



Remarks	Estimated time
Delayed till	09:42
Delayed till	14:20
Arrived	14:20
Arrived	08:23
Arrived	09:05
Arrived	08:19
Arrived	08:47
Arrived	09:20
Delayed till	09:20
Delayed till	09:53
Delayed till	09:53
Delayed till	09:53

High Performance Glass Products
for digital signage, digital displays
and touch screens



Glass products for digital signage and displays

Digital signage and displays are one of the media's most powerful sources. The demand for digital signage and displays is steadily growing. Digital displays are being used in many markets and are prevalent in restaurants, hotels, schools, retail, healthcare, and financial institutions.

NSG Group offers the widest range of robust, pyrolytic, toughenable, coated glass products available today. Our products offer solutions to a multitude of industry requirements.

- High light transmission
- Anti-reflection
- Transparent conductive
- Anti-static
- EMI shielding
- Heating



Pyrolytic coated cover glass

NSG **TEC**™

NSG **TEC**™ products are a perfect option for touch screen cover lites where a TCO coating is required. Our range of NSG **TEC**™ products provide excellent performance at a competitive price point. NSG **TEC**™ glass is very durable and robust.

For capacitive and resistive touch screens, a transparent conductor is needed. NSG **TEC**™ products use fluorine doped tin oxide as the TCO, and offer an excellent value alternative to ITO.

NSG **TEC**™ products are easily fabricated, including cutting, tempering and bending.

Our range of NSG **TEC**™ products are available in a variety of substrates and thicknesses, including low iron and clear glass. NSG **TEC**™ can be tuned to specific customer requirements.

Benefits

- More cost effective than ITO coatings
- Widest range of TCO sheet resistant products available
- Durable and robust coatings
- Coatings available on a range of glass thicknesses
- Capability of tuning coatings to meet specific requirements
- Large stock sizes up to 6000 × 3210 mm depending on product type and thickness

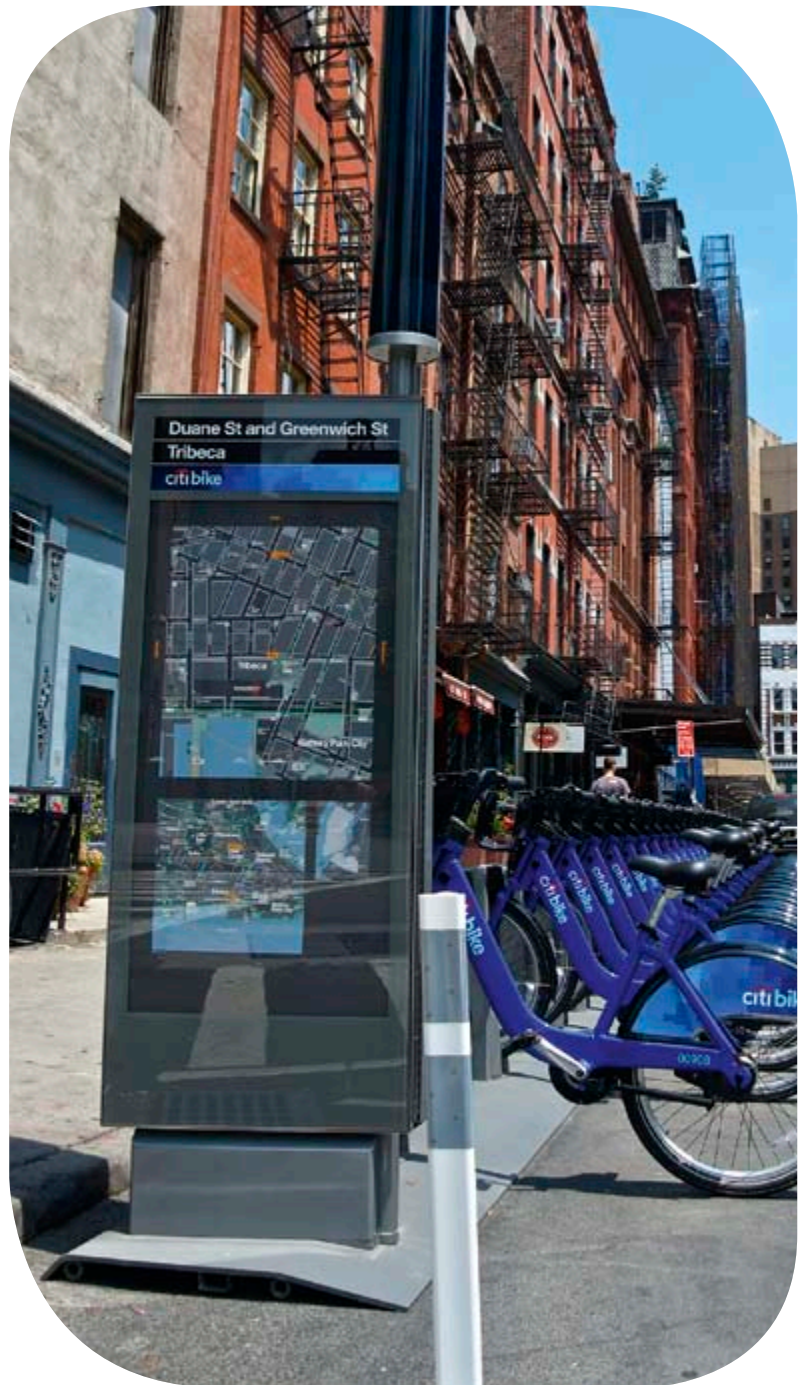
Features

- Anti-static
- EMI shielding
- Heated glazing
- Active component of touch screens

Applications

- Digital displays
- Touch screens
- Digital signage

Property	Range
Sheet resistance (Ω/\square)	5-500
Visible light transmittance (%)	80-85
Haze (%)	0.2 to >50
Thickness (mm)	0.9-12



NSG TEC™ - performance data

Product	Thickness (mm)	Visible light transmittance (%)	Sheet resistance (Ω/\square)	Haze (%)
NSG TEC™ 5	3.2	80	5	5
NSG TEC™ 7	2.2, 3.0, 3.2	80-81.5	6-8	<2
NSG TEC™ 10	2.2, 3.2	83-84.5	9-11	≤1
NSG TEC™ 15	1.3, 1.6, 1.8, 2.2, 3.0, 3.2, 4.0	83-84.5	12-14	≤0.5
	5.0, 6.0, 8.0, 10.0	82-83	12-14	≤0.5
NSG TEC™ 50	6.0	83-84	43-53	≤0.55
NSG TEC™ 70	3.2, 4.0	82-84	58-72	0.5
NSG TEC™ 100	3.2, 4.0	83-84	125-145	0.5
NSG TEC™ 250	3.2, 4.0	84-85	260-325	0.7

Nominal values shown. Specifications subject to change. Substrate = clear soda lime glass.
Other glass thickness and sheet resistance options are possible upon request.

Anti-reflective glass for digital signage

The Pilkington **OptiView™** range and Pilkington **OptAR™** range of coated anti-reflective products provide a complete set of solutions to minimise reflections in digital signage. These products product reduce glare that reflects off computer screens, televisions, flat panels, aircraft transparencies and similar electronic displays. As a result, displays are easier to read, eye strain is minimised and visual acuity is increased.

Monolithic anti-reflective

Manufactured on-line with a durable, single-sided pyrolytic coating, Pilkington **OptiView™** and Pilkington **OptAR™** and Pilkington **OptAR™** Plus offer all the benefits of on-line coated glass products including, easy handling, fabricating, cutting, tempering, bending and more. Pilkington **OptiView™** Ultra is a durable and robust magnetron sputtered coating, providing reduced reflection and high light transmission and is available in toughenable and non-toughenable forms. Monolithic anti-reflective products are ideal when optically bonded to the front of the display or when a mid-level reflection reduction is required. Pilkington **OptAR™** Plus and Pilkington **OptiView™** Ultra can be used in combination with a projected capacitive touch foil on #2.

Available thicknesses*

- 3 mm
- 3.2 mm
- 4 mm
- 6 mm
- 10 mm

Features and benefits

- Low reflection, less than 1% from coated surface
- Can be electrically conductive or fully dielectric
- Excellent visual performance with high light transmission
- Compatible with all touch screen technologies
- Easily fabricated
- Bendable
- Durable and robust coating
- Available on low iron substrate
- Large stock sizes up to 6000×3210 mm depending on product type and thickness

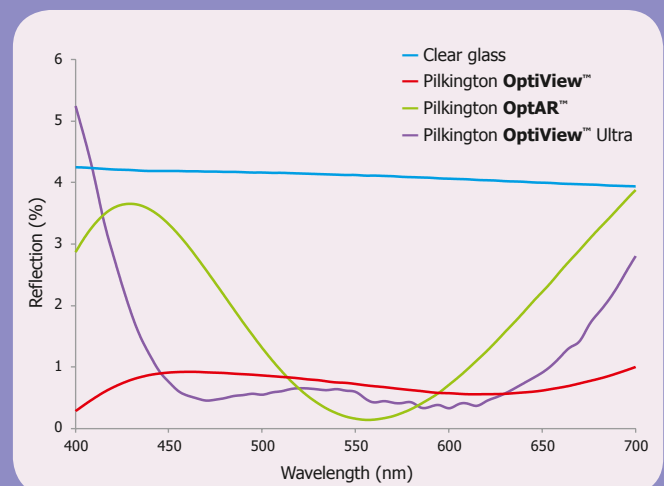
* Other thicknesses and low iron glass are available on request. Pilkington **OptiView™** Ultra is only available on low iron glass.

Pilkington **OptiView™** and Pilkington **OptAR™** - performance data

Product	Nominal glass thickness	Coated surface reflection	Visible transmittance	Total visible reflectance
	(mm)	(%)	(%)	(%)
Clear glass	3	<1	91	8
Pilkington OptAR™	3.2	<1	92	<5
Pilkington OptAR™ Plus	3.2	<1	95	<5
Pilkington OptiView™	3.2	<1	92	<5
Pilkington OptiView™ OW	3.2	<1	93	<5
Pilkington OptiView™ Ultra	3.2	<1	95	<5

Sheet resistance (Ω/\square) is <200 for all products listed above.

Front (coated) surface reflectance of Pilkington **OptiView™** and Pilkington **OptAR™** glass compared to 3 mm clear glass



Applications

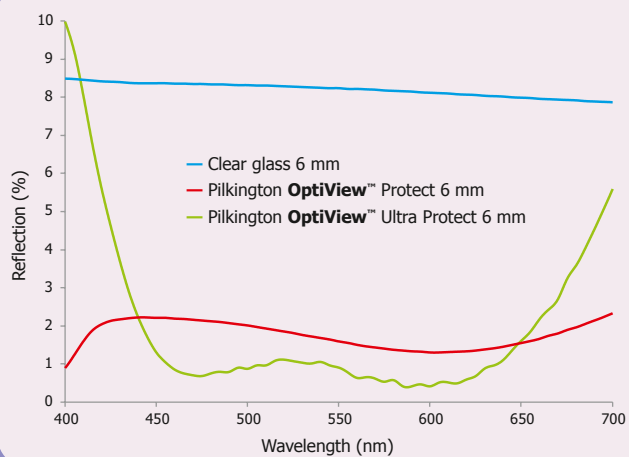
- Digital signage and displays
- Touch panel displays
- Aircraft transparencies
- Flat-panel LCD monitors
- Televisions and HDTV
- Specialty vehicle windshields and instrument panels
- Specialty electronic applications

Double-sided coated anti-reflective glass

Pilkington **OptiView™** Ultra provides the option of a glass with an anti-reflective coating on both sides. This allows reflection to be reduced while providing a glass thickness and weight, which is as low as possible. Pilkington **OptiView™** Ultra is available in toughenable and non-toughenable forms.



Reflectance of laminated
Pilkington **OptiView™** Protect
compared to 6 mm clear glass



Laminated anti-reflective glass

Pilkington **OptiView™** Protect and Pilkington **OptiView™** Ultra Protect for outdoor digital signage.

Many signage installations are used outdoors. Outdoor applications require additional strength and security. The laminated Pilkington **OptiView™** Protect product range offers many of benefits for outdoor signage.

- High light transmission: >90%
- Low reflection: <2%
- Neutral color
- Large sizes available up to 6000×3210 mm depending on product type and thickness
- UV Control. UV and IR rays can damage displays. Laminated Pilkington **OptiView™** Protect blocks almost 100% of UV and reduces infrared

Safety & Security

Vandal resistant. The Pilkington **OptiView™** Protect range is a laminated safety glass that performs under impact. Ordinary glass shatters into large pieces when impacted. Laminated lites of Pilkington **OptiView™** Protect may break when impacted, but the glass fragments will remain firmly bonded to the interlayer, minimising the risk of injury.

Durability

Pilkington **OptiView™** Protect range is durable and easy to clean like ordinary glass. Pilkington **OptiView™** Protect range meets the requirements of EN1096-2, Class A.

- Acid resistance
- Condensation resistance
- Salt spray resistance
- Abrasion resistance
- Pencil hardness 8H

Design flexibility

Pilkington **OptiView™** can be bent, toughened, heat-strengthened, painted for spandrel and a ceramic frit can be applied.

Custom designs, images, logos, text, patterns, or tinted interlayers can be laminated into the lites to create a truly customize design or application.

Pilkington **OptiView™** Protect and Pilkington **OptiView™** Ultra Protect - performance data

Product	Nominal glass thickness (mm)	Visible light (%)			Solar energy (%)		
		Transmittance	Reflectance		Transmittance	Reflectance	UV transmittance
			Outside	Inside			
Clear glass (non-laminated)	6	88	8	8	77	7	63
Pilkington OptiView™ Protect	6.4	92	1.7	1.7	70	4	<1
Pilkington OptiView™ Protect	8.4	90	1.7	1.7	67	4	<1
Pilkington OptiView™ Protect	12.4	88	1.7	1.7	62	3	<1
Pilkington OptiView™ Ultra Protect	6.8	98	1	1	77	13	<1
Pilkington OptiView™ Ultra Protect	8.8	98	1	1	77	13	<1

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:

- Pilkington **OptiView™** Protect 6,4 (laminated glass) = 3 mm Pilkington **OptiView™** (#1) + 0.38 mm clear PVB layer + 3 mm Pilkington **OptiView™** (#4);
- Pilkington **OptiView™** Protect 8,4 (laminated glass) = 4 mm Pilkington **OptiView™** (#1) + 0.38 mm clear PVB layer + 4 mm Pilkington **OptiView™** (#4);
- Pilkington **OptiView™** Protect 12,4 (laminated glass) = 6 mm Pilkington **OptiView™** (#1) + 0.38 mm clear PVB layer + 6 mm Pilkington **OptiView™** (#4).
- Pilkington **OptiView™** Ultra Protect 6,8 (laminated glass) = 3 mm Pilkington **OptiView™** Ultra (#1) + 0.76 mm clear PVB layer + 3 mm Pilkington **OptiView™** Ultra (#4).
- Pilkington **OptiView™** Ultra Protect 8,8 (laminated glass) = 4 mm Pilkington **OptiView™** Ultra (#1) + 0.76 mm clear PVB layer + 4 mm Pilkington **OptiView™** Ultra (#4).



Easy installation

Pilkington **OptiView™** Protect range is easily installed. Most laminated combinations can be easily cut to size and fabricated.

No visual distortion

Distortion can occur with heat-strengthened and toughened glass, known as roller wave distortion. Pilkington **OptiView™** Protect range provides crisp, clean views, free of distortion.

Available thicknesses

- 6.4 mm laminated glass
- 8.4 mm laminated glass
- 12.4 mm laminated glass

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.

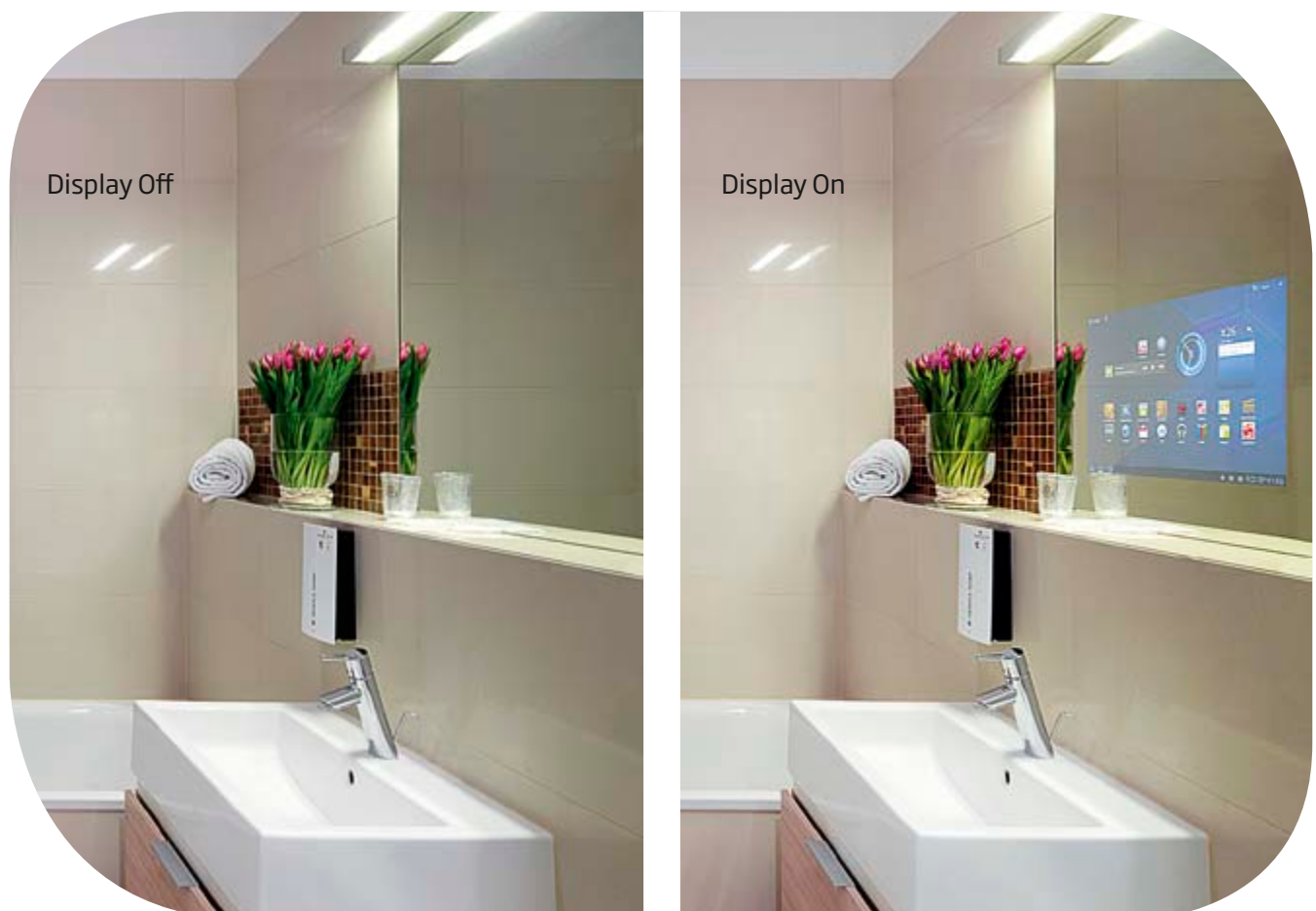
When the screen is turned 'off' Pilkington **MirroView™** maintains a mirrored appearance, which conceals the screen. When the screen is turned 'on' the picture on the video screen shows through.

Pilkington **MirroView™** is very durable and can be easily handled, transported and processed, including toughening 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.

Applications

- Bars and restaurants
- Bathrooms
- Digital signage

Available in large stock sizes, which can conceal one or multiple displays. With its highly reflective and durable coating, Pilkington **MirroView™** can be used as a traditional mirror with a small video screen concealed beneath. Ideal for bathroom applications, this allows individuals to easily view themselves in the mirror while watching television.





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

- Hotel rooms
- Lobbies and salons
- Retail
- Digital signage
- Touch screens

Pyrolytic coating advantages

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

Available thicknesses

- 3.2 mm
- 4 mm
- 6 mm



Pilkington **MirroView™** and Pilkington **MirroView™** 50/50 - performance data

Product	Nominal glass thickness (mm)	Glass substrate	Visible transmittance (%)	Visible reflectance coated side (%)	Visible reflectance glass side (%)	Proper glazing
Pilkington MirroView™	3.2	Clear	25	65	61	Mirror coating toward viewer-side
	4	Clear	25	65	60	
	6	Clear	25	65	59	
Pilkington MirroView™ 50/50	3.2	Clear	36	53	51	
	6	Clear	35	53	48	

Technical performance according to EN 410.

Uncoated cover glass for digital displays

Pilkington **Optiwhite™** low iron glass

Pilkington **Optiwhite™** offers a variety of benefits for touch screen and digital signage applications. Pilkington **Optiwhite™** is an extra-clear, low iron float glass; it is practically colourless, and the green cast inherent to other clear glasses is not present. It is perfect for applications where transparency and purity of colour are desired.

Available in thicknesses between 2 mm and 19 mm (the widest range on the market), Pilkington **Optiwhite™** provides increased design flexibility and, when combined with other Pilkington glass products, it can offer additional benefits such as anti-reflective or conductivity.

It also comes with all the reassurance of not only being a market-leading product in its own right, but of bearing the market-leading Pilkington name, and with the unrivalled support you would expect from our brand.



Features

- High light transmittance for true colour and outstanding visual clarity when an unrestricted view is required
- Purity of color with minimum colour 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
- Brilliant clarity when compared to ordinary standard clear float glass
- Can be toughened or laminated for safety and security
- Can be painted or silk-screened for spandrel or decorative applications
- Can be combined with other products from the Pilkington glass range to provide additional benefits

Pilkington **Optiwhite™** - performance data

Product	Nominal glass thickness (mm)	Visible light (%)		
		Transmittance	Reflectance	
			Outside	Inside
Pilkington Optiwhite™	2	92	8	8
	3	92	8	8
	4	92	8	8
	5	91	8	8
	6	91	8	8
	8	91	8	8
	10	91	8	8
	12	91	8	8
	15	90	8	8
	19	90	8	8

* Technical performance according to EN 410.

Pilkington **Microwhite™** thin float glass

Made to precise standards

Pilkington **Microwhite™** are extremely thin, high-grade float glass products manufactured to precise standards. They are made according to the highest specifications with very low thickness tolerances, to ensure flat and uniform products, suitable for a variety of applications.

The requirements of larger area touch screens and displays are different from those used in mobile devices. Large digital displays do not always require ultra-thin glass, less than 1 mm.

Pilkington **Microwhite™** are both manufactured by the standard float glass process. Pilkington **Microwhite™** is a low iron composition which produces a very pure, clear glass and has the added benefit of increased light transmission.

Applications

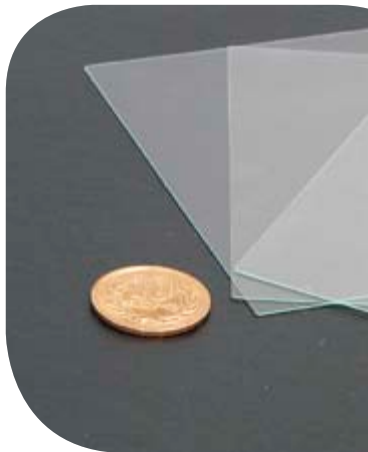
- Digital signage and displays
- Microscope slides
- Cosmetic mirrors
- Chromatographic plates
- LCD photo masks
- Automotive and technical glass
- PC display screens and tablet PC's

Features

- High-grade thin float glass with very low thickness tolerances
- Flat and uniform products
- Excellent optical transmission
- Improved wettability through a silane coating (optional)
- Cut to customer specifications

Additional features of Pilkington **Microwhite™**:

- Neutral edge colour
- Superior light and energy transmission



Pilkington **Microwhite™** - performance data

Product	Thickness range	Light transmittance
Pilkington Microwhite™	1.0-1.6 mm	91.7% at 1 mm

Technical performance according to EN 410.



This publication provides only a general description of the products. 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 these products 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, NSG, "TEC", "OptiView", "OptAR", "MirroView", "Optiwhite", "Optifloat" and "Microwhite" are trademarks owned by Nippon Sheet Glass Co. Ltd, or a subsidiary thereof.



CE marking confirms that a product complies with its relevant harmonised European Norm.

The CE marking label for each product, including declared values, can be found at www.pilkington.com/CE



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