03

reflective and low-E coated glass

6mm Stopsol Classic Grey toughened – McLay Industries.

Tinted glass controls the transmittance of heat and light by absorbing solar energy to a moderate degree. Where greater solar and thermal control is required, **reflective and low-E glass** can be used. Reflective glass absorbs and reflects a major proportion of the sun's direct heat energy more effectively than standard tinted glass. The mirror like appearance of reflective glass is achieved through the application of a metallic coating during or after glass manufacture. Where less reflectiveness is desired with both solar and thermal control and high visible light transmittance, a combination of neutral or tinted glass with an integral Low-E coating is available. Durable pyrolytic coated products such as **Sunergy®** provide superior climate control to standard tinted and some reflective products.

manufacturing methods

pyrolytic - on line coating/hard coat

A coating is applied during glass manufacture. The coating is fused into the glass at 1200˚C. The advantage of this product is its durability. It can be handled like a standard square of glass. It is ready to be cut, heat strengthened, toughened, laminated and bent. This product is sometimes called a 'hard coat' reflective.

vacuum coated glass - off line/sputter/soft coating

This process involves the deposition of metal particles onto the glass surface by a chain reaction in a vacuum vessel or chamber. It is sometimes called a 'soft coat' because the coating is more susceptible to damage than a hard coat glass when glazed in monolithic form. Where tempering is required, most coatings must be tempered first and then coated.

Vacuum coated glass is available in laminated form with the coating on the inside to protect it from damage. With exceptions, vacuum coated products generally have better SHGC's (reflective glass) and lower 'U' values (low-E glass) than pyrolytic products.

glass performance diagram definitions

- **SHGC** = Solar heat gain co-efficient;
- **U-value** = Thermal insulation properties expressed in watts x m^2 per degree Celsius;
- **VLT** = % Visible light transmittance;
- **VLR** = % Visible light reflectance.

primary function

reflective and low-E glass

Solar control – The energy emitted from our Sun is referred to as solar energy or radiation. Solar control with reflective and low-E coated glass in this text makes reference to there ability to control or reduce the sun's direct heat energy through the glass. Solar control also refers to the ability of a glass to reduce visible light and UV transmittance. Both reflective and low-E coated glass perform a solar control function by limiting to various degrees the transmittance of direct heat energy, visible light and UV transmission.

See also "Solar Heat Gain Co-efficient (SHGC)".

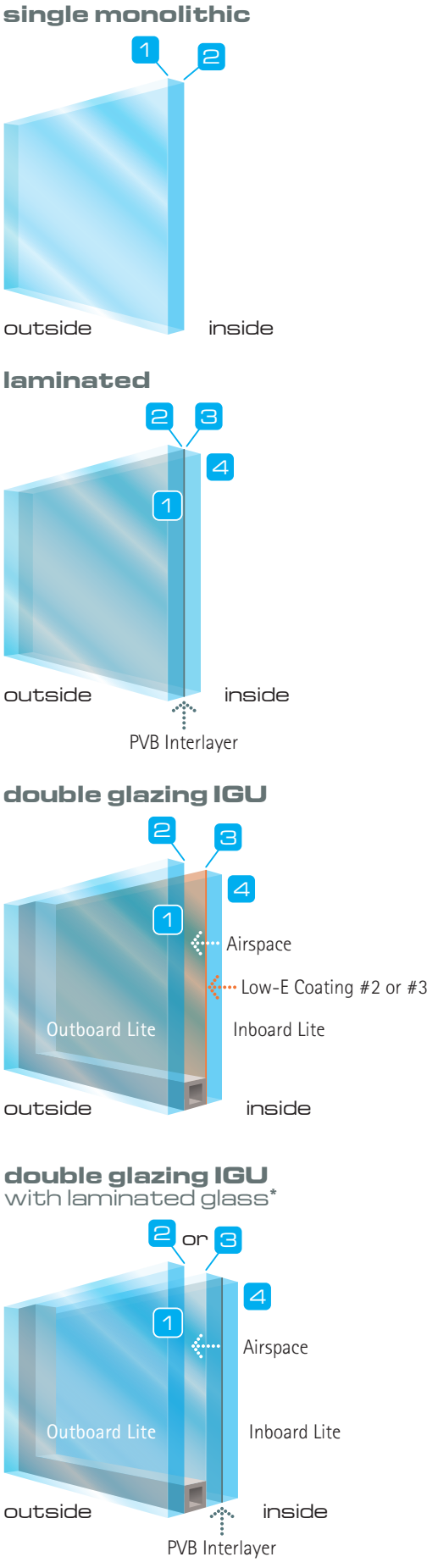
low-E glass

Thermal control – The Sun's direct transmission on the glass is not the only way in which heat is transferred. Heat is also transferred by method of re-radiation, conduction and convection. Thermal control refers to the ability of a glazing to resist heat transfer through these three methods. (Similar to the functional performance of batt or insulation foil for walls and ceilings).

Adding an additional pane of glass (IGU) and modifying the surface of the glass with a low-E coating will improve the insulation properties of the glass when compared to ordinary non coated glass. These thermal or insulation improvements work day and night in both summer and winter conditions, reducing heat entry and heat loss. Only low-E coated glass and IGU's can provide improved thermal control.

See also "U-value".

diagram 3.1:
glass surface positions



**Laminated glass can also be glazed as the outboard lite.*

design and glazing notes

- **Thermal breakage** – All reflective & low-E coated glass absorb and reflect a greater amount of heat than ordinary clear glass and therefore are more prone to thermal breakage. Ask our technical department for a free thermal assessment. Toughening or heat strengthening will prevent these breakages;

  For more information refer pages 135-136.

- **Glass edges** – Before glazing, annealed glass edges must be 'good' straight and clean cut with minimal defects. Reflective, vacuum coated low-E laminated and pyrolytic low-E laminated glass made up with tinted PVB's or body tinted lites should have flat ground edges on all sides as a minimum. Under no circumstances should reflective glass be glazed with damaged edges;

- **Cleaning** – Under no circumstances can abrasive cleaner be used on any surface;

  See "Cleaning Instructions" pages 26 and 139.

- **Spandrel panels** – Must always be heat strengthened;

- **Coating position: Reflective** – Some building authorities/ local councils set limits on glass reflectivity. Most monolithic (non laminated) applications should be glazed with the reflective surface to the inside or surface position #2. This will only marginally decrease performance, but will enhance the colour of the glass avoiding the strong 'mirror' like appearance when viewed from the outside. Laminated pyrolytic reflective coatings are laminated on surface position #2. Laminated vacuum coatings have different surface positions depending on the product. Most coatings are placed on surface position #3 which enhances colour depth when coloured interlayers are used. Products such as TS21, 30, 40 and SS22 with clear interlayers are placed on surface position #2. Reflective surface placement on surface position #1 should be avoided due to the effects of weathering and pollutants and subsequent cleaning difficulties;

  See Diagram 3.1, page 11.

- **Coating position: Low-E**

  See page 19.

- **Vacuum coated glazing** – Avoid use of vacuum coated monolithic reflective in areas subject to contact and/or abrasion (such as entry doors, foyers etc) because of coating susceptibility to damage;

- **Edge deletion: Vacuum coatings** – For IGU's and laminated glass, vacuum coated low-E glass must be edge deleted for proper adhesion and to minimize the chance of corrosion of the coating. Pyrolytic low-E such as Sungate® 500 and Sunergy® do not require edge deletion;

- **Visual distortion** – Toughening and heat strengthening of reflective glass will create some roller wave or visual distortion. It is recommended that a mock-up unit or on-site installation be viewed. Heat strengthening will create less visual distortion than toughening;

- **Read through** – 'Read through' of building structures is less likely where the visible light transmittance of the glass is less than or equal to 14%;

  For more information refer page 50.

- **Colour differences** – Coated glass changes colour when viewed at different times of the day, depending on the weather, surrounding reflections and the angle at which the glass is viewed. With this in mind it is recommended that either a mock-up or on site visit to a completed building is undertaken before a glass choice is made. Vacuum coatings such as TS and SS, when coated on clear glass, would highlight a silver/blue and silvery appearance respectively. When coated on tinted glass or manufactured with a tinted PVB interlayer in laminated glass, the colour of the tint/PVB will be more outstanding.

raked and out of square panels

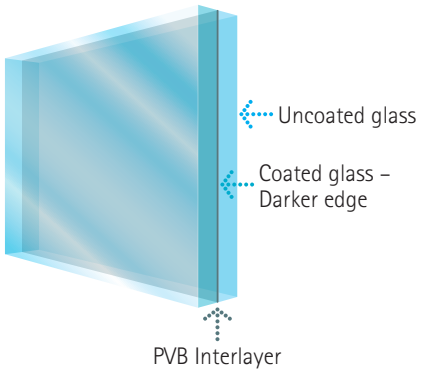
See page 79 for drawing presentation when ordering reflective and low-E glass.

identifying the low-E coating

Suppliers of low-E coated glass to fabricators or installers should have an identification label on the non coated side, stating which side to position the glass in the window or opening. If this label is not present, electronic instruments are available which determine the coated side. Alternatively, by simply running the clean palm of your hand over both surfaces, quickly identifies the coated surface as being more resistant to touch than the non-coated surface.

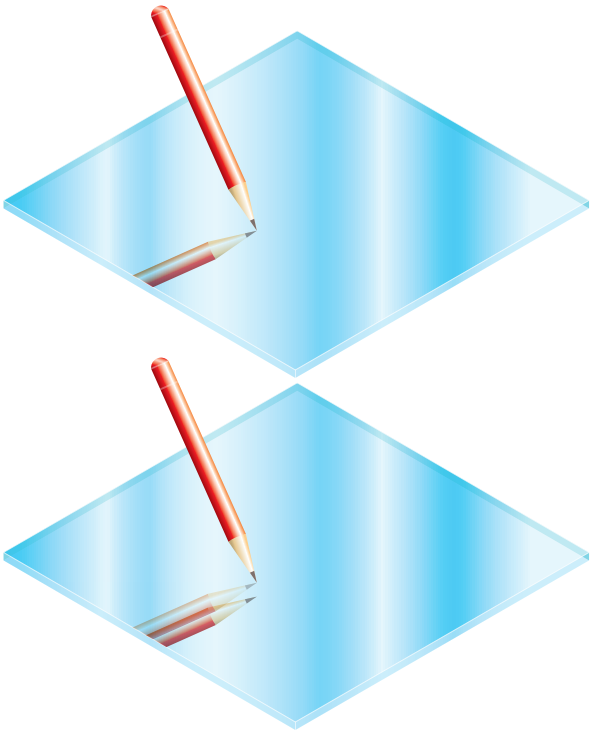
identifying the reflective coating - laminated glass

Subject to certain exceptions, tinted PVB interlayered laminated glass (i.e. 6.38mm SS22 green laminated) has the reflective coating on surface position #3. The effect of the tinted PVB interlayer is to dampen the reflectivity, thus making identification of 'outside' and 'inside' surfaces easier. However, with clear PVB interlayered laminated glass it may be more difficult to determine the coated surface (i.e. 6.38mm TS21 clear laminated). The coated surface can usually be identified by the darker of the two glass edges



identifying the reflective coating - monolithic glass

Reflection of pencil point image meets on coated surface.



Reflection of pencil point image does not meet on uncoated surface.

reflective glass - pyrolytic

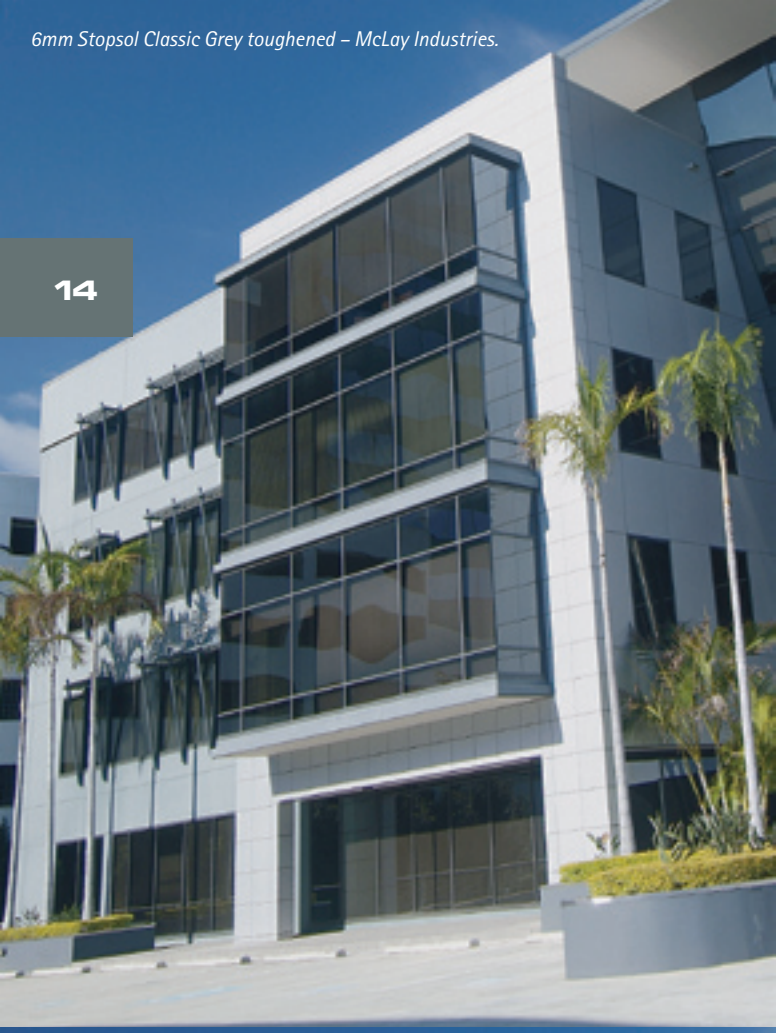
National Glass has available an extensive range of pyrolytic reflective glass products including the Solarcool® and Stopsol® range of products.

All reflective coatings should be glazed to the inside or surface position #2.

features and applications

- Solar control and the reduction of the sun's direct heat energy through the glass;
- Reduces cooling energy costs;
- Reduces glare;
- Improved occupant comfort and employee productivity through greater control of internal environment;
- Coating is more durable than soft coat. The same cleaning procedures as for normal glass can be applied;
- Glass is ready to be toughened or heat strengthened on very short lead times;
- Can be laminated to various required thicknesses;
- Wide range of colours are available including grey, bronze, green and blue to enhance building appearance.

All photos: 6mm Solarcool Azuria toughened – Bradnams Townsville.



6mm Stopsol Classic Grey toughened – McLay Industries.

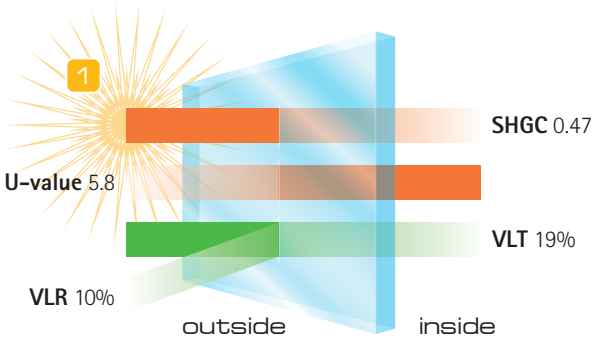
6mm Stopsol Classic Grey toughened – McLay Industries.

grey tint

stopsol® and solarcool™

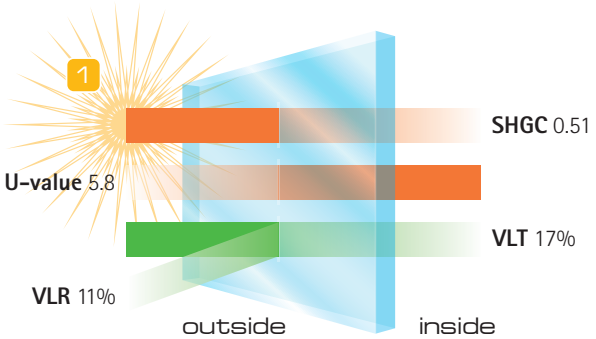
If a grey reflective appearance combined with excellent solar reflective properties is the choice, 6mm **Stopsol® Classic Grey** and **Solarcool™ Grey** is available.

Performance 6mm Stopsol® Classic Grey:



1 Total solar radiation 100% / Total visible light 100%.

Performance 6mm Solarcool™ Grey:



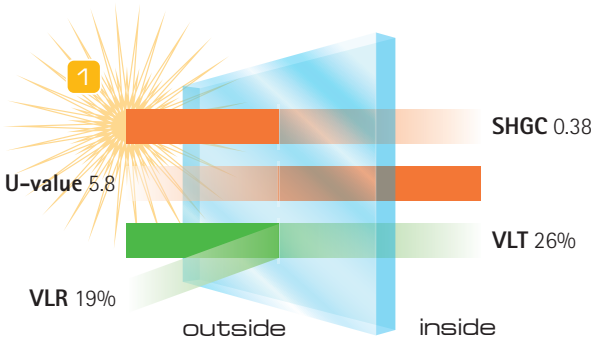
1 Total solar radiation 100% / Total visible light 100%.

green/blue tint

solarcool® azuria™

Solarcool® Azuria™ (formerly known as Solarcool® Azurlite) reflective glass is a visually stunning deep ocean green coloured glass which is made up of Azuria™ glass with the addition of a reflective coating. This pyrolytic product is available in 6mm annealed, toughened and laminated form.

Performance 6mm Solarcool® Azuria™:



1 Total solar radiation 100% / Total visible light 100%.

All photos: 6mm Solarcool Azuria toughened – Bradnams Townsville.

Laminated TS30 on clear – H.E Hughes & P.D.Hessey.

French Green vacuum coated reflective glass in IGU's – photo courtesy of Taiwan Glass.

vacuum coated reflective glass

Vacuum coated reflective glass products generally offer superior performance in terms of reducing heat gain when compared to pyrolytic products. This makes vacuum coated products ideal for commercial glazing where reducing cooling energy costs and ensuring occupant comfort are the priorities. Different coating combinations on clear and tinted glass or with combinations of tinted PVB interlayer in laminated glass, give an array of colour and performance features. These products can also be made up into insulated glass units with Low-E coated glass for even greater energy efficiency performance.

features and applications

- Superior solar control function compared to tinted float and pyrolytic reflective glass;
- Reduces cooling energy costs;
- Reduces glare;
- Improved occupant comfort and employee productivity through greater control of internal environment;
- Coating is durable when laminated or glazed to inside surfaces of IGU's;
- Wide range of colours are available including grey, bronze, green and blue to enhance building appearance.

coating types and definitions

TS

Titanium coating displaying reflected colours ranging from blue to silver to earth tones.

Product coating types	TS20, TS21, TS30, TS40, TS50

SS

Stainless Steel coating displaying neutral silver colours.

Product coating types	SS08, SS14, SS22

SL

Silver coating displaying silver colours.

Product coating types	SL10, SL14, SL20, SL30

The number reference after the coating type (i.e. such as SS08, SS22, TS21 and TS30), refers to the visible light transmittance of the glass. (When a tinted PVB interlayer is used or a tinted glass is coated reducing the visible light transmittance, the number reference is still a guide to visible light transmittance in comparison to the other coated product groups). The higher the number the greater the visible light transmittance. The lower the number, the better the glass is in reducing direct heat gain (i.e. TS21= 21% light transmittance).

performance characteristics

- Vacuum coating type series provides a large range of performance characteristics to suit most design needs;
- The SS08 range offers the lowest SHGC values at the expense of low levels of natural daylight;
- The TS21 and SS22 range have very similar characteristics with excellent heat gain reductions and modest levels of natural daylighting;
- The TS30/40 range offer moderate levels of heat gain reduction with visible light characteristics similar to that of some pyrolytic or hard coat reflectives.

Refer page 142 for performance data.

specifications

- **Maximum sizes** – Up to 2548mm x 3658mm;
- **Minimum size when toughened** – 305mm x 991mm;
- **Thicknesses** – Coatings on 3–19mm substrates;
- **Glass types** – Annealed, toughened, heat strengthened, laminated and IGU's;
- **Coatings types** – All coatings can be applied to clear and tinted glass. Other colour combinations are possible using laminated glass with coloured PVB interlayers. Coatings on tinted glass are generally only available on recently manufactured glass.

low-E coated glass

A **low-E** or **low emissivity** coated glass consists of a microscopically thin, virtually invisible, metal or metal oxide layer deposited on the glass pyrolytically (hard coat) or in a vacuum coater (soft coat). The coating on low-E glass is designed to improve thermal insulation similar to the function performed by roof or batt insulation.

Low-E products, **Sungate® 500** and **Sunergy®** are designed to improve the performance of windows in all climates. They reduce heat transfer by providing lower SHGC and U-value ratings compared to ordinary non-coated glass. Because the coating provides an insulation function similar to the function of roof or batt insulation, they perform day and night year around.

Sungate® 500 is highly transparent and works most efficiently in insulating glass units (IGU's). Sunergy® on the other hand is a new generation glass that combines a tinted glass with an integral low-E coating. Though primarily designed for best use in insulating glass units, single glazed Sunergy® provides superior heat gain reduction (lower SHGC) over many tinted and some reflective glass products and provides greater thermal insulation (lower U-values) than non coated glass.

The glass should always be glazed with the coating to the inside in single glazing and on either surface position #2 or #3 in IGU's to maximize performance.

features and applications

- Transparent coating – A low-E coating consists of a microscopically thin, virtually invisible, metal or metal oxide layer deposited on the glass pyrolytically (hard coat) or in a vacuum coater (soft coat);
- Solar and thermal control whilst allowing higher levels of natural daylight or visible light transmission;
- Helps reduce summer heat gain and winter heat loss through improvements in SHGC and U-values when compared to ordinary non coated glass;
- Reduces heating and cooling energy costs;
- Reduces ultra-violet substantially;
- Improves occupant comfort, reduces condensation build up (with IGU's);
- Coating is low reflecting and durable (hard coat);
- Best performance achieved in double glazed units (IGU's) though in single glazing situations Sunergy® can still provide superior performance and higher thermal insulation to many tinted and some reflective glass products;
- Available annealed, toughened and laminated.

the 'E' in low-E

The '**E**' in low-E refers to **emissivity**. Emissivity is a measure of a material's ability to radiate energy. A material with 'low' emissivity absorbs and radiates infrared energy poorly which is the key factor in reducing heat transfer.

Adding a low-E coating greatly improves the insulation performance by reflecting re-radiated heat back into the room on cold days and back outside on warm days. Re-radiated heat occurs when short wave infrared heat energy (part of the infrared energy spectrum that we normally feel as heat) is absorbed in the interior of the building by carpets, curtains, furniture, walls etc., and is converted into long wave (low energy) infrared heat. The low-E coated glass reflects this long wave heat radiation back into the room on cold days.

See Diagram 3.2.

Conversely, on warm days, short wave infrared heat energy is absorbed by the glass and by objects outside the house such as cars, footpaths, driveways, window sills etc and is converted into long wave infrared heat energy. The low-E coating now works to reflect this energy back outside reducing the overall heat gain through the window.

See Diagram 3.3.

The lower the emissivity of a coating the better the glass performs in reducing heat transfer. A black body is the perfect emitter with a surface emissivity of 1.0. Comparatively, ordinary clear glass has a surface emissivity level of 0.84, meaning 84% of the absorbed heat is emitted through to the colder side.

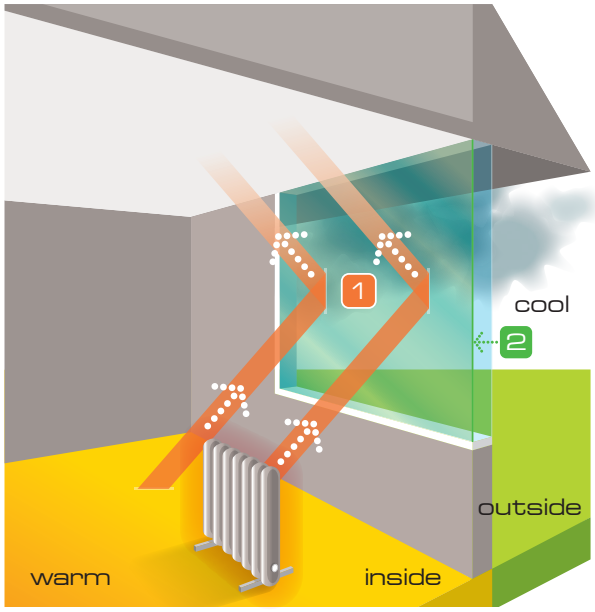
The lower the emissivity number, the less absorbed and re-radiated heat is passed through to the colder side.

See also "IGU" Section 9 and "Climate Control" Section 15.

emissivity levels

Ordinary clear	0.84
Sunergy®	0.28
Sungate® 500	0.20
Vacuum coatings	as low as 0.04

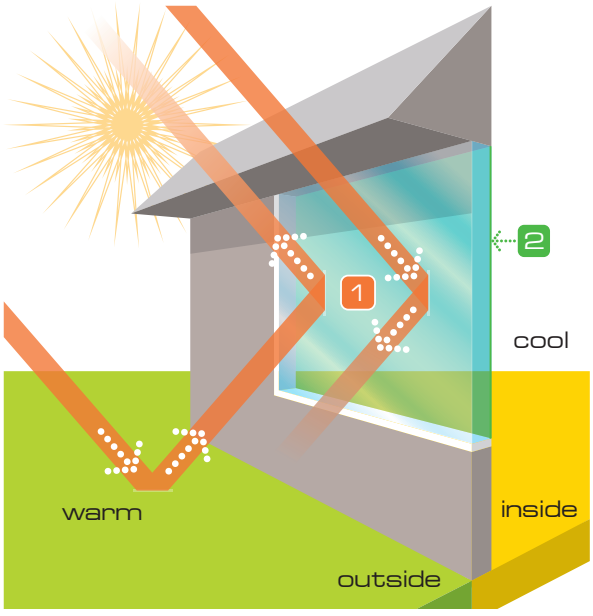
diagram 3.2: how low-E glass works on cold days



1 Typical oil bar heater energy and stored energy being released from floors (this stored energy may passively collect during the day from the sun's direct transmission).

2 The Low-E coating assists in reflecting this heat back inside.

diagram 3.3: how low-E glass works on warm days



1 Sun's direct intensity, short wave infrared heat energy, strikes the glass surface and surroundings converting this energy into long wave (low energy) infrared heat.

2 The Low-E coating assists in rejecting this heat back outside.

glass selection and coating position

single glazed monolithic* low-E

Low-E glass was primarily designed for use in IGU's. However, there has been an increasing demand for use of low-E coated glass such as Sunergy® as single glazing.

Sunergy® is the ideal choice for most Australian climatic conditions providing improved solar and thermal control.

See pages 20 and 36.

Sungate® 500 is best used in laminated form with a body tint glass or tinted PVB to improve solar and thermal control functions where windows have direct unwanted exposure to the sun.

See page 20.

Coating position – See Diagram 3.4.

Improvements of up to 30% in the U-value can be achieved with the low-E coating on surface position #2 for single monolithic *(see Fig 1)* and #4 for laminated glass *(see Fig 3)*. No improvements in U-value are achieved with the low-E coating on surface position #2 or #3 for laminated glass. Low-E coating placement on surface position #1 should be avoided due to effects of weathering and pollutants and subsequent cleaning difficulties.

However, you do get a reduction of direct heat gain through lower SHGC with the coating in any surface position.

***Monolithic:** It refers in this context to a single panel of glass, including laminated glass.

IGU's - insulated glass units

warm climates

Sunergy® is the ideal choice for most Australian climatic conditions providing improved solar and thermal control.

Adding a low-E coating to surface position #2 acts like an additional barrier by further slowing the rate of the heating of the air gap. Having the coating on surface position #3 allows the air gap to be heated more quickly, because the low-E surface position #2 barrier is removed. This reduces the performance of the glazing in terms of heat gain to the interior of the building.

See Diagram 3.4 – Fig 2.

cold climates

Where retention of heat is a priority, the low-E coating on surface position #3 is recommended. In these situations we are relying on the effects of passive solar heat gain to naturally heat the building's interior and the low-E coating to reflect any of the re-radiated heat back into the room. Best product selection would be Sungate® 500 or soft coat single or double layer low-E coating.

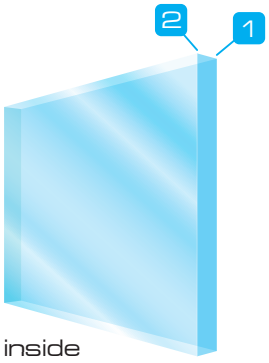
See Diagram 3.4 – Fig 2.

low-E must be air side to improve U-value

Low-E coating placement on surface position #2 or #3 of a laminated pane will not improve the U-value as the coating is now in direct contact with the PVB and the glass *(see Fig 3)*. Any re-radiated heat will now be conducted through PVB, coating and glass. The low-E coating must be air side to improve U-value. However, as previously noted, low-E coatings in any position placement will improve the SHGC.

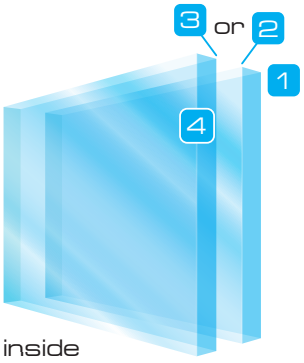
diagram 3.4: low-E coating position

figure 1: single monolithic



Surface position 2 provides for optimum performance.

figure 2: IGU

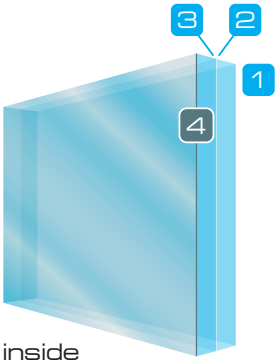


Surface positions 2 or 3 improves U-Value.

Surface position 2 is best for warm climates.

Surface position 3 is best for cold climates.

figure 3: laminated



Surface positions 2 or 3 will not improve U-value.

Surface position 4 provides for optimum performance.

Refrigeration unit.

6mm Sunergy Neutral window glazing

4mm Sunergy Neutral window glazing – Bradnams Toowoomba.

sungate® 500 low-E

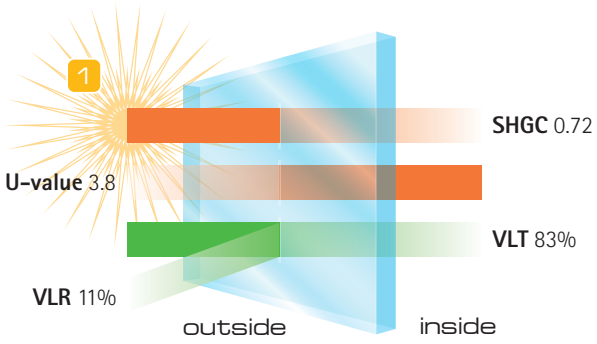
Sungate® 500 is a high transparent (4mm–VLT 83%) pyrolytic coated low-E glass used predominantly in IGU's for residential, commercial and specialist applications such as refrigeration units. The durable hard coat is easy to handle and process and can be laminated with a PVB interlayer.

See page 19 for optimal coating position.

emissivity and conductivity

Surface emissivity	0.20 (0.84 ordinary uncoated glass)
Electrical conductivity	19–22 (OHMS)

performance:
4mm sungate® 500 (#2)



1 Total solar radiation 100% / Total visible light 100%.

sunergy®

Sunergy® glass is a pyrolytic low-E coated tinted glass which combines improved solar control (SHGC) and thermal insulation (U-value). It is also an excellent response to current architectural trends desiring neutrality and low reflection. Sunergy® is available in a range of thicknesses in neutral, green and blue (Azur). 6.38mm laminated Sunergy® is available using a base 3mm Sunergy® Neutral. The base 3mm Sunergy® Neutral can be laminated with other glass products and coloured interlayers to achieve the desired performance and aesthetic.

emissivity levels

Surface emissivity	0.28 (0.84 ordinary uncoated glass)

single glazing

Sunergy®'s durable pyrolytic coating makes it possible to use Sunergy® in single glazing. In this case it is the solar control properties that are the most important function. Maximum performance is achieved with the coating on surface position #2 for single glass and #4 for laminated glass. Surface position #1 should be avoided *(see Diagram 3.4 – Fig 1 and Fig 3).* The U-value or the thermal insulation factor is also improved by up to 30% over ordinary non-coated glazing. Sunergy® Green and Azur offer a higher energy absorption than Sunergy® Neutral or normal glass. To avoid breakage as a result of thermal stress, we recommend that a thermal stress assessment be completed.

double glazing

When using Sunergy® in IGU's both the solar control and insulating properties improve dramatically. The U-value or thermal insulation factor is improved by up to 30% over standard double glazing and over 60%* compared to non coated single glazing. Achieving a lower U-value rating results in important energy savings for both winter and summer conditions.

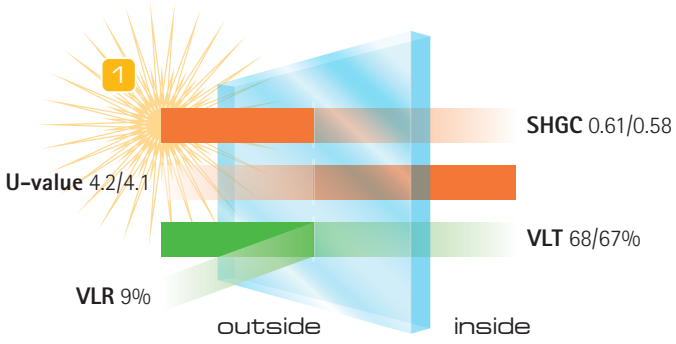
**Argon filled IGU.*

sunergy® neutral

Sunergy® Neutral is a pyrolytic coated glass with excellent performance properties and high thermal insulation. The glass displays a light grey hue in appearance. Sunergy® Neutral is available in annealed, toughened and laminated form in 4/6/10mm and 6.38mm. Should always be glazed with the coating in position #2 and #4 for laminated.

Performance 4mm/6.38mm Sunergy® Neutral:

6.38 made up of : 1 @ 3mm clear/1 @ 0.38mm clr PVB/1 @ 3mm Sunergy® Neutral #4.



1 Total solar radiation 100% / Total visible light 100%.

visual characteristics - low-E glass

Sungate® 500, Sunergy® and other low-E coated products in certain lighting conditions may display slight visual distinctions when compared to ordinary non coated glass. This is an inherent characteristic of the low-E coating and indicates the functional properties of the glass. We recommend samples be viewed under both natural and artificial lighting conditions for product acceptance.

10.38mm Sunergy Neutral laminated – Bradnams Commercial.

Colour differences – 4mm thicknesses for all glass.

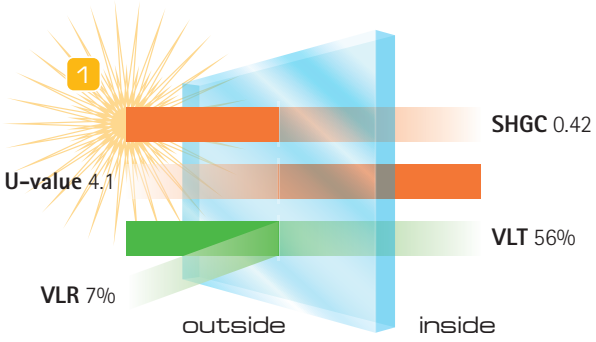
All photos: 6/8mm Sunergy Green – Bradnams Pialba.

sunergy® green

Sunergy® Green is a durable pyrolytic coating on a green tinted float glass. The excellent solar control performance and extremely high light transmission makes this product an ideal energy efficient glass. Standard thicknesses available is 6mm.

See page 19 for optimal coating position.

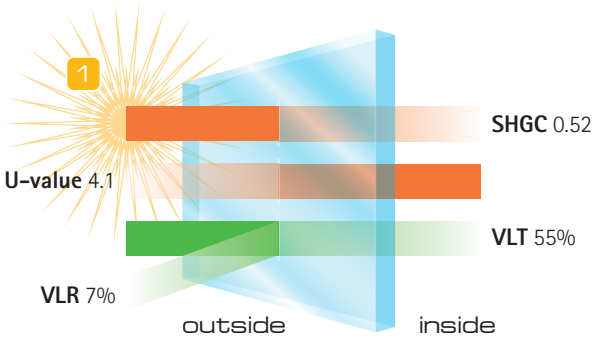
Performance 6mm Sunergy® Green:



1 Total solar radiation 100% / Total visible light 100%.

Performance 6.38mm Sunergy® Green PVB:

Made up of : 1 @ 3mm clear/1 @ 0.38mm green PVB/1 @ 3mm Sunergy® Neutral #4. This make-up uses a green PVB interlayer rather than the 6mm Sunergy® Green.



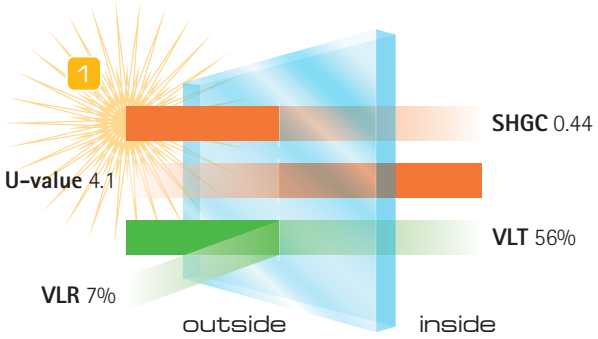
1 Total solar radiation 100% / Total visible light 100%.

sunergy® azur

Sunergy® Azur is a durable pyrolytic coating on a blue tinted float glass providing superior solar and thermal control. Standard thicknesses available is 6mm.

See page 19 for optimal coating position.

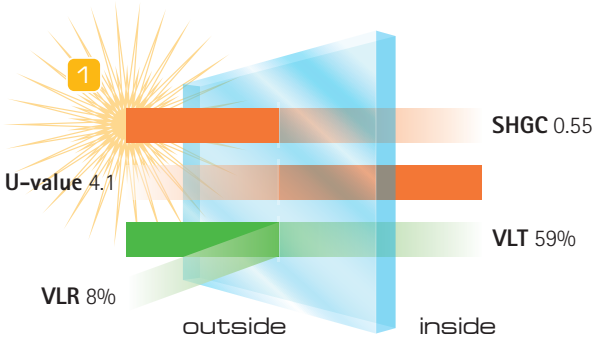
Performance 6mm Sunergy® Azur (Blue):



1 Total solar radiation 100% / Total visible light 100%.

Performance 6.38mm Sunergy® Blue PVB:

Made up of : 1 @ 3mm clear/1 @ 0.38mm cool blue PVB/1 @ 3mm Sunergy® Neutral #4. This make-up uses a cool blue PVB interlayer rather than the 6mm Sunergy® Azur.



1 Total solar radiation 100% / Total visible light 100%.

6mm Sunergy Azur toughened – Bradnam's Windows & Doors Brisbane.

6mm Sunergy Azur toughened – AQF Windows and Doors.

solarflex low-E coated - vacuum coated

Using state of the art vacuum sputtering coating technology, the **Solarflex** low-E coated glass series of products provide superior solar heat gain co-efficient (SHGC), improved U-values with high visible light transmittance when compared to many clear, tinted, pyrolytic reflective and low-E coated glass. Different combinations in IGU's create energy efficient spectrally selective glazings.

Solarflex low-E coatings filter out the heat producing components of the sun's energy, whilst still allowing for a high level of natural daylight or visible light transmittance. This feature produces the opportunity to design superior energy efficient building glazings which in turn reduces cooling, heating and lighting costs.

Coatings are almost neutral in colour, have lower levels of external reflectivity and can be applied to clear and body tinted substrates.

Available in IGU's only.

See page 19, Diagram 3.4 – Fig 2 for optimal coating position.
See also "Visual Characteristics – Low-E Coated Glass" page 21.

features and applications

- Superior solar and thermal control whilst not sacrificing natural daylight;
- Reduces unwanted heat gain and glare;
- Reduces cooling and heating energy costs;
- Reduces lighting costs;
- Improved occupant comfort and employee productivity through greater control of internal environment;
- Coating is durable when glazed to inside surfaces of IGU's;
- Wide range of colours are available including grey, bronze, green and blue to enhance building appearance.

specifications

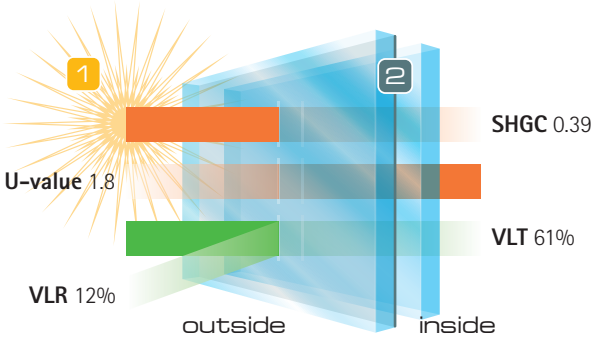
- **Maximum sizes** – Up to 2540mm x 3658mm;
- **Maximum IGU size** – 2438mm X 3500mm;
- **Minimum size when toughened** – 305mm x 991mm;
- **Thicknesses** – Coatings on 3–19mm substrates;
- **Glass types** – Toughened, heat strengthened, laminated in IGU's only;
- **Coatings types** – All coatings can be applied to clear and body tinted glass. Coatings on tinted glass are generally only available on recently manufactured glass.

emissivity

Surface emissivity	0.04–0.11 (0.84 ordinary uncoated glass)

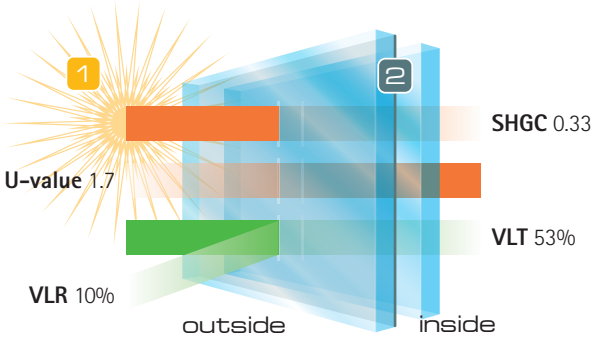
solarflex coating types and performance

SLE single low-E
on 6mm green IGU



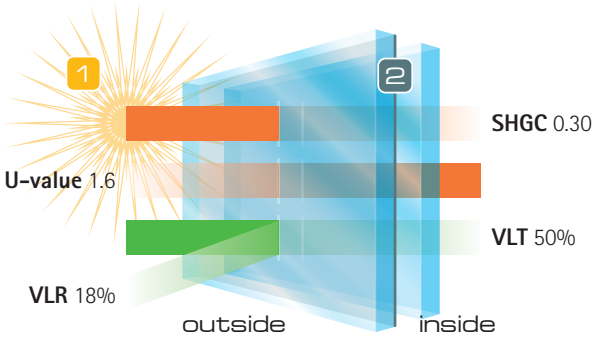
1 Total solar radiation 100% / Total visible light 100%.
2 Low-E on surface position #2.

DLE double low-E
on 6mm green IGU



1 Total solar radiation 100% / Total visible light 100%.
2 Low-E on surface position #2.

TLE62 Ti-based low-E
on 6mm green IGU



1 Total solar radiation 100% / Total visible light 100%.
2 Low-E on surface position #2.

See performance data page 152.

All photos: Toughened and heat strengthened Solarflex SLE single low-E on green IGU's.

general handling, cleaning and protection

Reflective and **low-E** coatings are generally more difficult to clean than ordinary non-coated glass. Running the clean palm of your hand across the surfaces of the glass will indicate that the coated side is more resistant or less smooth than the non-coated side. Therefore some caution should be applied with regards to processing, handling, cleaning and protection of the glass. Listed below are some specific do's and don'ts.

general

don't → Apply protective films to any coated surface mark or label the coated surface. There are some spray on films compatible with this type of glass.

delivery and storage

do → Make sure the glass is always supported, protect from knocks, abrasions and excessive pressure – especially on edges;

→ Keep surface dry, clean and interleaved.

don't → Store in direct sunlight or unventilated places.

cutting

do → Glass to be cut on clean vacuumed workbench coated side up.

handling

do → Handle glass manually, or with clean, oil free vacuum pads.

don't → Use gloves or vacuum pads which are dirty or contaminated.

cleaning

do → Clean panels as soon as possible after installation, especially if there is a risk of leaching, run-off or splattering from other building or on-site materials;

→ Use only soft, clean cloth, free from grit with a mild soap or detergent and water or recommended glass cleaner solution. Dry off excess water.

don't → Use abrasive cleaning.

installation

do → Take care not to damage the coating when fitting into frame, or with glazing tools, sealant guns etc., or by leaning materials against the coated surface;

→ Glaze with coated surface to the inside unless specified otherwise;

→ Remove excess lubricants immediately and check regularly for reappearance;

→ Clean up splashes from plaster, mortar or concrete before they harden;

→ Minimise damage by hanging protective guarding over (but not touching) glazed panels once completed.

don't → Glaze panels with damaged edges;

→ Use glass with vented or severely damaged edges;

→ Glaze with coating exposed to weather.

additional sunergy® cleaning instructions

general cleaning

Use only soft, clean cloth, free from grit with a mild soap or detergent and water or recommended glass cleaner solution. Dry off excess water.

metal traces

The Sunergy® coating is very hard and is not as smooth as the non-coated side (try running your hand across both surfaces). When it comes in contact with a metallic object, the object leaves a "scratch" on the coating, which is in fact not a scratch, but a small quantity of metal deposited into the crystals of the coating. By wiping it with a rag made humid by Hydrochloric Acid (1%) and water (99%), you can dissolve the iron, coming from the metallic object, and therefore strongly reduce and/or make the scratch disappear. This cleaning process is very efficient, and not dangerous for the coating or the glass. Only the concerned area should be treated, and rinsed with clear water.

Caution must be taken to avoid Hydrochloric Acid, coming in contact, with sealants & frame parts. Hydrochloric Acid will not remove real scratches in a glass surface. Please note that the reference is to Hydrochloric Acid (HCL) and not Hydro-Fluoric Acid (HF). Hydro-Fluoric Acid (HF) is **absolutely forbidden**, and if used would destroy the glass, the coating, etc.

Hydrochloric Acid should be handled to manufacturer's specifications.

plastic traces

For traces of plastic, it is possible to use Acetone, or Isopropylic Alcohol, or MEK, or other solvents (same precautions as with HCL).

All photos: 6mm green Sunergy toughened – Bradnams Toowoomba.