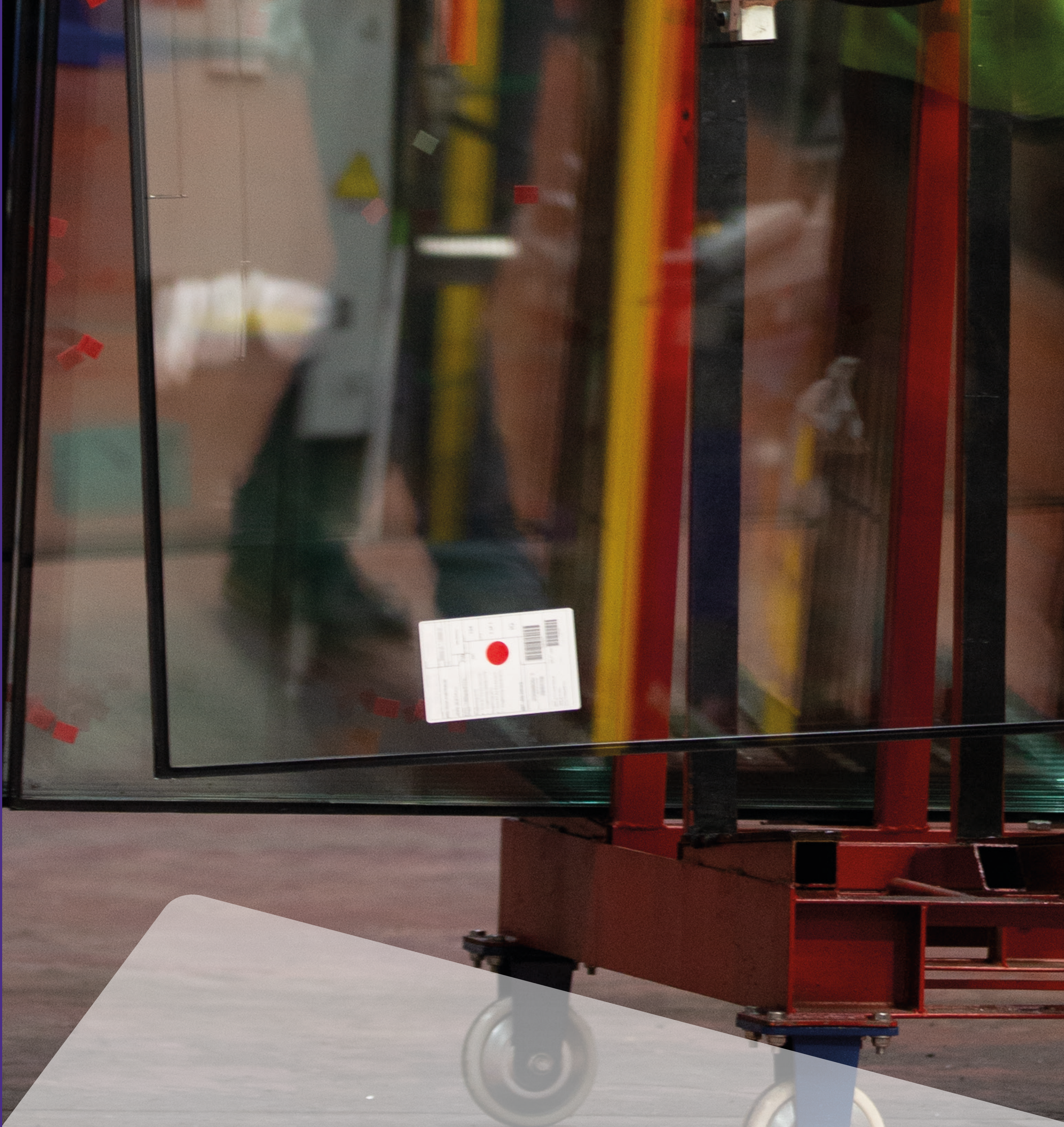
TechKnow™



TechKnow™

Coated glass surfaces

solos glass
see the possibilities

Coated glass surfaces

This information is intended for use by window fabricators, glaziers, and their customers. There is some uncertainty within the industry on how to orient a Low E coated IGU. This document has been developed, to provide a better understanding of how to maximise heating and cooling benefits based on the location of Low E surfaces within an IGU and how to identify the coated glass for optimum glazing.

There are three main areas of glazing performance which can be effected differently by the variety of glass and coating combinations.

Insulation

Calculated as a “U-Value” measured in W/m2K.

A measure of how effective glass and a window is in preventing heat escaping from the inside to the outside of a building.

The lower the U Value, the greater the resistance the glass has to heat flow and therefore the better insulator it is.

Glass in a single pane has very poor insulating qualities, however the introduction of air spaces and also adding metal coatings onto glass surfaces can vastly improve this insulation performance.

Solar Control

Measured as Solar Heat Gain Coefficient (SHGC).

The total amount of heat transmitted through the glass into the inside of the building is represented by the SHGC. The lower the number the better the solar control performance of that particular glass product.
Each glass type has a different SHGC.

When direct radiant heat from the sun hits a glazed panel, tremendous amounts of heat can easily enter inside the building. In many cases this is undesirable but can be controlled through inclusions and combinations of tints, airspaces and coatings.

Visible Light Transmittance (VLT) and Visible Light Reflection (VLR)

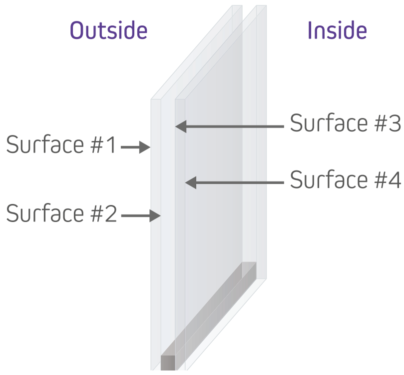
Measured as a percentage (%).

The amount of visible light transmitted through the glass.
A higher number means more light is passing through the glass.

Building Developers and Architects are designing buildings with high levels of natural light, which in turn reduces power loads for artificial light.

Spectrally selective coatings on glass surfaces can allow high levels of natural light and reduce higher proportions of infrared and associated heat gain. External light reflectance levels are commonly restricted to less than 20% in most metropolitan building areas.

Surface Numbering



A standard double-glazed unit has 4 surfaces. We allocate surface #1 to the outside of the building, each glass surface follows on from this, with surface #4 being inside the room. This is a global surface numbering convention (refer to diagram).

Coatings in a double-glazed unit are generally applied to either internal surface #2 or #3 for protection of the coatings and to optimize the performance.

Effects of swapping coatings between surface #2 and #3

Solar Control

Coatings on Surface #2 are closer to the direct heat source (the sun) therefore perform better in stopping the heat entering the building via a balance of reflection and absorption. Moving the coating back to surface #3 will enable the inner glass type to absorb more heat which will be directly re-radiated inside the room. As a result, you are more likely to feel this radiated heat when you are in a close vicinity to the glass.

Visible Light Reflectance

The external and internal reflectance levels are swapped around. Any external reflectance therefore will become internal and vice versa. This also includes changes in colour or hues between one side of the coating and the other. Be mindful of any local regulations on limiting light reflectance values to under 20%.

How do you identify the glass components?

Historically, most Low E coatings were designed to specifically improve insulation i.e. lowering U Values. As a result, they were mainly produced onto clear glass substrates and glazed to #3 for colder climates. Therefore, production labels applied to the non-coated component meant that labels were always glazed to the outside of the building. This is no longer the case, with the improvements to the new generation of coatings, that include solar control benefits or by adding the Low E coatings onto tinted glass, this means the production labels applied to non-coated panels result in labels needing to be glazed to the inside of the building.

It is also important when the units are delivered for glazing that the window fabricator can identify the coated glass component. Some of the new generation single silver i.e. OptEma™ Low E glass coatings are of such high clarity, that they can be difficult to tell apart from their clear component partner.

Why only label the non-coated panel?

To protect the delicate coatings on the glass and to reduce instances of damage during processing, coated surfaces avoid placement against benches, racks, furnace rollers and conveyor lines.

The IGU assembly and pressing process involves two glass components that travel one after the other along an upright conveyor for washing, inspection and assembly. The first component entering the IGU press is non-coated as coated glass must be loaded facing away from the conveyor. The internal vacuum lifters then pull the first component away from the line in preparation of assembly to the second component. The second component, will then have the spacer applied and aligned before joining the first component in the argon filled chamber to be pressed together. The first component will be the one facing out when the IGU has completed assembly on the line, therefore is the surface the label is applied to.

With the exception of dual coated IGU's, it is our guidance that the SOLOS Glass production label will be on the uncoated component.

What does this mean?

This would mean for coatings we want on surface #3, the units should be glazed so that the label is located outside the building. This is most common for colder type climates, where solar control is less of a priority to thermal insulation. Conversely, if it is a solar absorbing coating, which will work more efficiently on surface #2, then these units should be glazed so that the labels face inside the room.

The older generation of clear and neutral hard coat Low E coatings exhibit a much higher level of haze and solar absorbance, resulting in a wider performance variation between coatings on surface #2 or #3. This is due to the thicker coating application onto the glass during manufacture at the float glass plant.

In comparison, the sputter coatings such as OptEma™ are applied at an atomic level which results in thinner coatings of much higher clarity and efficiency.

Please refer to accompanying Table 1.1 where we list performance data showing both surface #2 and #3 performance for many commonly available coatings with our recommendations.

Note: With the highly efficient and high clarity single silver sputter coatings, such as the OptEma™ range, the performance variance between #2 and #3 almost disappears.

Table 1. Performance Data comparisons from surface #2 and #3

Climate		Outside Glass Type	Inside Glass Type	Low E Coating Hard (H) or Sputter (S)	Coating Surface	VLT %	VLR % (ext)	U Value	SHGC	Production Label to face outside or inside of the building
Cooling	✓	**6mm Clear**	**6mm Low E on Clear***	**H**	**#3**	**73%**	**17%**	**1.65**	**0.67**	**Outside**
		6mm Low E on Clear*	6mm Clear	H	#2	73%	16%	1.65	0.61	
Cooling	✓	**6mm Clear**	**6mm OptEma™**	**S**	**#3**	**79%**	**12%**	**1.38**	**0.56**	**Outside**
		6mm OptEma™	6mm Clear	S	#2	79%	13%	1.38	0.56	
Mixed	✓	**6mm Green**	**6mm Low E on Clear***	**H**	**#3**	**63%**	**14%**	**1.65**	**0.43**	**Outside**
		6mm Low E on Clear*	6mm Green	H	#2	63%	15%	1.65	0.58	
Mixed	✓	**6mm Low E on Green*****	**6mm Clear**	**H**	**#2**	**63%**	**13%**	**1.65**	**0.41**	**Inside**
		6mm Clear	6mm Low E on Green***	H	#3	63%	16%	1.65	0.64	
Mixed	✓	**6mm Low E Neutral on Clear (i)**	**6mm Clear**	**H**	**#2**	**53%**	**11%**	**1.65**	**0.45**	**Inside**
		6mm Clear	6mm Low E Neutral on Clear (i)	H	#3	53%	16%	1.65	0.63	
Warming	✓	**6mm Grey**	**6mm Low E on Clear***	**H**	**#3**	**34%**	**8%**	**1.65**	**0.40**	**Outside**
		6mm Low E on Clear*	6mm Grey	H	#2	34%	14%	1.65	0.57	
Warming	✓	**6mm Low E on Grey****	**6mm Clear**	**H**	**#2**	**35%**	**8%**	**1.65**	**0.39**	**Inside**
		6mm Clear	6mm Low E on Grey**	H	#3	35%	16%	1.65	0.57	
Warming	✓	**6mm CoolRay® 70**	**6mm Clear**	**S**	**#2**	**70%**	**13%**	**1.35**	**0.33**	**Inside**
		6mm Clear	6mm CoolRay® 70	S	#3	70%	15%	1.35	0.43	
Warming	✓	**6mm Grey**	**6mm CoolRay® 70**	**S**	**#3**	**34%**	**7%**	**1.35**	**0.25**	**Outside**
		6mm CoolRay® 70	6mm Grey	S	#2	34%	11%	1.35	0.32	

Key for Table 1.1

✓	SOLOS Glass Recommendations
*	Low E on Clear includes KlymetShield® | EnergyTech™ Low E Coatings
**	Low E on Grey includes KlymetShield® | EnergyTech™ Low E Coatings
***	Low E on Green includes KlymetShield® | EnergyTech™ Low E Coatings
(i)	Low E on Neutral includes KlymetShield® Neutral | SolTech™ Low E Coatings

Summary: swapping the Low E coating between #2 and #3

- VLT and Insulation U Values are not affected.
- Solar Control (SHGC) levels will change. In warmer climates to maximize SHGC values, we recommend placing the more radiant heat absorbing glass type to the outside of the building. In most cases this will be the darkest of the two glass panels.
- Visible Light Reflectance and Reflected colour values are swapped from external values to internal values.