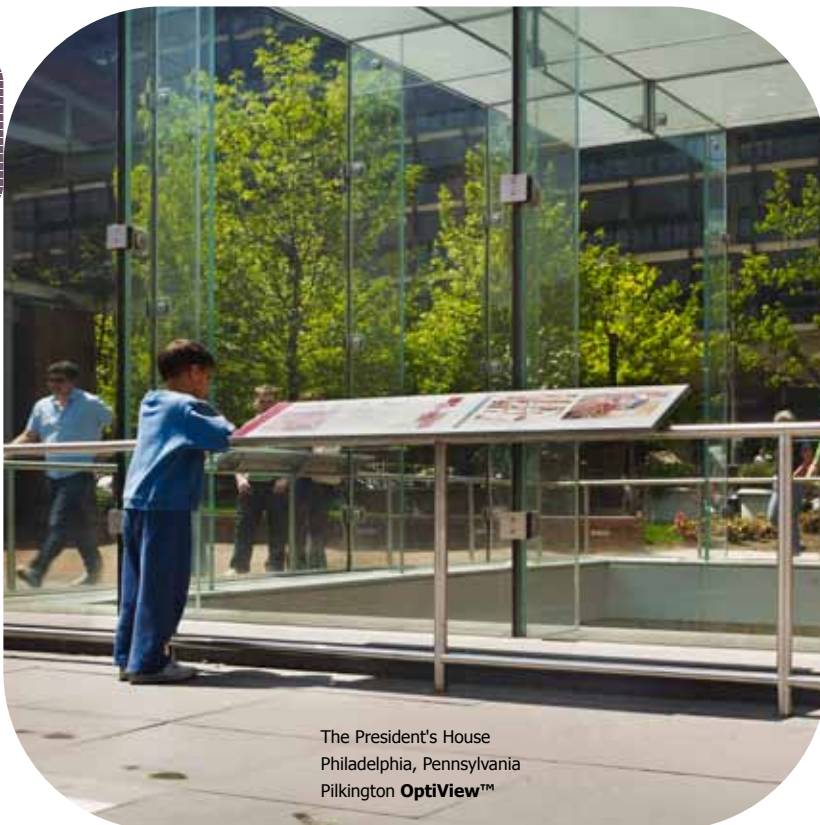
- Reduces exterior and interior visible light reflectance to less than 2 percent.
- Transmits more than 90 percent visible light.
- Low emissivity properties and thermal insulation when installed in an IGU.
- Superior safety, security and acoustic performance.
- Blocks more than 99 percent of transmitted UV.
- Durable pyrolytic surface that is bendable and temperable.
- May be laminated with a middle layer of Pilkington **OptiWhite™** to create thicker laminated lites.
- Available in low iron.

### Applications

- Retail storefronts
- Displays
- Museums
- Showrooms
- Stadiums
- Zoo/Exhibitions
- Where views are a priority

\*Thickness of laminated monolithic Glass = thickness of glass layer + thickness of pvb + thickness of glass layer

- 6.8 mm Pilkington **OptiView™** Laminated Single Glass = 3 mm Pilkington **OptiView™** (#1) + 0.8 clear pvb layer + 3 mm Pilkington **OptiView™** (#4)
- 8.8 mm Pilkington **OptiView™** Laminated Single Glass = 4 mm Pilkington **OptiView™** (#1) + 0.8 clear pvb layer + 4 mm Pilkington **OptiView™** (#4)
- 12.8 mm Pilkington **OptiView™** Laminated Single Glass = 6 mm Pilkington **OptiView™** (#1) + 0.8 clear pvb layer + 6 mm Pilkington **OptiView™** (#4)
- 19.8 mm Pilkington **OptiView™** Laminated Single Glass = 9.5 mm Pilkington **OptiView™** (#1) + 0.8 clear pvb layer + 9.5 mm Pilkington **OptiView™** (#4)



The President's House  
Philadelphia, Pennsylvania  
Pilkington **OptiView™**



## Pilkington **OptAR™** glare reduction, anti-reflective glass

Pilkington **OptAR™** is an affordable alternative for reducing glare that reflects off computer screens, aircraft transparencies, televisions, flat panels and similar electronic displays.

Manufactured on-line with a durable pyrolytic coating, Pilkington **OptAR™** offers all the benefits of an on-line coated glass including, easy handling, fabricating, cutting, tempering, bending and more.

Pilkington **OptAR™** reduces glare (reflected light intensity) and provides low reflectivity. As a result, eye strain is minimized, visual acuity is increased and displays are easier to read.

### **Features and Benefits**

- Electrically conductive
- Improved visual performance
- Easily fabricated
- Bendable
- Durable pyrolytic coating

### **Applications**

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

### **Available Thickness**

- 3.2 mm - clear glass substrate
- 2.2 mm - clear glass substrate





## Pilkington **Mirropane™** one-way mirror

### Technical Bulletins

**ATS 125**  
Pilkington **Mirropane™**  
Guidelines

**ATS 180**  
Hand Cleaning  
Pilkington **Mirropane™**

Pilkington **Mirropane™** is an observation mirror offering high quality, one-way vision that effectively provides discreet, unobtrusive monitoring. It has the appearance of a mirror on the subject side, while providing privacy to observers on the other side. It can also be laminated to provide protection from human impact and reduce noise or sound transmission.

### 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")

### Features and Benefits

- Durable pyrolytic surface
- Post heat-treatable
- High reflectivity
- Excellent availability
- Ideal for surveillance
- Minimizes read-through

### Applications

- Security
- Retail stores
- Supermarkets
- Correctional institutions
- Airports security
- Workplace monitoring
- Banks or cash offices
- Medical facilities
- Computer rooms
- Child care facilities
- Marketing focus group monitoring
- Any area requiring observation

## Pilkington **MirroView™** digital display mirror, for low light applications

Pilkington **MirroView™** is a highly reflective mirror coating with a clear substrate.

Pilkington **MirroView™** gives digital displays and video screens a modern, transitional look.

Pilkington **MirroView™** is ideal for concealing digital displays and video screens for commercial and residential applications.

When the screen is turned 'off'  
Pilkington **MirroView™** maintains a mirrored appearance, which conceals the screen. When the screen is turned 'on' the picture on the video screen shows through.

Pilkington **MirroView™** is very durable and can be easily handled, transported and processed, including tempering and laminating. Due to the durability of the pyrolytic coating, it does not degrade over time, which gives the product a virtually unlimited shelf-life.

### Available Thickness

- 1/8" (3mm) - Pilkington **MirroView™** only
- 1/4" (6mm)

## Pilkington **MirroView™ 50/50** digital display mirror, for high light applications

Pilkington **MirroView™ 50/50** offers the same qualities as the original product, yet it is designed for use in applications with high ambient light.

### Applications

- Living rooms
- Bathrooms
- Hotel rooms
- Retail shops
- Lobbies and salons
- Bars and restaurants
- Digital signage

### Pyrolytic Coating Advantage

- Durable coating
- Easily handled and transported
- No edge deletion required
- Virtually unlimited shelf-life
- Inventoried locally
- Tempered and laminated

### Technical Bulletin

ATS 191

Handling, Inspection,  
Fabrication and Design of  
Pilkington **MirroView™**





## NSG **TEC™** special applications glass

Whether your application involves heated glass for commercial refrigeration, heat reflecting, electrochromics, appliance glass, 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.

### Technical Bulletin

ATS 187

Handling, Inspecting  
and Fabricating  
NSG **TEC™** Glass

NSG **TEC™** Glass offers a wide range of thermal and heated glass performance properties, while it also increases light transmittance and optimizes electrical conductivity.

#### Features and Benefits

- Electrically conductive for heated and thermal control, electrostatic dissipation and reduced transmittance of electromagnetic radiation.
- Color neutral, minimizing reflected color.
- Easily fabricated durable pyrolytic surface can be handled, cut, insulated, laminated, heat-strengthened and tempered.
- Bendable which allows the glass to be heat processed and bent after production.
- Excellent availability for reduced lead times and control of costs.
- Virtually unlimited shelf-life.
- Will not change color over time.
- Scratch and abrasion resistant.
- Available in a variety of glass thicknesses and sheet resistances ranging from 8 ohms/sq. up to several thousand ohms/sq.



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 clear color-neutral appearance.

#### NSG **TEC™** 7

Offers the lowest resistivity value in the NSG **TEC™** 7 Glass range. Combined with relatively low haze, it can be used for a wide range of applications including dye-sensitized solar cells, electromagnetic shielding and thin film photovoltaics.

#### NSG **TEC™** 8

Designed for use specifically with amorphous silicon thin film photovoltaics. This product combines the low resistivity of NSG **TEC™** 7 with a high haze coating required for good conversion efficiencies of amorphous silicon modules.

#### NSG **TEC™** 35, 50, 70, and 250

For use in heated glass applications, these products combine thermal control with superior electro-optical properties.

#### NSG **TEC™** SB

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



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

## Pilkington **Optiwhite™** low iron glass

Today the use of glass in architecture and design is becoming more and more prevalent, and Pilkington **Optiwhite™** is at the very forefront of making it possible.

The reason for this is the sheer variety of benefits which Pilkington **Optiwhite™** can offer, making it an excellent choice for a wide range of applications. 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 1% and 8% higher than clear float glass in 3 mm to 19 mm thickness respectively, 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")
- 15 mm (5/8")
- 19 mm (3/4")

### Features and Benefits

- High light transmittance for true color and outstanding visual clarity when an unrestricted view is required.
- Purity of color with minimum color cast when viewing through the glass, ensuring a true representation of the designer's vision.
- Ensures a more natural, brighter view.
- Improves aesthetics of laminated glass.
- Provides less greenish color of the glass edges.
- High solar heat transmittance providing passive solar gain to allow more heat through, which can save costs on energy bills during the winter.
- Can be heat treated for safety and laminated for security.
- Can be painted or silk-screened for spandrel or decorative applications.
- Can be combined with other products from the Pilkington range to provide additional benefits.

### Applications

- Storefronts and displays
- Total vision system entries
- Furniture
- Appliance glass
- Solar collectors and photovoltaics
- Special applications requiring thick glass such as bullet resistant glass, aquariums or Pilkington **Pyrostop®** fire resistant glass.

### Technical Bulletins

**ATS 160**  
Tempering  
Pilkington **Optiwhite™**



Campbell's Employee Center  
Camden, New Jersey  
Pilkington **Optiwhite™**

## NSG **TEC™** – Photovoltaics

### Thin Film Photovoltaic Applications

NSG **TEC™** Glass products make a great choice for thin film photovoltaic (PV) applications.

The NSG Group produces a range of transparent conductive oxides on glass substrates that have been specifically tuned to meet the requirements of the thin film PV industry.

NSG Transparent Electrically Conductive Glass, 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 NSG Group 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 any of the following technologies:

- NSG **TEC™** A7 silicon (a-Si)
- NSG **TEC™** TIIX hybrid (a-Si/microcrystalline Si)
- NSG **TEC™** C15 cadmium telluride

The PV range of NSG **TEC™** products may be heat strengthened and fully tempered without any shift in sheet resistance.







## NSG **TEC™** – Photovoltaics

NSG **TEC™** range of products offers an excellent choice of Transparent Conductive Oxide glass for various thin film photovoltaic technologies. The range is specifically tuned to meet all requirements of the thin film photovoltaic industry in terms of conductivity, light transmittance, light trapping and cost effectiveness.

All our NSG **TEC™** products are manufactured using a patented chemical vapor deposition process to produce a durable, on-line pyrolytic coating that may be heat strengthened or fully tempered, providing complete flexibility for module production. In addition, properties such as conductivity (sheet resistance), light scattering (haze) and light transmittance can be optimized to meet individual customer requirements, whatever the technology. Our products are available in either standard or low iron glass composition depending on the substrate/coating combination. Each of our products within the range is targeted at a particular thin film photovoltaic technology.

### Features and Benefits

- High light transmittance, medium to high conductivity, low to high haze performance to suit all thin film photovoltaic applications.
- Coating properties remain durable under high fabrication temperatures. The coating is unaffected by very high processing temperature.
- Can be fully tempered/toughened or heat strengthened without damage to the coating or drop in performance.
- Available on standard clear or low iron glass, depending on the coating type.
- Durable on-line pyrolytic coating, making the product easy to transport, store, handle and process, reducing costs and lead times.
- Virtually unlimited shelf-life.



### Technical Information

For Technical Inquiries,  
please contact  
W&W Glass Company  
at (800)-452-7925 ext. 222

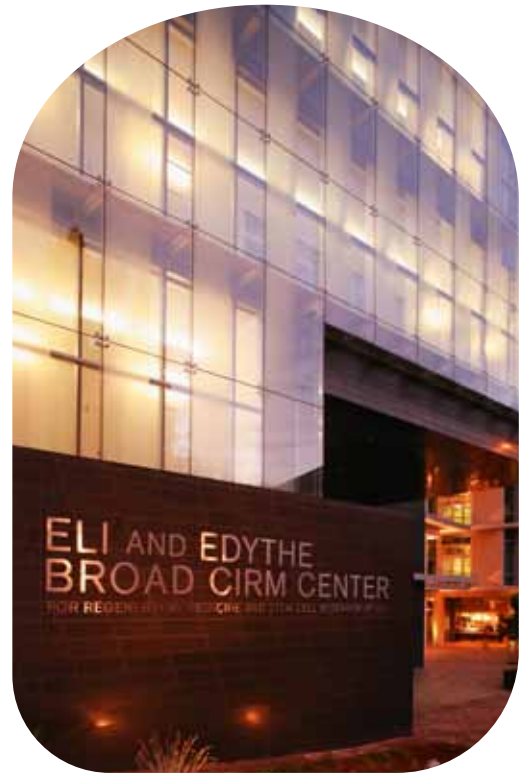
## Pilkington **Planar**™

Pilkington **Planar**™ allows for glass systems that can be engineered for large glazed areas that are completely transparent. The system allows glass to be attached to a variety of support structures at any angle, providing completely flush fitting glass panels. The glass panels are individually fixed so there is no restriction on the height of the building which can be glazed.

The specially engineered bushings, bolts and fittings are standard for all designs, while support components may be designed and fabricated to suit specific applications. A wide variety of Pilkington brand glass types are available in heat treated laminated glasses, providing options in appearance and solar control, along with transparency and opacity.

The support structure can be conventional load bearing post and beam, horizontally or vertically constructed, and is often incorporated as part of the building's primary frame. Suspended glass and tensile truss systems can also be used. The support structure can be internal or external, and fittings have been developed for both options. Pilkington **Planar**™ structural glass system is the

West Midtown Ferry Terminal  
New York City, New York  
Pilkington **Planar**™



University of Southern California  
Los Angeles, California  
Pilkington **Planar**™  
Pilkington **Optiwhite**™

original and still the leading structural glass system in the world. Invented by Pilkington over 35 years ago, Pilkington **Planar**™ systems provide a complete glass envelope for building structures, satisfying the most demanding and creative architectural requirements. Facades can be on any plane either vertical, horizontal or multi-angled.

By combining Pilkington **Planar**™ with the versatile range of products available from the NSG Group, the world's largest glassmaker, superior system performance on both functional and aesthetic levels can be achieved.

The Pilkington **Planar**™ system is handled and distributed by W&W Glass. For further product information visit [www.wwglass.com](http://www.wwglass.com), or contact W&W Glass at:

### W&W Glass

300 Airport Executive Park Suite 302  
Nanuet, NY 10954-7403  
Phone (800) 452-7925 or (845) 425-4000  
Fax (845) 425-6156

## Pilkington **Profilit™** profiled glass

Pilkington **Profilit™** is a self-supporting glazing system of U-shaped profiled 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 more than 30 years.

Engineering, installation and technical support for Pilkington **Profilit™** glass is coordinated by Technical Glass Products (TGP).

For more information visit [www.fireglass.com](http://www.fireglass.com), or contact TGP.

### Technical Glass Products

600 6th Street South  
Kirkland, WA 98033  
Phone (800) 426-0279  
Fax (800) 451-9857

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.

### Technical Information

For Technical Inquiries,  
please contact  
Technical Glass Products  
at (800)-426-0279



G. Ostervig Cable Factory  
Stanislawow, Poland  
Pilkington **Profilit™**



## Pilkington **Optiphon™** noise control glass

With increasing traffic on the road, rail and in the air, noise insulation has become a very important topic. It is not a question of it being a luxury anymore it is essential that noise reduction is considered in the specification of the glazing. With regard to employment law, comfort and medical necessity, noise insulation in building construction is an undisputed requirement to decrease stress- and noise-related illnesses.

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 a PVB interlayer.

Metropolitan Building  
Warsaw, Poland  
Pilkington **Optiphon™**  
Pilkington Spandrel Glass



Pilkington **Optiphon™** offers the opportunity to achieve specific noise reduction requirements.

### Features and Benefits

- Special PVB interlayer for enhanced sound insulation performance.
- A thinner and lighter glass for the equivalent acoustic performance.
- Available in jumbo andlehr end sizes.
- All products achieve at least safety class 1(B)1 (EN 12600).
- A high acoustic performance can be achieved when used in Insulating Glass Units (IGUs).
- Can also be used to improve noise insulation in a triple glazing construction.

### Types of Noise Sources:

- Urban and highway traffic
- Railway traffic
- Aircraft (propeller and jet)
- Factory equipment
- Living activities (talking, music, radio, television)
- Children playing

Pilkington **Optiphon™** can be combined with other Pilkington products for a multi-functional noise-reduction glass or a multi-functional noise-reduction IGU providing additional benefits, such as:

- Thermal insulation with Pilkington **Energy Advantage™**
- Solar control with Pilkington **Eclipse Advantage™** (coating in position 2 in IGU)
- Self-cleaning with Pilkington **Activ™** (coating in position 1 in IGU)

### Technical Definitions

#### Sound Transmission Class

Method for ranking sound reduction in decibels over the frequency range of 125-4,000 Hz.

ELE Headquarters  
Gelsenkirchen, Germany  
Pilkington **Optiphon™**  
Pilkington **Activ™**







## Warranty Information

### **Pilkington North America Inc. Architectural Glass Warranties**

This warranty covers Pilkington **Activ™**,  
Pilkington **Arctic Blue™**,  
Pilkington **Energy Advantage™**,  
Pilkington **Eclipse Advantage™**,  
Pilkington **Eclipse™**, Pilkington **EverGreen™**,  
Pilkington **Mirropane™**, Pilkington **MirroView™**,  
Pilkington **Optifloat™** Clear and Tinted Glass,  
Pilkington **OptAR™**,  
Pilkington **OptiView™**, Pilkington **Optiwhite™**,  
Pilkington **Solar-E™**, Pilkington **Solar-E™** Plus  
Pilkington **SuperGrey™**, NSG **TEC™** Glass,  
Pilkington Texture Glass and all other PILKINGTON  
NORTH AMERICA INC. ("PNA") tinted, clear and  
pyrolytically coated float glass products.

### **Glass Warranty**

PNA warrants that, with proper handling and maintenance, each of its above named glass building products (or in the case of pyrolytically coated glass products, the glass to which the coating is applied) will meet PNA's own published standards, which can be found at [www.pilkington.com/na](http://www.pilkington.com/na) (current as of the date of original factory shipment by PNA) and specifications detailed in ASTM C 1036 and / or EN 572 for flat glass. This warranty shall extend for a period of ten (10) years from the date of original factory shipment.

### **Coating Warranty**

PNA further warrants that, with proper handling and maintenance, the PNA applied coating on each of its above named pyrolytically coated glass building products will not peel under normal conditions for a period of ten (10) years from the date of original factory shipment.

PNA further warrants that, with proper handling and maintenance, the PNA 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 delamination of the special coating of the Pilkington **Activ™** Self-Cleaning Glass 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 PNA warranties, any warranty claim will be void unless (a) such claim is made in writing and is received by PNA within thirty (30) days after the earlier of the date that an alleged defect is actually discovered or the date when such alleged defect should have been discovered, and (b) such alleged defect, including the earlier non-discoverability of same, has been confirmed by (in PNA's sole discretion) a field inspection by PNA's qualified representative and/or having samples returned to PNA for examination and laboratory analysis. Any waiver of the foregoing, including PNA's right to confirm defective products through inspection or laboratory testing, must be in writing and signed by PNA to be binding against PNA. Notwithstanding other provisions of the PNA warranties, any warranty claim will be void unless it is received by PNA 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 PNA'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/na](http://www.pilkington.com/na).

**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, PNA 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 PNA'S KNOWLEDGE (IF ANY) OF THE INTENDED USE OF THE PRODUCTS.

**Limitation of Remedy; Limitation of Liability Exclusive Remedy:**

PNA's sole liability under either of the foregoing warranties shall be limited to replacement of the PNA glass product that is confirmed to be defective with the same delivery terms as applied to the original shipment, or, at PNA's option, to refund of the purchase price. If PNA 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 PNA 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.



## Monolithic Glass Standards and Sizes

Quality Levels	Nominal Glass Thickness		Approximate Weight <sup>4</sup>		Thickness Tolerance Range <sup>1</sup>				Maximum Standard Size <sup>2,3</sup>	
	in.	mm	lb/ft²	kg/m²	in.		mm		in.	mm
					min.	max.	min.	max.		
Pilkington <b>Optifloat™</b> Clear, Pilkington <b>Activ™</b> , Pilkington <b>Energy Advantage™</b> , Pilkington <b>Solar-E™</b> Plus, Pilkington <b>OptiView™*</b> , and Pilkington <b>OptAR™</b>										
Q3	3/32	2.5	1.2	6	0.085	0.101	2.16	2.57	96 x 130	2438 x 3302
	1/8	3	1.6	8	0.115	0.134	2.92	3.40	102 x 130	2591 x 3302
	5/32	4	2.1	10	0.149	0.165	3.78	4.19	130 x 180	3302 x 4572
Q1/Q3	3/16	5	2.5	12	0.180	0.199	4.57	5.05	130 x 204	3302 x 5182
Q2/Q3	1/4	6	3.1	15	0.219	0.244	5.56	6.20		
Pilkington <b>Optifloat™</b> Heavy Clear, Pilkington <b>Energy Advantage™***</b> , and Pilkington <b>Solar-E™****</b>										
Q3	5/16	8	4.1	20	0.292	0.332	7.42	8.43	130 x 204	3302 x 5182
	3/8	10	5.2	25	0.355	0.406	9.02	10.31		
	1/2	12	6.6	32	0.469	0.531	11.91	13.49	130 X 204	3302 X 5182
Pilkington <b>Optifloat™</b> Heavy Clear										
Q3	5/8	16	8.2	40	0.595	0.656	15.09	16.66	130 X 204	3302 X 5182
	3/4	19	9.9	48	0.719	0.781	18.26	19.84		
Pilkington <b>Optifloat™</b> Heavy Grey or Bronze										
Q3	5/16	8	4.1	20.3	0.303	0.327	7.70	8.30	130 x 204	3302 x 5182
	3/8	10	5.2	25.4	0.382	0.406	9.70	10.30		
	1/2	12	6.6	32.0	0.469	0.531	11.91	13.49	130 x 204	3302 x 5182
Pilkington <b>Optifloat™</b> Grey or Bronze										
Q3	1/8	3.2	1.6	8.0	0.115	0.134	2.92	3.40	102 x 130	2591 x 3302
	3/16	5	2.6	12.7	0.189	0.205	4.80	5.20	130 x 204	3302 x 5182
	1/4	6	3.1	15.2	0.228	0.244	5.80	6.20	130 x 204	3302 x 5182
Pilkington <b>Optifloat™</b> Heavy Blue-Green										
Q3	5/16	8	4.1	20.3	0.303	0.327	7.70	8.30	130 x 204	3302 x 5182
	3/8	10	5.2	25.4	0.382	0.406	9.70	10.30		
Pilkington <b>Optifloat™</b> Blue-Green, Green, Pilkington <b>EverGreen™</b> , Pilkington <b>Graphite Blue™</b> , and Pilkington <b>SuperGrey™</b>										
Q3	1/8	3.2	1.6	8.0	0.115	0.134	2.92	3.40	102 x 130	2591 x 3302
	3/16	5	2.6	12.7	0.189	0.205	4.80	5.20	130 x 204	3302 x 5182
	1/4	6	3.1	15.2	0.228	0.244	5.80	6.20	130 x 204	3302 x 5182
Pilkington <b>Arctic Blue™</b> High Performance Tint										
Q3	5/32	4	2.1	10.1	0.150	0.165	3.80	4.20	130 x 180	3302 x 4572
	1/4	6	3.1	15.2	0.228	0.244	5.80	5.80	130 x 204	3302 x 5182
	3/8	10	5.2	25.4	0.382	0.406	9.70	10.30	130 x 204	3302 x 5182
Pilkington <b>Eclipse Advantage™</b> , Pilkington <b>Mirropane™</b> and Pilkington <b>MirroView™</b>										
Q3	1/4	6	3.1	15.2	0.228	0.244	5.80	6.20	130 x 204	3302 x 5182
Pilkington <b>Optiwhite™</b>										
Q3	1/8	3.2	1.6	8.0	0.115	0.134	2.92	3.40	96x130	2438x3302
	3/16	5	2.5	12	0.180	0.199	4.57	5.05	130 x 204	3302 x 5182
	1/4	6	3.1	15.2	0.228	0.244	5.80	6.20		
	5/16	8	4.1	20.3	0.303	0.327	7.70	8.30		
	3/8	10	5.2	25	0.355	0.406	9.02	10.31		
	1/2	12	6.6	32	0.469	0.531	11.91	13.49		
	5/8	15	7.8	38.0	0.571	0.61	14.50	15.50		
	3/4	19	9.8	48.2	0.709	0.787	18.0	20.0		
Pilkington Texture Glass (all products except as noted below)										
EN 572-5	5/32	4	2.1	10.1	0.143	0.172	3.62	4.37	52.0 x 84.0	1320 x 2140
	1/4	6	3.1	15.2	0.224	0.256	5.70	6.50		
Pilkington Texture Glass <b>Reeded™</b>										
EN 572-5	5/32	4	2.1	10.1	0.143	0.172	3.62	4.37	52.0 x 83.9	1320 x 2130
Pilkington Texture Glass <b>Austral™</b> and <b>Morisco™</b>										
EN 572-5	5/32	4	2.1	10.1	0.143	0.172	3.62	4.37	63.0 x 98.0	1600 x 2500
Pilkington Texture Glass <b>Rayado™</b> , <b>Sparkel™</b> and <b>Yacare™</b>										
EN 572-5	5/32	4	2.1	10.1	0.143	0.172	3.62	4.37	57.0 x 98.0	1450 x 2500
EN 572-5	3/16	5	2.6	12.7	0.173	0.213	4.39	5.42	63.0 x 98.0	1600 x 2500

1. Per ASTM C 1036; with exception of Pilkington Texture Glass

2. Size listed may, in some cases, be too large to meet applicable static load requirements.

3. Certain other thicknesses and sizes may be available upon request

4. Based on the mean of the thickness range. Note glass density = 158 lb./cu. ft.

5. Coated glasses meet quality level of ASTM C 1376

\* Pilkington **OptiView™** is not available in 3/32" (2.5 mm). \*\* Pilkington **Optifloat™** Blue-Green: 1/8" (3.2 mm) and 3/16" (5 mm) are not standard products. Subject to availability.

\*\*\* The largest size for Pilkington **Energy Advantage™** 1/2" (12 mm) is 130 x 204. \*\*\*\* Pilkington **Solar-E™** is not available in 1/2" (12 mm).

**Uncoated Monolithic Glass Performance Data<sup>1,10</sup>**

	Nominal Glass Thickness		Visible Light <sup>2</sup>			Solar Energy <sup>2</sup>			U-Factor <sup>5</sup>			Solar Heat Gain Coefficient <sup>7</sup>	Shading Coefficient <sup>8</sup>
	in.	mm	Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	UV Transmittance <sup>2</sup> %	U.S. Summer <sup>*</sup>	U.S. Winter <sup>*</sup>	European <sup>6**</sup>		
				Outside	Inside								
Pilkington <b>Optifloat™</b> Clear													
	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 <b>Optiwhite™</b> low iron													
	1/8	3	91	9	9	91	8	88	0.94	1.04	5.8	0.91	1.04
	5/32	4	91	9	9	90	8	87	0.94	1.04	5.8	0.91	1.04
	3/16	5	91	9	9	90	8	86	0.93	1.03	5.7	0.91	1.04
	1/4	6	91	9	9	90	8	85	0.93	1.02	5.7	0.90	1.04
	5/16	8	91	9	9	89	8	84	0.92	1.01	5.6	0.90	1.03
	3/8	10	91	9	9	88	8	83	0.91	1.00	5.6	0.89	1.03
	1/2	12	90	9	9	88	8	81	0.89	0.99	5.5	0.89	1.02
	5/8	15	90	9	9	86	8	77	0.88	0.97	5.4	0.88	1.01
	3/4	19	90	8	8	86	8	78	0.86	0.95	5.3	0.88	1.01
Pilkington <b>Optifloat™</b> Tints													
Green	1/4	6	76	7	7	46	5	29	0.93	1.03	5.7	0.61	0.70
Blue-Green	1/4	6	75	7	7	48	6	32	0.93	1.02	5.7	0.62	0.72
	5/16	8	70	7	7	40	5	25	0.92	1.01	5.6	0.57	0.66
	3/8	10	67	6	6	36	5	21	0.91	1.00	5.6	0.54	0.63
Bronze	1/8	3	68	6	6	65	6	37	0.94	1.04	5.8	0.73	0.84
	3/16	5	59	6	6	55	6	28	0.93	1.03	5.7	0.67	0.77
	1/4	6	51	6	6	48	5	22	0.93	1.02	5.7	0.62	0.72
	5/16	8	44	5	5	39	5	16	0.92	1.01	5.6	0.57	0.65
	3/8	10	39	5	5	34	5	13	0.91	1.00	5.6	0.53	0.61
	1/2	12	29	5	5	25	4	8	0.89	0.98	5.5	0.48	0.55
Grey	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	0.93	1.02	5.7	0.58	0.66
	5/16	8	33	5	5	31	5	14	0.92	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	0.42	0.49
Pilkington <b>Graphite Blue™</b>													
	1/4	6	61	6	6	54	6	37	0.93	1.02	5.7	0.67	0.77
	5/16	8	54	6	6	46	5	30	0.92	1.01	5.6	0.61	0.70
	3/8	10	47	5	5	39	5	25	0.91	1.00	5.6	0.57	0.65
Pilkington <b>EverGreen™</b> High Performance Tint													
	1/8	3	76	7	7	49	6	27	0.94	1.04	5.8	0.63	0.72
	3/16	5	73	7	7	42	5	21	0.93	1.03	5.7	0.58	0.67
	1/4	6	66	6	6	33	5	14	0.93	1.02	5.7	0.53	0.60
Pilkington <b>Arctic Blue™</b> High Performance Tint													
	5/32	4	65	6	6	45	5	31	0.94	1.04	5.8	0.60	0.69
	1/4	6	53	6	6	33	5	20	0.93	1.02	5.7	0.52	0.60
	5/16	8	42	5	6	25	5	13	0.92	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 <b>SuperGrey™</b> High Performance Tint													
	1/8	3	25	5	5	23	4	6	0.94	1.04	5.8	0.45	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.S. U-Factor (Btu/hr.sq ft. °F) is based on NFRC/ASTM standards, \*\*European U-Factor (W/sq m K) is based on EN 410/673 (CEN) standard.

All performance values are center-of-glass values calculated using the LBNL Window 6.3 program. See page 51 for explanation of references - 1, 10.



**Coated Monolithic Glass Performance Data<sup>1,10</sup>**

	Nominal Glass Thickness		Visible Light <sup>2</sup>			Solar Energy <sup>2</sup>			U-Factor <sup>5</sup>			Solar Heat Gain Coefficient <sup>7</sup>	Shading Coefficient <sup>8</sup>
	in.	mm	Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	UV Transmittance <sup>2</sup> %	U.S. Summer <sup>*</sup>	U.S. Winter <sup>*</sup>	European <sup>6**</sup>		
				Outside	Inside								
Pilkington <b>Energy Advantage™</b> thermal control low-e (coating on #2 surface)													
	3/32	2.5	84	11	11	75	11	67	0.50	0.66	3.7	0.77	0.89
	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
	1/4	6	82	10	11	66	10	49	0.49	0.64	3.6	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
Pilkington <b>Solar-E™</b> solar control low-e (coating on #2 surface)													
Clear	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
	3/16	5	60	7	9	44	7	44	0.50	0.65	3.7	0.53	0.61
	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	0.50	0.64	3.7	0.52	0.59
	3/8	10	60	8	9	40	7	38	0.49	0.64	3.6	0.50	0.58
Pilkington <b>Solar-E™</b> solar control low-e (coating on #2 surface)													
EverGreen	1/4	6	45	6	9	20	5	8	0.50	0.65	3.7	0.35	0.40
	5/16	8	40	7	9	16	5	5	0.50	0.64	3.7	0.32	0.36
Grey	1/4	6	30	5	8	23	6	13	0.50	0.65	3.7	0.37	0.42
	5/16	8	23	5	8	17	5	9	0.50	0.64	3.7	0.32	0.37
Pilkington <b>Solar-E™</b> Plus solar control low-e (coating on #2 surface)													
Blue-Green	1/4	6	41	6	9	24	5	19	0.50	0.65	3.7	0.38	0.43
	5/16	8	39	6	9	21	5	15	0.50	0.65	3.7	0.35	0.41
Graphite Blue	1/4	6	35	6	9	28	5	23	0.50	0.65	3.7	0.41	0.47
	5/16	8	30	6	9	23	5	18	0.50	0.64	3.7	0.37	0.43
Arctic Blue	1/4	6	30	5	8	17	5	11	0.50	0.65	3.7	0.32	0.37
	5/16	8	27	6	8	14	5	9	0.50	0.65	3.7	0.30	0.35
Pilkington <b>Eclipse Advantage™</b> solar control low-e (coating on #2 surface)													
Clear	1/4	6	67	25	28	58	19	30	0.53	0.67	3.7	0.62	0.72
	5/16	8	66	25	28	55	17	29	0.53	0.67	3.7	0.60	0.69
Blue-Green	1/4	6	56	19	27	35	11	16	0.53	0.67	3.7	0.46	0.53
	5/16	8	53	17	27	30	10	13	0.53	0.67	3.7	0.42	0.48
EverGreen	1/4	6	48	15	27	23	8	7	0.53	0.67	3.7	0.37	0.43
	5/16	8	43	13	27	18	7	4	0.53	0.67	3.7	0.34	0.39
Arctic Blue	1/4	6	39	12	27	23	8	10	0.53	0.67	3.7	0.37	0.42
	5/16	8	32	10	27	17	7	7	0.53	0.67	3.7	0.33	0.38
Bronze	1/4	6	38	11	27	35	10	11	0.53	0.67	3.7	0.46	0.53
	5/16	8	31	9	26	28	8	8	0.53	0.67	3.7	0.41	0.47
Grey	1/4	6	32	10	27	29	8	10	0.53	0.67	3.7	0.42	0.48
	5/16	8	25	8	27	22	7	7	0.53	0.67	3.7	0.37	0.42
Pilkington <b>Eclipse™</b> Gold (coating on #2 surface)													
	1/4	6	40	36	45	45	25	9	0.93	1.02	5.7	0.54	0.62
	5/16	8	40	34	44	42	23	8	0.92	1.01	5.6	0.53	0.61
Pilkington <b>Eclipse™</b> Sunset Gold (coating on #2 surface)													
	1/4	6	24	16	44	30	12	3	0.93	1.02	5.7	0.48	0.55
Pilkington <b>Activ™</b> self-cleaning (coating on #1 surface)													
Clear	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	0.94	1.04	5.8	0.81	0.93
	1/4	6	82	15	15	75	12	44	0.93	1.02	5.7	0.79	0.90
Blue	1/4	6	49	14	9	32	11	14	0.93	1.02	5.7	0.50	0.57

\*U.S. U-Factor (Btu/hr.sq ft. °F) is based on NFRC/ASTM standards, \*\*European U-Factor (W/sq m K) is based on EN 410/673 (CEN) standard.

All performance values are center-of-glass values calculated using the LBNL Window 6.3 program. See page 51 for explanation of references - <sup>1,10</sup>.

## Laminated Monolithic Glass Performance Data<sup>1, 10</sup>

	Nominal Glass Thick- ness		Visible Light <sup>2</sup>			Solar Energy <sup>2</sup>			U-Factor <sup>5</sup>			Solar Heat Gain Coefficient <sup>7</sup>	Shading Coefficient <sup>8</sup>
	in.	mm	Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	UV Transmittance <sup>2</sup> %	U.S. Summer*	U.S. Winter*	European**		
				Outside	Inside								
Pilkington <b>OptiView</b> ™	1/4	6.8	92	1.7	1.7	70	4	<1	0.68	0.80	4.6	0.77	0.88
Clear Glass (non-laminated)	1/4	6	88	8	8	77	7	63	0.93	1.03	5.7	0.82	0.94
Pilkington <b>OptiView</b> ™	5/16	8.8	90	1.7	1.7	67	4	<1	0.67	0.79	4.5	0.75	0.86
Clear Glass (non-laminated)	5/16	8	87	8	8	73	7	57	0.92	1.01	5.6	0.79	0.91
Pilkington <b>OptiView</b> ™	1/2	12.8	88	1.7	1.7	62	3	<1	0.66	0.77	4.4	0.71	0.82
Clear Glass (non-laminated)	1/2	12	84	8	8	64	6	49	0.89	0.98	5.5	0.73	0.84

Clear float glass performance based on non-laminated, monolithic glass. (Note - all thicknesses are nominal)

Thickness of laminated glass = thickness of glass layer + thickness of pvb + thickness of glass layer

- 6.8 mm Pilkington **OptiView**™ Single Laminated Glass = 3 mm Pilkington **OptiView**™ (#1) + 0.8 mm clear pvb layer + 3 mm Pilkington **OptiView**™ (#4)
- 8.8 mm Pilkington **OptiView**™ Single Laminated Glass = 4 mm Pilkington **OptiView**™ (#1) + 0.8 mm clear pvb layer + 4 mm Pilkington **OptiView**™ (#4)
- 12.8 mm Pilkington **OptiView**™ Single Laminated Glass = 6 mm Pilkington **OptiView**™ (#1) + 0.8 mm clear pvb layer + 6 mm Pilkington **OptiView**™ (#4)

## Double Laminated Insulating Glass Unit Performance Data<sup>1, 10</sup>

Nominal Glass Thickness		Visible Light <sup>2</sup>			Solar Energy <sup>2</sup>			U-Factor <sup>5</sup>						Solar Heat Gain Coefficient <sup>7</sup>	Shading Coefficient <sup>8</sup>
in.	mm	Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	UV Transmittance <sup>2</sup> %	U.S. Summer <sup>*</sup>		U.S. Winter <sup>*</sup>		European <sup>**</sup>			
			Outside	Inside				Air	Argon	Air	Argon	Air	Argon		
Pilkington <b>OptiView™</b> Outer Lite (Coating on #1 and #2 Surface) and Pilkington <b>OptiView™</b> Inner Lite (Coating on #3 and #4 Surface)															
1/4	6.8	84	3	3	54	5	<1	0.33	0.30	0.33	0.30	1.9	1.7	0.66	0.76
5/16	8.8	81	3	3	50	5	<1	0.32	0.30	0.32	0.29	1.9	1.7	0.64	0.73
1/2	12.8	77	3	3	43	4	<1	0.32	0.29	0.32	0.29	1.9	1.7	0.59	0.68

An insulating unit consists of two lites of equal glass thickness.

Thickness of Double Laminated Insulating Glass = thickness of Single Laminated Glass layer + air space thickness + thickness of Single Laminated Glass layer

- 26.3 mm Pilkington **OptiView**™ Double Laminated Insulating Glass = 6.8 mm Pilkington **OptiView**™ Single Laminated Glass + 12.7 mm airspace + 6.8 mm Pilkington **OptiView**™ Laminated Single Glass
- 30.3 mm Pilkington **OptiView**™ Double Laminated Insulating Glass = 8.8 mm Pilkington **OptiView**™ Single Laminated Glass + 12.7 mm airspace + 8.8 mm Pilkington **OptiView**™ Laminated Single Glass
- 38.3 mm Pilkington **OptiView**™ Double Laminated Insulating Glass = 12.8 mm Pilkington **OptiView**™ Single Laminated Glass + 12.7 mm airspace + 12.8 mm Pilkington **OptiView**™ Laminated Single Glass

## Vacuum Glazing Performance Data

	Thickness (mm)	Visible Light <sup>2</sup>		Solar Energy <sup>2</sup>		U-Factor <sup>5</sup>		Solar Heat Gain Coefficient <sup>7</sup>
		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	Europe (W/sq m K)	U.S. Winter (Btu/hr.sq ft. °F)	
Pilkington <b>Spacia</b> ™*	6.2	76	16	61	15	1.4	0.25	0.66
Pilkington <b>Spacia</b> ™ Cool*	6.2	70	23	46	36	1.0	0.18	0.49
Pilkington <b>Spacia</b> ™ Shizuka*	9.2	73	15	56	13	1.4	0.25	0.61
Pilkington <b>Spacia</b> ™ 21 Thermal Control**	18.2	64	22	47	19	0.9	0.16	0.58
Pilkington <b>Spacia</b> ™ 21 Solar Control**	18.2	59	25	37	27	0.7	0.15	0.46

\*Double glazed unit \*\*Triple glazed unit

## Sound Control Performance Data

	Nominal Glass Thickness		dB Sound Reduction Index By Octave Band - Hz						
	in.	mm	125	250	500	1000	2000	4000	STC
Pilkington <b>Optiphon™</b>									
	5/16	8.8	30	30	32	36	38	43	36
	3/8	10.8	31	32	33	37	38	47	37
Monolithic Clear Glass									
	3/8	10	26	28	31	32	35	43	34
	5/16	8	20	24	29	34	29	37	32
	1/4	6	18	23	30	35	27	32	31
Clear Insulating Unit*									
	1/4	6	20	18	28	38	34	38	31

- Laboratory measured to the ISO 140-3 standard. Monolithic, unlaminate clear glass tested.
  - Laboratory measured to the ASTM E90-09 standard. Other configurations are available through special order.
- \* Insulating glass unit constructed of two lites of equal glass thickness and 1/2" (12.7 mm) airspace.

## Insulating Glass Unit Performance Data<sup>1,10</sup>

	Nominal Glass Thick-ness		Visible Light <sup>2</sup>			Solar Energy <sup>2</sup>			U-Factor <sup>5</sup>			Solar Heat Gain Coefficient <sup>7</sup>	Shading Coefficient <sup>8</sup>
			Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	UV Transmittance <sup>2</sup> %	U.S. Summer*	U.S. Winter*	European <sup>6**</sup>		
	in.	mm		Outside	Inside								
Pilkington Uncoated Float Glass outer lite and Pilkington <b>Optifloat™</b> Clear inner lite													
Clear	3/32	2	83	15	15	79	14	70	0.51	0.48	2.8	0.82	0.94
	1/8	3	83	15	15	77	14	67	0.51	0.48	2.8	0.81	0.93
	5/32	4	82	15	15	75	14	64	0.50	0.48	2.8	0.79	0.91
	3/16	5	79	15	15	64	12	50	0.50	0.48	2.8	0.73	0.83
	1/4	6	78	15	15	61	12	47	0.50	0.47	2.8	0.71	0.81
Green	1/4	6	68	12	14	38	8	23	0.50	0.47	2.8	0.49	0.56
Blue-Green	1/4	6	67	12	14	39	8	26	0.50	0.47	2.8	0.50	0.58
Bronze	1/8	3.2	62	10	13	57	10	33	0.51	0.48	2.8	0.64	0.73
	3/16	5	53	9	13	45	8	23	0.50	0.48	2.8	0.55	0.64
	1/4	6	45	8	12	38	7	18	0.50	0.47	2.8	0.50	0.58
Grey	1/8	3.2	55	9	13	52	9	31	0.51	0.48	2.8	0.59	0.68
	3/16	5	45	8	13	39	7	21	0.50	0.48	2.8	0.50	0.58
	1/4	6	39	7	12	32	6	17	0.50	0.47	2.8	0.45	0.52
Pilkington <b>Graphite Blue™</b>	1/4	6	54	9	13	43	8	29	0.50	0.47	2.8	0.55	0.63
	5/16	8	47	8	13	35	7	23	0.49	0.47	2.8	0.48	0.55
Pilkington <b>Evergreen™</b> High Performance Tint	1/8	3	70	12	14	43	8	24	0.51	0.48	2.8	0.52	0.60
	3/16	5	65	11	14	35	7	18	0.50	0.48	2.8	0.46	0.53
	1/4	6	58	10	13	28	6	11	0.50	0.47	2.8	0.40	0.46
Pilkington <b>Arctic Blue™</b> High Performance Tint	5/32	4	59	10	13	40	7	28	0.50	0.48	2.8	0.49	0.57
	1/4	6	47	8	13	27	6	17	0.50	0.47	2.8	0.40	0.46
	5/16	8	37	7	12	20	5	10	0.49	0.47	2.8	0.34	0.39
Pilkington <b>Supergrey™</b> High Performance Tint	1/8	3	23	5	12	20	5	6	0.51	0.48	2.8	0.33	0.38
	3/16	5	11	4	12	9	4	2	0.50	0.48	2.8	0.24	0.28
	1/4	6	8	4	11	6	4	1	0.50	0.47	2.8	0.22	0.25

An insulating unit consists of two lites of equal glass thickness, and a 1/2 in. (12.7 mm) airspace.

\*U.S. U-Factor (Btu/hr.sq ft. °F) is based on NFRC/ASTM standards, \*\*European U-Factor (W/sq m K) is based on EN 410/673 (CEN) standard.

All performance values are center-of-glass values calculated using the LBNL Window 6.3 program. See Pilkington Architectural Product Guide for explanation of references - <sup>1,10</sup>.



## One-Way Mirror Performance Data

Product	Nominal Glass Thickness		Glass Substrate	Visible <sup>2</sup> Transmittance (%)	Visible <sup>4</sup> Reflectance Coated Side (%)	Visible <sup>4</sup> Reflectance Glass Side (%)	Recommended Light Ratio	Proper Glazing
	in.	mm						
Pilkington <b>Mirropane™</b>	1/4	6	Grey	11	68	16	8:1 Subject-side: Observer-side	Mirror coating toward <b>subject-side</b>
Pilkington <b>MirroView™</b>	1/8	3	Clear	20	76	70	-	Mirror coating toward <b>viewer-side</b>
	1/4	6	Clear	20	74	66	-	Mirror coating toward <b>viewer-side</b>
Pilkington <b>MirroView™</b> 50/50	1/4	6	Clear	45	53	50	-	Mirror coating toward viewer-side

- Typical values of Pilkington production are provided.
- Visible data is based on laboratory spectrophotometric measurements weighted by the factors in W5\_NFRC\_2003.STD in LBNL Window 5.2 software.

## Pilkington Energy Advantage™ Low-e Insulating Glass Unit Performance Data<sup>1,10</sup>

	Nominal Glass Thickness		Visible Light <sup>2</sup>			Solar Energy <sup>2</sup>			U-Factor <sup>5</sup>						Solar Heat Gain Coefficient <sup>7</sup>	Shading Coefficient <sup>8</sup>
			Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	UV Transmittance <sup>2</sup> %	U.S. Summer*		U.S. Winter*		European <sup>6**</sup>			
	in.	mm		Outside	Inside				Air	Argon	Air	Argon	Air	Argon		
Pilkington Uncoated Float Glass outer lite and Pilkington <b>Energy Advantage™</b> low-e (coating on #3 surface) inner lite																
Clear	3/32	2.5	77	18	17	67	17	58	0.33	0.28	0.34	0.29	1.9	1.6	0.76	0.88
	1/8	3	77	17	17	66	17	55	0.33	0.28	0.34	0.29	1.9	1.6	0.75	0.87
	5/32	4	77	17	16	64	17	53	0.33	0.28	0.34	0.29	1.9	1.5	0.74	0.85
	3/16	5	74	17	17	55	15	41	0.33	0.28	0.33	0.29	1.8	1.5	0.68	0.79
	1/4	6	73	17	16	52	14	37	0.33	0.28	0.33	0.29	1.8	1.5	0.67	0.77
Green	1/4	6	63	13	15	33	9	18	0.33	0.28	0.33	0.29	1.8	1.5	0.44	0.50
Blue-Green	1/4	6	62	13	15	34	9	21	0.33	0.28	0.33	0.29	1.8	1.5	0.46	0.52
Bronze	1/8	3	58	12	15	48	12	27	0.33	0.28	0.34	0.29	1.9	1.6	0.58	0.67
	3/16	5	49	10	15	38	10	19	0.33	0.28	0.33	0.29	1.8	1.5	0.50	0.58
	1/4	6	42	8	14	32	8	14	0.33	0.28	0.33	0.29	1.8	1.5	0.45	0.52
Grey	1/8	3	52	10	15	43	10	26	0.33	0.28	0.34	0.29	1.9	1.6	0.53	0.61
	3/16	5	42	8	15	32	8	17	0.33	0.28	0.33	0.29	1.8	1.5	0.45	0.51
	1/4	6	36	7	14	27	7	13	0.33	0.28	0.33	0.29	1.8	1.5	0.40	0.46
Pilkington <b>Graphite Blue™</b>	1/4	6	50	10	14	37	10	23	0.33	0.28	0.33	0.29	1.8	1.5	0.50	0.57
	5/16	8	44	9	14	30	8	18	0.33	0.28	0.33	0.28	1.8	1.5	0.44	0.50
Pilkington <b>EverGreen™</b> High Performance Tint	1/8	3	65	14	16	37	9	20	0.33	0.28	0.34	0.29	1.9	1.6	0.46	0.53
	3/16	5	61	13	16	31	8	14	0.33	0.28	0.33	0.29	1.8	1.5	0.41	0.47
	1/4	6	54	11	14	24	7	9	0.33	0.28	0.33	0.29	1.8	1.5	0.35	0.40
Pilkington <b>Arctic Blue™</b> High Performance Tint	5/32	4	55	11	15	34	8	23	0.33	0.28	0.34	0.29	1.9	1.5	0.44	0.50
	1/4	6	43	9	14	23	7	13	0.33	0.28	0.33	0.29	1.8	1.5	0.34	0.39
	5/16	8	35	7	14	17	6	8	0.33	0.28	0.33	0.28	1.8	1.5	0.29	0.33
Pilkington <b>Supergrey™</b> High Performance Tint	1/8	3	21	5	14	16	5	5	0.33	0.28	0.34	0.29	1.9	1.6	0.27	0.31
	3/16	5	10	4	14	7	4	2	0.33	0.28	0.33	0.29	1.8	1.5	0.18	0.21
	1/4	6	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 equal glass thickness, and a 1/2 in. (12.7 mm) airspace.

\*U.S. U-Factor (Btu/hr.sq ft. °F) is based on NFRC/ASTM standards, \*\*European U-Factor (W/sq m K) is based on EN 410/673 (CEN) standard.

All performance values are center-of-glass values calculated using the LBNL Window 6.3 program. See Pilkington Architectural Product Guide for explanation of references - 1, 10.

**Pilkington Energy Advantage™ Low-e Insulating Glass Unit Performance Data<sup>1,10</sup>**

	Nominal Glass Thickness		Visible Light <sup>2</sup>			Solar Energy <sup>2</sup>			U-Factor <sup>5</sup>						Solar Heat Gain Coefficient <sup>7</sup>	Shading Coefficient <sup>8</sup>
			Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	UV Transmittance <sup>2</sup> %	U.S. Summer*		U.S. Winter*		European <sup>6**</sup>			
	in.	mm		Outside	Inside				Air	Argon	Air	Argon	Air	Argon		
Pilkington <b>Energy Advantage™</b> Low-e (coating on #2 surface) outer lite and Pilkington <b>Optifloat™</b> Clear inner lite																
	3/32	2.5	77	17	18	67	16	58	0.33	0.28	0.34	0.29	1.9	1.6	0.70	0.81
	1/8	3	77	17	17	66	16	55	0.33	0.28	0.34	0.29	1.9	1.6	0.69	0.80
	5/32	4	77	16	17	64	15	53	0.33	0.28	0.34	0.29	1.9	1.5	0.69	0.79
	3/16	5	74	17	17	55	14	41	0.33	0.28	0.33	0.29	1.8	1.5	0.63	0.73
	1/4	6	73	16	17	52	13	37	0.33	0.28	0.33	0.29	1.8	1.5	0.62	0.71
	5/16	8	71	15	16	47	12	32	0.33	0.28	0.33	0.28	1.8	1.5	0.59	0.67
	3/8	10	69	15	16	43	12	29	0.32	0.27	0.33	0.28	1.8	1.5	0.56	0.64
	1/2	12	67	15	16	39	11	27	0.32	0.28	0.32	0.28	1.8	1.5	0.53	0.61
Pilkington <b>Energy Advantage™</b> Low-e (coating on #2 surface) outer lite and Pilkington <b>Energy Advantage™</b> Low-e (coating on #4 surface) inner lite <sup>9</sup>																
	3/32	2.5	72	18	19	60	17	47	0.25	0.22	0.26	0.23	1.6	1.4	0.66	0.76
	1/8	3	72	18	19	58	17	46	0.25	0.22	0.26	0.23	1.6	1.3	0.65	0.75
	5/32	4	71	18	19	57	17	44	0.25	0.22	0.26	0.23	1.6	1.3	0.64	0.74
	3/16	5	69	18	19	49	15	33	0.24	0.21	0.26	0.23	1.6	1.3	0.59	0.68
	1/4	6	68	17	18	47	14	29	0.24	0.21	0.26	0.23	1.5	1.3	0.58	0.66
	5/16	8	66	17	18	42	13	26	0.24	0.21	0.26	0.23	1.5	1.3	0.54	0.62
	3/8	10	64	16	17	38	12	23	0.24	0.21	0.26	0.22	1.5	1.3	0.51	0.59
	1/2	12	63	16	18	36	11	24	0.24	0.21	0.26	0.23	1.5	1.3	0.49	0.57

An insulating unit consists of two lites of equal glass thickness, and a 1/2 in. (12.7 mm) airspace.

\*U.S. U-Factor (Btu/hr.sq ft. °F) is based on NFRC/ASTM standards, \*\*European U-Factor (W/sq m K) is based on EN 410/673 (CEN) standard.

All performance values are center-of-glass values calculated using the LBNL Window 6.3 program. See Pilkington Architectural Product Guide for explanation of references - <sup>1, 10</sup>.

**Coated Insulating Glass Unit Performance Data<sup>1,10</sup>**

	Nominal Glass Thickness		Visible Light <sup>2</sup>			Solar Energy <sup>2</sup>			U-Factor <sup>5</sup>						Solar Heat Gain Coefficient <sup>7</sup>	Shading Coefficient <sup>8</sup>
	in.	mm	Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	UV Transmittance <sup>2</sup> %	U.S. Summer*		U.S. Winter*		European <sup>6**</sup>			
				Outside	Inside				Air	Argon	Air	Argon	Air	Argon		
Pilkington <b>Solar-E™</b> outer lite (coating on #2 surface) and Pilkington <b>Optifloat™</b> Clear inner lite																
Clear	1/8	3	55	11	16	41	10	41	0.33	0.28	0.34	0.29	1.9	1.6	0.47	0.54
	5/32	4	55	10	16	40	9	39	0.33	0.28	0.34	0.29	1.9	1.6	0.46	0.53
	3/16	5	53	10	15	36	9	34	0.33	0.28	0.33	0.29	1.9	1.6	0.45	0.52
	1/4	6	53	10	15	34	9	31	0.33	0.28	0.33	0.29	1.8	1.5	0.43	0.50
	5/16	8	52	10	15	32	8	29	0.33	0.28	0.33	0.29	1.8	1.5	0.43	0.49
Pilkington <b>Solar-E™</b> outer lite (coating on #2 surface) and Pilkington <b>Optifloat™</b> Clear inner lite																
EverGreen	1/4	6	40	8	15	17	6	7	0.33	0.28	0.33	0.29	1.8	1.5	0.26	0.30
	5/16	8	35	8	15	14	6	4	0.33	0.28	0.33	0.29	1.8	1.5	0.23	0.27
Grey	1/4	6	27	6	14	19	6	10	0.33	0.28	0.33	0.29	1.8	1.5	0.28	0.33
	5/16	8	20	5	14	13	5	7	0.33	0.28	0.33	0.29	1.8	1.5	0.24	0.27
Pilkington <b>Solar-E™</b> Plus outer lite (coating on #2 surface) and Pilkington <b>Optifloat™</b> Clear inner lite																
Blue-Green	1/4	6	37	8	15	20	6	15	0.33	0.28	0.33	0.29	1.9	1.6	0.30	0.34
	5/16	8	34	7	15	17	6	12	0.33	0.28	0.33	0.29	1.8	1.5	0.27	0.31
Graphite Blue	1/4	6	25	6	14	19	5	16	0.33	0.28	0.33	0.29	1.9	1.6	0.30	0.34
	5/16	8	26	7	15	18	6	14	0.33	0.28	0.33	0.29	1.8	1.5	0.28	0.33
Arctic Blue	1/4	6	27	6	14	14	5	9	0.33	0.28	0.33	0.29	1.9	1.6	0.24	0.27
	5/16	8	24	6	14	12	5	7	0.33	0.28	0.33	0.29	1.8	1.5	0.22	0.25
Pilkington <b>Solar-E™</b> (coating on #2 surface) outer lite and Pilkington <b>Energy Advantage™</b> Low-e (coating on the #4 surface) inner lite <sup>9</sup>																
Clear	1/4	6	49	11	17	32	9	26	0.24	0.22	0.26	0.23	1.6	1.3	0.41	0.47
	5/16	8	48	11	17	29	9	23	0.24	0.21	0.26	0.23	1.5	1.3	0.40	0.45
Pilkington <b>Solar-E™</b> (coating on #2 surface) outer lite and Pilkington <b>Energy Advantage™</b> Low-e (coating on the #4 surface) inner lite <sup>9</sup>																
EverGreen	1/4	6	37	8	17	16	6	5	0.24	0.22	0.26	0.23	1.6	1.3	0.24	0.27
	5/16	8	33	8	17	12	6	3	0.24	0.21	0.26	0.23	1.5	1.3	0.21	0.24
Grey	1/4	6	25	6	16	17	7	8	0.24	0.22	0.26	0.23	1.6	1.3	0.26	0.30
	5/16	8	19	6	16	12	5	6	0.24	0.21	0.26	0.23	1.5	1.3	0.21	0.24
Pilkington <b>Solar-E™</b> Plus (coating on #2 surface) outer lite and Pilkington <b>Energy Advantage™</b> Low-e (coating on the #4 surface) inner lite <sup>9</sup>																
Blue-Green	1/4	6	34	8	17	18	6	12	0.25	0.22	0.26	0.23	1.6	1.3	0.27	0.31
	5/16	8	32	7	16	15	6	9	0.24	0.22	0.26	0.23	1.6	1.3	0.24	0.28
Graphite Blue	1/4	6	23	6	16	17	6	13	0.25	0.22	0.26	0.23	1.6	1.3	0.27	0.31
	5/16	8	25	7	16	16	6	11	0.24	0.22	0.26	0.23	1.6	1.3	0.26	0.29
Arctic Blue	1/4	6	25	6	16	13	5	7	0.25	0.22	0.26	0.23	1.6	1.3	0.21	0.25
	5/16	8	22	6	16	11	5	5	0.24	0.22	0.26	0.23	1.6	1.3	0.19	0.22

An insulating unit consists of two lites of equal glass thickness, and a 1/2 in. (12.7 mm) airspace.

\*U.S. U-Factor (Btu/hr.sq ft. °F) is based on NFRC/ASTM standards, \*\*European U-Factor (W/sq m K) is based on EN 410/673 (CEN) standard.

All performance values are center-of-glass values calculated using the LBNL Window 6.3 program. See Pilkington Architectural Product Guide for explanation of references - <sup>1,10</sup>.



# Coated Insulating Glass Unit Performance Data<sup>1,10</sup>

	Nominal Glass Thickness		Visible Light <sup>2</sup>			Solar Energy <sup>2</sup>			U-Factor <sup>5</sup>						Solar Heat Gain Coefficient <sup>7</sup>	Shading Coefficient <sup>8</sup>
			Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	UV Transmittance <sup>2</sup> %	U.S. Summer*		U.S. Winter*		European <sup>6**</sup>			
	in.	mm		Outside	Inside				Air	Argon	Air	Argon	Air	Argon		
Pilkington <b>Eclipse Advantage™</b> (coating on #2 surface) outer lite and Pilkington <b>Optifloat™</b> Clear inner lite																
Clear	1/4	6	60	29	31	46	21	24	0.35	0.30	0.35	0.30	1.9	1.6	0.55	0.63
	5/16	8	58	29	30	42	20	21	0.34	0.30	0.34	0.30	1.9	1.6	0.53	0.60
Blue-Green	1/4	6	51	21	29	29	12	13	0.35	0.30	0.35	0.30	1.9	1.6	0.38	0.44
	5/16	8	47	19	29	24	10	10	0.34	0.30	0.34	0.30	1.9	1.6	0.34	0.39
EverGreen	1/4	6	43	17	30	20	9	6	0.35	0.30	0.35	0.30	1.9	1.6	0.29	0.33
	5/16	8	38	15	29	15	8	4	0.34	0.30	0.34	0.30	1.9	1.6	0.25	0.29
Arctic Blue	1/4	6	35	13	30	19	9	9	0.35	0.30	0.35	0.30	1.9	1.6	0.29	0.33
	5/16	8	29	11	29	14	7	6	0.34	0.30	0.34	0.30	1.9	1.6	0.25	0.28
Bronze	1/4	6	34	13	29	28	11	9	0.35	0.30	0.35	0.30	1.9	1.6	0.38	0.44
	5/16	8	28	10	28	21	9	6	0.34	0.30	0.34	0.30	1.9	1.6	0.33	0.38
Grey	1/4	6	29	10	29	23	9	8	0.35	0.30	0.35	0.30	1.9	1.6	0.34	0.39
	5/16	8	22	8	29	17	7	6	0.34	0.30	0.34	0.30	1.9	1.6	0.28	0.32
Pilkington <b>Eclipse Advantage™</b> (coating on #2 surface) outer lite and Pilkington <b>Energy Advantage™</b> Low-e (coating on #4 surface) inner lite <sup>9</sup>																
Clear	1/4	6	56	30	30	41	22	19	0.25	0.23	0.27	0.24	1.6	1.4	0.51	0.58
	5/16	8	55	29	30	37	20	17	0.25	0.23	0.27	0.24	1.6	1.4	0.48	0.55
Blue-Green	1/4	6	48	22	29	26	12	10	0.25	0.23	0.27	0.24	1.6	1.4	0.35	0.40
	5/16	8	44	20	29	21	11	8	0.25	0.23	0.27	0.24	1.6	1.4	0.30	0.35
EverGreen	1/4	6	40	18	30	18	9	5	0.25	0.23	0.27	0.24	1.6	1.4	0.26	0.30
	5/16	8	36	15	29	14	8	3	0.25	0.23	0.27	0.24	1.6	1.4	0.23	0.26
Arctic Blue	1/4	6	33	14	29	17	9	7	0.25	0.23	0.27	0.24	1.6	1.4	0.26	0.30
	5/16	8	27	11	29	13	7	5	0.25	0.23	0.27	0.24	1.6	1.4	0.22	0.25
Bronze	1/4	6	32	13	29	24	11	7	0.25	0.23	0.27	0.24	1.6	1.4	0.34	0.39
	5/16	8	26	10	28	19	9	5	0.25	0.23	0.27	0.24	1.6	1.4	0.29	0.33
Grey	1/4	6	27	11	29	20	9	7	0.25	0.23	0.27	0.24	1.6	1.4	0.30	0.35
	5/16	8	21	8	29	15	7	5	0.25	0.23	0.27	0.24	1.6	1.4	0.25	0.29

An insulating unit consists of two lites of equal glass thickness, and a 1/2 in. (12.7 mm) airspace.

\*U.S. U-Factor (Btu/hr.sq ft. °F) is based on NFRC/ASTM standards, \*\*European U-Factor (W/sq m K) is based on EN 410/673 (CEN) standard.

All performance values are center-of-glass values calculated using the LBNL Window 6.3 program. See Pilkington Architectural Product Guide for explanation of references - <sup>1, 10</sup>.

	Nominal Glass Thickness		Visible Light <sup>2</sup>			Solar Energy <sup>2</sup>			U-Factor <sup>5</sup>						Solar Heat Gain Coefficient <sup>7</sup>	Shading Coefficient <sup>8</sup>
			Transmittance <sup>3</sup>	Reflectance <sup>4</sup> %		Transmittance <sup>3</sup> %	Reflectance <sup>4</sup> %	UV Transmittance <sup>2</sup> %	U.S. Summer*		U.S. Winter*		Europe**			
	in.	mm		Outside	Inside				Air	Argon	Air	Argon	Air	Argon		
Pilkington <b>Eclipse™</b> (coating on #2 surface) outer lite and Pilkington <b>Optifloat™</b> Clear inner lite																
Gold	1/4	6	36	38	45	35	27	7	0.50	0.47	0.47	0.45	2.8	2.6	0.45	0.52
	5/16	8	36	35	42	31	24	5	0.49	0.47	0.47	0.44	2.8	2.6	0.43	0.49
Sunset Gold	1/4	6	22	16	44	24	13	3	0.50	0.47	0.47	0.45	2.8	2.6	0.36	0.42
Pilkington <b>Eclipse™</b> (coating on #2 surface) outer lite and Pilkington <b>Energy Advantage™</b> Low-e (coating on #3 surface) inner lite																
Gold	1/4	6	34	38	42	30	28	5	0.33	0.28	0.33	0.29	1.8	1.5	0.41	0.48
	5/16	8	34	36	40	26	26	4	0.33	0.28	0.33	0.28	1.8	1.5	0.39	0.45
Sunset Gold	1/4	6	21	16	41	19	14	2	0.33	0.28	0.33	0.29	1.8	1.5	0.31	0.36
Pilkington <b>Activ™</b> (coating on #1 surface) outer lite and Pilkington <b>Optifloat™</b> Clear inner lite																
Clear	1/8	3	77	21	20	71	17	43	0.51	0.48	0.48	0.45	2.8	2.7	0.74	0.86
	5/32	4	76	21	20	69	17	41	0.50	0.48	0.48	0.45	2.8	2.7	0.73	0.84
	1/4	6	74	21	20	59	16	34	0.50	0.47	0.47	0.45	2.8	2.6	0.68	0.78
Blue	1/4	6	44	16	15	26	12	11	0.50	0.47	0.47	0.45	2.8	2.6	0.38	0.43
Pilkington <b>Activ™</b> (coating on #1 surface) outer lite and Pilkington <b>Energy Advantage™</b> Low-e (coating on #3 surface) inner lite																
Clear	1/8	3	72	23	21	60	20	36	0.33	0.28	0.34	0.29	1.9	1.6	0.69	0.80
	5/32	4	71	23	21	58	20	34	0.33	0.28	0.34	0.29	1.9	1.5	0.68	0.78
	1/4	6	69	23	20	51	19	27	0.33	0.28	0.33	0.29	1.8	1.5	0.64	0.74
Blue	1/4	6	40	17	16	22	12	9	0.33	0.28	0.33	0.29	1.8	1.5	0.33	0.38
Pilkington <b>Activ™</b> (coating on #1 surface) outer lite and Pilkington <b>Solar-E™</b> (coating on #3 surface) inner lite																
Clear	1/8	3	51	21	13	37	20	27	0.33	0.28	0.34	0.29	1.9	1.6	0.64	0.74
	5/32	4	51	21	13	36	20	26	0.33	0.28	0.34	0.29	1.9	1.6	0.63	0.73
	1/4	6	50	21	13	34	19	24	0.33	0.28	0.33	0.29	1.8	1.5	0.60	0.69
Blue	1/4	6	30	16	11	15	12	8	0.33	0.28	0.33	0.29	1.8	1.5	0.31	0.36

An insulating unit consists of two lites of equal glass thickness, and a 1/2 in. (12.7 mm) airspace.

\*U.S. U-Factor (Btu/hr.sq ft. °F) is based on NFRC/ASTM standards, \*\*European U-Factor (W/sq m K) is based on EN 410/673 (CEN) standard.

All performance values are center-of-glass values calculated using the LBNL Window 6.3 program. See Pilkington Architectural Product Guide for explanation of references - <sup>1, 10</sup>.

NSG **TEC™** Performance Data

Product	Thickness (mm)	Visible Light Transmittance (%)	Sheet Resistance (Ohms/sq.)	Haze (%)	Hemispherical Emittance
NSG <b>TEC™</b> Product Properties					
NSG <b>TEC™</b> 7	2.2, 3.0, 3.2	80-82	6-8	≤2	0.12
NSG <b>TEC™</b> 8	2.2, 3.2	80-81.5	7-9	12	0.12
NSG <b>TEC™</b> 10	2.2, 3.2, 4.0	83-84.5	9-11	≤1	0.13
NSG <b>TEC™</b> 15	1.3, 1.6, 1.8, 2.2, 3.0, 3.2	83-84.5	12-14	≤0.45	0.15
	4.0, 5.0, 6.0, 8.0, 10.0	82-83	12-14	≤0.74	0.15
NSG <b>TEC™</b> 20	4.0	83-84	19-25	≤0.65	0.22
NSG <b>TEC™</b> 35	3.2, 6.0	82-84	32-48	≤0.65	0.36
NSG <b>TEC™</b> 50	6.0	83-84	43-53	≤0.55	0.39
NSG <b>TEC™</b> 70	3.2, 4.0	82-84	58-72	≤0.55	0.48
NSG <b>TEC™</b> 100	3.2, 4.0	83-84	125-145	≤0.55	0.60
NSG <b>TEC™</b> 250	3.2, 4.0	84-85	260-325	≤0.70	0.67
NSG <b>TEC™</b> 1000	3.2	88	1000-3000	0.5	0.81

Notes: Nominal values shown. Specifications subject to change. Substrate = Clear soda lime glass.

Glazing (Room/Cool Side)	Airspaces (Number)	U-Value (W/M² K)	Room-Side Glass Temp. (C)	Condensation RH** (%)	RH Improvement (%)	Heat Flow Through Glass (W/m²)	Heat Flow Reduction (%)	Power Density (W/m²)
NSG <b>TEC™</b> Refrigerator Door Applications*								
Clear/Clear	1	2.4	20	64	Base Case	54	Base Case	0
Triple Clear***	2	2.0	21	69	8	45	17	0
NSG <b>TEC™</b> 15/Clear	1	1.7	22	73	14	38	30	0

\* Room-side temperature = 27°C, refrigeration temperature = 4°C.

\*\*\* No power.

Glazing (Room/Cool Side)	Airspaces (Number)	U-Value (W/M² K)	Room-Side Glass Temp. (C)	Condensation RH** (%)	RH Improvement (%)	Heat Flow Through Glass (W/m²)	Heat Flow Reduction (%)	Power Density (W/m²)
NSG <b>TEC™</b> Freezer Door Applications*								
Triple Clear***	2	1.9	15	48	Base Case	87	Base Case	0
NSG <b>TEC™</b> 70/Clear/Clear	2	1.7	24	81	70	82	6	82
NSG <b>TEC™</b> 70/NSG <b>TEC™</b> 15	1	1.6	25	87	82	75	14	82
NSG <b>TEC™</b> 70/NSG <b>TEC™</b> 15/clear	2	1.5	25	90	88	73	17	82

\* Room-side temperature = 27°C, freezer temperature = -20°C.

\*\* Condensation along the room-side glass surface away from the frame when the relative humidity (RH) within the room is greater than the value noted.

Notes: All glass 3.2mm; Airspace 12mm for doubles, 6mm for triples; Airspace filled with air; All simulations utilizing LBL Windows 5.2; Demist heater power of 100 Watts (82 W/m²); Input voltage = 120 volts; Units 800mm × 1,700mm, bus bars along 800mm dimensions.



## Performance Data Notes

1. Some combinations or installations may require heating treating to prevent glass breakage from thermal stress.
2. Visible, Solar and UV data are based on laboratory spectrophotometric measurements weighted by an appropriate weighting function(s) using LBNL Windows 6.3 Software. Wave length ranges of the sun's energy used to calculate properties: Visible from 0.38 to 0.78 microns, Solar from 0.30 to 2.5 microns and UV from 3.0 to 0.38 microns.
3. Transmittance - Percentage of normally incident visible light or solar energy passing directly through the glazing.
4. Reflectance - Percentage of normally incident visible light or solar energy reflected away from the glazing.
5. U-Factor (Btu/hr.sq ft. °F) - Measure of the heat gain or loss through glazing due to environmental differences between the outdoor and indoor air. U-Factors given are center-of-glass values calculated using LBNL Windows 6.3. To NFRC standard 100-2001. Winter U-Factors are based on an outdoor temperature of 0°F (-18°C), an indoor temperature of 70°F (21°C) and a 12.3 mph (5.5m/s) wind velocity with no sun. Summer U-Factors are based on an outdoor temperature of 90°F (32°C), and indoor temperature of 75°F (24°C), a solar intensity of 248 Btu/hr.sq ft. °F. (783 W/sqm) and a 6.3mph (2.8m/s) wind. To obtain metric U-Factor (W/sq m. °C), multiply by 5.678. "U-Factor" is identical to the previously known term of "U-Value".
6. European U-Factor (W/sq m.K) is based on EN 410/673 (CEN) standard.
7. Solar Heat Gain Coefficient or SHGC - The ratio of the total solar heat gain through the glass relative to the incident solar radiation. The solar heat gain includes both the solar energy directly transmitted through the glass, plus the solar energy absorbed by the glass and subsequently convected and thermally radiated inward.
8. Shading Coefficient or SC - The ratio of solar heat gain through the glass relative to that through 1/8" (3mm) clear glass at nominal incidence. Note that Relative Heat Gain or RHG (Btu/hr.sq ft), which is the amount of heat gained through the glass at assumed summer conditions, can be calculated using the following equation:  $RHG = SC \times 200 + Us \times 14$ . To obtain metric RHG (W/sq m), multiply by 3.154.
9. A low-e coating on the exposed interior surface may increase the possibility of condensation formation during winter conditions.
10. Typical values of Pilkington production are provided.

Design and Uniform Static Loads  
ASTM Standard Practice E 1300 contains design load evaluation procedures for different glass thickness and failure probabilities. For a copy of this standard visit [www.ASTM.org](http://www.ASTM.org) or write to:

### ASTM

100 Bar Harbor Drive  
West Conshohocken, PA 19428

For design and comprehensive technical data, please visit the Pilkington Web site:

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

## Technical Bulletins

### ATS 129

Properties

### ATS 171

Optics and Window 5  
Procedures

This publication provides only a general description of the product. Further, more detailed, information may be obtained from your local supplier of Pilkington products. It is the responsibility of the user to ensure that the use of this product is appropriate for any particular application and that such use complies with all relevant legislation, standards, codes of practice and other requirements. 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. Pilkington, "Activ," "Eclipse," "Eclipse Advantage," "Energy Advantage" "Mirropane," "MirroView," "OptAR," "Optifloat," "Optiphon," "OptiView," "Optiwhite," "Planar," "Pyrostop," "Optifloat," "Solar-E," "Spacia," and "TEC" are trademarks owned by Nippon Sheet Glass Co. Ltd, or a subsidiary thereof.



**Pilkington North America**

811 Madison Ave Toledo, Ohio 43604-5684

[buildingproducts.pna@nsg.com](mailto:buildingproducts.pna@nsg.com)

Tel 800 221 0444 • Fax 419 247 4573

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