



NATIONAL GLASS  
DISTRIBUTION

Glass Portfolio

Professional Advice | Dependable Quality

## Company History

The founder's original ethos of quality, truth and personal growth, bolstered by a good dose of energy, pervades the organisation.



Glass



Aluminium



Extrusions



Flyscreens



Machines

In the year...

- '95 National Glass Distribution was founded by Anthony Adler with the first order being delivered on a garden trailer.
- '98 Distribution branches established in most major South African cities.
- '00 Manufacturing was added with the establishment of a resin laminated safety glass plant and installation of European polishing and bevelling machines.
- '04 The first PVB laminated safety glass plant was established.
- '07 Double glazed (SIG) plant commissioned, which introduced "warm edge" technology to the South African market for the first time.
- '08 Agencies for glass and aluminium processing machinery were garnered.
- '12 Tamglass tempering furnaces were installed in Cape Town & Johannesburg producing SABS certified safety glass.
- '15 SABS approved automotive safety glass production started mainly for the bus industry.
- '16 National Glass Distribution has the most SAGI graduates in SA and has AAAMSA approved SAFIERA thermal simulators.

## Locations



### Branches

Johannesburg | Pretoria | Cape Town | Port Elizabeth | George  
East London | Nelspruit



### Exports



NATIONAL GLASS  
DISTRIBUTION



## • GLASS

Float | Mirror | Laminated | Toughened  
High Performance | Insulated | Processed

## • ALUMINIUM

Doors | Windows | Showers | Eco-Fly Screens  
Security Barriers | Louvres | Extrusions

## • MACHINES

Dewey Glass Processing  
Yuefeng Aluminium  
Waterjet SA Cutters

## Two Decades Industry Experience

### COMPANY OVERVIEW

National Glass Distribution is led by founder Anthony Adler. Established in 1995 the Group offers two decades of industry experience in the South African Glass and Aluminium industry.

The company with a culture of quality at its heart is driven by an energetic and dynamic management team led by Belinda Louw, Francois Viljoen, Gary Martin, Nic Kruger and Alwyn Gouws.

A team of in-house industry professionals made up of SAFIERA accredited simulators and SAGI Competent Persons (Cat 1) and (Cat 2) provide expert advice from initial design to final delivery.

**Eagle Aluminium** forms part of the National Glass product mix which offers an extensive selection of residential and commercial windows, doors, showers and Eco-Fly Screens.





# NATIONAL GLASS

D I S T R I B U T I O N



Photographs used are for illustration purposes only

## 1 of 9 in South Africa

### Nic Kruger

#### Competent Person (Glazing) Cat 1

Nic Kruger, National Sales & Marketing Manager, has been awarded **Competent Person Glazing (Cat 1)** status by the South African Glass Institute.

*He joins an elite group of industry leaders, being only the **2nd person to achieve this in 12 years.***

Competent Persons Glazing (Cat 2) can deviate from deemed to satisfy tables in SANS 10400-N using a rational design from wind loading charts found in SANS 10137.

A special application of glass such as, but not limited to, underwater viewing panels, glass floors, glass balustrades, stair treads, frameless entrances and bolted assemblies require the written approval of a Competent Person Glazing (Cat 1). Such written approval shall be included with the glazing certificate issued to the building inspector for the relevant contract.

National Glass has built a formidable advisory of **SAGI graduates** comprising of a **Competent Person Glazing (Cat 1)** and numerous **(Cat 2)** as well as a team of qualified **SAFIERA thermal simulators**.

They are able to assist in optimizing your glass and aluminium requirements to achieve the most cost effective solutions.

**Nic Kruger**  
MSAGI - CPG1



|           |                                                           |    |  |
|-----------|-----------------------------------------------------------|----|--|
| <b>01</b> | <b>CUSTOMER ZONE</b>                                      |    |  |
|           | Orders & Quotes                                           | 1  |  |
|           | Portal & Payment Methods                                  | 1  |  |
|           | Customer Feedback                                         | 1  |  |
|           | Leadership Contacts                                       | 1  |  |
| <b>02</b> | <b>PRODUCT RANGE</b>                                      |    |  |
|           | Laminated Safety                                          | 2  |  |
|           | Tinted PVB Laminates                                      | 3  |  |
|           | SolarVue™                                                 | 3  |  |
|           | SolarShield®                                              | 3  |  |
|           | Low E                                                     | 4  |  |
|           | Acoustic                                                  | 4  |  |
|           | Toughened                                                 | 5  |  |
|           | Obscure                                                   | 5  |  |
|           | Mirror                                                    | 5  |  |
|           | Bullet Resistant - BRG                                    | 5  |  |
|           | Fire Rated                                                | 5  |  |
|           | Double Glazing - SIG Units                                | 6  |  |
| <b>07</b> | <b>PRODUCT KNOWLEDGE</b>                                  |    |  |
|           | Visible Light Transmission                                | 7  |  |
|           | Visible Light Reflection                                  | 7  |  |
|           | Solar Energy                                              | 7  |  |
|           | Direct Solar Energy Transmission                          | 7  |  |
|           | Solar Energy Reflectance                                  | 7  |  |
|           | Total Solar Energy Transmission                           | 7  |  |
|           | Total Solar Energy Elimination                            | 7  |  |
|           | Shading Coefficient                                       | 7  |  |
|           | Solar Heat Gain Coefficient                               | 7  |  |
|           | U-Value                                                   | 7  |  |
|           | Ultra Violet Elimination                                  | 7  |  |
|           | IGDB                                                      | 7  |  |
|           | ISO Damaged Weighted Transmittance                        | 7  |  |
|           | Sound Reduction                                           | 7  |  |
|           | Performance Data                                          |    |  |
|           | • Standard Laminated Glass Sheet Sizes                    | 8  |  |
|           | • Standard Sheet Sizes                                    | 9  |  |
| <b>10</b> | <b>PERFORMANCE DATA SPECIFICATIONS</b>                    |    |  |
|           | Single Glazed                                             | 10 |  |
|           | • Tinted Laminates                                        | 11 |  |
|           | • Tinted Laminates Low E                                  | 11 |  |
|           | • Translucent Laminates                                   | 11 |  |
|           | • SolarVue™                                               | 12 |  |
|           | • SolarVue™ Low E                                         | 12 |  |
|           | • SolarShield®                                            | 13 |  |
|           | • SolarShield® Low E                                      | 14 |  |
|           | • National Glass                                          | 15 |  |
|           | SAGDB                                                     | 16 |  |
|           | Double Glazed                                             |    |  |
|           | • Tinted Laminates Air-Gap PVB Clear                      | 17 |  |
|           | • Tinted Laminates Air-Gap PVB Clear Low E                | 17 |  |
|           | • Translucent Laminates Air-Gap PVB Clear                 | 18 |  |
|           | • Translucent Laminates Air-Gap PVB Clear Low E           | 18 |  |
|           | • SolarVue™ Air-Gap PVB Clear                             | 19 |  |
|           | • SolarVue™ Air-Gap PVB Clear Low E                       | 19 |  |
|           | • SolarShield® Air-Gap PVB Clear                          | 20 |  |
|           | • SolarShield® Air-Gap PVB Clear Low E                    | 21 |  |
|           | • National Glass                                          | 22 |  |
| <b>23</b> | <b>REGULATIONS</b>                                        |    |  |
|           | AAAMSA Group                                              | 23 |  |
|           | AAAMSA Visual Inspection Criteria                         | 24 |  |
|           | The Law: National Building Regulations                    | 24 |  |
|           | • SANS 10400-N Glazing                                    | 24 |  |
|           | • SANS 10160: Structural Design                           | 25 |  |
|           | • SANS 10137: Installation of Glazing                     | 25 |  |
|           | • SANS 1414: Specifications of SIG Units                  | 26 |  |
|           | Illustrations                                             | 27 |  |
|           | SANS 10400-N Safety Glass Requirements                    | 28 |  |
|           | Glazing Tables                                            | 29 |  |
|           | Building Classifications                                  | 30 |  |
| <b>32</b> | <b>ENERGY EFFICIENCY</b>                                  |    |  |
|           | What to look for in energy efficient products             | 32 |  |
|           | Simulated Complete Fenestration Product                   |    |  |
|           | Performance Values                                        | 33 |  |
| <b>34</b> | <b>TECHNICAL</b>                                          |    |  |
|           | Tolerances                                                | 34 |  |
|           | Toughened Glass Guidelines                                | 35 |  |
|           | Coated Glazing Installation Guide                         | 36 |  |
|           | PFG Mirror Care Guidelines                                | 37 |  |
|           | Cleaning Guidelines for Low E Hard Coated Glass           | 38 |  |
|           | Putty Glazing Guidelines                                  | 39 |  |
| <b>40</b> | <b>FORMS</b>                                              |    |  |
|           | Mirror Checklist                                          | 40 |  |
|           | Thermal Stress Evaluation Form                            | 40 |  |
|           | SIG Units                                                 | 41 |  |
|           | Frameless Shopfronts                                      | 41 |  |
|           | Frameless Shower (Standard)                               | 42 |  |
|           | Frameless Shower (Non-Standard)                           | 42 |  |
|           | Balustrade Pre-Testing Checklist                          | 43 |  |
|           | Balustrade Inspection Report                              | 44 |  |
| <b>45</b> | <b>LIGHT TRANSMISSION AND SOLAR HEAT GAIN COEFFICIENT</b> |    |  |
|           | Table                                                     | 45 |  |

## ORDERS | QUOTES



Email:  
orders@natglass.co.za



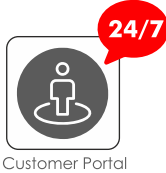
SMS:  
44855



Fax:  
010 591 5660

## PORTAL

Visit <http://portal.natglass.co.za> to activate your profile where you can access:



Statements



Price List



Dispatch List



POD's



Quotes

## PAYMENT METHODS

We accept the following payment methods:



SnapScan



EFT



Credit Card



Credit Acc

## DEPARTMENT EMAIL ADDRESSES

Orders orders@natglass.co.za

Accounts debtors@natglass.co.za

## CUSTOMER FEEDBACK

Should our product not meet your expectations, please contact [info@natglass.co.za](mailto:info@natglass.co.za) and attach our customer call logging sheet available from <http://portal.natglass.co.za>

## LEADERSHIP CONTACTS

If you are not receiving the service you deserve, please contact:



### BELINDA LOUW

Executive Director

+27 83 656 7755

[blouw@natglass.co.za](mailto:blouw@natglass.co.za)



### FRANCOIS VILJOEN

Executive Director

+27 83 651 6859

[fviljoen@natglass.co.za](mailto:fviljoen@natglass.co.za)



### NIC KRUGER

National Sales & Marketing Manager

+27 83 225 9924

[nkruger@natglass.co.za](mailto:nkruger@natglass.co.za)



### ALWYN GOUWS

National Operations Manager

+27 83 651 5288

[agouws@natglass.co.za](mailto:agouws@natglass.co.za)



## LAMINATED SAFETY GLASS

### THE BENEFITS OF LAMINATED GLASS

PVB (Polyvinyl Butyral) laminated safety glass makes it significantly more difficult for criminals to break through. It also prevents a simple fall against a large window from turning into a tragic accident. In addition to these well-proven safety and security benefits, laminated safety glass blocks noise and harmful UV radiation.

#### ■ Performance Ratings

Laminated glass is available in three performance variations:

- Normal Strength (NS) for human impact safety (1 x 0.38mm PVB Interlayer)
- High Penetration Resistant (HPR) for additional security (2 x 0.38mm PVB Interlayers)
- High Impact (HI) for security in high-risk applications (4 x 0.38mm PVB Interlayers)

### THE BENEFITS OF LAMINATED SAFETY GLASS

#### ■ Safety

The toughness and resilience of laminated glass makes it an excellent safety glazing material. In vertical or sloped applications, laminated glass can resist penetration from impact. If the glass is broken, fragments will adhere to the PVB interlayer, reducing the risk of personal injury and property damage.

All 0.38mm and 0.76mm National Glass Distribution PVB, carries the SANS 1263 – 1:2013 mark. This standard requires that a 45kg swing bag is dropped through a pendulum arc from a height of 450mm and strikes the centre of the test pane with an impact force of 203 Joule. The impact of the swing bag should not rupture the vinyl interlayer to allow 75mm sphere to pass through it.

#### ■ Security

Laminated glass offers greater protection for people and properties over other glass products. The standard two-ply construction provides resistance to penetration when subjected to attempted forced entry. In multiple configurations, laminated glass can even resist bullets, heavy objects, or small explosions.

#### ■ Security Resistance

As per SANS 1263 – 2:2007, our 1.52mm High Impact Laminated glass is tested by repeatedly dropping a 225g steel ball from a height of 9m. The impact of each drop is approximately the same as a blow from a hammer. The table shows the number of blows required to penetrate the glass.

| Laminate strength           | Abbreviation | No of blows |
|-----------------------------|--------------|-------------|
| Normal Strength             | NS           | 3           |
| High Penetration Resistance | HPR          | 8           |
| High Impact                 | HI           | 24          |

**NB:** The size of the hole at penetration point is approximately 50mm in diameter. Many more blows are required to gain access.

#### ■ Sound Control

The sound damping performance of the PVB makes laminated glass an effective sound control product. Laminated glass is commonly used in airports, museums, sound studio and schools to reduce unwanted noise from aeroplanes, heavy machinery and traffic, to name a few. National Glass Distribution manufactures Acoustic PVB, using a special 0.76mm sound absorbing acoustic vinyl.

#### ■ Solar Energy Performance

Laminated glass offers unique combinations of clear or tinted interlayers and solar heat reflecting coatings which can serve to reduce the harsh effects of glare and solar radiation. This creates comfortable conditions for the occupants of buildings.

#### ■ Ultraviolet Screening

The ultraviolet (UV) filtering performance of the polyvinyl butyral interlayer helps protect valuable furnishings, displays or merchandise from the fading effects of UV radiation. The ISO Damage Weighted Transmittance (Tdw-ISO) values illustrate the performance of the glass to reduce fading by taking into account the transmittance of both UV and visible light in the wave lengths from 300 to 600 nanometers. An example in the table below shows the comparison between Clear laminated and a PVB Grey Laminated. The reduction of damaging radiation improves by 50%

| Non Coated Product | Tdw-ISO | Coated Product      | Tdw-ISO | % Reduction |
|--------------------|---------|---------------------|---------|-------------|
| PVB Clear          | 65%     | Solarvue Neutral HL | 35%     | 46%         |
| PVB Grey           | 32%     | Solarvue Grey HL    | 19%     | 40%         |
| <b>% Reduction</b> | 50%     |                     | 45%     |             |

#### ■ Natural and Man-made Disasters

Laminated glass can help provide protection from injury and property damage from man-made or natural disasters. By keeping the glass intact within the frame, laminated glass helps reduce injuries from large shards of flying glass caused by, for example hurricanes, earthquakes or other unusual loading on the glass.

## TINTED PVB LAMINATES

Tinted laminated glass products are made from various combinations of clear and tinted glasses and PVB interlayers. Tinted laminates are available in a wide range of colours to meet a variety of aesthetic, glare reduction and solar control demands. Coloured and patterned interlayers can be used individually or in various combinations to create colourful and distinctive glass facades, partitions and interiors.

Because the patterns and colours are encapsulated between layers of glass, Tinted Laminates are easier to keep clean than sandblasted glass, and it does not peel like applied vinyl. Tinted Laminates reduce damaging short-wave ultraviolet radiation and offer additional safety, security and noise control benefits. The lighter tints eliminate some solar energy and are intended for use in glazing areas where safety, glare control and aesthetic qualities are required. The deeper tints improve glare control and provide a higher degree of solar heat elimination.

### ■ Edge Working

The edges of all heat absorbing glass exposed to heat radiation should be polished to reduce the possibility of thermal breakage. The edges must be free of damage such as vents and chips. Please request a Thermal Stress Evaluation for your project before ordering, to identify the risk of any thermal cracking.

## SOLARVUE™

SolarVue™ provides medium solar control and a neutral, low reflective appearance in a range of colours. A thin deposit of nickel and chromium eliminates more than 55% of solar heat, while transmitting more than 45% of visible light. SolarVue™ also eliminates more than 99% of damaging UV radiation.

SolarVue™ is a PVB laminated safety glass marked to SABS 1263-1. SolarVue™ can be custom manufactured to meet various safety, security and noise reduction standards.

### Suggested applications:

- Medium solar energy control
- Glare reduction in buildings
- Glazed partitions and screens

### ■ Coating Densities

- High Light (HL)
- Extra High Light (XHL)

### ■ Coating: Glazing Guide

SolarVue™ is a sided product, meaning that its appearance will vary when viewed from different sides. Care must be exercised when cutting and glazing to ensure a uniform appearance. Stock sheets are labelled by the factory to indicate the coated side. SolarVue™ Neutral is best installed with the coating towards the sun. Tinted SolarVue™ products are normally glazed with the tinted side facing the sun. If optimum light and solar control are required, the coated side should be placed outside

### ■ Environmental Influences

The visual appearance of coated glass is determined not only by the colour of the glass and the coating. It is also influenced by environmental factors such as the solar angle, ambient light level and quality, reflections in the glass and the viewing angle. The nature of coated glass makes it imperative to assess the true colour and reflectance of the proposed product in the context of an existing building, failing which in a full-scale mockup, before a final selection is made. National Glass Distribution architectural solutions specialists are available to assist with project management and technical advice.

### ■ Edge Working

The edges of all heat absorbing glass exposed to heat radiation should be polished to reduce the possibility of thermal breakage. The edges must be free of damage such as vents and chips. Please request a Thermal Stress Evaluation for your project before ordering, to identify the risk of any thermal cracking.

## SOLARSHIELD®

SolarShield® makes it possible to create attractive buildings with highly efficient solar control. The combination of a metallic coating and a clear or tinted PVB (polyvinyl butyral) interlayer is designed primarily to keep out as much of the sun's heat as possible. In addition to reducing solar heat, SolarShield® also limits the amount of light entering the interior and blocks up to 99% of damaging UV radiation. SolarShield® is a laminated safety glass marked to SABS 1263-1.

It can be custom manufactured to meet various safety, security and noise reduction standards. SolarShield® is available in a range of colours and three densities of coating. The numbers S10, S20, S30 refer to the light transmission of the coating, which in turn is directly proportional to the amount of solar heat entering the building. For example, S10 indicates 10% light transmission on coated glass prior to lamination.

### Suggested applications:

- Maximum solar energy control
- Curtain walls External solar screens
- Skylights
- Glare reduction in buildings
- Glazed partitions and screens
- One way vision panels
- Reflective glass for wall cladding
- Decorative safety mirrors
- Lift interiors

### ■ Coating: Glazing Guide

SolarShield® is a sided product, meaning that its appearance will vary when viewed from different sides. Care must be exercised when cutting and glazing to ensure a uniform appearance. Stock sheets are labelled by the factory to indicate the coated side.

SolarShield® Silver is best installed with the coating towards the sun. Tinted SolarShield® products are normally glazed with the tinted side facing the sun. If optimum light and solar control are required, the silver side should be placed outside. For one-way vision, the tinted side must face the observer.

## Environmental Influences

The visual appearance of coated glasses is determined not only by the colour of the glass and the coating. It is also influenced by environmental factors such as the solar angle, ambient light level and quality, reflections in the glass and the viewing angle. The nature of coated glass makes it imperative to assess the true colour and reflectance of the proposed product in the context of an existing building, failing which in a full-scale mock-up, before a final selection is made. National Glass Distribution is available to assist in this process.

## Edge Working

The edges of all heat absorbing glass exposed to heat radiation should be polished to reduce the possibility of thermal breakage. The edges must be free of damage such as vents and chips. Please request a Thermal Stress Evaluation for your project before ordering, to identify the risk of any thermal cracking.

## LOW E GLASS

Low Emissivity (Low E) coated monolithic glass offers superior thermal insulation in standard frames designed for single glazing. Low E products reduce heating and air-conditioning costs by keeping more heat in during winter and blocking it out during summer.

Low E is a clear glass that maximises light transmission, while Solar E has a denser coating that controls solar heat radiation and glare. Both Low E and Solar E are available in laminated and toughened forms. For the ultimate in insulating performance, Low E panels can be used in double glazed units.

## Cleaning and Processing

The coated surface of the Low E Glass highlights finger marks and general dirt. The surface may also highlight any scratches, which would be invisible on a normal glass surface. Please contact National Glass Distribution for cleaning and processing instructions. Low E glass is a sided product, meaning that its appearance may vary when viewed from different sides. Care must be exercised when cutting and glazing to ensure a uniform appearance. In single glazed applications, the coating must always be to the inside of the building.

## Edge Working

The edges of all Low E laminated glass should be polished to reduce the possibility of thermal breakage. Edges must be free of damage such as vents and chips. Please request a Thermal Stress Evaluation for your project before ordering, to identify the risk of any thermal cracking.

## ACOUSTIC LAMINATED GLASS

Acoustic laminated safety glass is manufactured with a special vinyl interlayer that offers better sound control than traditional polyvinyl butyral (PVB) interlayers. The sound control rating of glass is expressed as a weighted sound reduction index (R<sub>w</sub>) measured in decibels (dB). Conventional laminated glass with a single normal strength (NS) vinyl interlayer is rated at 33dB.

A high penetration resistant (HPR) interlayer can improve the rating to 34dB. Acoustic laminated with a 0.76 mm HPR interlayer is rated at 38dB and provides a noticeable improvement in sound reduction. Acoustic laminates also work better at lower temperatures because the Acoustic interlayer retains its sound reducing properties better than traditional PVB interlayers. In addition to a better weighted sound reduction index, Acoustic laminates offer superior dampening across the coincidence dip – a frequency range in which glass of a specific thickness typically becomes more transparent to sound waves.

## Applications

Acoustic laminates can be glazed into standard aluminium, wooden or specialist frames to control noise from a variety of sources, including aircraft, road traffic, music systems, public events, schools and other busy institutions.

## Options and Sizes

Acoustic laminates are available with any of the coloured vinyl interlayers of the tinted laminated glass range. Acoustic laminates can also be manufactured with any SolarVue™ or SolarShield coated products.

Acoustic PVB Sound Transmission Loss

| Thickness (mm) | Product                 | STL (dB) | % Reduction |
|----------------|-------------------------|----------|-------------|
| 4              | Clear                   | 29       | - 40%       |
| 6              | Clear                   | 31       | - 20%       |
| 6.38           | Laminate Clear          | 33       | 0           |
| 6.76           | Acoustic Laminate Clear | 36       | + 30%       |
| 8.38           | Laminate Clear          | 35       | + 20%       |
| 8.76           | Acoustic Laminate Clear | 38       | + 50%       |
| 4/12/4         | SIG                     | 31       | - 20%       |
| 6.38/12/4      | SIG                     | 35       | + 20%       |
| 6.38/12/6.38   | SIG                     | 37       | + 40%       |
| 6.76/12/6.76   | SIG (using 6.76mm)      | 40       | + 70%       |

**NOTE:** % reduction based on 6.38mm benchmark

To put the table values in context, one must bear in mind that every 10dB difference in sound pressure level represents a halving or doubling of the perceived noise. Therefore it can be assumed that every db difference represents approximately 10%.

As 4mm float has an average STL of 29dB, it can be said that 6.76mm Acoustic Laminate is 7dB better i.e. 70%. 8.76mm Acoustic Laminate would be 90% better than 4mm float.

It is important to remember that these acoustic values are very dependent on the frequency of the noise source, and that low frequency noise tends to be structure borne, and is extremely difficult to insulate against. Examples of low frequency noise would be jack hammers, exhaust brakes of trucks, bass music etc. We also need to take into account that certain noise will come through the actual frames of the doors and windows where they

## TOUGHENED SAFETY GLASS

Toughened safety glass is ideal for bolted structural glazing and frameless applications. Superb resistance to thermal stress also allows toughened safety glass to be used in applications such as refrigerator and oven doors, where ordinary annealed glass would be likely to fracture.

Toughened safety glass is available in a range of thicknesses and various colours. Toughened safety glass meets the safety glass requirements of the South African National Building Regulations. Toughened safety glass is up to 5 times stronger than normal monolithic float glass.

**National Glass Distribution** also offers a service in which we will do the deductions and design layouts of your frameless showers once tight sizes are supplied. Frameless shower hardware is also available, and please contact National Glass Distribution for assistance.

### Applications:

- All doors and sidelights, framed or unframed
- Sliding or patio doors
- Glazed panels in doors
- Balcony enclosures
- Shower doors and bath enclosures
- Barriers between different levels
- Low-level glazing
- Balustrades
- Hail resistance
- Kitchen splashbacks
- Where additional strength for wind loading is required
- Where glass is subjected to high thermal stress
- Table tops

## OBSCURE

Obscure patterned glass obscures a view without noticeable loss of natural or artificial light. Obscure glass is available in a range of textures, making it possible to achieve the desired functionality with a decorative effect that complements the aesthetic environment.

### 3 levels of privacy are available:

- A – Low obscurity
- B – Medium obscurity
- C – High obscurity

## MIRROR

National Glass Distribution offers copper-backed mirrors which are in line with global best practices. These mirrors have slightly thicker layers of silver and copper to improve the reflectivity, as well as three layers of special paint to provide protection against the elements, temperature fluctuations, abrasion and UV radiation. This has several advantages, including long lasting tarnish resistance. These mirrors comply with the international standard DIN EN 1036

Mirrors are available in a variety of sizes and thicknesses. Edges may be bevelled and polished to alleviate sharp corners and enhance aesthetics.

Care needs to be taken with the installation of all mirrors. Refer to page 37 for the PFG Mirror Care Guidelines.

## BULLET RESISTANT GLASS

Bullet-resistant glass is a term for glass that is particularly resistant to being penetrated when struck by bullets. Since manufacturing glass of usable thickness capable of fully stopping most bullets cannot currently be done, the industry generally refers to it as bullet-resistant glass instead.

Bullet-resistant glass is usually constructed by using layers of laminated glass. The desired result is a material with an appearance and light-transmitting behaviour of standard glass but offers varying degrees of protection.

Bullet-resistant glass constructed of laminated glass layers is built from glass sheets bonded together with polyvinyl butyral. This type of bullet-resistant glass has been in regular use on combat vehicles since World War II.

The use of interlayers provides impact resistance, such as physical assault with a hammer, an axe, etc. The interlayer provides little in the way of bullet resistance.

The glass, which is much harder than the interlayer, flattens the bullet and thereby prevents penetration. This type of bullet-resistant glass is usually 28-78mm thick and is usually heavy.

| Category | Thickness | Glass Make-Up              | Rating         |
|----------|-----------|----------------------------|----------------|
| GA       | 28mm      | 4 + 10 + 10 + 3*           | 9mm Parabellum |
| GB       | 38mm      | 4 + 10 + 10 + 10 + 3*      | 357 Magnum     |
| GC       | 53mm      | 4 + 12 + 12 + 10 + 10 + 3* | 44 Magnum      |
| RA       | 53mm      | 4 + 12 + 12 + 10 + 10 + 3* | R4 Rifle       |
| RB       | 78mm      | (6 x 12) + 3*              | R1 Rifle       |

**NOTE:** 0.38mm Interlayers

## FIRE RATED GLASS

Available in clear or textured versions, for vision or obscuration respectively, readily available, and easy to handle, stock, cut and glaze Georgian Wired Glass is suitable for use in fire and non-fire applications.

Georgian Wired Cast (Obscure) and Georgian Wired Plate (Clear) both have a 30 Min fire rating.

Should a safety glass application be required, we can laminate the Georgian Wired Plate to a 3mm Clear resulting in a 9.76mm Georgian Wired Plate laminated glass meeting the requirements of SANS 1263 – 1

For a 2 hour fire rating, Pyran S borosilicate glass is available in a 6mm thickness. This can also be toughened for safety glass applications.

It is vital to ensure that the framework also has the same fire rating as the glass. Ceramic setting blocks and glazing tape is also required to ensure that the glass does not fall out the frame.

Bear in mind that the Fire Rated Fenestration products will only contain the fire within the designated area, and will not extinguish the fire like a sprinkler system would.

Unlike sprinklers or other “active” protection systems, fire-rated glass is on duty 24 hours a day. If there is a power failure, a loss of water pressure, or a human error that interferes with the sprinklers working properly, fire-rated glass will not be affected and will continue to perform its function.

## Double Glazing (SIG)

### Sealed Insulated Glass Units

**Sealed Insulated Glass Units (SIG's)** are manufactured from two or more panes of glass held apart by a spacer and bonded with a hermetic seal, trapping dehydrated air between the glass panes.

Their primary function is to improve the thermal insulating properties of a glazing product, as well as contribute to safety, security and acoustics.

The appearance and performance of SIG Units can be modified by incorporating different glass types and thicknesses and altering the width of the spacer bar.

#### The benefits and functions of SIG Units include:

- Improved sound reduction
- Improved security
- Improved resistance to wind-loads
- Improved thermal insulation
- Improved solar energy control
- Minimized condensation

#### A Global Vision

Windows and doors have been targeted as a major energy reduction opportunity in residential and commercial buildings.

Evidence shows that the total amount of thermal emissions can be reduced if SIG Units are used. SIG Units are considered to become a major trend for years to come.

## Warm Edge Spacer

**National Glass Distribution** manufactures SIG Units using flexible spacer bars and promote "Warm Edge Technology", which contributes to energy efficient buildings.

The flexible spacer follows the edge of the glass and is a complete insulating glass spacer system which requires only one start and finish joint. It does not allow heat loss transmission through the spacer bar.

Our spacer performs 8% better than the traditional aluminium spacer.

Warm Edge Spacer



U Value = 0.540

Aluminium Spacer



U Value = 0.588

## PRODUCT TERMINOLOGY

### ■ VISIBLE LIGHT TRANSMISSION

This figure indicates the amount of light that passes through the sample pane of glass.

For example, if the sample pane of glass has a Visible Light Transmission performance figure of 32, it means that if the light source is placed in front of the sample pane of glass, 32% of that light will pass through that pane of glass. Visible light is measured in the 380 to 780 nanometre wavelength range perpendicular to the glass surface.

### ■ VISIBLE LIGHT REFLECTION

This figure indicates the amount of light that is reflected away from the surface of the sample pane of glass.

For example, if the sample pane of glass has a Visible Light Reflection performance figure of 9, it means that of the 100% of light that strikes the surface of the glass, 9% is reflected back towards the light source. As a guide, clear glass has a Visible Light Reflection performance figure of 8. Selection: The lower the figure the better. Consideration must be given to the effect of the light reflected from the glass into the surrounding environment.

### ■ SOLAR ENERGY (HEAT)

Solar Energy (Heat) striking the surface of a pane of glass reacts in three ways: a portion is transmitted through the glass, a portion is reflected away from the glass surface and a portion is absorbed within the glass.

### ■ DIRECT SOLAR ENERGY (HEAT) TRANSMISSION

This figure indicates the amount of Solar Energy (Heat) that is transmitted directly through the sample pane of glass.

For example, if the sample pane of glass has a direct Solar Energy (Heat) Transmission performance figure of 29, it means that of the 100% of solar energy (heat) that strikes the surface of the pane of glass, 29% is transmitted directly through that pane of glass. Selection: The lower the figure, the better the performance

### ■ SOLAR ENERGY (HEAT) REFLECTANCE

This figure indicates the amount of Solar Energy (Heat) that is reflected away from the surface of the sample pane of glass.

For example, if the glass has a Solar Energy (Heat) Reflectance performance figure of 8, it means that of the 100% of Solar Energy (Heat) striking the glass surface, 8% is reflected away from that surface.

### ■ TOTAL SOLAR ENERGY (HEAT) TRANSMISSION

The amount of Solar Energy (Heat) absorbed within the sample pane of glass is re-radiated out through both surfaces of the glass pane. This figure indicates the amount of Direct and Re-radiated Solar Energy (Heat) that is transmitted through the sample pane of glass.

For example, if the sample pane of glass has a Total Solar Energy (Heat) Transmission performance figure of 41, it means that of the 100% of Solar Energy (Heat) that strikes the glass surface, 41% is transmitted through the glass directly or through re-radiation. Selection: The lower the figure, the better the performance.

### ■ TOTAL SOLAR ENERGY (HEAT) ELIMINATION

This is a function of the Total Solar Energy (Heat) Transmission performance figure referred to above.

For example, a Total Solar Energy (Heat) Transmission performance figure of 41 will generate a Total Solar Energy (Heat) Elimination performance figure of 59. Selection: The higher the figure, the better the performance.

### ■ SHADING COEFFICIENT (SC)

This figure is a function of the Total Solar Energy (Heat) transmitted through the sample pane of glass as compared to the Total Solar Energy (Heat) transmitted through a 3mm thick pane of clear glass which has a shading co-efficient of 1.00.

For example, if the sample pane of glass has a shading coefficient of 0.48, it means that the sample pane of glass allows the transmission of 48% of the Total Solar Energy (Heat) that would be transmitted through the 3mm thick pane of glass. Selection: The lower the figure, the better the performance.

### ■ SOLAR HEAT GAIN COEFFICIENT (SHGC)

This is the total solar heat in the wavelength range between 300 and 2500 nanometres that is transmitted through the glass from the exterior to the interior of the building. SHGC is a measure of the direct heat transmittance plus the portion of solar heat that is absorbed by the glass and is re-radiated into the interior of the building.

The lower the SHGC, the better the solar heat elimination is through the glass.

### ■ U-VALUE

This figure indicates the amount of energy (measured in Watts) that is lost through 1m<sup>2</sup> of the sample pane of glass for every degree of temperature difference between the outside and the inside ambient air. Selection: The lower the figure, the better the performance.

### ■ ULTRA VIOLET ELIMINATION

This is the amount of Ultra Violet either absorbed or reflected by the glass.

For example, the UV Elimination on 6mm Clear Float would be ± 17% opposed to > 95% on the 6.38mm Clear PVB Laminated Safety Glass. Selection: The higher the figure, the better the performance.

### ■ ISO DAMAGED WEIGHTED TRANSMITTANCE (T<sub>dw</sub>-ISO)

T<sub>dw</sub>-ISO values illustrate the reduction in fading by taking both Ultraviolet (UV) and visible light wave lengths into account.

### ■ IGDB

A listing of over 4000 glazing components with validated performance specification from listed manufacturers.

### ■ SOUND REDUCTION (R<sub>w</sub>)

A measure of sound insulation of glass based on an average value measured in decibels (dB) taking into account the sound values, frequencies and pitch sensitivity.

## PERFORMANCE DATA

### STANDARD LAMINATED GLASS SHEET SIZES

| SHEET SIZES    |             |            |       |       | TINTED LAMINATES |      |        |      |              |               |                   | SOLARSHIELD |      |        |      |              |        | SOLARVUE   |      |        |      |         |              |
|----------------|-------------|------------|-------|-------|------------------|------|--------|------|--------------|---------------|-------------------|-------------|------|--------|------|--------------|--------|------------|------|--------|------|---------|--------------|
| Thickness (mm) | Length (mm) | Width (mm) | Clear | Low E | Aquamarine       | Blue | Bronze | Grey | Serene Green | Shadowlite 25 | White Translucent | Aquamarine  | Blue | Bronze | Grey | Serene Green | Silver | Aquamarine | Blue | Bronze | Grey | Neutral | Serene Green |
| 4.38           | 1830        | 1550       | MTO   |       |                  |      |        |      |              |               |                   |             |      | N/A    |      |              |        |            |      |        |      |         |              |
| 5.38           | 2000        | 1550       |       |       |                  |      |        |      |              |               |                   |             |      |        |      |              |        |            |      |        |      |         |              |
| 6.38           | 2440        | 1830       |       | N/A   |                  |      | MTO    | MTO  |              | MTO           | MTO               |             |      | MTO    | MTO  |              | MTO    |            |      |        |      | MTO     |              |
|                | 2440        | 2000       |       |       |                  |      | STD    | STD  | N/A          | STD           | STD               |             |      | STD    | STD  | N/A          | STD    |            |      |        |      | STD     | N/A          |
|                | 2440        | 2134       |       |       |                  |      | MTO    | MTO  |              | MTO           | MTO               |             |      | MTO    | MTO  |              | MTO    |            |      |        |      | MTO     |              |
|                | 2700        | 2025       |       |       |                  |      |        |      |              |               |                   |             |      |        |      |              |        |            |      |        |      |         |              |
|                | 3210        | 2250       |       | STD   |                  |      | STD    | STD  | MTO          | STD           | STD               |             |      | STD    | STD  | MTO          | STD    |            |      |        |      | STD     | MTO          |
|                | 3210        | 2440       |       | N/A   |                  |      |        |      |              |               |                   |             |      |        |      |              |        |            |      |        |      |         |              |
|                | 3660        | 2440       |       |       |                  |      | MTO    | MTO  | N/A          |               |                   |             |      |        |      | N/A          |        |            |      |        |      |         | N/A          |
| 8.38           | 3210        | 2250       | STD   | STD   | MTO              | MTO  |        |      | MTO          |               |                   | MTO         | MTO  |        |      | MTO          |        |            |      |        |      |         | MTO          |
|                | 3210        | 2440       |       |       |                  |      | STD    | STD  | MTO          |               |                   | MTO         | MTO  |        |      | MTO          |        |            |      |        |      |         | MTO          |
|                | 3660        | 2440       |       | N/A   |                  |      |        |      | N/A          |               |                   |             |      |        |      | N/A          |        |            |      |        |      |         | N/A          |
| 10.38          | 3210        | 2250       |       | STD   |                  |      |        |      | MTO          | MTO           | MTO               |             |      | MTO    | MTO  | MTO          | MTO    |            |      |        |      | MTO     | MTO          |
|                | 3210        | 2440       |       | N/A   |                  |      |        |      |              |               |                   |             |      | MTO    | MTO  |              |        |            |      |        |      |         |              |
|                | 3660        | 2440       |       |       |                  |      | MTO    | MTO  | N/A          |               |                   |             |      |        |      | N/A          |        |            |      |        |      |         | N/A          |
| 12.38          | 3210        | 2250       |       | STD   |                  |      |        |      | MTO          |               |                   |             |      |        |      | MTO          |        |            |      |        |      |         | MTO          |
|                | 3210        | 2440       |       | N/A   |                  |      |        |      |              |               |                   |             |      |        |      |              |        |            |      |        |      |         |              |
|                | 3660        | 2440       |       |       |                  |      |        |      | N/A          |               |                   |             |      |        |      | N/A          |        |            |      |        |      |         | N/A          |

STD Standard | MTO Made to Order | N/A Not Available

- All the above are also available with multiple vinyls - HPR and HI
- Lead time confirmed on receipt of order
- SolarVue™ range available in HL and XHL
- SolarShield® range available in S10, S20 and S30
- Vanceva range is made to order

#### Vanceva Colour Range:

- Aqua Blue
- Sapphire Blue
- True Blue
- Smoke Grey
- Dark Red
- Ruby Red
- General Rose
- Evening Shadow
- Tangerine
- Cool White
- Golden Light Yellow
- Sahara Sun Yellow

#### Tinted Vinyl Colours:

- Aquamarine
- Blue
- Bronze
- Grey
- Regal Blue
- Shadowlite 10,25,50
- White Translucent

# STANDARD MONOLITHIC SIZES

| FLOAT GLASS    |             |            |       |                |               |             |       |         | MIRROR         |             |            |        |        |      |                |     |     |     |     |
|----------------|-------------|------------|-------|----------------|---------------|-------------|-------|---------|----------------|-------------|------------|--------|--------|------|----------------|-----|-----|-----|-----|
| Thickness (mm) | Length (mm) | Width (mm) | Clear | Non Reflective | Bronze Tinted | Grey Tinted | Low E | Solar E | Thickness (mm) | Length (mm) | Width (mm) | Silver | Bronze | Grey | Venetian Strip |     |     |     |     |
| 2mm            | 1550        | 2000       |       |                |               |             |       |         | 3mm            | 1830        | 1220       |        |        |      |                |     |     |     |     |
|                | 1830        | 900        |       |                |               |             |       |         |                | 2440        | 1830       |        |        |      |                | STD |     |     | N/A |
|                | 1830        | 1070       |       |                |               |             |       |         |                | 2440        | 2134       |        |        |      |                |     |     |     |     |
| 3mm            | 1830        | 1220       |       |                |               |             |       |         | 4mm            | 1830        | 1220       |        | N/A    | N/A  |                |     |     |     |     |
|                | 2000        | 1500       |       |                |               |             |       |         |                |             |            |        |        |      |                | N/A |     | STD |     |
|                | 2000        | 1650       |       |                |               |             |       |         |                | STD         |            |        |        |      |                |     |     |     | MTO |
|                | 3210        | 2250       |       |                |               |             |       |         | 5mm            | 2440        | 2134       |        |        |      |                |     |     |     |     |
|                | 1830        | 900        |       |                |               |             |       |         |                | 3210        | 2250       |        |        |      |                | STD | MTO | MTO |     |
|                | 2440        | 1530       |       |                |               |             |       |         |                |             |            |        |        |      |                |     |     |     |     |
| 4mm            | 2440        | 1830       |       |                | STD           | STD         | N/A   | N/A     | 6mm            | 2440        | 1830       |        |        |      |                |     |     |     |     |
|                | 3210        | 2250       |       |                |               |             |       |         |                |             |            |        |        |      |                | STD | STD |     |     |
|                | 3300        | 2134       |       |                |               |             |       |         |                | N/A         | MTO        |        |        |      |                | MTO |     |     |     |
|                | 3300        | 2140       | N/A   |                |               |             |       |         | 5mm            | 3210        | 2250       |        | N/A    | N/A  | N/A            |     |     |     |     |
|                | 1220        | 900        |       |                |               |             |       |         |                |             |            |        |        |      |                |     |     |     |     |
|                | 2440        | 1830       |       |                |               |             |       |         |                | STD         |            |        |        |      |                | N/A | N/A |     |     |
| 5mm            | 3210        | 2250       | STD   |                | STD           | STD         | N/A   | N/A     | 6mm            | 3210        | 2250       |        |        |      |                |     |     |     |     |
|                | 3300        | 2134       |       |                |               |             |       |         |                | N/A         | MTO        |        |        |      |                | MTO |     |     |     |
|                | 3300        | 2140       |       |                |               |             |       |         |                |             |            |        |        |      |                |     |     |     |     |
|                | 1220        | 900        |       |                | N/A           | N/A         |       |         | 6mm            | 1220        | 900        |        |        |      |                |     |     |     |     |
|                | 2440        | 1830       |       |                |               |             |       |         |                | STD         |            |        |        |      |                | N/A | N/A |     |     |
|                | 3210        | 2250       |       |                |               |             |       |         |                |             |            |        |        |      |                | STD | STD | STD | STD |
| 6mm            | 3210        | 2440       |       |                | N/A           | N/A         | STD   | STD     | 6mm            | 3210        | 2440       |        |        |      |                |     |     |     |     |
|                | 3300        | 2134       |       |                |               |             |       |         |                | N/A         | MTO        |        |        |      |                | MTO |     |     |     |
|                | 3300        | 2140       |       |                |               |             |       |         |                |             |            |        |        |      |                |     |     |     |     |
|                | 3660        | 2440       | STD   | N/A            | N/A           | N/A         |       |         | 6mm            | 3660        | 2440       |        |        |      |                |     |     |     |     |
|                | 3210        | 2250       |       |                |               |             |       |         |                | N/A         | MTO        |        |        |      |                | MTO |     |     |     |
|                | 3210        | 2440       |       |                |               |             |       |         |                | STD         |            |        |        |      |                | STD | STD |     |     |
| 8mm            | 3300        | 2134       | N/A   |                | MTO           | MTO         |       |         | 6mm            | 3300        | 2134       |        |        |      |                |     |     |     |     |
|                | 3300        | 2140       |       |                |               |             |       |         |                |             |            |        |        |      |                |     |     |     |     |
|                | 3660        | 2440       |       |                |               |             |       |         |                | STD         |            |        |        |      |                | N/A | N/A |     |     |
|                | 3210        | 2250       | N/A   |                | MTO           | MTO         |       |         | 6mm            | 3210        | 2250       |        |        |      |                |     |     |     |     |
|                | 3210        | 2440       |       |                |               |             |       |         |                | STD         |            |        |        |      |                | STD | STD |     |     |
|                | 3300        | 2134       |       |                |               |             |       |         |                | N/A         | MTO        |        |        |      |                | MTO |     |     |     |
| 10mm           | 3300        | 2140       | N/A   |                | MTO           | MTO         |       |         | 6mm            | 3300        | 2140       |        |        |      |                |     |     |     |     |
|                | 3660        | 2440       |       |                |               |             |       |         |                | STD         |            |        |        |      |                | N/A | N/A |     |     |
|                | 3210        | 2250       |       |                |               |             |       |         |                | N/A         | MTO        |        |        |      |                | MTO |     |     |     |
|                | 3210        | 2440       | STD   |                | N/A           | N/A         | N/A   | N/A     | 6mm            | 3210        | 2440       |        |        |      |                |     |     |     |     |
|                | 3300        | 2134       |       |                |               |             |       |         |                |             |            |        |        |      |                |     |     |     |     |
|                | 3300        | 2140       |       |                |               |             |       |         |                |             |            |        |        |      |                |     |     |     |     |
| 12mm           | 3660        | 2440       | STD   |                | N/A           | N/A         |       |         | 6mm            | 3660        | 2440       |        |        |      |                |     |     |     |     |
|                | 3210        | 2250       |       |                |               |             |       |         |                | N/A         | MTO        |        |        |      |                | MTO |     |     |     |
|                | 3210        | 2440       |       |                |               |             |       |         |                | STD         |            |        |        |      |                | N/A | N/A |     |     |
|                | 3300        | 2134       | N/A   |                | MTO           | MTO         |       |         | 6mm            | 3300        | 2134       |        |        |      |                |     |     |     |     |
|                | 3300        | 2140       |       |                |               |             |       |         |                |             |            |        |        |      |                |     |     |     |     |
|                | 3660        | 2440       |       |                |               |             |       |         |                | STD         |            |        |        |      |                | N/A | N/A |     |     |
|                | 3300        | 2700       | STD   |                | N/A           | N/A         |       |         | 6mm            | 3300        | 2700       |        |        |      |                |     |     |     |     |
|                |             |            |       |                |               |             |       |         |                |             |            |        |        |      |                |     |     |     |     |
|                |             |            |       |                |               |             |       |         |                |             |            |        |        |      |                |     |     |     |     |

STD Standard | MTO Made to Order | N/A Not Available

## NATIONAL GLASS DISTRIBUTION PERFORMANCE DATA

## SINGLE GLAZED



## TINTED LAMINATES

| IGDB       | Product             | Visible Light |            | Solar Energy      |             |            |                     |      | SC    | U-Value | DWT     | Noise Control | Safety | Security |
|------------|---------------------|---------------|------------|-------------------|-------------|------------|---------------------|------|-------|---------|---------|---------------|--------|----------|
| COLOURVUE™ |                     | Transmission  | Reflection | Total Elimination | Reflectance | Absorption | Direct Transmission | SHGC | Ratio | (W/m²)K | Tdw-ISO | Rw            | Rating | Rating   |
|            |                     |               |            |                   |             |            |                     |      |       |         |         |               |        |          |
| ZA100200   | Aquamarine          | 72            | 7          | 26                | 6           | 29         | 65                  | 0.74 | 0.85  | 5.76    | 52%     | 33            | 1      | 1        |
| ZA100201   | Blue                | 72            | 7          | 27                | 6           | 30         | 64                  | 0.73 | 0.84  | 5.76    | 55%     | 33            | 1      | 1        |
| ZA100202   | Bronze              | 53            | 6          | 35                | 6           | 41         | 53                  | 0.65 | 0.75  | 5.76    | 35%     | 33            | 1      | 1        |
| ZA100203   | Grey                | 42            | 5          | 37                | 5           | 47         | 48                  | 0.63 | 0.72  | 5.76    | 32%     | 33            | 1      | 1        |
| ZA100204   | Regal Blue          | 54            | 6          | 30                | 6           | 35         | 59                  | 0.70 | 0.80  | 5.76    | 46%     | 33            | 1      | 1        |
| ZA100205   | Shadowlite 10       | 9             | 4          | 59                | 4           | 80         | 16                  | 0.41 | 0.48  | 5.70    | 4%      | 33            | 2      | 2        |
| ZA100206   | Shadowlite 25       | 29            | 5          | 47                | 5           | 62         | 33                  | 0.53 | 0.61  | 5.76    | 16%     | 33            | 1      | 1        |
| ZA100226   | Shadowlite 50       | 56            | 6          | 34                | 6           | 41         | 53                  | 0.66 | 0.76  | 5.76    | 35%     | 33            | 1      | 1        |
| ZA100239   | Serene Green        | 79            | 7          | 36                | 6           | 44         | 50                  | 0.64 | 0.73  | 5.75    | 56%     | 33            | 1      | 1        |
| ZA100214   | True Blue           | 11            | 4          | 43                | 5           | 55         | 40                  | 0.57 | 0.65  | 5.76    | 22%     | 33            | 1      | 1        |
| ZA100215   | Aqua Blue           | 78            | 7          | 23                | 7           | 24         | 69                  | 0.77 | 0.88  | 5.76    | 60%     | 33            | 1      | 1        |
| ZA100216   | Tangerine           | 40            | 6          | 35                | 6           | 42         | 52                  | 0.65 | 0.74  | 5.76    | 11%     | 33            | 1      | 1        |
| ZA100212   | Sahara Sun Yellow   | 78            | 7          | 27                | 6           | 30         | 64                  | 0.73 | 0.84  | 5.76    | 24%     | 33            | 1      | 1        |
| ZA100218   | Smoke Grey          | 78            | 7          | 24                | 7           | 25         | 68                  | 0.76 | 0.87  | 5.76    | 55%     | 33            | 1      | 1        |
| ZA100213   | Sapphire Blue       | 52            | 6          | 32                | 6           | 38         | 56                  | 0.68 | 0.78  | 5.76    | 50%     | 33            | 1      | 1        |
| ZA100211   | Ruby Red            | 48            | 6          | 27                | 6           | 31         | 63                  | 0.73 | 0.84  | 5.76    | 38%     | 33            | 1      | 1        |
| ZA100217   | Golden Light Yellow | 86            | 8          | 23                | 7           | 23         | 70                  | 0.77 | 0.68  | 5.76    | 41%     | 33            | 1      | 1        |
| ZA100210   | Evening Shadow      | 50            | 6          | 37                | 5           | 46         | 49                  | 0.63 | 0.72  | 5.76    | 32%     | 33            | 1      | 1        |
| ZA100209   | Dark Red            | 15            | 5          | 45                | 5           | 59         | 36                  | 0.55 | 0.63  | 5.76    | 8%      | 33            | 1      | 1        |
| ZA100219   | Cool White          | 80            | 7          | 26                | 6           | 29         | 65                  | 0.74 | 0.85  | 5.76    | 55%     | 33            | 1      | 1        |
| ZA100208   | Coral Rose          | 76            | 7          | 22                | 7           | 22         | 71                  | 0.78 | 0.90  | 5.76    | 56%     | 33            | 1      | 1        |
| ZA100228   | Deep Aquamarine     | 59            | 6          | 32                | 6           | 38         | 56                  | 0.68 | 0.78  | 5.70    | 42%     | 33            | 2      | 2        |
| ZA100229   | Deep Blue           | 60            | 6          | 33                | 6           | 39         | 55                  | 0.67 | 0.77  | 5.70    | 48%     | 33            | 2      | 2        |
| ZA100230   | Deep Bronze         | 31            | 5          | 44                | 5           | 58         | 37                  | 0.56 | 0.64  | 5.70    | 19%     | 33            | 2      | 2        |
| ZA100231   | Deep Grey           | 20            | 5          | 47                | 5           | 62         | 33                  | 0.53 | 0.60  | 5.70    | 16%     | 33            | 2      | 2        |
| ZA100232   | Deep Regal Blue     | 34            | 5          | 38                | 5           | 47         | 48                  | 0.62 | 0.72  | 5.70    | 33%     | 33            | 2      | 2        |
| ZA100240   | Deep Serene Green   | 71            | 7          | 45                | 5           | 59         | 36                  | 0.55 | 0.63  | 5.74    | 49%     | 33            | 1      | 1        |

| Abbreviation | Definition                         |
|--------------|------------------------------------|
| IGDB         | International Glazing Database     |
| SHGC         | Solar Heat Gain Coefficient        |
| SC           | Shading Coefficient                |
| Tdw-ISO      | ISO Damaged Weighted Transmittance |
| Rw           | Weighted Sound Reduction Index     |

 TINTED LAMINATES LOW E

| IGDB             | Product         | Visible Light |            | Solar Energy      |             |            |                     |      | SC    | U-Value | DWT     | Noise Control | Safety | Security |
|------------------|-----------------|---------------|------------|-------------------|-------------|------------|---------------------|------|-------|---------|---------|---------------|--------|----------|
| COLOURVUE™ LOW E |                 | Transmission  | Reflection | Total Elimination | Reflectance | Absorption | Direct Transmission | SHGC | Ratio | (W/m²)K | Tdw-ISO | Rw            | Rating | Rating   |
| ZA100220         | Aquamarine      | 67            | 8          | 36                | 8           | 35         | 57                  | 0.64 | 0.73  | 3.65    | 48%     | 33            | 1      | 1        |
| ZA100221         | Blue            | 67            | 9          | 37                | 8           | 35         | 57                  | 0.63 | 0.73  | 3.65    | 51%     | 33            | 1      | 1        |
| ZA100222         | Bronze          | 49            | 7          | 45                | 7           | 47         | 46                  | 0.55 | 0.63  | 3.65    | 33%     | 33            | 1      | 1        |
| ZA100223         | Grey            | 40            | 6          | 48                | 7           | 51         | 42                  | 0.52 | 0.60  | 3.65    | 29%     | 33            | 1      | 1        |
| ZA100224         | Regal Blue      | 50            | 7          | 41                | 8           | 40         | 52                  | 0.59 | 0.68  | 3.65    | 42%     | 33            | 1      | 1        |
| ZA100227         | Shadowlite 10   | 9             | 4          | 70                | 5           | 82         | 13                  | 0.30 | 0.34  | 3.62    | 4%      | 33            | 2      | 2        |
| ZA100246         | Shadowlite 25   | 27            | 5          | 59                | 6           | 66         | 29                  | 0.41 | 0.48  | 3.65    | 15%     | 33            | 1      | 1        |
| ZA100247         | Shadowlite 50   | 52            | 7          | 45                | 7           | 46         | 47                  | 0.55 | 0.64  | 3.65    | 33%     | 33            | 1      | 1        |
| ZA100238         | Serene Green    | 74            | 9          | 46                | 7           | 49         | 44                  | 0.54 | 0.62  | 3.64    | 51%     | 33            | 1      | 1        |
| ZA100237         | Deep Aquamarine | 55            | 7          | 42                | 7           | 42         | 50                  | 0.58 | 0.67  | 3.62    | 38%     | 33            | 2      | 2        |
| ZA100236         | Deep Blue       | 56            | 7          | 43                | 7           | 44         | 49                  | 0.57 | 0.66  | 3.62    | 44%     | 33            | 2      | 2        |
| ZA100235         | Deep Bronze     | 29            | 5          | 55                | 6           | 61         | 33                  | 0.45 | 0.51  | 3.62    | 18%     | 33            | 2      | 2        |
| ZA100234         | Deep Grey       | 19            | 5          | 59                | 6           | 66         | 28                  | 0.41 | 0.47  | 3.62    | 14%     | 33            | 2      | 2        |
| ZA100233         | Deep Regal Blue | 32            | 5          | 48                | 7           | 51         | 42                  | 0.52 | 0.60  | 3.62    | 31%     | 33            | 2      | 2        |

 TRANSLUCENT LAMINATES

| IGDB        | Product      | Visible Light |            | Solar Energy      |             |            |                     |      | SC    | U-Value | DWT     | Noise Control | Safety | Security |
|-------------|--------------|---------------|------------|-------------------|-------------|------------|---------------------|------|-------|---------|---------|---------------|--------|----------|
| TRANSLUCENT |              | Transmission  | Reflection | Total Elimination | Reflectance | Absorption | Direct Transmission | SHGC | Ratio | (W/m²)K | Tdw-ISO | Rw            | Rating | Rating   |
| ZA100207    | Arctic Snow  | 67            | 7          | 31                | 6           | 36         | 58                  | 0.69 | 0.79  | 5.76    | 45%     | 33            | 1      | 1        |
| ZA100241    | Aquamarine   | 54            | 6          | 36                | 5           | 45         | 50                  | 0.64 | 0.73  | 5.70    | 36%     | 33            | 2      | 2        |
| ZA100242    | Blue         | 54            | 6          | 37                | 5           | 46         | 49                  | 0.63 | 0.73  | 5.70    | 39%     | 33            | 2      | 2        |
| ZA100244    | Bronze       | 40            | 5          | 42                | 5           | 55         | 40                  | 0.58 | 0.66  | 5.70    | 25%     | 33            | 2      | 2        |
| ZA100245    | Grey         | 32            | 5          | 45                | 5           | 58         | 37                  | 0.55 | 0.64  | 5.70    | 22%     | 33            | 2      | 2        |
| ZA100243    | Regal Blue   | 41            | 5          | 39                | 5           | 50         | 45                  | 0.61 | 0.70  | 5.70    | 32%     | 33            | 2      | 2        |
| ZA100225    | Serene Green | 60            | 6          | 44                | 5           | 57         | 38                  | 0.56 | 0.64  | 5.75    | 39%     | 33            | 1      | 1        |



SOLARVUE™

| IGDB Product |              |     | Visible Light |            | Solar Energy      |             |            |                     |      | SC    | U-Value | DWT     | Noise Control | Safety | Security |
|--------------|--------------|-----|---------------|------------|-------------------|-------------|------------|---------------------|------|-------|---------|---------|---------------|--------|----------|
| SOLARVUE™    |              |     | Transmission  | Reflection | Total Elimination | Reflectance | Absorption | Direct Transmission | SHGC | Ratio | (W/m²)K | Tdw-ISO | Rw            | Rating | Rating   |
| 16060        | Neutral      | HL  | 47            | 12         | 46                | 11          | 50         | 32                  | 0.54 | 0.62  | 5.76    | 35%     | 33            | 1      | 1        |
| 16097        |              | XHL | 56            | 10         | 39                | 9           | 44         | 47                  | 0.61 | 0.70  | 5.76    | 40%     | 33            | 1      | 1        |
| 16103        | Aquamarine   | HL  | 39            | 10         | 48                | 10          | 56         | 34                  | 0.52 | 0.59  | 5.76    | 29%     | 33            | 1      | 1        |
| 16089        |              | XHL | 48            | 8          | 42                | 8           | 50         | 42                  | 0.58 | 0.66  | 5.76    | 36%     | 33            | 1      | 1        |
| 16117        | Blue         | HL  | 41            | 11         | 46                | 10          | 53         | 37                  | 0.54 | 0.62  | 5.76    | 33%     | 33            | 1      | 1        |
| 16091        |              | XHL | 46            | 8          | 42                | 8           | 50         | 42                  | 0.58 | 0.67  | 5.76    | 37%     | 33            | 1      | 1        |
| 16057        | Bronze       | HL  | 28            | 7          | 57                | 6           | 75         | 19                  | 0.43 | 0.50  | 5.76    | 19%     | 33            | 1      | 1        |
| 16093        |              | XHL | 35            | 6          | 47                | 6           | 59         | 35                  | 0.53 | 0.61  | 5.76    | 24%     | 33            | 1      | 1        |
| 16059        | Grey         | HL  | 24            | 7          | 53                | 8           | 66         | 25                  | 0.47 | 0.54  | 5.76    | 19%     | 33            | 1      | 1        |
| 16095        |              | XHL | 29            | 6          | 48                | 6           | 61         | 33                  | 0.52 | 0.60  | 5.76    | 22%     | 33            | 1      | 1        |
| 16061        | Regal Blue   | HL  | 33            | 8          | 49                | 9           | 58         | 33                  | 0.51 | 0.59  | 5.75    | 28%     | 33            | 1      | 1        |
| 16099        |              | XHL | 39            | 7          | 43                | 7           | 53         | 40                  | 0.57 | 0.65  | 5.75    | 32%     | 33            | 1      | 1        |
| 16116        | Arctic Snow  | HL  | 33            | 16         | 54                | 14          | 58         | 28                  | 0.46 | 0.53  | 5.75    | 23%     | 33            | 1      | 1        |
| 16106        |              | XHL | 41            | 13         | 48                | 11          | 54         | 35                  | 0.52 | 0.60  | 5.76    | 28%     | 33            | 1      | 1        |
| 16062        | Serene Green | HL  | 42            | 9          | 53                | 6           | 69         | 25                  | 0.47 | 0.54  | 5.75    | 29%     | 33            | 1      | 1        |
| 16101        |              | XHL | 49            | 9          | 51                | 9           | 61         | 30                  | 0.49 | 0.57  | 5.75    | 35%     | 33            | 1      | 1        |



SOLARVUE™ LOW E

| IGDB Product    |              |     | Visible Light |            | Solar Energy      |             |            |                     |      | SC    | U-Value | DWT     | Noise Control | Safety | Security |
|-----------------|--------------|-----|---------------|------------|-------------------|-------------|------------|---------------------|------|-------|---------|---------|---------------|--------|----------|
| SOLARVUE™ LOW E |              |     | Transmission  | Reflection | Total Elimination | Reflectance | Absorption | Direct Transmission | SHGC | Ratio | (W/m²)K | Tdw-ISO | Rw            | Rating | Rating   |
| 16003           | Neutral      | HL  | 43            | 14         | 57                | 12          | 56         | 32                  | 0.43 | 0.49  | 3.65    | 31%     | 33            | 1      | 1        |
| 16098           |              | XHL | 54            | 10         | 49                | 9           | 49         | 42                  | 0.51 | 0.59  | 3.65    | 38%     | 33            | 1      | 1        |
| 16055           | Aquamarine   | HL  | 40            | 10         | 56                | 9           | 59         | 32                  | 0.44 | 0.50  | 3.65    | 29%     | 33            | 1      | 1        |
| 16090           |              | XHL | 44            | 9          | 54                | 8           | 57         | 35                  | 0.46 | 0.53  | 3.65    | 31%     | 33            | 1      | 1        |
| 16056           | Blue         | HL  | 30            | 8          | 60                | 9           | 64         | 27                  | 0.40 | 0.46  | 3.65    | 24%     | 33            | 1      | 1        |
| 16092           |              | XHL | 46            | 9          | 51                | 9           | 53         | 38                  | 0.49 | 0.56  | 3.65    | 36%     | 33            | 1      | 1        |
| 16058           | Bronze       | HL  | 26            | 8          | 64                | 8           | 69         | 23                  | 0.36 | 0.42  | 3.65    | 18%     | 33            | 1      | 1        |
| 16094           |              | XHL | 32            | 6          | 58                | 6           | 65         | 29                  | 0.42 | 0.48  | 3.65    | 21%     | 33            | 1      | 1        |
| 16104           | Grey         | HL  | 24            | 7          | 63                | 7           | 70         | 23                  | 0.37 | 0.42  | 3.65    | 18%     | 33            | 1      | 1        |
| 16096           |              | XHL | 28            | 6          | 59                | 6           | 66         | 28                  | 0.41 | 0.47  | 3.65    | 21%     | 33            | 1      | 1        |
| 16004           | Regal Blue   | HL  | 30            | 8          | 60                | 9           | 64         | 27                  | 0.40 | 0.46  | 3.65    | 24%     | 33            | 1      | 1        |
| 16100           |              | XHL | 34            | 7          | 57                | 8           | 61         | 31                  | 0.43 | 0.50  | 3.65    | 27%     | 33            | 1      | 1        |
| 16105           | Serene Green | HL  | 40            | 10         | 64                | 7           | 72         | 21                  | 0.36 | 0.41  | 3.65    | 28%     | 33            | 1      | 1        |
| 16102           |              | XHL | 46            | 9          | 60                | 7           | 66         | 27                  | 0.40 | 0.46  | 3.64    | 32%     | 33            | 1      | 1        |



| IGDB      Product |              |     | Visible Light |            | Solar Energy      |             |            |                     |      | SC    | U-Value | DWT                  | Noise Control  | Safety | Security |
|-------------------|--------------|-----|---------------|------------|-------------------|-------------|------------|---------------------|------|-------|---------|----------------------|----------------|--------|----------|
| SOLARSHIELD®      |              |     | Transmission  | Reflection | Total Elimination | Reflectance | Absorption | Direct Transmission | SHGC | Ratio | (W/m²)K | T <sub>dw</sub> -ISO | R <sub>w</sub> | Rating | Rating   |
| 16111             | Silver       | S10 | 11            | 43         | 75                | 38          | 53         | 9                   | 0.25 | 0.29  | 5.76    | 8%                   | 33             | 1      | 1        |
| 16122             |              | S20 | 24            | 28         | 64                | 25          | 56         | 19                  | 0.36 | 0.42  | 5.76    | 18%                  | 33             | 1      | 1        |
| 16054             |              | S30 | 35            | 19         | 55                | 18          | 54         | 28                  | 0.45 | 0.52  | 5.76    | 26%                  | 33             | 1      | 1        |
| 16112             | Aquamarine   | S10 | 9             | 29         | 72                | 28          | 64         | 8                   | 0.28 | 0.32  | 5.76    | 7%                   | 33             | 1      | 1        |
| 16118             |              | S20 | 20            | 20         | 63                | 21          | 62         | 17                  | 0.27 | 0.42  | 5.76    | 16%                  | 33             | 1      | 1        |
| 16045             |              | S30 | 32            | 13         | 54                | 13          | 60         | 27                  | 0.46 | 0.53  | 5.76    | 25%                  | 33             | 1      | 1        |
| 16022             | Blue         | S10 | 10            | 29         | 72                | 30          | 62         | 8                   | 0.28 | 0.32  | 5.76    | 8%                   | 33             | 1      | 1        |
| 16034             |              | S20 | 19            | 22         | 64                | 22          | 62         | 16                  | 0.36 | 0.41  | 5.75    | 16%                  | 33             | 1      | 1        |
| 16115             |              | S30 | 30            | 15         | 55                | 15          | 59         | 26                  | 0.45 | 0.51  | 5.76    | 25%                  | 33             | 1      | 1        |
| 16024             | Bronze       | S10 | 8             | 16         | 69                | 19          | 74         | 7                   | 0.31 | 0.35  | 5.76    | 5%                   | 33             | 1      | 1        |
| 16036             |              | S20 | 16            | 12         | 63                | 13          | 73         | 14                  | 0.37 | 0.43  | 5.76    | 11%                  | 33             | 1      | 1        |
| 16047             |              | S30 | 22            | 9          | 57                | 10          | 69         | 21                  | 0.43 | 0.49  | 5.76    | 16%                  | 33             | 1      | 1        |
| 16027             | Grey         | S10 | 6             | 13         | 69                | 18          | 75         | 7                   | 0.31 | 0.35  | 5.76    | 5%                   | 33             | 1      | 1        |
| 16038             |              | S20 | 13            | 9          | 63                | 13          | 73         | 14                  | 0.37 | 0.43  | 5.76    | 11%                  | 33             | 1      | 1        |
| 16049             |              | S30 | 19            | 8          | 58                | 10          | 70         | 20                  | 0.42 | 0.48  | 5.76    | 15%                  | 33             | 1      | 1        |
| 16028             | Regal Blue   | S10 | 9             | 20         | 70                | 25          | 67         | 8                   | 0.30 | 0.34  | 5.75    | 8%                   | 33             | 1      | 1        |
| 16040             |              | S20 | 15            | 15         | 65                | 19          | 67         | 14                  | 0.35 | 0.40  | 5.75    | 13%                  | 33             | 1      | 1        |
| 16051             |              | S30 | 24            | 11         | 57                | 13          | 64         | 23                  | 0.43 | 0.50  | 5.75    | 21%                  | 33             | 1      | 1        |
| 16110             | Arctic Snow  | S10 | 10            | 28         | 71                | 25          | 66         | 8                   | 0.29 | 0.34  | 5.76    | 7%                   | 33             | 1      | 1        |
| 16119             |              | S20 | 25            | 22         | 61                | 20          | 60         | 20                  | 0.39 | 0.45  | 5.76    | 19%                  | 33             | 1      | 1        |
| 16120             |              | S30 | 34            | 17         | 55                | 15          | 57         | 27                  | 0.45 | 0.52  | 5.76    | 25%                  | 33             | 1      | 1        |
| 16030             | Serene Green | S10 | 11            | 32         | 69                | 18          | 75         | 7                   | 0.31 | 0.35  | 5.75    | 8%                   | 33             | 1      | 1        |
| 16042             |              | S20 | 23            | 21         | 63                | 13          | 73         | 14                  | 0.37 | 0.43  | 5.75    | 18%                  | 33             | 1      | 1        |
| 16053             |              | S30 | 34            | 15         | 57                | 10          | 69         | 21                  | 0.43 | 0.49  | 5.75    | 25%                  | 33             | 1      | 1        |

 SOLARSHIELD® LOW E

| IGDB                  |              |     | Product      |            |                   | Visible Light |            | Solar Energy        |      |       |         |         | SC | U-Value | DWT    | Noise Control | Safety | Security |
|-----------------------|--------------|-----|--------------|------------|-------------------|---------------|------------|---------------------|------|-------|---------|---------|----|---------|--------|---------------|--------|----------|
| SOLARSHIELD®<br>LOW E |              |     | Transmission | Reflection | Total Elimination | Reflectance   | Absorption | Direct Transmission | SHGC | Ratio | (W/m²)K | Tdw-ISO | Rw | Rating  | Rating |               |        |          |
| 16032                 | Silver       | S10 | 9            | 39         | 81                | 35            | 58         | 7                   | 0.19 | 0.21  | 3.65    | 7%      | 33 | 1       | 1      |               |        |          |
| 16044                 |              | S20 | 24           | 27         | 71                | 23            | 60         | 17                  | 0.29 | 0.33  | 3.65    | 18%     | 33 | 1       | 1      |               |        |          |
| 16002                 |              | S30 | 34           | 17         | 63                | 17            | 57         | 26                  | 0.37 | 0.43  | 3.66    | 25%     | 33 | 1       | 1      |               |        |          |
| 16021                 | Aquamarine   | S10 | 8            | 27         | 81                | 28            | 66         | 6                   | 0.19 | 0.22  | 3.65    | 6%      | 33 | 1       | 1      |               |        |          |
| 16033                 |              | S20 | 19           | 19         | 72                | 19            | 66         | 15                  | 0.28 | 0.32  | 3.65    | 15%     | 33 | 1       | 1      |               |        |          |
| 16046                 |              | S30 | 28           | 14         | 66                | 13            | 65         | 22                  | 0.34 | 0.40  | 3.65    | 21%     | 33 | 1       | 1      |               |        |          |
| 16023                 | Blue         | S10 | 8            | 31         | 81                | 32            | 61         | 7                   | 0.19 | 0.22  | 3.65    | 7%      | 33 | 1       | 1      |               |        |          |
| 16035                 |              | S20 | 18           | 21         | 73                | 22            | 64         | 14                  | 0.27 | 0.31  | 3.65    | 15%     | 33 | 1       | 1      |               |        |          |
| 16001                 |              | S30 | 29           | 14         | 65                | 14            | 64         | 22                  | 0.35 | 0.40  | 3.65    | 23%     | 33 | 1       | 1      |               |        |          |
| 16025                 | Bronze       | S10 | 8            | 15         | 78                | 17            | 76         | 7                   | 0.22 | 0.25  | 3.66    | 6%      | 33 | 1       | 1      |               |        |          |
| 16037                 |              | S20 | 16           | 11         | 72                | 13            | 74         | 13                  | 0.28 | 0.32  | 3.65    | 11%     | 33 | 1       | 1      |               |        |          |
| 16048                 |              | S30 | 19           | 9          | 69                | 10            | 74         | 16                  | 0.31 | 0.35  | 3.65    | 13%     | 33 | 1       | 1      |               |        |          |
| 16027                 | Grey         | S10 | 5            | 14         | 80                | 20            | 75         | 5                   | 0.20 | 0.23  | 3.65    | 4%      | 33 | 1       | 1      |               |        |          |
| 16039                 |              | S20 | 13           | 9          | 73                | 12            | 76         | 12                  | 0.27 | 0.31  | 3.65    | 10%     | 33 | 1       | 1      |               |        |          |
| 16050                 |              | S30 | 18           | 8          | 69                | 10            | 74         | 16                  | 0.31 | 0.36  | 3.65    | 14%     | 33 | 1       | 1      |               |        |          |
| 16029                 | Regal Blue   | S10 | 8            | 20         | 80                | 24            | 69         | 7                   | 0.20 | 0.23  | 3.65    | 7%      | 33 | 1       | 1      |               |        |          |
| 16041                 |              | S20 | 15           | 14         | 73                | 17            | 70         | 13                  | 0.27 | 0.31  | 3.65    | 13%     | 33 | 1       | 1      |               |        |          |
| 16052                 |              | S30 | 23           | 10         | 67                | 12            | 68         | 20                  | 0.33 | 0.38  | 3.65    | 19%     | 33 | 1       | 1      |               |        |          |
| 16031                 | Serene Green | S10 | 9            | 33         | 80                | 17            | 78         | 5                   | 0.20 | 0.23  | 3.65    | 6%      | 33 | 1       | 1      |               |        |          |
| 16043                 |              | S20 | 22           | 20         | 73                | 13            | 75         | 12                  | 0.27 | 0.31  | 3.65    | 16%     | 33 | 1       | 1      |               |        |          |
| 16121                 |              | S30 | 33           | 17         | 64                | 16            | 60         | 24                  | 0.36 | 0.42  | 3.64    | 23%     | 33 | 1       | 1      |               |        |          |

| IGDB           | Product          | Visible Light |            | Solar Energy      |             |            |                     |      | SC    | U-Value | DWT                  | Noise Control  | Safety | Security |
|----------------|------------------|---------------|------------|-------------------|-------------|------------|---------------------|------|-------|---------|----------------------|----------------|--------|----------|
| NATIONAL GLASS |                  | Transmission  | Reflection | Total Elimination | Reflectance | Absorption | Direct Transmission | SHGC | Ratio | (W/m²)K | T <sub>dw</sub> -ISO | R <sub>w</sub> | Rating | Rating   |
| PVB            |                  |               |            |                   |             |            |                     |      |       |         |                      |                |        |          |
| ZA300101       | PVB Clear        | 88            | 8          | 20                | 7           | 18         | 74                  | 0.80 | 0.92  | 5.77    | 65%                  | 33             | 1      | 1        |
| ZA300102       | PVB Clear Low E  | 83            | 10         | 29                | 9           | 24         | 66                  | 0.71 | 0.81  | 3.65    | 58%                  | 33             | 1      | 1        |
| ZA300103       | PVB Grey         | 41            | 5          | 38                | 5           | 47         | 48                  | 0.62 | 0.72  | 5.76    | 32%                  | 33             | 1      | 1        |
| ZA300104       | PVB Grey Low E   | 38            | 6          | 48                | 7           | 52         | 42                  | 0.52 | 0.59  | 3.65    | 29%                  | 33             | 1      | 1        |
| ZA300105       | PVB Bronze       | 53            | 6          | 35                | 6           | 42         | 52                  | 0.65 | 0.75  | 5.76    | 36%                  | 33             | 1      | 1        |
| ZA300105       | PVB Bronze Low E | 50            | 7          | 45                | 7           | 47         | 46                  | 0.55 | 0.63  | 3.65    | 33%                  | 33             | 1      | 1        |
| N/A            | PVB Solar E      | 59            | 7          | 49                | 7           | 52         | 41                  | 0.51 | 0.59  | 3.65    | 45%                  | 33             | 1      | 1        |
| CLEAR          |                  |               |            |                   |             |            |                     |      |       |         |                      |                |        |          |
| 16014          | 3mm              | 89            | 8          | 13                | 8           | 8          | 84                  | 0.87 | 1.00  | 5.92    | 84%                  | 28             |        |          |
| 16015          | 4mm              | 89            | 8          | 15                | 8           | 10         | 82                  | 0.85 | 0.98  | 5.88    | 83%                  | 29             |        |          |
| 16016          | 5mm              | 89            | 8          | 16                | 7           | 12         | 81                  | 0.84 | 0.97  | 5.84    | 82%                  | 30             |        |          |
| 16017          | 6mm              | 88            | 8          | 17                | 7           | 14         | 78                  | 0.83 | 0.95  | 5.81    | 80%                  | 31             |        |          |
| 16018          | 8mm              | 88            | 8          | 20                | 7           | 18         | 75                  | 0.80 | 0.92  | 5.74    | 78%                  | 33             |        |          |
| 16011          | 10mm             | 86            | 8          | 23                | 7           | 24         | 70                  | 0.77 | 0.89  | 5.67    | 76%                  | 35             |        |          |
| 16012          | 12mm             | 85            | 8          | 24                | 7           | 26         | 67                  | 0.76 | 0.87  | 5.61    | 74%                  | 36             |        |          |
| CLEAR LOW E    |                  |               |            |                   |             |            |                     |      |       |         |                      |                |        |          |
| 4140           | 4mm Clear Low E  | 83            | 11         | 26                | 11          | 19         | 70                  | 0.74 | 0.85  | 3.74    | 73%                  | 29             | N/A    |          |
| 4142           | 6mm Clear Low E  | 81            | 11         | 29                | 10          | 23         | 67                  | 0.71 | 0.82  | 3.70    | 71%                  | 31             |        |          |
| SOLAR E        |                  |               |            |                   |             |            |                     |      |       |         |                      |                |        |          |
| 9933           | 4mm Solar E      | 60            | 8          | 46                | 8           | 47         | 44                  | 0.54 | 0.62  | 3.71    | 57%                  | 29             |        |          |
| 9935           | 6mm Solar E      | 60            | 8          | 47                | 7           | 49         | 44                  | 0.53 | 0.61  | 3.68    | 57%                  | 31             |        |          |
| OTHER          |                  |               |            |                   |             |            |                     |      |       |         |                      |                |        |          |
| 4279           | 4mm Grey         | 57            | 6          | 30                | 6           | 35         | 59                  | 0.70 | 0.80  | 5.88    | 52%                  | 29             |        |          |
| 4267           | 6mm Grey         | 44            | 5          | 38                | 5           | 47         | 47                  | 0.62 | 0.71  | 5.81    | 40%                  | 31             |        |          |
| 4274           | 4mm Bronze       | 62            | 6          | 28                | 6           | 31         | 63                  | 0.72 | 0.83  | 5.88    | 51%                  | 29             |        |          |
| 4269           | 6mm Bronze       | 51            | 5          | 35                | 5           | 43         | 52                  | 0.65 | 0.75  | 5.81    | 40%                  | 31             |        |          |



NATIONAL GLASS  
DISTRIBUTION

# SAGDB

Performance figures  
you can trust!

## National Glass Distribution laminated safety glass products

**National Glass Distribution** has listed numerous laminated safety glass products which we manufacture on the South African Glass Database (SAGDB).

The Centre of Glass (CoG) performance specifications of these products are verified by simulating the raw products, which are listed on the International Glazing Database v48, in LBNL software programs, Optics version 6 and Berkley Lab Window v7.4.8.

By having our products listed on the SAGDB, they can be used in THERM Finite Element Simulator v7.4.3.0 to obtain thermal performance figures, based on NFRC 100 – 2010 environmental conditions, of the complete fenestration system combining glass, frame system and glazing hardware.

The complete fenestration simulation figures can be used for your SANS 204 energy efficiency calculations instead of having to use the SANS 204 Table 6 defaults.

Refer to [www.natglass.co.za](http://www.natglass.co.za) for our Centre of Glass (CoG) performance values of our glass products or [www.eaglealuminium.co.za](http://www.eaglealuminium.co.za) for our simulated figures of our complete aluminium range.



National Glass Distribution is affiliated with a number of associations that enforce a strict code of ethical conduct and adherence to the standards in the glass and aluminium industry.

**SAFIERA:** South African Fenestration and Insulation Energy Rating Authority

**NFRC:** National Fenestration Rating Council



NATIONAL GLASS DISTRIBUTION PERFORMANCE DATA

DOUBLE GLAZED

TINTED LAMINATES AIR-GAP PVB CLEAR

| IGDB Product              |                   | Visible Light |            | Solar Energy      |             |              |              |                     |      | SC    | U-Value (W/m²)K |       | DWT     | Noise Control |       | Safety | Security |
|---------------------------|-------------------|---------------|------------|-------------------|-------------|--------------|--------------|---------------------|------|-------|-----------------|-------|---------|---------------|-------|--------|----------|
| COLOURVUE™<br>+ PVB CLEAR |                   | Transmission  | Reflection | Total Elimination | Reflectance | Absorption 1 | Absorption 2 | Direct Transmission | SHGC | Ratio | Air-gap         |       | Tdw-ISO | Air-gap Rw    |       | Rating | Rating   |
|                           |                   |               |            |                   |             |              |              |                     |      |       | 6 mm            | 12 mm |         | 6 mm          | 12 mm |        |          |
| ZA100200                  | Aquamarine        | 64            | 11         | 38                | 9           | 30           | 11           | 50                  | 0.62 | 0.71  | 3.03            | 2.68  | 45%     | 34            | 35    | 1      | 2        |
| ZA100201                  | Blue              | 64            | 11         | 39                | 9           | 30           | 10           | 50                  | 0.61 | 0.71  | 3.03            | 2.68  | 48%     | 34            | 35    | 1      | 2        |
| ZA100202                  | Bronze            | 46            | 8          | 47                | 8           | 43           | 9            | 40                  | 0.53 | 0.61  | 3.03            | 2.68  | 31%     | 34            | 35    | 1      | 2        |
| ZA100203                  | Grey              | 37            | 7          | 50                | 7           | 48           | 9            | 37                  | 0.50 | 0.58  | 3.03            | 2.68  | 28%     | 34            | 35    | 1      | 2        |
| ZA100204                  | Regal Blue        | 47            | 8          | 42                | 9           | 36           | 10           | 45                  | 0.58 | 0.66  | 3.03            | 2.68  | 40%     | 34            | 35    | 1      | 2        |
| ZA100205                  | Shadowlite 10     | 8             | 5          | 71                | 5           | 81           | 4            | 12                  | 0.29 | 0.33  | 3.01            | 2.67  | 4%      | 35            | 36    | 2      | 3        |
| ZA100206                  | Shadowlite 25     | 25            | 5          | 60                | 6           | 64           | 6            | 25                  | 0.40 | 0.46  | 3.03            | 2.68  | 14%     | 34            | 35    | 1      | 2        |
| ZA100226                  | Shadowlite 50     | 49            | 8          | 46                | 8           | 43           | 9            | 41                  | 0.54 | 0.62  | 3.03            | 2.68  | 31%     | 34            | 35    | 1      | 2        |
| ZA100239                  | Serene Green      | 70            | 13         | 48                | 8           | 45           | 6            | 40                  | 0.52 | 0.60  | 3.02            | 2.68  | 48%     | 34            | 35    | 1      | 2        |
| ZA100230                  | Deep Bronze       | 28            | 6          | 57                | 6           | 59           | 7            | 28                  | 0.43 | 0.50  | 3.01            | 2.67  | 17%     | 35            | 36    | 2      | 3        |
| ZA100231                  | Deep Grey         | 18            | 5          | 60                | 6           | 64           | 6            | 24                  | 0.40 | 0.46  | 3.01            | 2.67  | 14%     | 35            | 36    | 2      | 3        |
| ZA100240                  | Deep Serene Green | 63            | 11         | 57                | 7           | 59           | 4            | 30                  | 0.43 | 0.50  | 3.02            | 2.68  | 43%     | 34            | 35    | 1      | 2        |

TINTED LAMINATES WITH PVB CLEAR

TINTED LAMINATES WITH PVB CLEAR

TINTED LAMINATES AIR-GAP PVB CLEAR LOW E

| IGDB                            | Product           | Visible Light |            | Solar Energy      |             |              |    |              |      | SC                  | U-Value (W/m²)K |       | DWT     | Noise Control |         | Safety     | Security |        |        |
|---------------------------------|-------------------|---------------|------------|-------------------|-------------|--------------|----|--------------|------|---------------------|-----------------|-------|---------|---------------|---------|------------|----------|--------|--------|
| COLOURVUE™<br>+ PVB CLEAR LOW E |                   | Transmission  | Reflection | Total Elimination | Reflectance | Absorption 1 |    | Absorption 2 |      | Direct Transmission | SHGC            | Ratio | Air-gap |               | Tdw-ISO | Air-gap Rw |          | Rating | Rating |
|                                 |                   |               |            |                   |             |              |    |              |      |                     |                 |       | 6 mm    | 12 mm         |         | 6 mm       | 12 mm    |        |        |
| ZA100200                        | Aquamarine        | 60            | 13         | 42                | 11          | 30           | 13 | 44           | 0.58 | 0.67                | 2.41            | 1.88  | 42%     | 34            | 35      | 1          | 2        |        |        |
| ZA100201                        | Blue              | 60            | 13         | 42                | 11          | 31           | 13 | 45           | 0.58 | 0.66                | 2.41            | 1.88  | 44%     | 34            | 35      | 1          | 2        |        |        |
| ZA100202                        | Bronze            | 44            | 8          | 50                | 9           | 44           | 11 | 36           | 0.50 | 0.57                | 2.41            | 1.88  | 28%     | 34            | 35      | 1          | 2        |        |        |
| ZA100203                        | Grey              | 35            | 7          | 53                | 8           | 49           | 11 | 32           | 0.47 | 0.54                | 2.41            | 1.88  | 25%     | 34            | 35      | 1          | 2        |        |        |
| ZA100204                        | Regal Blue        | 45            | 9          | 56                | 10          | 37           | 13 | 40           | 0.54 | 0.62                | 2.41            | 1.88  | 37%     | 34            | 35      | 1          | 2        |        |        |
| ZA100205                        | Shadowlite 10     | 8             | 5          | 76                | 5           | 81           | 4  | 10           | 0.24 | 0.28                | 2.40            | 1.88  | 4%      | 35            | 36      | 2          | 3        |        |        |
| ZA100206                        | Shadowlite 25     | 24            | 5          | 64                | 6           | 64           | 8  | 22           | 0.36 | 0.42                | 2.41            | 1.88  | 13%     | 34            | 35      | 1          | 2        |        |        |
| ZA100226                        | Shadowlite 50     | 46            | 9          | 50                | 9           | 44           | 11 | 36           | 0.50 | 0.57                | 2.41            | 1.88  | 28%     | 34            | 35      | 1          | 2        |        |        |
| ZA100239                        | Serene Green      | 66            | 15         | 52                | 9           | 46           | 8  | 36           | 0.48 | 0.56                | 2.41            | 1.88  | 44%     | 34            | 35      | 1          | 2        |        |        |
| ZA100230                        | Deep Bronze       | 26            | 6          | 61                | 7           | 60           | 8  | 25           | 0.39 | 0.45                | 2.40            | 1.88  | 15%     | 35            | 36      | 2          | 3        |        |        |
| ZA100231                        | Deep Grey         | 17            | 5          | 64                | 6           | 65           | 8  | 21           | 0.36 | 0.41                | 2.40            | 1.88  | 12%     | 35            | 36      | 2          | 3        |        |        |
| ZA100240                        | Deep Serene Green | 59            | 13         | 61                | 8           | 60           | 5  | 27           | 0.39 | 0.45                | 2.41            | 1.88  | 39%     | 34            | 35      | 1          | 2        |        |        |

TINTED LAMINATES WITH PVB CLEAR LOW E

TINTED LAMINATES WITH PVB CLEAR LOW E

| Abbreviation | Definition                         |
|--------------|------------------------------------|
| IGDB         | International Glazing Database     |
| SHGC         | Solar Heat Gain Coefficient        |
| SC           | Shading Coefficient                |
| Tdw-ISO      | ISO Damaged Weighted Transmittance |
| Rw           | Weighted Sound Reduction Index     |

 TRANSLUCENT LAMINATES AIR-GAP PVB CLEAR

| IGDB                    | Product      | Visible Light |            | Solar Energy      |             |              |              |                     |      | SC    | U-Value (W/m²)K |       | DWT     | Noise Control |       | Safety | Security |
|-------------------------|--------------|---------------|------------|-------------------|-------------|--------------|--------------|---------------------|------|-------|-----------------|-------|---------|---------------|-------|--------|----------|
| TRANSLUCENT + PVB CLEAR |              | Transmission  | Reflection | Total Elimination | Reflectance | Absorption 1 | Absorption 2 | Direct Transmission | SHGC | Ratio | Air-gap         |       | Tdw-ISO | Air-gap Rw    |       | Rating | Rating   |
|                         |              |               |            |                   |             |              |              |                     |      |       | 6 mm            | 12 mm |         | 6 mm          | 12 mm |        |          |
| ZA100207                | Arctic Snow  | 59            | 10         | 43                | 8           | 38           | 9            | 45                  | 0.57 | 0.65  | 3.03            | 2.68  | 39%     | 34            | 35    | 1      | 2        |
| ZA100241                | Aquamarine   | 48            | 8          | 48                | 8           | 46           | 8            | 38                  | 0.52 | 0.59  | 3.01            | 2.67  | 32%     | 35            | 36    | 2      | 3        |
| ZA100242                | Blue         | 48            | 8          | 49                | 7           | 47           | 8            | 38                  | 0.51 | 0.59  | 3.08            | 2.67  | 34%     | 35            | 36    | 2      | 3        |
| ZA100244                | Bronze       | 35            | 6          | 55                | 6           | 56           | 7            | 31                  | 0.45 | 0.52  | 3.01            | 2.67  | 22%     | 35            | 36    | 2      | 3        |
| ZA100245                | Grey         | 28            | 6          | 57                | 6           | 60           | 7            | 28                  | 0.43 | 0.50  | 3.01            | 2.67  | 19%     | 35            | 36    | 2      | 3        |
| ZA100243                | Regal Blue   | 36            | 7          | 51                | 7           | 51           | 8            | 34                  | 0.49 | 0.56  | 3.01            | 2.67  | 28%     | 35            | 36    | 2      | 3        |
| ZA100225                | Serene Green | 53            | 9          | 56                | 7           | 58           | 5            | 31                  | 0.44 | 0.51  | 3.02            | 2.67  | 34%     | 34            | 35    | 1      | 2        |

TRANSLUCENT LAMINATES WITH PVB CLEAR

TRANSLUCENT LAMINATES WITH PVB CLEAR

 TRANSLUCENT LAMINATES AIR-GAP PVB CLEAR LOW E

| IGDB                             | Product      | Visible Light |            | Solar Energy      |             |              |              |                     |      | SC    | U-Value (W/m²)K |       | DWT                  | Noise Control          |       | Safety | Security |   |
|----------------------------------|--------------|---------------|------------|-------------------|-------------|--------------|--------------|---------------------|------|-------|-----------------|-------|----------------------|------------------------|-------|--------|----------|---|
| TRANSLUCENT<br>+ PVB CLEAR LOW E |              | Transmission  | Reflection | Total Elimination | Reflectance | Absorption 1 | Absorption 2 | Direct Transmission | SHGC | Ratio | Air-gap         |       | T <sub>dw</sub> -ISO | Air-gap R <sub>w</sub> |       | Rating | Rating   |   |
|                                  |              |               |            |                   |             |              |              |                     |      |       | 6 mm            | 12 mm |                      | 6 mm                   | 12 mm |        |          |   |
|                                  | ZA100207     | Arctic Snow   | 55         | 11                | 47          | 10           | 39           | 11                  | 40   | 0.53  | 0.61            | 2.41  | 1.88                 | 36%                    | 34    | 35     | 1        | 2 |
|                                  | ZA100241     | Aquamarine    | 45         | 9                 | 52          | 8            | 47           | 10                  | 34   | 0.48  | 0.55            | 2.40  | 1.88                 | 29%                    | 35    | 36     | 2        | 3 |
|                                  | ZA100242     | Blue          | 45         | 9                 | 52          | 8            | 48           | 10                  | 34   | 0.48  | 0.55            | 2.40  | 1.88                 | 31%                    | 35    | 36     | 2        | 3 |
|                                  | ZA100244     | Bronze        | 33         | 7                 | 58          | 7            | 57           | 9                   | 28   | 0.42  | 0.48            | 2.40  | 1.88                 | 20%                    | 35    | 36     | 2        | 3 |
|                                  | ZA100245     | Grey          | 27         | 6                 | 41          | 7            | 60           | 8                   | 25   | 0.39  | 0.45            | 2.40  | 1.88                 | 18%                    | 35    | 36     | 2        | 3 |
|                                  | ZA100243     | Regal Blue    | 27         | 6                 | 42          | 7            | 60           | 8                   | 25   | 0.45  | 0.52            | 2.40  | 1.88                 | 26%                    | 35    | 36     | 2        | 3 |
| ZA100225                         | Serene Green | 50            | 10         | 60                | 7           | 59           | 6            | 28                  | 0.40 | 0.46  | 2.41            | 1.88  | 32%                  | 34                     | 35    | 1      | 2        |   |

TRANSLUCENT LAMINATES WITH PVB CLEAR LOW E

TRANSLUCENT LAMINATES WITH PVB CLEAR LOW E

 **SOLARVUE™ AIR-GAP PVB CLEAR**

| IGDB Product          |              |     | Visible Light |            | Solar Energy      |             |              |    |              |      | SC                  | U-Value (W/m²)K |       | DWT     | Noise Control |         | Safety     | Security |                            |        |
|-----------------------|--------------|-----|---------------|------------|-------------------|-------------|--------------|----|--------------|------|---------------------|-----------------|-------|---------|---------------|---------|------------|----------|----------------------------|--------|
| SOLARVUE™ + PVB CLEAR |              |     | Transmission  | Reflection | Total Elimination | Reflectance | Absorption 1 |    | Absorption 2 |      | Direct Transmission | SHGC            | Ratio | Air-gap |               | Tdw-ISO | Air-gap Rw |          | Rating                     | Rating |
|                       |              |     |               |            |                   |             |              |    |              |      |                     |                 |       | 6 mm    | 12 mm         |         | 6 mm       | 12 mm    |                            |        |
| 16060                 | Neutral      | HL  | 42            | 13         | 57                | 12          | 51           | 6  | 30           | 0.43 | 0.50                | 3.03            | 2.68  | 20%     | 34            | 35      | 1          | 2        | SOLARVUE AIR-GAP PVB CLEAR |        |
| 16097                 |              | XHL | 49            | 13         | 51                | 11          | 45           | 8  | 37           | 0.49 | 0.56                | 3.03            | 2.68  | 34%     | 34            | 35      | 1          | 2        |                            |        |
| 16013                 | Aquamarine   | HL  | 35            | 11         | 60                | 11          | 57           | 6  | 27           | 0.40 | 0.46                | 3.03            | 2.68  | 25%     | 34            | 35      | 1          | 2        |                            |        |
| 16089                 |              | XHL | 42            | 10         | 54                | 9           | 51           | 7  | 32           | 0.46 | 0.53                | 3.03            | 2.68  | 30%     | 34            | 35      | 1          | 2        |                            |        |
| 16117                 | Blue         | HL  | 37            | 12         | 58                | 11          | 55           | 6  | 29           | 0.42 | 0.48                | 3.03            | 2.68  | 29%     | 34            | 35      | 1          | 2        |                            |        |
| 16091                 |              | XHL | 41            | 10         | 54                | 9           | 52           | 7  | 33           | 0.46 | 0.53                | 3.03            | 2.68  | 32%     | 34            | 35      | 1          | 2        |                            |        |
| 16057                 | Bronze       | HL  | 25            | 7          | 64                | 6           | 75           | 27 | 15           | 0.31 | 0.36                | 3.03            | 2.68  | 16%     | 34            | 35      | 1          | 2        |                            |        |
| 16093                 |              | XHL | 31            | 7          | 59                | 7           | 60           | 6  | 27           | 0.41 | 0.48                | 3.03            | 2.68  | 20%     | 34            | 35      | 1          | 2        |                            |        |
| 16059                 | Grey         | HL  | 21            | 7          | 65                | 8           | 67           | 5  | 20           | 0.35 | 0.40                | 3.03            | 2.68  | 16%     | 34            | 35      | 1          | 2        |                            |        |
| 16095                 |              | XHL | 26            | 7          | 60                | 7           | 63           | 6  | 25           | 0.40 | 0.46                | 3.03            | 2.68  | 19%     | 34            | 35      | 1          | 2        |                            |        |
| 16061                 | Regal Blue   | HL  | 29            | 9          | 61                | 10          | 60           | 6  | 25           | 0.39 | 0.45                | 3.03            | 2.68  | 24%     | 34            | 35      | 1          | 2        |                            |        |
| 16099                 |              | XHL | 35            | 8          | 55                | 8           | 54           | 7  | 31           | 0.45 | 0.52                | 3.03            | 2.68  | 28%     | 34            | 35      | 1          | 2        |                            |        |
| 16116                 | Arctic Snow  | HL  | 29            | 16         | 65                | 15          | 59           | 5  | 22           | 0.35 | 0.40                | 3.03            | 2.68  | 20%     | 34            | 35      | 1          | 2        |                            |        |
| 16016                 |              | XHL | 36            | 14         | 53                | 11          | 55           | 6  | 27           | 0.41 | 0.47                | 3.03            | 2.68  | 25%     | 34            | 35      | 1          | 2        |                            |        |
| 16062                 | Serene Green | HL  | 38            | 13         | 66                | 11          | 66           | 4  | 20           | 0.34 | 0.39                | 3.02            | 2.68  | 26%     | 34            | 35      | 1          | 2        |                            |        |
| 16101                 |              | XHL | 43            | 11         | 63                | 10          | 63           | 4  | 24           | 0.37 | 0.43                | 3.02            | 2.68  | 30%     | 34            | 35      | 1          | 2        |                            |        |

SOLARVUE AIR-GAP PVB CLEAR

 **SOLARVUE™ AIR-GAP PVB CLEAR LOW E**

| IGDB Product                   |              |     | Visible Light |            | Solar Energy      |             |              |              |                     |      | SC    | U-Value (W/m²)K |       | DWT                  | Noise Control          |       | Safety | Security |
|--------------------------------|--------------|-----|---------------|------------|-------------------|-------------|--------------|--------------|---------------------|------|-------|-----------------|-------|----------------------|------------------------|-------|--------|----------|
| SOLARVUE™<br>+ PVB CLEAR LOW E |              |     | Transmission  | Reflection | Total Elimination | Reflectance | Absorption 1 | Absorption 2 | Direct Transmission | SHGC | Ratio | Air-gap         |       | T <sub>dw</sub> -ISO | Air-gap R <sub>w</sub> |       | Rating | Rating   |
|                                |              |     |               |            |                   |             |              |              |                     |      |       | 6 mm            | 12 mm |                      | 6 mm                   | 12 mm |        |          |
| 16060                          | Neutral      | HL  | 40            | 14         | 60                | 13          | 52           | 7            | 27                  | 0.40 | 0.46  | 2.41            | 1.88  | 28%                  | 34                     | 35    | 1      | 2        |
| 16097                          |              | XHL | 47            | 14         | 54                | 12          | 46           | 9            | 33                  | 0.46 | 0.53  | 2.41            | 1.88  | 32%                  | 34                     | 35    | 1      | 2        |
| 16013                          | Aquamarine   | HL  | 33            | 12         | 63                | 11          | 58           | 7            | 24                  | 0.37 | 0.42  | 2.41            | 1.88  | 23%                  | 34                     | 35    | 1      | 2        |
| 16089                          |              | XHL | 39            | 11         | 51                | 10          | 53           | 8            | 29                  | 0.42 | 0.49  | 2.41            | 1.88  | 28%                  | 34                     | 35    | 1      | 2        |
| 16117                          | Blue         | HL  | 34            | 11         | 61                | 11          | 55           | 7            | 26                  | 0.39 | 0.44  | 2.41            | 1.88  | 26%                  | 34                     | 35    | 1      | 2        |
| 16091                          |              | XHL | 39            | 11         | 57                | 10          | 52           | 9            | 29                  | 0.43 | 0.49  | 2.41            | 1.88  | 29%                  | 34                     | 35    | 1      | 2        |
| 16057                          | Bronze       | HL  | 23            | 8          | 73                | 7           | 76           | 4            | 14                  | 0.27 | 0.31  | 2.41            | 1.88  | 15%                  | 34                     | 35    | 1      | 2        |
| 16093                          |              | XHL | 29            | 8          | 62                | 8           | 61           | 7            | 24                  | 0.38 | 0.43  | 2.41            | 1.88  | 18%                  | 34                     | 35    | 1      | 2        |
| 16059                          | Grey         | HL  | 20            | 7          | 69                | 9           | 68           | 6            | 18                  | 0.31 | 0.36  | 2.41            | 1.88  | 15%                  | 34                     | 35    | 1      | 2        |
| 16095                          |              | XHL | 24            | 7          | 64                | 8           | 63           | 8            | 22                  | 0.36 | 0.41  | 2.41            | 1.88  | 18%                  | 34                     | 35    | 1      | 2        |
| 16061                          | Regal Blue   | HL  | 28            | 9          | 64                | 10          | 60           | 7            | 23                  | 0.36 | 0.41  | 2.41            | 1.88  | 22%                  | 34                     | 35    | 1      | 2        |
| 16099                          |              | XHL | 33            | 8          | 59                | 9           | 55           | 9            | 28                  | 0.41 | 0.47  | 2.41            | 1.88  | 26%                  | 34                     | 35    | 1      | 2        |
| 16116                          | Arctic Snow  | HL  | 28            | 17         | 68                | 15          | 60           | 6            | 20                  | 0.32 | 0.37  | 2.41            | 1.88  | 19%                  | 34                     | 35    | 1      | 2        |
| 16016                          |              | XHL | 34            | 14         | 63                | 12          | 56           | 7            | 25                  | 0.37 | 0.43  | 2.41            | 1.88  | 23%                  | 34                     | 35    | 1      | 2        |
| 16062                          | Serene Green | HL  | 35            | 14         | 69                | 10          | 67           | 4            | 18                  | 0.31 | 0.35  | 2.41            | 1.88  | 23%                  | 34                     | 35    | 1      | 2        |
| 16101                          |              | XHL | 41            | 12         | 66                | 10          | 63           | 5            | 22                  | 0.34 | 0.39  | 2.41            | 1.88  | 28%                  | 34                     | 35    | 1      | 2        |

SOLARVUE AIR-GAP PVB CLEAR LOW E

SOLARVUE AIR-GAP PVB CLEAR LOW E

 SOLARSHIELD® AIR-GAP PVB CLEAR

| IGDB Product                |              |     | Visible Light |            | Solar Energy         |             |              |              |                        |      | SC    | U-Value<br>(W/m²)K |       | DWT     | Noise<br>Control |       | Safety | Security |
|-----------------------------|--------------|-----|---------------|------------|----------------------|-------------|--------------|--------------|------------------------|------|-------|--------------------|-------|---------|------------------|-------|--------|----------|
| SOLARSHIELD®<br>+ PVB CLEAR |              |     | Transmission  | Reflection | Total<br>Elimination | Reflectance | Absorption 1 | Absorption 2 | Direct<br>Transmission | SHGC | Ratio | Air-gap            |       | Tdw-ISO | Air-gap<br>Rw    |       | Rating | Rating   |
|                             |              |     | 6 mm          | 12 mm      |                      |             |              |              |                        |      |       | 6 mm               | 12 mm |         | 6 mm             | 12 mm |        |          |
| 16111                       | Silver       | S10 | 10            | 43         | 83                   | 38          | 53           | 13           | 7                      | 0.17 | 0.20  | 3.03               | 2.68  | 8%      | 34               | 35    | 1      | 2        |
| 16122                       |              | S20 | 22            | 28         | 73                   | 26          | 56           | 3            | 15                     | 0.27 | 0.31  | 3.03               | 2.68  | 16%     | 34               | 35    | 1      | 2        |
| 16054                       |              | S30 | 32            | 20         | 65                   | 19          | 55           | 5            | 22                     | 0.35 | 0.40  | 3.03               | 2.68  | 23%     | 34               | 35    | 1      | 2        |
| 16112                       | Aquamarine   | S10 | 9             | 29         | 91                   | 28          | 64           | 2            | 7                      | 0.19 | 0.22  | 3.03               | 2.68  | 7%      | 34               | 35    | 1      | 2        |
| 16118                       |              | S20 | 18            | 21         | 73                   | 21          | 63           | 3            | 13                     | 0.27 | 0.30  | 3.03               | 2.68  | 13%     | 34               | 35    | 1      | 2        |
| 16045                       |              | S30 | 29            | 13         | 60                   | 13          | 61           | 4            | 21                     | 0.35 | 0.40  | 3.03               | 2.68  | 21%     | 34               | 35    | 1      | 2        |
| 16022                       | Blue         | S10 | 9             | 30         | 81                   | 31          | 61           | 2            | 7                      | 0.19 | 0.22  | 3.03               | 2.68  | 7%      | 34               | 35    | 1      | 2        |
| 16034                       |              | S20 | 17            | 28         | 75                   | 26          | 58           | 3            | 13                     | 0.25 | 0.29  | 3.03               | 2.68  | 14%     | 34               | 35    | 1      | 2        |
| 16115                       |              | S30 | 27            | 18         | 66                   | 17          | 58           | 5            | 21                     | 0.34 | 0.39  | 3.03               | 2.68  | 21%     | 34               | 35    | 1      | 2        |
| 16024                       | Bronze       | S10 | 7             | 16         | 80                   | 19          | 74           | 2            | 5                      | 0.20 | 0.23  | 3.03               | 2.68  | 5%      | 34               | 35    | 1      | 2        |
| 16036                       |              | S20 | 14            | 12         | 74                   | 14          | 73           | 3            | 11                     | 0.26 | 0.30  | 3.03               | 2.68  | 10%     | 34               | 35    | 1      | 2        |
| 16047                       |              | S30 | 20            | 10         | 69                   | 11          | 69           | 4            | 16                     | 0.31 | 0.36  | 3.03               | 2.68  | 14%     | 34               | 35    | 1      | 2        |
| 16027                       | Grey         | S10 | 6             | 13         | 80                   | 18          | 75           | 2            | 5                      | 0.20 | 0.23  | 3.03               | 2.68  | 5%      | 34               | 35    | 1      | 2        |
| 16038                       |              | S20 | 12            | 9          | 74                   | 13          | 74           | 3            | 11                     | 0.26 | 0.30  | 3.03               | 2.68  | 9%      | 34               | 35    | 1      | 2        |
| 16049                       |              | S30 | 17            | 8          | 70                   | 10          | 71           | 3            | 15                     | 0.30 | 0.35  | 3.03               | 2.68  | 12%     | 34               | 35    | 1      | 2        |
| 16028                       | Regal Blue   | S10 | 8             | 20         | 80                   | 25          | 67           | 2            | 7                      | 0.20 | 0.23  | 3.03               | 2.68  | 7%      | 34               | 35    | 1      | 2        |
| 16040                       |              | S20 | 14            | 16         | 75                   | 19          | 68           | 3            | 11                     | 0.25 | 0.28  | 3.03               | 2.68  | 12%     | 34               | 35    | 1      | 2        |
| 16051                       |              | S30 | 22            | 11         | 68                   | 13          | 65           | 4            | 18                     | 0.32 | 0.37  | 3.03               | 2.68  | 18%     | 34               | 35    | 1      | 2        |
| 16110                       | Arctic Snow  | S10 | 9             | 28         | 82                   | 36          | 56           | 2            | 7                      | 0.18 | 0.20  | 3.03               | 2.68  | 6%      | 34               | 35    | 1      | 2        |
| 16119                       |              | S20 | 23            | 24         | 72                   | 23          | 58           | 3            | 16                     | 0.28 | 0.33  | 3.03               | 2.68  | 17%     | 34               | 35    | 1      | 2        |
| 16120                       |              | S30 | 30            | 18         | 65                   | 17          | 58           | 4            | 22                     | 0.35 | 0.40  | 3.03               | 2.68  | 22%     | 34               | 35    | 1      | 2        |
| 16030                       | Serene Green | S10 | 10            | 32         | 80                   | 18          | 75           | 1            | 6                      | 0.20 | 0.23  | 3.02               | 2.68  | 7%      | 34               | 35    | 1      | 2        |
| 16042                       |              | S20 | 21            | 22         | 74                   | 13          | 73           | 2            | 11                     | 0.26 | 0.30  | 3.02               | 2.68  | 16%     | 34               | 35    | 1      | 2        |
| 16053                       |              | S30 | 31            | 16         | 69                   | 10          | 71           | 3            | 17                     | 0.31 | 0.36  | 3.02               | 2.68  | 22%     | 34               | 35    | 1      | 2        |

SOLARSHIELD WITH PVB CLEAR

## DOUBLE GLAZED

 SOLARSHIELD® AIR-GAP PVB CLEAR LOW E

| IGDB Product                      |              |     | Visible Light |            | Solar Energy      |             |              |              |                     |      | SC    | U-Value (W/m²)K |       | DWT     | Noise Control |       | Safety | Security |
|-----------------------------------|--------------|-----|---------------|------------|-------------------|-------------|--------------|--------------|---------------------|------|-------|-----------------|-------|---------|---------------|-------|--------|----------|
| SOLARSHIELD®<br>+ PVB CLEAR LOW E |              |     | Transmission  | Reflection | Total Elimination | Reflectance | Absorption 1 | Absorption 2 | Direct Transmission | SHGC | Ratio | Air-gap         |       | Tdw-ISO | Air-gap Rw    |       | Rating | Rating   |
|                                   |              |     |               |            |                   |             |              |              |                     |      |       | 6 mm            | 12 mm |         | 6 mm          | 12 mm |        |          |
| 16111                             | Silver       | S10 | 9             | 42         | 85                | 39          | 54           | 2            | 6                   | 0.15 | 0.17  | 2.41            | 1.88  | 7%      | 34            | 35    | 1      | 2        |
| 16122                             |              | S20 | 20            | 29         | 76                | 26          | 57           | 4            | 14                  | 0.24 | 0.28  | 2.41            | 1.88  | 15%     | 34            | 35    | 1      | 2        |
| 16054                             |              | S30 | 30            | 21         | 68                | 19          | 56           | 5            | 20                  | 0.32 | 0.36  | 2.41            | 1.88  | 21%     | 34            | 35    | 1      | 2        |
| 16112                             | Aquamarine   | S10 | 8             | 28         | 84                | 28          | 65           | 2            | 6                   | 0.16 | 0.18  | 2.41            | 1.88  | 6%      | 34            | 35    | 1      | 2        |
| 16118                             |              | S20 | 17            | 21         | 77                | 21          | 63           | 3            | 12                  | 0.23 | 0.27  | 2.41            | 1.88  | 13%     | 34            | 35    | 1      | 2        |
| 16045                             |              | S30 | 27            | 14         | 68                | 14          | 62           | 5            | 19                  | 0.32 | 0.36  | 2.41            | 1.88  | 19%     | 34            | 35    | 1      | 2        |
| 16022                             | Blue         | S10 | 9             | 30         | 84                | 31          | 62           | 2            | 6                   | 0.16 | 0.18  | 2.41            | 1.88  | 7%      | 34            | 35    | 1      | 2        |
| 16034                             |              | S20 | 16            | 28         | 78                | 27          | 58           | 3            | 12                  | 0.22 | 0.26  | 2.41            | 1.88  | 13%     | 34            | 35    | 1      | 2        |
| 16115                             |              | S30 | 25            | 18         | 70                | 18          | 59           | 5            | 19                  | 0.30 | 0.35  | 2.41            | 1.88  | 20%     | 34            | 35    | 1      | 2        |
| 16024                             | Bronze       | S10 | 7             | 16         | 83                | 19          | 74           | 2            | 5                   | 0.17 | 0.19  | 2.41            | 1.88  | 5%      | 34            | 35    | 1      | 2        |
| 16036                             |              | S20 | 13            | 12         | 77                | 14          | 73           | 3            | 10                  | 0.23 | 0.26  | 2.41            | 1.88  | 9%      | 34            | 35    | 1      | 2        |
| 16047                             |              | S30 | 19            | 10         | 72                | 10          | 70           | 5            | 15                  | 0.28 | 0.32  | 2.41            | 1.88  | 13%     | 34            | 35    | 1      | 2        |
| 16027                             | Grey         | S10 | 6             | 13         | 83                | 18          | 75           | 2            | 5                   | 0.17 | 0.19  | 2.41            | 1.88  | 4%      | 34            | 35    | 1      | 2        |
| 16038                             |              | S20 | 11            | 10         | 78                | 13          | 75           | 3            | 10                  | 0.22 | 0.26  | 2.41            | 1.88  | 9%      | 34            | 35    | 1      | 2        |
| 16049                             |              | S30 | 16            | 8          | 73                | 10          | 72           | 5            | 14                  | 0.27 | 0.31  | 2.41            | 1.88  | 12%     | 34            | 35    | 1      | 2        |
| 16028                             | Regal Blue   | S10 | 8             | 20         | 83                | 25          | 68           | 2            | 6                   | 0.17 | 0.19  | 2.41            | 1.88  | 6%      | 34            | 35    | 1      | 2        |
| 16040                             |              | S20 | 13            | 16         | 79                | 19          | 68           | 3            | 10                  | 0.21 | 0.25  | 2.41            | 1.88  | 11%     | 34            | 35    | 1      | 2        |
| 16051                             |              | S30 | 20            | 11         | 71                | 14          | 66           | 5            | 16                  | 0.29 | 0.33  | 2.41            | 1.88  | 16%     | 34            | 35    | 1      | 2        |
| 16110                             | Arctic Snow  | S10 | 9             | 38         | 85                | 36          | 57           | 2            | 6                   | 0.15 | 0.17  | 2.41            | 1.88  | 6%      | 34            | 35    | 1      | 2        |
| 16119                             |              | S20 | 21            | 24         | 75                | 23          | 59           | 4            | 15                  | 0.25 | 0.29  | 2.41            | 1.88  | 15%     | 34            | 35    | 1      | 2        |
| 16120                             |              | S30 | 28            | 18         | 69                | 17          | 58           | 5            | 20                  | 0.31 | 0.36  | 2.41            | 1.88  | 20%     | 34            | 35    | 1      | 2        |
| 16030                             | Serene Green | S10 | 10            | 32         | 83                | 19          | 75           | 2            | 5                   | 0.17 | 0.19  | 2.41            | 1.88  | 7%      | 34            | 35    | 1      | 2        |
| 16042                             |              | S20 | 20            | 22         | 77                | 21          | 74           | 2            | 10                  | 0.23 | 0.26  | 2.41            | 1.88  | 14%     | 34            | 35    | 1      | 2        |
| 16053                             |              | S30 | 29            | 16         | 72                | 10          | 72           | 3            | 15                  | 0.28 | 0.32  | 2.41            | 1.88  | 20%     | 34            | 35    | 1      | 2        |

SOLARSHIELD AIR-GAP PVB CLEAR LOW E

| IGDB           | Product              | Visible Light |            | Solar Energy      |             |              |              |                     |      | SC    | U-Value (W/m²)K                                       |      | DWT     | Noise Control                                            |    | Safety | Security |     |  |  |
|----------------|----------------------|---------------|------------|-------------------|-------------|--------------|--------------|---------------------|------|-------|-------------------------------------------------------|------|---------|----------------------------------------------------------|----|--------|----------|-----|--|--|
| NATIONAL GLASS |                      | Transmission  | Reflection | Total Elimination | Reflectance | Absorption 1 | Absorption 2 | Direct Transmission | SHGC | Ratio | Air-gap<br><div><div>6 mm</div><div>12 mm</div></div> |      | Tdw-ISO | Air-gap Rw<br><div><div>6 mm</div><div>12 mm</div></div> |    | Rating | Rating   |     |  |  |
| PVB            |                      |               |            |                   |             |              |              |                     |      |       |                                                       |      |         |                                                          |    |        |          |     |  |  |
| ZA300101       | Clear + Clear        | 78            | 14         | 32                | 11          | 19           | 12           | 58                  | 0.68 | 0.78  | 3.03                                                  | 2.68 | 56%     | 34                                                       | 35 | 1      | 2        |     |  |  |
| ZA300100/2     | Clear + Clear Low E  | 73            | 17         | 35                | 13          | 20           | 15           | 52                  | 0.65 | 0.74  | 2.41                                                  | 1.88 | 51%     | 34                                                       | 35 | 1      | 2        |     |  |  |
| 4mm            |                      |               |            |                   |             |              |              |                     |      |       |                                                       |      |         |                                                          |    |        |          |     |  |  |
| 16015          | Clear + Clear        | 80            | 15         | 25                | 13          | 11           | 8            | 68                  | 0.75 | 0.86  | 3.09                                                  | 2.28 | 72%     | 29                                                       | 30 |        |          |     |  |  |
| 16015/4140     | Clear + Clear Low E  | 74            | 18         | 30                | 16          | 11           | 15           | 58                  | 0.70 | 0.80  | 2.46                                                  | 1.93 | 64%     | 29                                                       | 30 |        |          |     |  |  |
| 4279/16015     | Grey + Clear         | 51            | 8          | 41                | 9           | 36           | 6            | 49                  | 0.59 | 0.68  | 3.09                                                  | 2.73 | 45%     | 29                                                       | 30 |        |          |     |  |  |
| 4279/4140      | Grey + Clear Low E   | 47            | 10         | 46                | 10          | 37           | 11           | 41                  | 0.54 | 0.62  | 2.46                                                  | 1.93 | 41%     | 29                                                       | 30 |        |          |     |  |  |
| 4279/16015     | Bronze + Clear       | 55            | 9          | 38                | 9           | 33           | 6            | 52                  | 0.62 | 0.71  | 3.09                                                  | 2.73 | 45%     | 29                                                       | 30 |        |          |     |  |  |
| 4279/4140      | Bronze + Clear Low E | 51            | 11         | 43                | 11          | 33           | 11           | 44                  | 0.57 | 0.65  | 2.46                                                  | 1.93 | 40%     | 29                                                       | 30 |        |          |     |  |  |
| 6mm            |                      |               |            |                   |             |              |              |                     |      |       |                                                       |      |         |                                                          |    |        |          | N/A |  |  |
| 16017          | Clear + Clear        | 79            | 15         | 28                | 12          | 15           | 11           | 63                  | 0.72 | 0.82  | 3.05                                                  | 2.70 | 69%     | 31                                                       | 34 |        |          |     |  |  |
| 16017/4142     | Clear + Clear Low E  | 73            | 17         | 33                | 15          | 16           | 16           | 54                  | 0.67 | 0.77  | 2.44                                                  | 1.91 | 61%     | 31                                                       | 34 |        |          |     |  |  |
| 4279/16017     | Grey + Clear         | 39            | 7          | 50                | 7           | 49           | 7            | 38                  | 0.50 | 0.58  | 3.05                                                  | 2.70 | 35%     | 31                                                       | 34 |        |          |     |  |  |
| 4267/4142      | Grey + Clear Low E   | 36            | 7          | 54                | 8           | 50           | 10           | 32                  | 0.46 | 0.53  | 2.44                                                  | 1.91 | 31%     | 31                                                       | 34 |        |          |     |  |  |
| 4269/16017     | Bronze + Clear       | 45            | 8          | 47                | 7           | 44           | 7            | 41                  | 0.53 | 0.61  | 3.05                                                  | 2.70 | 34%     | 31                                                       | 34 |        |          |     |  |  |
| 4269/4142      | Bronze + Clear Low E | 41            | 8          | 51                | 9           | 45           | 11           | 35                  | 0.49 | 0.56  | 2.44                                                  | 1.91 | 31%     | 31                                                       | 34 |        |          |     |  |  |

OTHER

OTHER

**Notes:**

- Performance data calculated using LBNL Software by an AAAMSA accredited SAFIERA simulator using NFRC 100 – 2010 environmental conditions
- These figures are based on Centre of Glass (CoG) values and exclude any framing components
- Low E coating is on surface 2 of the single glazed units and surface 3 of the double glazed units
- Slight variations may occur due to manufacturing tolerances

**Safety and Security Ratings:**

- Normal Strength (NS) for human impact safety (1 x 0.38mm PVB Interlayer)
- High Penetration Resistant (HPR) for additional security (2 x 0.38mm PVB Interlayers)
- High Impact (HI) for security in high-risk applications (4 x 0.38mm PVB Interlayers)

Ratings 1, 2 and 3 are compliant with SABS 1263 – 1 (Human Impact) and rating 3 is compliant with SANS 1263 – 2 (Vandalism)

## Winds of change...

The Association of Architectural Aluminium Manufacturers of South Africa (AAAMSA) was founded over 40 years ago with a primary focus on fostering trade within the industry.

Johan Heyneke has recently taken over the chairman reigns and will be directing the associations energies on marketing, training and regulation.

AAAMSA is looking to maximise members contribution ensuring sound fenestration practice.

“AAAMSA’s primary focus is to ensure safe and compliant fenestration”



JOHAN HEYNEKE - EXECUTIVE DIRECTOR

## Excellence through Knowledge and Design!

-  Technical expertise
-  Product certification
-  Industry credibility
-  Energy efficiency regulator
-  Electronic SAGGA glazing certificates
-  Close link with building inspections

### AAAMSA administers the following associations:

**Aluminium Industry**  
SAFIERA | ASDA | SASA



**Glass Industry**  
SAGI | SAGGA | SASEMA



**Insulation Industry**  
TIASA | EPSASA | TPMA



**Ceiling & Partitioning Industry**  
SABISA



## AAAMSA VISUAL INSPECTION CRITERIA

### ■ SCRATCHES AND BLEMISHES

Inspection will be viewed at a distance of 3 metres under reasonable lighting conditions under which the project is normally viewed.

### ■ FENESTRATION

Scratches on framing are defined as a mark on the surface which penetrates the powder coated, anodised or painted surface, thereby exposing the base material.

Flaws, stains, paint runs or other imperfections that mark the aesthetics of aluminium, which are visible from a distance of 3 metres under ambient lighting conditions, may result in the product being rejected.

*The above can be found in the AAAMSA selection guide.*

## THE LAW

### NATIONAL BUILDING REGULATIONS

#### SANS 10400-N GLAZING

Only applicable to a building less than 10m in height

### ■ TYPE AND FIXING OF GLAZING

- **Any material used in the glazing of any building shall be of a secure and durable type and shall be fixed in a manner and position that will ensure that it will:**
  - (a) Safely sustain any wind actions which can reasonably be expected;
  - (b) Not allow penetration of water to the interior of the building; and
  - (c) Be apparent, in the case of clear glazing, to any person approaching such glazing

**NOTE:** Neutral cure silicone to be used on all glazing applications.

### ■ GLAZING INSTALLATIONS

- **Glass glazing materials shall comply with requirements of parts 1 to 5 of SANS 50572**
- **Frames to receive glazing material shall comply with SANS 613 and be capable of withstanding the wind and impact loads determined in accordance with the requirements of SANS 10400-B without deflecting more than 1/175<sup>th</sup> of their span**
- **The thickness of panes of glass, other than in lifts shall:**
  - (a) Be no less than that given in tables 1 to 4, or
  - (b) Be determined by a Competent Person (glazing) in accordance with the requirements of SANS 10137, or
  - (c) Be based on wind loads determined in accordance with the requirements of SANS 10400-B

**NOTE:** SANS 10400-B requires that wind loads be determined by a Competent Person (structures). If no wind load is specified the default table (1-4) shall be used to determine the glass thickness.

- **The top and bottom of glass fins installed at butt joints of glass panes shall be fully fixed to the supporting structure and have overall dimensions as given in table 7. Silicone sealant that has a tensile strength of at least 1MPa shall be used.**

**NOTE:** A butt joint is assumed to have no structural strength. Therefore panels which incorporate a butt joint are not considered to be supported on all sides. A glass fin is necessary to provide the support at the joint so that the pane can be considered to be supported on four sides or two opposite sides.

### ■ GLASS FIN ASSEMBLY

- A minimum wind load of 600Pa is used for the determination of glass fin dimensions for internal and 1500Pa for external applications
- Glass fins must be made of safety glass ie. toughened, laminated or multi-laminated
- The thickness of panes of glass fins shall be no less than in table 7 (pg 29)

In terms of SANS 10400-N any deviations from the above, for example shaped fins, are to be approved by a duly appointed Competent Person (Glazing) in writing for each individual contract/application.

**NOTES:** Customer to supply own fin shoes for installation and must comply with SANS 10137.

### ■ SAFETY GLAZING

- All safety glazing material shall be permanently marked **by the installer** in such a manner that the markings are visible in individual panes after installation
- Safety glazing material that complies with the requirements of SANS 1263-1 shall be used where (see Figure H to J, pg 28):
  - (a) the occupancy or building classification is:
    - A3 (place of instruction)
    - E1 (place of detention)
    - E2 (hospital)
    - E3 (other institutional residential buildings)
    - H2 (dormitory)
  - (b) doors and sidelights form part of any entrance up to 2100mm from finished floor level;
  - (c) a window has a sill height of less than 500mm from the floor
  - (d) a window has a sill height of less than 800mm from the floor without any permanent barrier that prevents persons from coming into contact with the glass panel, and is so placed that persons are likely, on normal traffic routes, to move directly towards such a window;
  - (e) a bath enclosure or shower cubicle is glazed or where glazing occurs immediately above or within 1800mm of a bath or shower
  - (f) glazing is used in any shop front or display window within 2100mm from the finished floor level;
  - (g) glazing is used in any wall or balustrade to or immediately adjacent to a stairway, ramp, landing or balcony;
  - (h) glazing is used within 1800mm of the pitch line of a stairway or the surface of a ramp, landing or balcony;
  - (i) glazing applications are sloped or horizontal;
  - (j) a mirror is installed as a facing to a cupboard door less than 800mm above floor level and there is no solid backing;
  - (k) glazing is used around areas such as swimming pools and ice rinks;
  - (l) glazing is used in internal partitions, which are within 2100mm of floor level
- Glass in balustrades shall be toughened safety glass unless rigidly supported on all sides
- Glass in horizontal or sloping applications shall be laminated or toughened safety glass. Toughened safety glass shall only be used where individual panes are framed on all sides
- Wired glass that has two-edged support may be used in vertical glazing sawtooth roofs
- The thickness and maximum panel dimensions of frameless shower enclosures shall be as given in table 10 (pg 29)

## ■ PERMANENT MARKINGS ON SAFETY GLAZING MATERIALS

### • GLASS CODE ① : HUMAN IMPACT

#### (a) PVB laminate

- NS 0.38mm interlayer
- HPR 0.76mm interlayer

#### (b) Toughened safety glass

Any other glazing materials complying with the requirements of SANS 1263-1

### • GLASS CODE ② : BURGLARY & VANDALISM

#### (a) PVB Laminate

- HI 1.52mm interlayer

Any other glazing materials complying with the requirements of SANS 1263-2

### • GLASS CODE ③ : ARMED ATTACK

#### (a) Bullet resistant multi laminate

Any other glazing materials complying with the requirements of SANS 1263-3

PVB is tested by repeatedly dropping a 225g steel ball from a height of 9 metres. The impact of each drop is approximately equivalent to the blow from a hammer. The table shows the number of blows required to penetrate the glass:

| Laminate strength           | Abbreviation | No of blows |
|-----------------------------|--------------|-------------|
| Normal Strength             | NS           | 3           |
| High Penetration Resistance | HPR          | 8           |
| High Impact                 | HI           | 24          |

**NB:** The size of the hole at penetration is approximately 50mm in diameter. Many more blows are required to gain access.

**NOTE:** Wired glass is not regarded as safety glazing material unless it conforms to SANS 1263 Part 1.

*Toughened safety glass is permanently marked at the point of manufacture and must include the glass code.*

*Laminated glass is marked by etching, engraving or sand blasting. The mark consists of the glazer's name or initials together with the relevant glass code. The glass code must always be present and visible.*

## SANS 10160: STRUCTURAL DESIGN

### ■ BALUSTRADES

It is mandatory that any balustrade design is confirmed through testing or is structurally designed by a Competent Person Glazing (Cat 1) or structural engineer with the appropriate Professional Indemnity Insurance for compliance with the structural requirements of SANS 10160.

A residential balustrade guarding the edge of any balcony, bridge, flat roof or similar place more than 1m above the adjacent ground or floor level shall be no less than 1m in height and shall not have an opening that permits the passage of a 100mm diameter ball. These requirements also apply to an interior balcony or any mezzanine floor (SANS 10400-D). In addition balustrading guarding a swimming pool shall not be less than 1,2m high measured from the ground level.

## SANS 10137: INSTALLATION OF GLAZING

### ■ SETTING AND LOCATION BLOCKS

Before placing the glazing pane in the surround, where necessary place setting blocks into position on the rebate platform. With the exception of panes of an area not exceeding 0.3m<sup>2</sup>, rest the glazing pane on the setting blocks to centralize it within the surround. Use blocks with a length of 25mm to 75mm, except at the bottom bar of vertically pivoted windows, where a single block with a length of at least 150mm is sufficient. Use the location block in openable windows as well, to prevent distortion of the frame. Setting and location blocks should be of a material that is compatible with the glazing materials and sealants used and should be of hardness 50° to 90° Shore A durometer.

**NOTE:** Any organic setting blocks such as timber and masonite are unacceptable as they are not compatible with glazing material. They are not of suitable shore hardness; they rot and are eaten by insects.

### ■ SOUTH AFRICAN GLASS INSTITUTE

Competent Persons Glazing (Cat 2) can deviate from deemed to satisfy tables in SANS 10400-N using a rational design from wind loading charts found in SANS 10137.

A special application of glass such as, but not limited to, underwater viewing panels, glass floors, glass balustrades, stair treads, frameless entrances and bolted assemblies require the written approval of a Competent Person Glazing (Cat 1). Such written approval shall be included with the glazing certificate issued to the building inspector for the relevant contract.

National Glass Distribution has a number of Competent Persons Glazing to assist you with technical advice.

Nic Kruger, our National Sales and Marketing Manager, has been awarded Competent Person Glazing (Cat 1) status by the South African Glass Institute.

He joins an elite group of industry leaders, being only the 2nd person to achieve this in 12 years.

National Glass has built a formidable advisory of SAGI graduates comprising of a Competent Person Glazing (Cat 1) and numerous (Cat 2) as well as a team of qualified SAFIERA thermal simulators.

They are able to assist in optimizing your glass and aluminium requirements to achieve the most cost effective solutions.

## ■ THERMAL STRESS

It is the responsibility of the persons installing the glass to ensure that it does not crack due to thermal or other causes. The installer should request a thermal stress evaluation by the glass manufacturer or Competent Person (Cat 1) to protect the interests of all parties concerned before commencement of the project.

### • What is Thermal Stress?

- (a) The internal stresses created when glass is subjected to variations in temperature across its area
- (b) Edges are cooler than the centre of the glass and they expand at different rates
- (c) When the Safe Temperature Difference (STD) between the centre and edge is exceeded (40°C for annealed and laminated), the glass is under thermal stress and may crack
- (d) Generally higher risk in solar control glasses – the higher the solar absorption the higher the risk of thermal stress cracks
- (e) Thermal breakage is generally recognised by the fact that it starts perpendicular to the edge of the glass and results in a 'lazy' crack
- (f) Damaged edges may cause cracking at a lower than expected temperature differential

Refer to figure E (pg 27) for thermal stress illustrations

### • Factors which influence Thermal Break

- (a) Glass type and solar absorption
- (b) Location
- (c) Orientation
- (d) Blinds and shutters
- (e) Framing material and mullions
- (f) Overhangs
- (g) Columns

### • Summary

- (a) High heat absorbing glass requires thermal stress analysis
- (b) Blinds, framing, overhangs, column widths, location, orientation and edgework affect the thermal stress of the glass
- (c) Thermal cracks will always originate on the edge and start perpendicular to the edge
- (d) Always ensure edges have no chips or shells and are machine polished
- (e) With double glazed (SIG) units the outer panel is generally more at risk than the inner panel
- (f) Refer to figure C (pg 27) for factors influencing thermal break

### • National Glass Thermal Stress Evaluation Form

Refer to page 40 for evaluation form

## SANS 1414: SPECIFICATIONS OF SIG UNITS

### ■ SIG UNITS

Double Glazed Units (SIG) are manufactured from two or more panes of glass held apart by a spacer and bonded with a hermetic seal, trapping dehydrated air between the glass panes.

National Glass Distribution manufactures SIG's using black flexible spacer bars and promotes Warm Edge, which contributes to energy efficient fenestration products.

This flexible spacer follows the edge of the glass and is a complete insulating glass spacer system which requires only one start and finish joint. It limits heat loss transmission through the spacer bar. Warm Edge Technology also performs better with regards to heat loss through the unit.

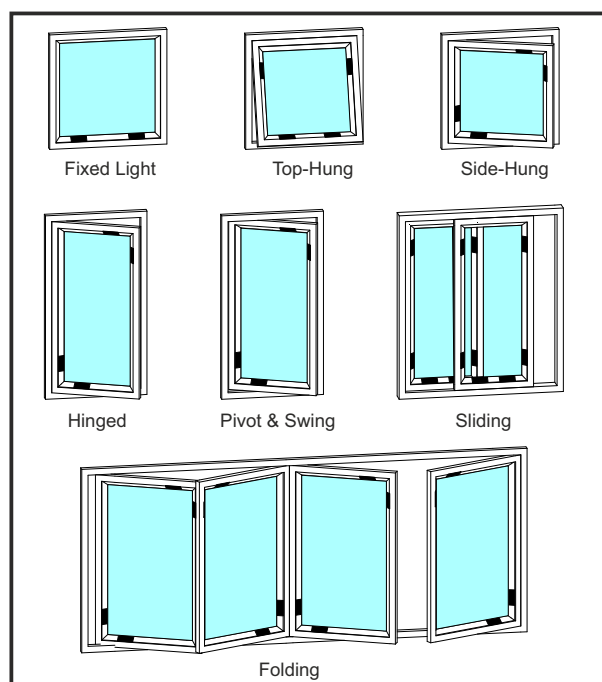
### • Benefits of SIG's:

- (a) Controls heat and cold transfer through fenestration
- (b) The reduction of sound transmission
- (c) Increased wind-loading resistance
- (d) Minimizing the formation of condensation on glass
- (e) Increasing safety and security

### • Glazing Instructions:

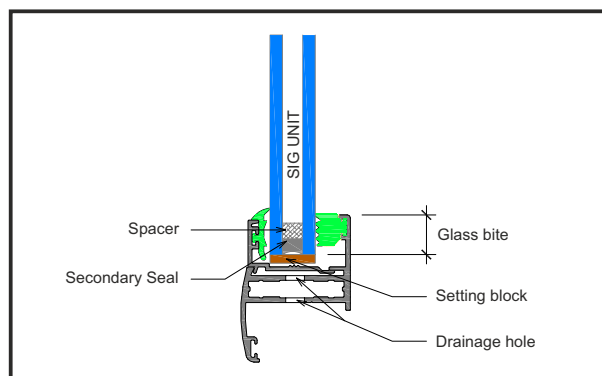
- (a) Position the breather tube (if supplied) to the top side of the jamb (vertical) facing downwards. Crimp and seal the breather tube once the unit is at its final installation
- (b) Ensure that the framing system has sufficient weep holes/drainage and that SIG's are glazed with setting blocks wide enough to support both panes of glass in accordance with SANS 10137 (refer to Figure A pg 27)
- (c) Neutral cure silicone is the only recommended sealant when glazing SIG's. Consult with the sealant manufacture to ensure compatibility of the products
- (d) Flexible Warm Edge units are not suitable for flush or pressure glazed applications
- (e) Units with a high solar absorption may require a thermal stress evaluation which is the responsibility of the installer
- (f) Unless otherwise indicated, Low E coated glass will be glazed to surface 3 of the SIG
- (g) An SIG order form may be required on receipt of order if information is missing

**Figure A:** Setting block positions

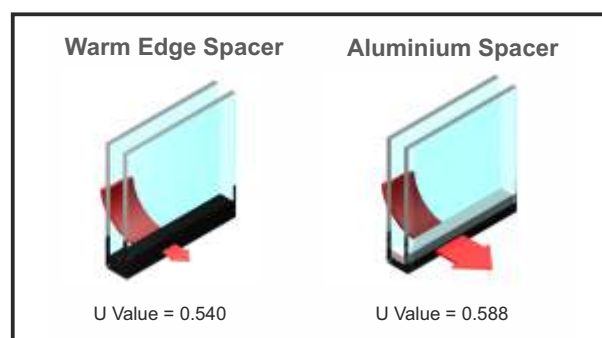


**Note:** For doors this document must be viewed together with the "Heel & Toe Guide"

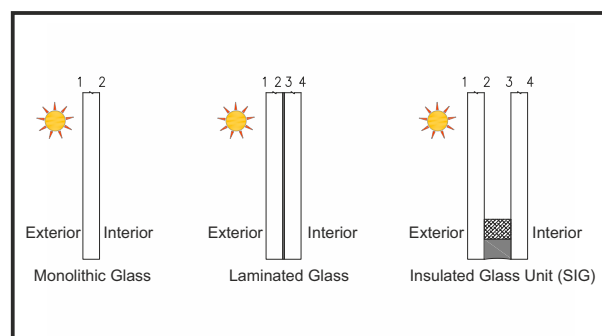
**Figure B:** SIG units - glazing detail



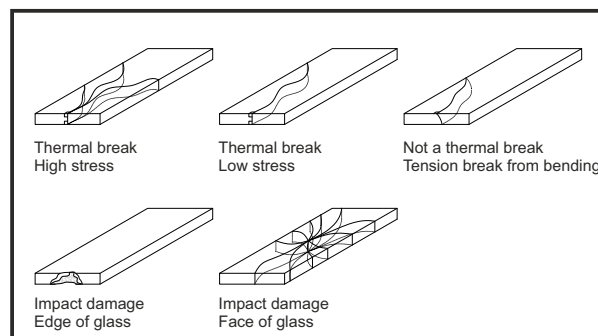
**Figure C:** SIG Units



**Figure D:** Surface drawing

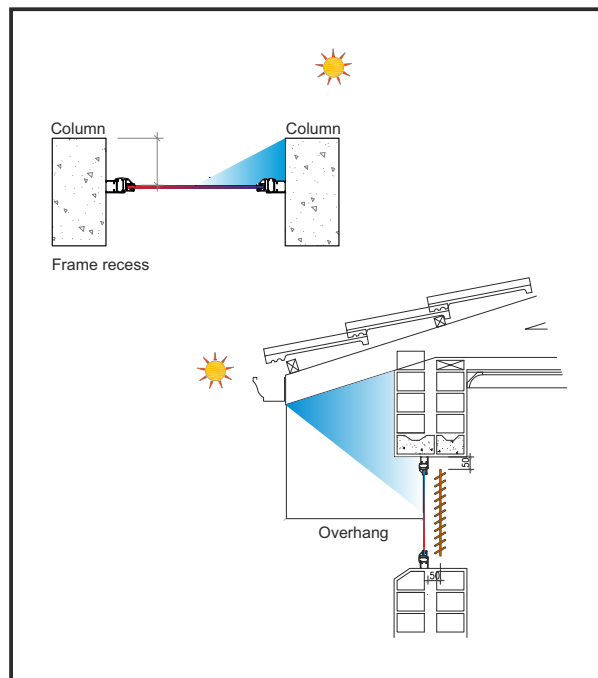


**Figure E:** Thermal stress

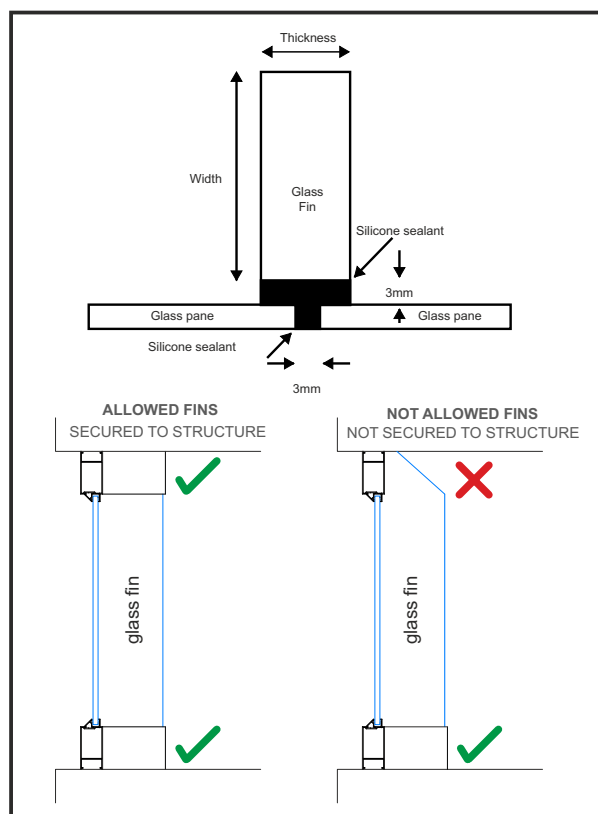


**Note:** Low stress below 10 343 Pa (below 1500 psi)

**Figure F:** Thermal stress factors



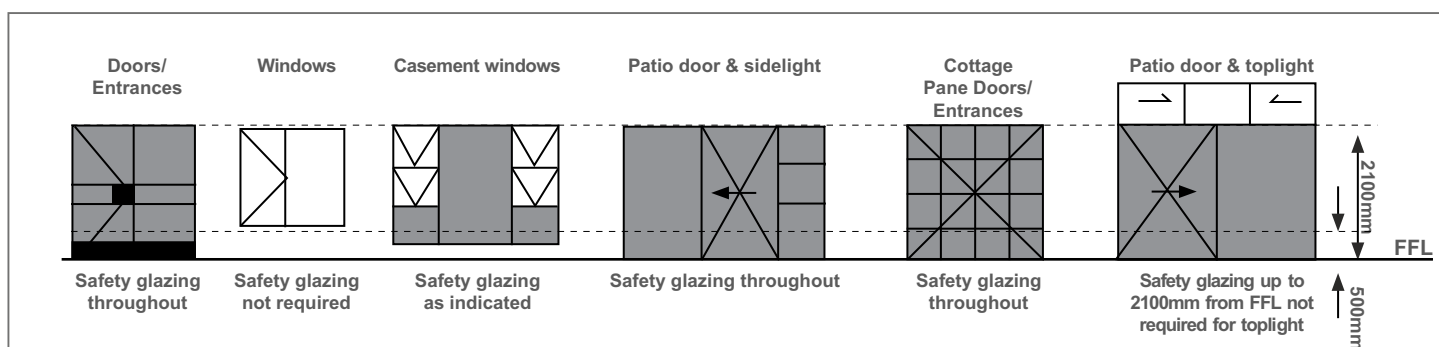
**Figure G:** Glass fin assembly detail



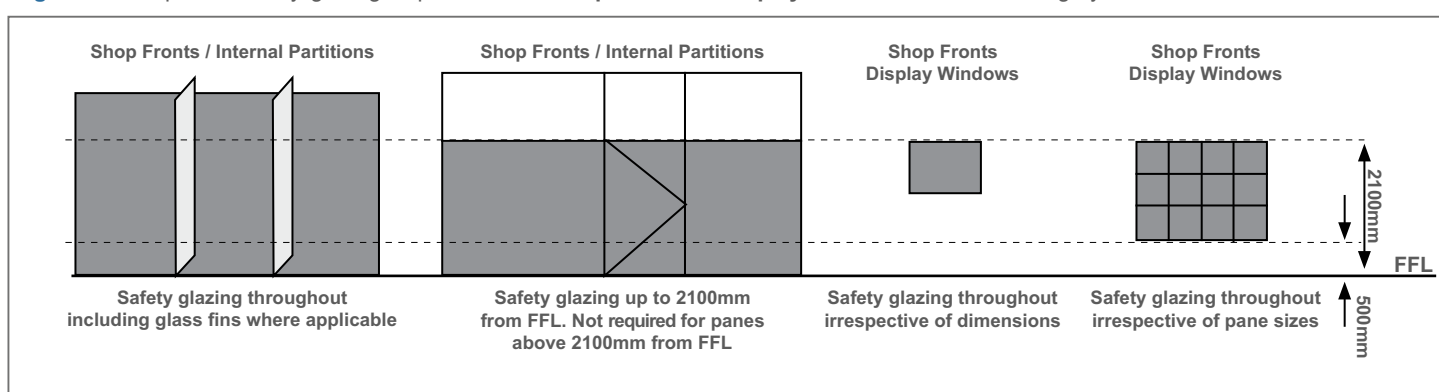
**Note:** The above has been based on SANS 10400-N: 2012 Edition 3.1 for a fin height/main pane width ration of 1.0 or less.

## SANS 10400-N EXAMPLES

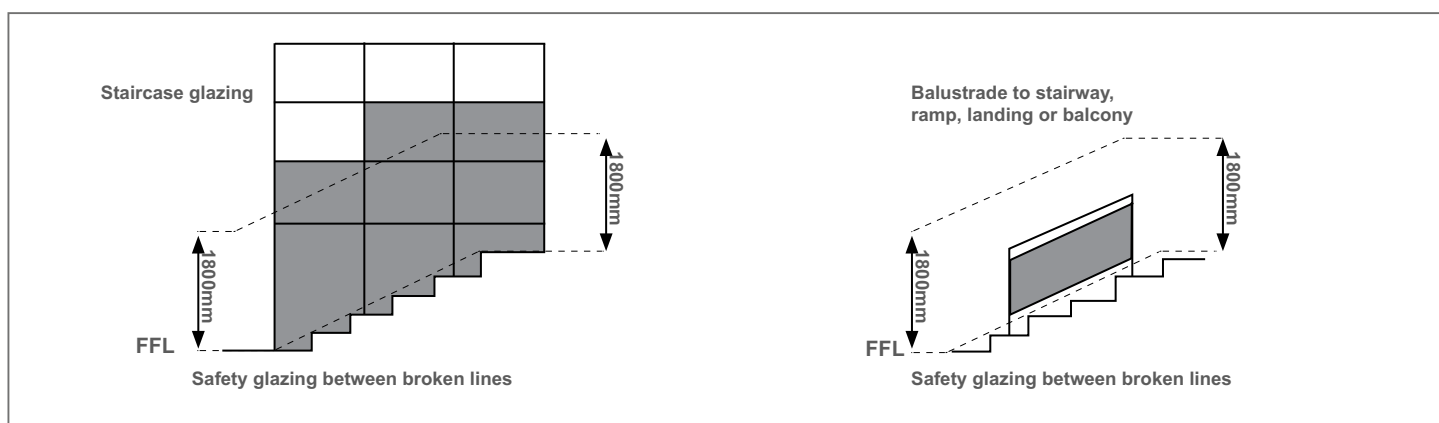
**Figure H:** Examples of safety glazing requirements in **doors** and **windows** as indicated in grey



**Figure I:** Examples of safety glazing requirements in **shop fronts** or **display windows** as indicated in grey



**Figure J:** Examples of safety glazing requirements around **staircases** and **landings** as indicated in grey



\*FFL: Finished Floor Level

## TABLES

## ■ SANS 10400-N TABLES

**Table 1:** Dimension for the vertical glass supported in a frame **on all sides in external walls** in a building where the height measured from the ground to the top of such wall does not exceed 10m.

| Type of Glass              | Maximum pane area m <sup>2</sup><br>Nominal glass thickness in mm |      |     |     |     |     |     |
|----------------------------|-------------------------------------------------------------------|------|-----|-----|-----|-----|-----|
|                            | 3                                                                 | 4    | 5   | 6   | 8   | 10  | 12  |
| Monolithic annealed        | 0.75                                                              | 1.5  | 2.1 | 3.2 | 4.6 | 6.0 | 6.0 |
| Patterned annealed & wired | -                                                                 | 0.75 | 1.2 | 1.9 | 2.6 | 3.4 | -   |
| Laminated annealed safety  | -                                                                 | -    | -   | 2.9 | 4.3 | 5.7 | 5.7 |
| Toughened safety           | -                                                                 | 1.9  | 3.0 | 4.5 | 8.0 | 8.0 | 8.0 |

**Table 2:** Dimensions for vertical glass supported by a frame **on all sides in internal walls**.

| Type of Glass              | Maximum pane area m <sup>2</sup><br>Nominal glass thickness in mm |      |     |     |     |     |     |
|----------------------------|-------------------------------------------------------------------|------|-----|-----|-----|-----|-----|
|                            | 3                                                                 | 4    | 5   | 6   | 8   | 10  | 12  |
| Monolithic annealed        | 0.75                                                              | 1.5  | 2.1 | 3.2 | 4.6 | 6.0 | 6.0 |
| Patterned annealed & wired | -                                                                 | 0.75 | 1.2 | 1.9 | 2.6 | 3.4 | -   |
| Laminated annealed safety  | -                                                                 | -    | -   | 4.1 | 6.0 | 7.2 | 7.2 |
| Toughened safety           | -                                                                 | 3.0  | 4.2 | 6.4 | 9.2 | 9.2 | 9.2 |

**Table 3:** Dimensions for vertical glass supported by a frame **on two opposite sides in external walls** in buildings where the height measured from the ground to the top of such wall does not exceed 10m.

| Type of Glass              | Max pane span between supports in m<br>Nominal glass thickness in mm |      |     |      |      |      |     |
|----------------------------|----------------------------------------------------------------------|------|-----|------|------|------|-----|
|                            | 3                                                                    | 4    | 5   | 6    | 8    | 10   | 12  |
| Monolithic annealed        | -                                                                    | 0.4  | 0.5 | 0.6  | 0.85 | 1.0  | 1.3 |
| Patterned annealed & wired | -                                                                    | 0.25 | 0.3 | 0.35 | 0.5  | 0.6  | -   |
| Laminated annealed safety  | -                                                                    | -    | -   | 0.55 | 0.8  | 0.95 | 1.2 |
| Toughened safety           | -                                                                    | 0.55 | 0.7 | 0.85 | 1.15 | 1.3  | 1.8 |

**Table 4 :** Dimensions for vertical glass support by a frame **on two opposite sides in internal walls**.

| Type of Glass              | Max pane span between supports in m<br>Nominal glass thickness in mm |      |      |      |      |      |      |
|----------------------------|----------------------------------------------------------------------|------|------|------|------|------|------|
|                            | 3                                                                    | 4    | 5    | 6    | 8    | 10   | 12   |
| Monolithic annealed        | -                                                                    | 0.65 | 0.8  | 0.95 | 1.3  | 1.55 | 2.0  |
| Patterned annealed & wired | -                                                                    | 0.4  | 0.48 | 0.57 | 0.78 | 0.9  | -    |
| Laminated annealed safety  | -                                                                    | -    | -    | 0.9  | 1.25 | 1.5  | 1.95 |
| Toughened safety           | -                                                                    | 0.9  | 1.1  | 1.3  | 1.75 | 2.0  | 2.7  |

**Table 7:** Minimum glass fin dimensions in a building where the height measured from the ground to the top of such wall does not exceed 10m.

| Fin height in m | Fin dimensions in mm  |                       |
|-----------------|-----------------------|-----------------------|
|                 | Internal Applications | External Applications |
| 1.5             | 150 x 12              | 150 x 15              |
| 2               | 150 x 12              | 150 x 19              |
| 2.5             | 150 x 12              | 175 x 19              |
| 3               | 175 x 15              | 200 x 25              |
| 3.5             | 225 x 15              | 275 x 25              |
| 4               | 275 x 15              | 300 x 25              |

**Table 8:** Flat glass pane to be used in lift car walls.

| Type of glass        | Diameter of inscribed circle |                  |
|----------------------|------------------------------|------------------|
|                      | 1m Max                       | 2m Max           |
|                      | Minimum thickness mm         |                  |
| Toughened, Laminated | 8<br>(4+4+0.76)              | 10<br>(5+5+0.76) |
| Laminated            | 10<br>(5+5+0.76)             | 12<br>(6+6+0.76) |

**Table 9:** Flat glass panels to be used in horizontally sliding doors in lifts.

| Type of Glass        | Min thickness mm               | Width mm   | Free door height mm | Fixing of the glass panels           |
|----------------------|--------------------------------|------------|---------------------|--------------------------------------|
| Toughened, Laminated | 16<br>(8+8+0.76)               | 360 TO 720 | 2.1 Max             | Two fixings upper & lower            |
| Laminated            | 16<br>(8+8+0.76)               | 300 TO 720 | 2.1 Max             | Three fixings upper/lower & one side |
|                      | 10<br>(6+4+0.76)<br>(5+5+0.76) | 300 TO 870 | 2.1 Max             | All sides                            |

**Note:** These are only valid provided that, in the case of the three-side, four-side fixing, the fixings are rigidly connected to each other.

**Table 10:** Dimensions for flat frameless glass shower enclosures.

| Toughened safety glass thickness mm | Maximum panel size in m <sup>2</sup> |              |
|-------------------------------------|--------------------------------------|--------------|
|                                     | Doors and panels supporting doors    | Fixed panels |
| 6                                   | 1.6                                  | 2.1          |
| 8                                   | 2.0                                  | 3.3          |
| 10                                  | 2.2                                  | 4.0          |

**Table 11:** Maximum Glazing m<sup>2</sup> of 4 edge supported SIG's in a building where the height measured from the ground to the top of such wall does not exceed 10m.

| Double glazing (SIG)                                                                                                                                                                                                 |                                                                              |      |      |      |       |       |       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------|------|------|-------|-------|-------|
| Dimensions for vertical SIG supported by a frame on all sides in external walls in buildings where the height measured from the ground to the top of such wall does not exceed 10m and in all internal applications. |                                                                              |      |      |      |       |       |       |
| Type of Glass                                                                                                                                                                                                        | Maximum pane area in m <sup>2</sup><br>Nominal glass thickness weakest light |      |      |      |       |       |       |
|                                                                                                                                                                                                                      | 3                                                                            | 4    | 5    | 6    | 8     | 10    | 12    |
| Monolithic annealed                                                                                                                                                                                                  | 1.00                                                                         | 2.00 | 2.80 | 4.27 | 6.13  | 8.00  | 8.00  |
| Patterned annealed & wired                                                                                                                                                                                           | -                                                                            | 1.00 | 1.60 | 2.53 | 3.47  | 4.53  | -     |
| Laminated annealed safety                                                                                                                                                                                            | -                                                                            | -    | -    | 3.87 | 5.73  | 7.60  | 7.60  |
| Toughened safety                                                                                                                                                                                                     | -                                                                            | 2.53 | 4.00 | 6.00 | 10.67 | 10.67 | 10.67 |

\*Table 11 is based on AAAMSA recommended guidelines

Table 12: Building classifications

| Category | Class | Occupancy                                                                                                                                                                                                                                                                                                                 |
|----------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A        | A1    | <b>Entertainment and public assembly</b><br>• Occupancy where persons gather to eat, drink, dance or participate in other recreation.                                                                                                                                                                                     |
|          | A2    | <b>Theatrical and indoor sport</b><br>• Occupancy where persons gather for the viewing of theatrical, operatic, orchestral, choral, cinematographic or sport performances.                                                                                                                                                |
|          | A3    | <b>Places of instruction</b> (S)<br>• Occupancy where school children, students or other persons assemble for the purpose of tuition or learning.                                                                                                                                                                         |
|          | A4    | <b>Worship</b><br>• Occupancy where persons assemble for the purpose of worshipping.                                                                                                                                                                                                                                      |
|          | A5    | <b>Outdoor sport</b><br>• Occupancy where persons view outdoor sports events.                                                                                                                                                                                                                                             |
| B        | B1    | <b>High risk commercial service</b><br>• Occupancy where a non-industrial process is carried out and where either the material handled or the process carried out is liable, in the event of fire, to cause combustion with extreme rapidity or give rise to poisonous fumes, or cause explosions.                        |
|          | B2    | <b>Moderate risk commercial service</b><br>• Occupancy where a non-industrial process is carried out and where either the material handled or the process carried out is liable, in the event of fire, to cause combustion with moderate rapidity but is not likely to give rise to poisonous fumes, or cause explosions. |
|          | B3    | <b>Low risk commercial service</b><br>• Occupancy where a non-industrial process is carried out and where neither the material handled nor the process carried out falls into the high or moderate risk category.                                                                                                         |
| C        | C1    | <b>Exhibition hall</b><br>• Occupancy where goods are displayed primarily for viewing by the public.                                                                                                                                                                                                                      |
|          | C2    | <b>Museum</b><br>• Occupancy comprising a museum, art gallery or library.                                                                                                                                                                                                                                                 |
| D        | D1    | <b>High risk industrial</b><br>• Occupancy where an industrial process is carried out and where either the material handled or the process carried out is liable, in the event of fire, to cause combustion with extreme rapidity or give rise to poisonous fumes, or cause explosions.                                   |
|          | D2    | <b>Moderate risk industrial</b><br>• Occupancy where an industrial process is carried out and where either the material handled or the process carried out is liable, in the event of fire, to cause combustion with moderate rapidity but is not likely to give rise to poisonous fumes, or cause explosions.            |
|          | D3    | <b>Low risk industrial</b><br>• Occupancy where an industrial process is carried out and where neither the material handled nor the process carried out falls into the high or moderate risk category.                                                                                                                    |
|          | D4    | <b>Plant room</b><br>• Occupancy comprising usually unattended mechanical or electrical services necessary for the running of a building.                                                                                                                                                                                 |
| E        | E1    | <b>Place of detention</b> (S)<br>• Occupancy where people are detained for punitive or corrective reasons or because of their mental condition.                                                                                                                                                                           |
|          | E2    | <b>Hospital</b> (S)<br>• Occupancy where people are cared for or treated because of physical or mental disabilities and where they are generally bedridden.                                                                                                                                                               |
|          | E3    | <b>Other institutional (residential)</b> (S)<br>• Occupancy where groups of people who either are not fully fit, or who are restricted in their movements or their ability to make decisions, reside and are cared for.                                                                                                   |
|          | E4    | <b>Health care</b><br>• Occupancy which is a common place of long term or transient living for a number of unrelated persons consisting of a single unit on its own site who, due to varying degrees of incapacity, are provided with personal care services or are undergoing medical treatment.                         |

Table 12: Building classifications continued...

| Category | Class | Occupancy                                                                                                                                                                                                                                                                                           |
|----------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F        | F1    | <b>Large shop</b> <ul style="list-style-type: none"> <li>Occupancy where merchandise is displayed and offered for sale to the public and the floor area exceeds 250m<sup>2</sup></li> </ul>                                                                                                         |
|          | F2    | <b>Small shop</b> <ul style="list-style-type: none"> <li>Occupancy where merchandise is displayed and offered for sale to the public and the floor area does not exceed 250m<sup>2</sup></li> </ul>                                                                                                 |
|          | F3    | <b>Wholesalers' store</b> <ul style="list-style-type: none"> <li>Occupancy where goods are displayed and stored and where only a limited selected group of persons is present at any one time.</li> </ul>                                                                                           |
| G        | G1    | <b>Offices</b> <ul style="list-style-type: none"> <li>Occupancy comprising offices, banks, consulting rooms and other similar usage.</li> </ul>                                                                                                                                                     |
| H        | H1    | <b>Hotel</b> <ul style="list-style-type: none"> <li>Occupancy where persons rent furnished rooms, not being dwelling units.</li> </ul>                                                                                                                                                              |
|          | H2    | <b>Dormitory</b> (S) <ul style="list-style-type: none"> <li>Occupancy where groups of people are accommodated in one room.</li> </ul>                                                                                                                                                               |
|          | H3    | <b>Domestic residence</b> <ul style="list-style-type: none"> <li>Occupancy consisting of two or more dwelling units on a single site.</li> </ul>                                                                                                                                                    |
|          | H4    | <b>Dwelling house</b> <ul style="list-style-type: none"> <li>Occupancy consisting of a dwelling unit on its own site, including a garage and other domestic outbuildings, if any.</li> </ul>                                                                                                        |
|          | H5    | <b>Hospitality</b> <ul style="list-style-type: none"> <li>Occupancy where unrelated persons rent furnished rooms on a transient basis within a dwelling house or domestic residence with sleeping accommodation for not more than 16 persons within a dwelling unit.</li> </ul>                     |
| J        | J1    | <b>High risk storage</b> <ul style="list-style-type: none"> <li>Occupancy where material is stored and where the stored material is liable, in the event of fire, to cause combustion with extreme rapidity or give rise to poisonous fumes, or cause explosions.</li> </ul>                        |
|          | J2    | <b>Moderate risk storage</b> <ul style="list-style-type: none"> <li>Occupancy where material is stored and where the stored material is liable, in the event of fire, to cause combustion with moderate rapidity but is not likely to give rise to poisonous fumes, or cause explosions.</li> </ul> |
|          | J3    | <b>Low risk storage</b> <ul style="list-style-type: none"> <li>Occupancy where the material stored does not fall into the high or moderate risk category.</li> </ul>                                                                                                                                |
|          | J4    | <b>Parking garage</b> <ul style="list-style-type: none"> <li>Occupancy used for storing or parking of more than 10 motor vehicles.</li> </ul>                                                                                                                                                       |

(S) indicates that safety glass is required throughout the building, irrespective of glazing position



NATIONAL GLASS  
DISTRIBUTION

# WHAT TO LOOK FOR IN ENERGY EFFICIENT PRODUCTS

## National Glass Distribution guidelines when choosing performance glass

Choosing the correct performance glass is a vital aspect of any building as it has a considerable impact on quality of life within the home. A more comfortable and energy efficient living environment can be achieved when glazed elements are implemented in accordance with SANS 10400 XA (Energy Usage) and SANS 204 (Energy Efficiency in Buildings) standards.

Key to understanding energy efficiency is knowing what **U-Values** and **Solar Heat Gain** are. Glass and glazed products are rated according to these and assigned values.

**U-Value** is a unit of measurement describing the ability of any given building element such as a window, wall, or roof to transfer heat. The lower the number, the better the insulation; ie. less heat is being lost to the outside. The higher the number, the more energy is being transferred and the higher the costs of heating/cooling the building.

**Solar Heat Gain Coefficient** is usually referred to as SHGC. This measures the glass' ability to transmit solar energy into a room. The higher the value, the greater its ability to transmit solar heat. Depending on circumstances such as elevation, altitude, latitude and geographical location (bottom of a cold valley or up on a sun soaked hill), the requirement for higher or lower SHGC should be carefully considered.

Heat escapes through glass, so energy efficiencies can be substantially improved by using glass that offers better insulation than plain monolithic (single layer) clear glass. To reduce heat loss through glazed elements, a Low E (low emissivity) glass or double glazing unit is recommended.

### Benefits of double glazing:

- Improved sound reduction
- Improved security
- Improved resistance to wind-loads
- Improved thermal insulation
- Improved solar energy control
- Minimized condensation

The type of spacers used in double glazing is important, as some may transfer energy and require multiple joints (potential for leaks). **National Glass Distribution** units are made using flexible, non-conductive, "Warm Edge Technology" spacers. These perform better than aluminium spacers with regards to heat loss and the flexible spacer follows the full perimeter of the glass, thus requiring only one joint.

In South Africa where we have a warmer climate, **National Glass Distribution** recommends the following cost effective double glazing make up **Solarvue Neutral – 12mm Air Gap – NG PVB Clear**.

Where glass with a *higher solar absorption factor* is specified, it is recommended that a *thermal stress analysis* is carried out to avoid thermal stress cracks. These can occur when the centre of the glass becomes hotter than the edges.

A glazing certificate should be requested from the installer to ensure that the installation complies with the SANS 10400-N (Glazing) standard, which means that the correct glass thickness has been used and that safety glass has been used where required.

**National Glass Distribution** proudly carries the SANS 1263-1 mark on all of its safety glass and conforms to SANS 613 with its Eagle Aluminium product range.

## Q&A

### Thermal Stress Analysis requested?

*This indicates if the glass will crack due to the thermal differences between the glass and frame. National Glass can provide this for your installer.*

### Will the unit keep heat in or out?

*It's important to understand what you want the glass to achieve. For warmer climates one should focus on the SHGC value. If you reside in a colder climate, the U-value is important.*

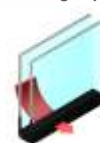
### Correct setting blocks used?

*Setting blocks are used to install glass in the frame. If the incorrect blocks are used, there is a chance the glass will break.*

### Breather tube on the unit?

*A breather tube is inserted into the glass, to allow the glass to expand and contract if moving between different altitudes. Once the glass is installed the breather tube will need to be crimped by the installer to avoid condensation build up in the unit.*

Warm Edge Spacer



U Value = 0.540

Aluminium Spacer



U Value = 0.588

**National Glass Distribution** is affiliated with the following associations: AAAMSA, SAGGA, SAGI and SAFIERA.



## Simulated Complete Fenestration Product Performance Values

| Single Glazed                                                                                                                                 |         |       | 4mm Clear                          |         |       | 4mm Clear Low E                          |         |       | 5mm Clear                             |         |       | 6.38mm Clear                          |         |       | 6.38mm Clear Low E                    |         |       | 6.38mm S/V Neu HL Low E |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------|---------|-------|------------------------------------|---------|-------|------------------------------------------|---------|-------|---------------------------------------|---------|-------|---------------------------------------|---------|-------|---------------------------------------|---------|-------|-------------------------|--|--|
| Doors:<br>Patio<br>Quad<br>Palace<br>Hinged                                                                                                   | U-VALUE | SHGC  | VT                                 | U-VALUE | SHGC  | VT                                       | U-VALUE | SHGC  | VT                                    | U-VALUE | SHGC  | VT                                    | U-VALUE | SHGC  | VT                                    | U-VALUE | SHGC  | VT                      |  |  |
|                                                                                                                                               |         |       |                                    |         |       |                                          | 6,332   | 0,693 | 0,718                                 |         |       |                                       | 6,278   | 0,659 | 0,710                                 | 4,634   | 0,584 | 0,666                   |  |  |
|                                                                                                                                               |         |       |                                    |         |       |                                          |         |       |                                       |         |       |                                       | 6,297   | 0,633 | 0,680                                 | 4,757   | 0,562 | 0,637                   |  |  |
|                                                                                                                                               |         |       |                                    |         |       |                                          |         |       |                                       |         |       |                                       | 6,314   | 0,546 | 0,575                                 | 5,003   | 0,485 | 0,538                   |  |  |
|                                                                                                                                               |         |       |                                    |         |       |                                          |         |       |                                       |         |       |                                       | 5,929   | 0,567 | 0,594                                 | 4,495   | 0,503 | 0,556                   |  |  |
| Windows:<br>Elite Slider<br>1000 Slider<br>Vertical Slider<br>Casement 30<br>Casement 36<br>Casement 30 Fix<br>Casement 36 Fix<br>Clip 44 Fix |         |       |                                    |         |       |                                          |         |       |                                       |         |       |                                       |         |       |                                       |         |       |                         |  |  |
|                                                                                                                                               | 6,569   | 0,647 | 0,659                              | 5,057   | 0,564 | 0,609                                    |         |       |                                       | 6,484   | 0,610 | 0,650                                 | 4,981   | 0,541 | 0,541                                 | 4,983   | 0,333 | 0,316                   |  |  |
|                                                                                                                                               | 6,626   | 0,624 | 0,631                              | 5,187   | 0,545 | 0,583                                    |         |       |                                       | 6,577   | 0,589 | 0,623                                 | 5,107   | 0,523 | 0,583                                 | 5,108   | 0,323 | 0,303                   |  |  |
|                                                                                                                                               | 6,435   | 0,683 | 0,701                              | 4,832   | 0,595 | 0,647                                    |         |       |                                       |         |       |                                       |         |       |                                       |         |       |                         |  |  |
|                                                                                                                                               | 5,928   | 0,678 | 0,693                              | 4,289   | 0,590 | 0,640                                    |         |       |                                       |         |       |                                       |         |       |                                       |         |       |                         |  |  |
|                                                                                                                                               | 5,939   | 0,674 | 0,689                              | 4,320   | 0,587 | 0,636                                    |         |       |                                       | 5,841   | 0,636 | 0,681                                 | 4,216   | 0,565 | 0,641                                 | 4,211   | 0,345 | 0,332                   |  |  |
|                                                                                                                                               | 5,830   | 0,742 | 0,768                              | 3,990   | 0,645 | 0,709                                    |         |       |                                       | 5,857   | 0,636 | 0,680                                 | 4,252   | 0,563 | 0,637                                 | 4,247   | 0,344 | 0,330                   |  |  |
|                                                                                                                                               | 5,847   | 0,738 | 0,763                              | 4,031   | 0,642 | 0,705                                    |         |       |                                       | 5,733   | 0,698 | 0,757                                 | 3,909   | 0,618 | 0,710                                 | 3,909   | 0,373 | 0,368                   |  |  |
| Double Glazed (6.5mm)                                                                                                                         |         |       | 4mm Clear - 6.5mm - 4mm Clear      |         |       | 6.38mm Clear - 6.5mm - 6.38mm Clear      |         |       | 6.38mm Clear - 6.5 - 4mm Clear TSG    |         |       | 6.38mm SV Neu HL- 6.5 - 4mm TSG Low E |         |       | 6.38mm SV Neu HL- 6.5 - 4mm TSG Low E |         |       |                         |  |  |
| Doors:<br>Palace                                                                                                                              | U-VALUE | SHGC  | VT                                 | U-VALUE | SHGC  | VT                                       | U-VALUE | SHGC  | VT                                    | U-VALUE | SHGC  | VT                                    | U-VALUE | SHGC  | VT                                    | U-VALUE | SHGC  | VT                      |  |  |
|                                                                                                                                               |         |       |                                    |         |       |                                          | 4,697   | 0,470 | 0,511                                 |         |       |                                       |         |       |                                       |         |       |                         |  |  |
|                                                                                                                                               |         |       |                                    |         |       |                                          |         |       |                                       |         |       |                                       |         |       |                                       |         |       |                         |  |  |
|                                                                                                                                               |         |       |                                    |         |       |                                          |         |       |                                       |         |       |                                       |         |       |                                       |         |       |                         |  |  |
|                                                                                                                                               |         |       |                                    |         |       |                                          |         |       |                                       |         |       |                                       |         |       |                                       |         |       |                         |  |  |
| Windows:<br>Casement 30<br>Casement 36<br>Casement 30 Fix<br>Casement 36 Fix                                                                  |         |       |                                    |         |       |                                          |         |       |                                       |         |       |                                       |         |       |                                       |         |       |                         |  |  |
|                                                                                                                                               | 3,914   | 0,599 | 0,623                              |         |       |                                          |         |       |                                       | 3,437   | 0,525 | 0,570                                 | 3,437   | 0,330 | 0,308                                 | 3,437   | 0,330 | 0,308                   |  |  |
|                                                                                                                                               | 3,945   | 0,596 | 0,619                              |         |       |                                          |         |       |                                       | 3,906   | 0,557 | 0,612                                 | 3,473   | 0,523 | 0,566                                 | 3,473   | 0,329 | 0,306                   |  |  |
|                                                                                                                                               | 3,577   | 0,654 | 0,690                              |         |       |                                          |         |       |                                       | 3,542   | 0,610 | 0,682                                 | 3,049   | 0,573 | 0,631                                 | 3,049   | 0,356 | 0,341                   |  |  |
| Double Glazed (12mm)                                                                                                                          |         |       | 6.38mm Clear - 12mm - 6.38mm Clear |         |       | 6.38mm Clear - 12mm - 6.38mm Clear Low E |         |       | 6.38mm SV Neu HL- 12mm - 6.38mm Low E |         |       | 6.38mm SV Neu HL- 12mm - 6.38mm Low E |         |       | 6.38mm SV Neu HL- 12mm - 6.38mm Low E |         |       |                         |  |  |
| Doors:<br>Palace<br>Hinged                                                                                                                    | U-VALUE | SHGC  | VT                                 | U-VALUE | SHGC  | VT                                       | U-VALUE | SHGC  | VT                                    | U-VALUE | SHGC  | VT                                    | U-VALUE | SHGC  | VT                                    | U-VALUE | SHGC  | VT                      |  |  |
|                                                                                                                                               | 4,469   | 0,472 | 0,511                              | 4,000   | 0,451 | 0,479                                    |         |       |                                       | 4,001   | 0,278 | 0,259                                 | 4,001   | 0,278 | 0,259                                 | 4,001   | 0,278 | 0,259                   |  |  |
|                                                                                                                                               | 4,021   | 0,495 | 0,535                              | 3,555   | 0,466 | 0,492                                    |         |       |                                       | 3,555   | 0,289 | 0,265                                 | 3,555   | 0,289 | 0,265                                 | 3,555   | 0,289 | 0,265                   |  |  |
| Windows:<br>Clip 44 Fix                                                                                                                       |         |       |                                    |         |       |                                          |         |       |                                       |         |       |                                       |         |       |                                       |         |       |                         |  |  |
|                                                                                                                                               | 3,520   | 0,602 | 0,677                              | 2,882   | 0,573 | 0,631                                    |         |       |                                       | 2,882   | 0,345 | 0,340                                 | 2,882   | 0,345 | 0,340                                 | 2,882   | 0,345 | 0,340                   |  |  |

### Notes:

- N/A - Not available due to glazing rebate / cavity restriction
- Low E coating to surface 2 of single glazed unit
- Low E coating to surface 3 of the double glazed unit
- Simulated by AAAAMSA accredited SAFIERA simulator using LBNL software
- U-Value (W/m²K) is the measure of structural heat loss per m²



NATIONAL GLASS  
DISTRIBUTION

## TOLERANCES

### EXTRACT FROM AAAMSA SELECTION GUIDELINES 2012 - CHAPTER 10.4.4

#### ■ SCRATCHES AND BLEMISHES

- The scratch and blemish inspection should be viewed at a distance of 3 metres under normal lighting conditions
- Normal lighting conditions shall mean reasonable lighting conditions under which the product is normally viewed
- If visible when viewed from a distance of 3 metres under the lighting conditions described, the product/s may be rejected

#### ■ GLASS INSPECTION

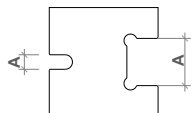
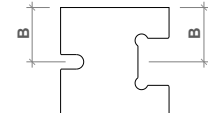
- Scratches in glass which are applicable, are those which are under 75mm long in any area, and those which are longer than 75mm which do not encroach more than 75mm from the edge

#### ■ GLASS DISTORTION/COLOUR VARIATIONS

- There will always be some degree of distortion in glass
- Toughened glass has more distortion than annealed glass
- Some gasket glazed systems such as roll-in or wedged gaskets tend to create more distortion than other systems
- SIG units will distort due to changes in temperature and atmospheric pressure
- SIG units feature a spacer between the two sheets of glass round the perimeter of the unit
- This spacer is set in the from the edge to allow for the inclusion of a secondary seal
- The spacer is often visible and the rebate and primary seal, being soft mastic; is not always perfectly flush with the spacer inner surface. In addition both the spacer and the sealant may protrude beyond the sight line and, provided the requirements of section 10.4.4 are met, this is considered acceptable
- Colour, reflectance and transmission in functional glasses may vary slightly and is considered acceptable

#### ■ CUT OUT / SLOTS

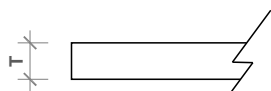
| Thickness               | By Hand | By CNC  |
|-------------------------|---------|---------|
| <b>Cut out size</b>     |         |         |
| 4, 5, 6mm               | ± 2mm   | ± 1.0mm |
| 8, 10mm                 | ± 3mm   | ± 1.0mm |
| 12mm                    | ± 3mm   | ± 1.0mm |
| 15mm                    | ± 5mm   | ± 1.0mm |
| <b>Cut out location</b> |         |         |
| All                     | ± 3mm   | ± 2mm   |

A = Cut to size      B = Cut out location

#### ■ THICKNESS

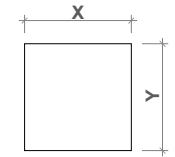
| Thickness | Float Glass | Patterned Glass |
|-----------|-------------|-----------------|
| 4, 5, 6mm | ± 0.2mm     | ± 0.5mm         |
| 8, 10mm   | ± 0.3mm     | -1 +0mm         |
| 12mm      | ± 0.3mm     | N/A             |
| 15mm      | ± 0.5mm     |                 |
| 19mm      | ± 1.0mm     |                 |



T = Thickness

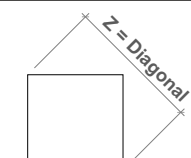
#### ■ CUT TO SIZE

| Dimensions          | Tolerances |
|---------------------|------------|
| Dimensions < 1500mm | ± 2mm      |
| Dimensions > 1500mm | ± 3mm      |



#### ■ DIAGONAL

| Dimensions          | Tolerances |
|---------------------|------------|
| Dimensions < 1500mm | ± 2mm      |
| Dimensions > 1500mm | ± 3mm      |



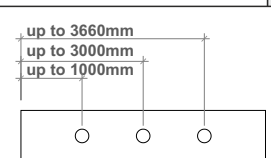
Z = Diagonal

#### ■ BOW

| Thickness    | Bow           |
|--------------|---------------|
| 4, 5, 6mm    | 1mm per 200mm |
| 8, 10mm      | 1mm per 300mm |
| 12, 15, 19mm | 1mm per 300mm |

#### ■ HOLE POSITION

| Edge Distance | Tolerances |
|---------------|------------|
| Up to 1000mm  | ± 1mm      |
| Up to 3000mm  | ± 2mm      |
| Up to 3660mm  | ± 3mm      |



## TOUGHENED GLASS GUIDELINES

### DEFINITIONS

Toughening is the process whereby float glass is processed to increase its strength, making it a safety glass.

Toughened glass is also referred to as **Tempered glass**.

### PRODUCT KNOWLEDGE

- Toughened glass must be cut to size and the edge work processed **before toughening**, and cannot be re-worked once toughened
- Polishing the edges or drilling holes in the glass must also be carried out before the toughening process starts
- Toughened glass breaks into small chunks instead of splintering into jagged shards. The small chunks are less likely to cause injury
- As a result of its safety and strength, toughened glass is used in a variety of demanding applications, including:
  - Showers
  - Balustrades
  - Frameless glass doors
  - Table tops
  - Doors and windows

### PROCEDURE FOR GLASS TO BE TOUGHENED

- Cutting
- Processing (refer to table)
- Toughening

### GLASS WHICH CANNOT BE TOUGHENED

- Laminated
- Bullet Resistant
- Glass which is too small (1 side must be 300mm)
- Glass which is too long and narrow i.e. 1:16 glass ratio
- Chipped
- Heavily patterned obscure
- Georgian Wired
- Glass with no edge work

### IMPORTANT CONSIDERATIONS

#### Washing:

- The glass has to be washed and dried before the toughening process
- Glass has to be washed immediately after cutting, grinding or drilling to avoid the glass staining

#### Storage:

- Float glass must be stored indoors and in a clean, dry and warm place to avoid moisture and dirt on the glass surface
- The humidity must be less than 80% and the temperature must be over 10°C
- Moisture causes staining, and other problems on the glass surface, which will cause irreparable damage

### NATGLASS TOUGHENING GUIDELINES

#### Thickness

- 4 - 19mm

#### Minimum Size

- 300 x 50mm

#### Maximum Size

- JHB: 3600 x 2080mm
- CT: 3000 x 1700mm

#### Minimum edge work

- 4 - 6mm Arris
- 8 - 19mm Machine Polish

#### Minimum distance from edge of hole to edge of glass

- $X = 1.5 \times \text{thickness of glass}$
- $Y = 4 \times \text{thickness of glass}$

#### Minimum hole spacing (edge of hole to edge of hole)

- $X = 1.5 \times \text{thickness of glass}$
- Distance between =  $4 \times \text{thickness (t) of the glass}$

#### Minimum hole dimension

- Hole diameter must be a minimum of the glass thickness

#### Maximum hole quantity

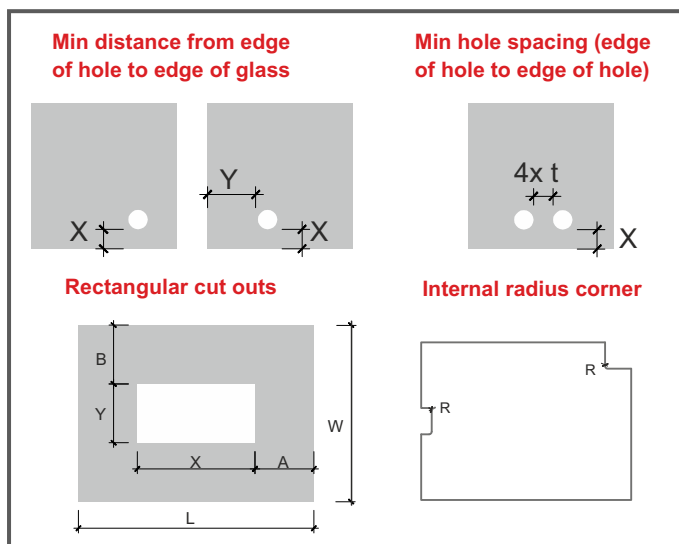
- 24 holes per panel
- Maximum of 2 different hole diameters per panel

#### Rectangular cut outs

- $X = \text{Max } 1/3 \text{ of length}$
- $Y = \text{Max } 1/3 \text{ of width}$
- $A = \text{Min } 1/2 \text{ of } X$
- $B = \text{Min } 1/2 \text{ of } Y$

#### Internal radius corners

- Waterjet minimum radius  $\geq$  glass thickness
- CNC Bright polish minimum radius 51mm
- CNC Machine polish (matt finish) minimum radius 8mm depending on glass thickness



## COATED GLAZING INSTALLATION GUIDE

### ■ SOLARSHIELD / SOLARVUE LAMINATED SAFETY GLASS

The coating is applied to surface 3. Therefore the coated side sticker will be applied to surface 1, and hence the coated side is glazed to the outside. The tinted colour is always glazed to the outside.

### ■ LOW E MONOLITHIC AND LAMINATED SAFETY GLASS

The coated side of Laminated Low E product should never be on surface 2 or 3, as this affects the performance of the Low E coating. The Low E coating should be on surface 2 for Monolithic Glass and on surface 4 for Laminated Safety Glass, and hence the coated side should always be glazed to the inside.

#### ***Monolithic glass has 2 surfaces:***

- surface 1 being the external surface and;
- surface 2 the internal surface
- i.e. surface 1 is glazed to the outside

#### ***Laminated Safety Glass has 4 surfaces:***

- surface 1 being the external surface
- surface 2 and 3 are facing the vinyl and;
- surface 4 being the internal surface
- i.e. surface 1 is glazed to the outside

#### ■ Monolithic Glass



OUTSIDE

INSIDE

SURFACE 1

SURFACE 2



#### ■ Laminated Safety Glass



OUTSIDE

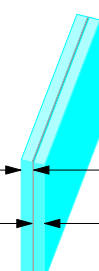
INSIDE

SURFACE 1

SURFACE 2

SURFACE 3

SURFACE 4





## MIRROR CARE GUIDELINES

### 1. STORAGE & TRANSPORT

#### DO

- Store mirrors vertically. Do not lay mirrors flat. Glass exhibits more strength when stored upright.
- Make sure that the handling equipment used is strong enough to handle the weight of the mirror. A dropped mirror is a ruined mirror.
- Ensure that the area where the mirror is stored, is dry - avoid condensation.



### 2. PROCESSING & CUTTING

#### DO

- Make sure that mirrors (especially backs and edges) are thoroughly washed after manufacture - use clean water to wash.
- Replace water in polisher and/or beveller regularly. The water PH level is recommended to be between 6.5 and 8.0 (close to neutral).
- PFG highly recommend using a water based varnish to seal all processed glass.
- Run the processing machine empty before taking a break or shutting for the day to prevent mirror standing in water longer than necessary.
- When cutting the mirror, try to keep at least one factory edge, and install this edge at the bottom where puddling may occur.
- Always grind or polish as shown, to minimise chipping and damage to the protective paint layer.



### 3. FIXING & INSTALLATION

#### DO

- Use gloves when handling a mirror to prevent skin-borne salts or chemicals from damaging the mirror face or backing.
- Wear the correct safety equipment.
- Paint the wall behind the mirror only with enamel paint and allow the paint to dry.
- Set the mirror at least 5mm off the wall, allow air to circulate behind the mirror - don't seal the mirror into the recess. Recommended in EN 1036.
- Use a water based varnish to seal the edges in any area of high humidity - bathrooms and gyms.
- Use adhesive that is specifically recommended for mirrors. Apply the adhesive in vertical strips.
- Use approved tapes, mastics and adhesives. Ask your adhesive supplier for recommendations.



- Use neutral cure silicones and tapes recommended for use on mirrors. PFG recommends caution using any silicon in contact with mirror.
- Use grommets on screws to protect metal screw contact on glass.
- Follow the adhesive manufacturer recommendations
- Ensure the area is well ventilated and free of fumes or solvents, typically from grout cleaners, tile adhesives or similar.



#### NOTE

- If adhesive is used, be sure it is approved for mirror use.
- Never use an abrasive cleaner on any mirror surface.
- Mechanical fastening devices should always be used in conjunction with the adhesive - this helps prevent possible personal injury or damage if the adhesive fails.
- Remove surface marks or dirt with an oil-free cloth.
- A frame is recommended for longevity.
- Ensure the correct product with sufficient tactile and adhesive strength is used as recommended by the adhesive supplier.

### 4. MAINTENANCE

#### DO

- Clean the mirror regularly by washing it with a soft cloth, rinsing it with warm water and drying it with a soft cloth.
- When using a window cleaner, spray the liquid on the cloth first, and then wipe the mirror. Keep the edges dry at all times.



#### DON'T

- Install mirrors on new plaster, new masonry or on a freshly painted wall.
- Use silicon with algacide or that says "mold resistant".
- Use acid based glues: only natural cure adhesives.
- Install mirrors outdoors, without additional engineered protection for the backing and the edges of the mirror.
- Use any acid or alkali cleaners on mirrors. Chemicals attack the surface, edges and backing of the mirror.
- Install on uneven surfaces. This can cause stress or strain on the mirror, which can cause the surface or backing to crack. It can also cause the mirror to warp, leading to distortion.
- Slide one mirror sheet over another, as this will scratch the mirror surface.





## CLEANING GUIDELINES FOR LOW E HARD COATED GLASS

**Low E glass** is an energy efficient product that has a very thin coating applied to one surface during its manufacture. **National Glass Distribution** only supplies “hard coated” Low E glass, i.e. the coating is what is referred to as a *pyrolytic* coating. This is a thin coating which is chemically bonded to the glass surface while it is still in a semi-molten state, which reacts to form a hard, durable ceramic coating. This coating provides improved control of thermal insulation over ordinary float glass.

The coated surface, always glazed to the inside of the building (except in Insulated Glass Units where it is on the inner pane but facing outside), requires a slightly different cleaning procedure to that needed for ordinary, uncoated float glass.

The following recommended guidelines provide the best results when cleaning the coated surface. Any preferred cleaning method for float glass is acceptable for the uncoated surface.

### Precautions & Warnings

#### DON'T

- Use abrasive, powder-based, ammonia-based or alcohol-based cleaning solutions.
- Use cleaners that contain any harsh acid or alkali (hydrochloric acid is the exception to this, under certain circumstances only, and is covered under “Specialized Cleaning” further down).
- Clean glass when it is hot, or in direct sun light.
- Use hot water on cold glass, or cold water on hot glass.
- Use power washers or garden hoses to clean windows and doors
- Allow cleaning solutions to contact the edges of any laminated glass.
- Allow cleaning fluid to dry on glass, or surrounding surfaces.
- Use squeegees, razor blades, scrapers, scourers and metal or abrasive products.

### 1. ROUTINE HAND CLEANING

This procedure should be followed as required, to remove accumulated dust and fingerprints.

#### Recommended Cleaning Products:

- Clean lukewarm soapy water
- Solution of one part vinegar to ten parts clean water
- Commercially available vinegar based cleaners
- Commercial domestic glass cleaners such as Mr Muscle Window and Surface Cleaner
- Clean lint-free soft cloth

#### Recommended Cleaning Procedure:

- 👉 Always start cleaning at the top of the window or door and work down.
- 👉 Flush with generous amounts of clean water to remove dirt particles
- 👉 Spray with soapy water (and/or vinegar solution for more stubborn marks).
- 👉 Remove all traces of cleaning solution by rinsing with clean water. Excess water must be removed with a cloth.
- 👉 To prevent streaking, do not dry completely but leave a thin film of moisture on glass. This film will quickly evaporate, leaving a clean surface. Repeat the process if necessary.
- 🚫 Do not wipe with a dry cloth, or when the surface is dry.

### 2. SPOT CLEANING

This refers to individual spots or areas of stubborn dirt and foreign materials, such as grease, oil, tape adhesive, paint and even crayons.

#### Recommended Cleaning Products:

- Acetone
- Denatured alcohol
- Mineral turpentine
- Clean lint-free soft cloth

#### Recommended Cleaning Procedure:

- 👉 Observe all handling, safety and disposal instructions of the chemical manufacturer.
- 👉 Apply a small amount of the cleaner to a clean WET cloth.
- 👉 Rub gently on the area requiring spot cleaning, taking care not to allow the cleaner to come in contact with any surrounding frame, surface or paintwork which may be damaged or marked by these solvents.
- 👉 Wipe clean with a wet cloth.
- 👉 Follow this with the recommended hand cleaning procedure.
- 🚫 Do not wipe with a dry cloth, or when the surface is dry.

### 3. SPECIALIZED CLEANING

The Low E coating is hard enough that any metal object coming in contact with it, may lose a tiny amount of metal, which may be deposited on the coated surface. This may appear as a “stain” or “scratch”.

#### Recommended Cleaning Products:

- Solution of 10% Dilute Hydrochloric Acid (such as typical pool acid) to 90% clean water
- Clean lint-free soft cloth

#### Recommended Cleaning Procedure:

- 👉 Observe all handling, safety and disposal instructions of the chemical manufacturer.
- 👉 Wear protective gloves and eye wear, and take extreme care not to spill any acid or solution. The diluted solution may be corrosive to any organic matter.
- 👉 **ALWAYS ADD ACID TO WATER**  
Adding water to the acid could cause it to react violently and splutter, causing injury or damage. Pour the water into the container first, carefully stir the acid into the water, in the proportions indicated.
- 👉 Apply a small amount of the prepared solution to a clean WET cloth.
- 👉 Rub gently, only on the area requiring spot cleaning, taking care not to allow the cleaner to come into contact with any surrounding frame, surface or paintwork.
- 👉 Wipe clean with a wet cloth.
- 👉 Follow this with the recommended hand cleaning procedure.
- 🚫 Do not wipe with a dry cloth, or when the surface is dry.



## PUTTY GLAZING GUIDELINES

- Ensure that the frame is clean and dry and that all rust is removed in the case of steel windows.
- Metal frames should be painted with a primer.
- Wooden windows must be sealed with a suitable wood sealer.
- Ensure that all applications are left to dry according to manufacturer's specifications.
- Do not add any chemicals such as turpentine or paraffin to the putty, as this prevents it from hardening and may cause cracking.
- Putty glazing without beads will require approximately 2kg per m<sup>2</sup> of glass.
- Pen the bag of Putty and knead it until you get a uniform consistency.
- Mix the putty with the supplied catalyst.
- Thoroughly knead the putty, ensuring that the catalyst is properly mixed.
- For back putty, do not add the catalyst, as the glass expands and contracts with heat and needs space to move.
- Back putty should be evenly applied 3mm thick by hand.
- Apply pressure only at the edges of the glass when inserting the pane into position.
- The front holding putty should be applied with a putty knife and at angle of 60°.
- Allow 7 – 10 days for putty to dry, before it is painted.
- The glazed putty should not be left unpainted for a period of longer than 17 days to prevent cracking.





**NATIONAL GLASS**  
DISTRIBUTION

### Mirror Checklist (one mirror per checklist)

Customer Order Zone: ☒ orders@natglass.co.za | ☎ +27 44855 | 🌐 +27(0)10 591 5660 | 🌐 http://portal.natglass.co.za

#### FOR OFFICE USE ONLY

Acc No: \_\_\_\_\_ Job Name: \_\_\_\_\_ Site Address: \_\_\_\_\_  
 Customer: \_\_\_\_\_ Client: \_\_\_\_\_ End User: \_\_\_\_\_  
 Inspection So: \_\_\_\_\_ Client Contact No: \_\_\_\_\_ Contact No End User: \_\_\_\_\_

#### Customer inspection sheet:

Thickness (mm) 3mm ☐ 4mm ☐ 5mm ☐ Specify size (mm) \_\_\_\_\_  
 Edge Work Bevel ☐ AAR ☐ PAR ☐ Clean Cut ☐  
 Area behind mirror Painted Wall ☐ Unpainted Wall ☐ Board ☐ Framed ☐ Tiled ☐  
 Was wall behind mirror painted with oil based paint (e.g. gloss) Yes ☐ No ☐ Comment \_\_\_\_\_

#### Was the mirror fitted with the following:

Screws ☐ Quantity \_\_\_\_\_  
 Mastic ☐ Brand \_\_\_\_\_ Vertically ☐ Horizontally ☐  
 Mirror Adhesive ☐ Brand \_\_\_\_\_ Vertically ☐ Horizontally ☐  
 Silicone ☐ Brand \_\_\_\_\_ Acid Base ☐ Neutral Cure ☐  
 Tape ☐ Brand \_\_\_\_\_ Vertically ☐ Horizontally ☐

#### What is the gap size?

Specify gap size (mm) \_\_\_\_\_  
 Have the mirror edges and back been sealed with sealant prior to installation? Yes ☐ No ☐

#### Brand of sealer used:

Brand \_\_\_\_\_  
 Natglass ☐ Customer ☐

#### Who sealed the mirror?

Are any mirror edges sealed against the wall using silicone or grout? Yes ☐ No ☐

#### Is bottom of mirror resting on basin, bath or shower?

Yes ☐ No ☐

#### Is mirror fitted within 1m of a bath or shower?

Yes ☐ No ☐

#### Have photos been taken?

Yes ☐ No ☐

#### Does installation comply with \*PFG Mirror Installation Guide?

Yes ☐ No ☐

#### Warranty claim?

Yes ☐ No ☐

#### Date and batch on back of mirror?

Date \_\_\_\_\_ Batch \_\_\_\_\_

#### REPRESENTATIVES

Natglass Rep: \_\_\_\_\_ Position: \_\_\_\_\_ Signature: \_\_\_\_\_  
 Customer Name: \_\_\_\_\_ Position: \_\_\_\_\_ Signature: \_\_\_\_\_

☎ +27(0)10 593 8400 | ☒ info@natglass.co.za | 🌐 www.natglass.co.za



**NATIONAL GLASS**  
DISTRIBUTION

### Thermal Stress Evaluation Form

Customer Order Zone: ☒ orders@natglass.co.za | ☎ +27 44855 | 🌐 +27(0)10 591 5660 | 🌐 http://portal.natglass.co.za

#### CUSTOMER USE

#### OFFICE USE

Acc No: \_\_\_\_\_ Warehouse: \_\_\_\_\_ Quote No: \_\_\_\_\_  
 Customer: \_\_\_\_\_ Sales Exec: \_\_\_\_\_ SO No: \_\_\_\_\_  
 PO No: \_\_\_\_\_ Internal Sales: \_\_\_\_\_

#### Customer to complete:

Location ☐ Inland ☐ Coastal ☐

Orientation ☐ N ☐ NE ☐ E ☐ SE ☐ S ☐ SW ☐ W ☐ NW ☐

Vision Panels (i.e. Blinds / Curtains) Type: ☐ Ventilated ☐ Unventilated ☐  
 Colour: ☐ Light ☐ Dark ☐

Spandrel Panels ☐ Airgap distance between glass and backing material \_\_\_\_\_

Glass pane size (mm) Width \_\_\_\_\_ Height \_\_\_\_\_

Glazing ☐ Single ☐ Double ☐

Single Glazing Glass Type \_\_\_\_\_ Thickness \_\_\_\_\_

SIG make up Inner Pane \_\_\_\_\_ Spacer \_\_\_\_\_ Outer Pane \_\_\_\_\_

Framing Material ☐ Aluminium ☐ Wood ☐ uPVC ☐ Steel ☐

Glazing System ☐ Beads ☐ Channel ☐ Flush ☐

Colour of Frames ☐ Light ☐ Dark ☐

Extent of columns / Reveal beyond frame "See image" Column" \_\_\_\_\_

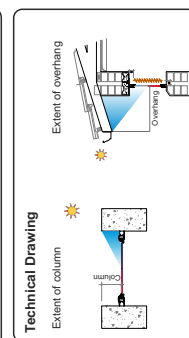
Extent of overhang / Reveal beyond glass "See image" Overhang" \_\_\_\_\_

**OFFICE USE**

| Glass Panel | No Shadow | Mobile Shadow | Static Shadow | Safe | Safe |
|-------------|-----------|---------------|---------------|------|------|
| 1.          | BTD       | Safe          | BTD           | Y/N  | Y/N  |
| 2.          | Y/N       | Y/N           | Y/N           | Y/N  | Y/N  |

Recommendations: \_\_\_\_\_

Thermal Stress Evaluation by: \_\_\_\_\_



#### Special Instructions

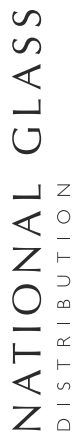
Completed by: Natglass ☐ Customer ☐

I hereby give Natglass Distributors (PTY) Ltd express permission to perform the Thermal Stress Analysis.

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Position: \_\_\_\_\_ Date: \_\_\_\_\_



☎ +27(0)10 593 8400 | 🌐 www.eaglealuminium.co.za



## Order Form: Frameless Shopfronts

Customer Order Zone: ✉ [orders@natglass.co.za](mailto:orders@natglass.co.za) ☎ +27 44855 | 📞 +27(0)10 591 5660 | 🌐 <http://portal.natglass.co.za>

|              |                 |           |
|--------------|-----------------|-----------|
| Customer Use | Warehouse:      | Quote No: |
| Acc No:      | Sales Exec:     | SO No:    |
| Customer:    | Internal Sales: |           |
| PO No:       |                 |           |

| Glass                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product                                                                                                                                                                                                                  | Thickness (mm) <div>             Select one:             <div> <input type="checkbox"/> Float               <input type="checkbox"/> Laminate               <input type="checkbox"/> Toughened             </div> </div> |
| Coating                                                                                                                                                                                                                  |                                                                                                                                                                                                                          |
| Only applicable to Low E, Solarvue & Solarsheild<br>Select one: <div> <input type="checkbox"/> Surface 3             <input type="checkbox"/> Surface 4             <input type="checkbox"/> No Coating           </div> |                                                                                                                                                                                                                          |



|                                             |                                                               |
|---------------------------------------------|---------------------------------------------------------------|
| Please complete if information is not on PQ | Essential information to process SIG Units - please complete. |
|---------------------------------------------|---------------------------------------------------------------|

Completed by: Natclass ☐ Customer ☐

I hereby give Natglass Distributors (PTY) Ltd express permission to manufacture as per this order form and agree to all terms and conditions on my signed quote, order and signed off drawings.

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Position: \_\_\_\_\_ Date: \_\_\_\_\_



+27(0)10 593 8400 |  [www.eaglealuminium.co.za](http://www.eaglealuminium.co.za)



## Order Form: Frameless Shopfronts

Customer Order Zone: ✉ [orders@natglass.co.za](mailto:orders@natglass.co.za) ☎ +27 44855 | 📞 +27(0)10 591 5660 | 🌐 <http://portal.natglass.co.za>

|              |                 |           |
|--------------|-----------------|-----------|
| Customer Use | Warehouse:      | Quote No: |
| Acc No:      | Sales Exec:     | SO No:    |
| Customer:    | Internal Sales: |           |
| PO No:       |                 |           |

Please sketch design below:

A full-page view of a blank sheet of graph paper. The paper features a uniform grid of small squares, typical of standard graph paper used for mathematics or engineering. The grid covers the entire area of the page, bounded by a thin black border.

**Notes:**

- No seals provided, not weatherproof
- Refer to price list for handle options
- Designed in accordance with SANS 10137:2011
- Sign off by CPG Cat 1 or Engineer may be required
- Not compliant with SANS 613

**Customer to complete: (One form per shopfront)**

[illegible]

Completed by: Natglass ☐ Customer ☐

I hereby give Natglass Distributors (PTY) Ltd express permission to manufacture as per this order form and agree to all terms and conditions on my signed quote, order and signed off drawings.

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Position: \_\_\_\_\_ Date: \_\_\_\_\_



+27(0)10 593 8400 |  [www.eaglealuminium.co.za](http://www.eaglealuminium.co.za)



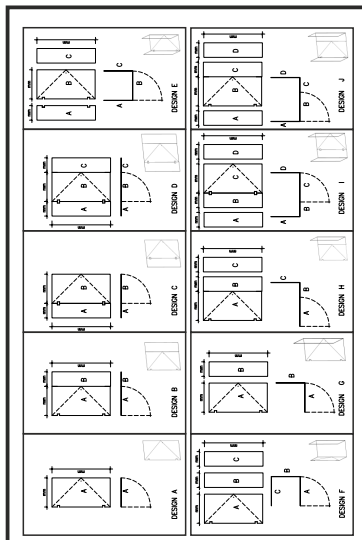
**NATIONAL GLASS**  
DISTRIBUTION

## Order Form: Frameless Showers (Standard)

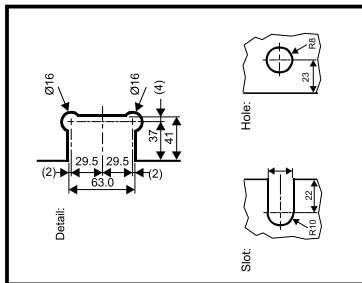
Customer Order Zone: ☒ orders@natglass.co.za | ☎ +27 (0)10 591 5660 | 🌐 http://portal.natglass.co.za

|              |           |                 |           |
|--------------|-----------|-----------------|-----------|
| CUSTOMER USE | Acc No:   | Warehouse:      | Quote No: |
|              | Customer: | Sales Exec:     | SO No:    |
|              | PO No:    | Internal Sales: |           |
| OFFICE USE   |           |                 |           |

### Design Options



### Standard Cut Out Detail



### Notes:

- Seals around door only
- Handle is a back-to-back knob
- Standard design supplied with shelf stabiliser
- Chrome plated hardware
- Cill plate optional, not standard

### Description:

CLR Clear  
OB Obscure  
GL Glass

**Customer to complete: (One form per shower)**

| Design Select | Tight Size |       | Cill Plate | Glass                    |                    | Comments |
|---------------|------------|-------|------------|--------------------------|--------------------|----------|
|               | Panel      | Width | Height     | YES NO                   | Specify glass type |          |
| A             | E          |       |            | <input type="checkbox"/> |                    |          |
| B             | G          |       |            | <input type="checkbox"/> |                    |          |
| C             | H          |       |            | <input type="checkbox"/> |                    |          |
| D             | I          |       |            | <input type="checkbox"/> |                    |          |
| E             | J          |       |            | <input type="checkbox"/> |                    |          |
| Overall       |            |       |            | <input type="checkbox"/> |                    |          |

### Special Instructions

Completed by: Natglass ☐ Customer ☐

I hereby give Natglass Distributors (PTY) Ltd express permission to manufacture as per this order form and agree to all terms and conditions on my signed quote, order and signed off drawings.

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Position: \_\_\_\_\_ Date: \_\_\_\_\_



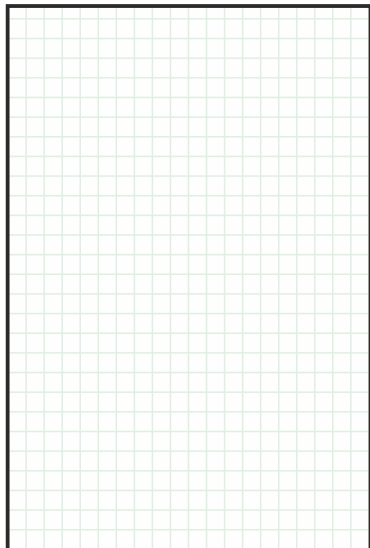
**NATIONAL GLASS**  
DISTRIBUTION

## Order Form: Frameless Showers (Non Standard)

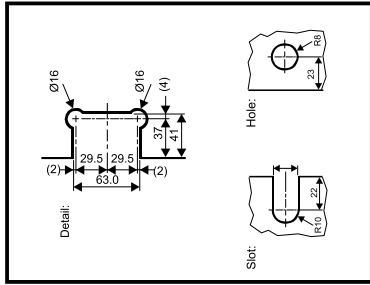
Customer Order Zone: ☒ orders@natglass.co.za | ☎ +27 (0)10 591 5660 | 🌐 http://portal.natglass.co.za

|              |           |                 |           |
|--------------|-----------|-----------------|-----------|
| CUSTOMER USE | Acc No:   | Warehouse:      | Quote No: |
|              | Customer: | Sales Exec:     | SO No:    |
|              | PO No:    | Internal Sales: |           |
| OFFICE USE   |           |                 |           |

Please sketch design below:



### Standard Cut Out Detail



### Notes:

- Seals only around door
- Handle is a back-to-back knob
- Max door width 900mm x 2200mm
- Cill plate optional

### Description:

CLR Clear  
OB Obscure

**Customer to complete: (One form per shower)**

| Additional Panel Ref | Size (mm) |        | Glass                                                    | Preferences              |                          |                          | Seals                    |                          | Comments |
|----------------------|-----------|--------|----------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------|
|                      | Width     | Height |                                                          | Hole                     | Slot                     | Bar                      | Magnetic                 | Bubble                   |          |
|                      |           |        | CLR <input type="checkbox"/> OB <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |          |
|                      |           |        | CLR <input type="checkbox"/> OB <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |          |
|                      |           |        | CLR <input type="checkbox"/> OB <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |          |
|                      |           |        | CLR <input type="checkbox"/> OB <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |          |
|                      |           |        | CLR <input type="checkbox"/> OB <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |          |

### Special Instructions

Completed by: Natglass ☐ Customer ☐

I hereby give Natglass Distributors (PTY) Ltd express permission to manufacture as per this order form and agree to all terms and conditions on my signed quote, order and signed off drawings.

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Position: \_\_\_\_\_ Date: \_\_\_\_\_



+27(0)10 593 8400 | www.eaglealuminium.co.za



**NATIONAL GLASS**  
DISTRIBUTION

EAGLE  
ALUMINIUM

### Balustrade Pre-Testing Checklist

Customer Order Zone: ✉ orders@natglass.co.za | ☎ +27 44855 | 🌐 +27(0)10 591 5660 | 🌐 http://portal.natglass.co.za

#### CUSTOMER INFORMATION

Acc No: \_\_\_\_\_ Job Name: \_\_\_\_\_ Site Address: \_\_\_\_\_  
Acc Name: \_\_\_\_\_ Client: \_\_\_\_\_ End User: \_\_\_\_\_  
Inspection SO: \_\_\_\_\_ Client Contact No: \_\_\_\_\_ Contact No End User: \_\_\_\_\_

#### Customer inspection sheet:

Associations: AAAMSA ☐ SAGGA ☐ NONE ☐ OTHER ☐ Specify \_\_\_\_\_

Glass Thickness (mm): TSG ☐ LAM ☐ TSG LAM ☐ Specify size (mm) \_\_\_\_\_

Number of panels in system: Specify \_\_\_\_\_ Panel Width (mm) \_\_\_\_\_ Panel Height (mm) \_\_\_\_\_

#### Test Rig Information:

Location of testing: Factory ☐ Site ☐  
Testing impact: 200J ☐ 400J ☐  
Is the test rig ready: Yes ☐ No ☐ If YES, please attach photo  
Has an in-house test been completed: Yes ☐ No ☐ If YES, please attach video  
What is the weight of swing bag: \_\_\_\_\_ kg  
What height is the swing bag fixing point: \_\_\_\_\_ mm  
Do you have a Line Load Rig: Yes ☐ No ☐ If YES, please attach photo  
Have you tested any Balustrade systems: Yes ☐ No ☐

#### Balustrade Information:

☐ Frameless Sunkin  
☐ Frameless Side-mounted  
☐ Frameless Bottom Channel  
☐ Frameless Surface Spigot  
☐ Two Edge Supported Channel  
☐ Two Edge Supported Clamped  
☐ Four Edge Supported  
☐ Hand Railing Yes ☐ No ☐

Hand Rail Details:

Indicate: Dimensions of fixings and positions, handrail and supports.

☎ +27(0)10 593 8400 | ✉ info@natglass.co.za | 🌐 www.natglass.co.za



**NATIONAL GLASS**  
DISTRIBUTION

EAGLE  
ALUMINIUM

### Balustrade Pre-Testing Checklist

Customer Order Zone: ✉ orders@natglass.co.za | ☎ +27 44855 | 🌐 +27(0)10 591 5660 | 🌐 http://portal.natglass.co.za

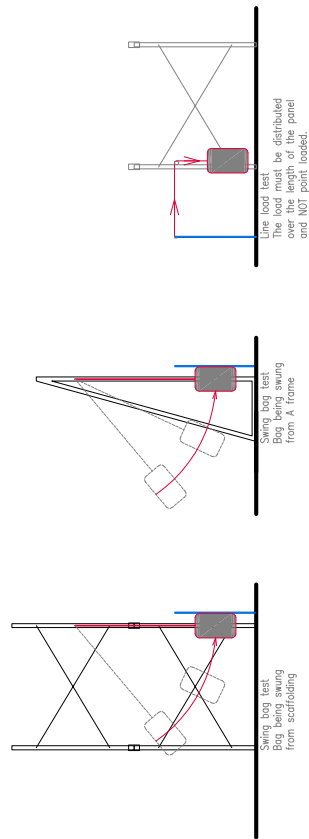
#### CUSTOMER INFORMATION

Acc No: \_\_\_\_\_ Job Name: \_\_\_\_\_ Site Address: \_\_\_\_\_  
Acc Name: \_\_\_\_\_ Client: \_\_\_\_\_ End User: \_\_\_\_\_  
Inspection SO: \_\_\_\_\_ Client Contact No: \_\_\_\_\_ Contact No End User: \_\_\_\_\_

#### Notes:

- Standard impact test of 400J, but if perpendicular approach distance is less than 1.5m the impact needs to meet 200J
- On testing we will need detailed drawings and specifications of all components used (i.e. Silicon, gROUT, spigots, wedge gaskets etc.)
- Handrails need to be secured and present at final site installation
- Make sure that the pendulum of the bag can accommodate the drop height

#### Examples of some test rigs:



☎ +27(0)10 593 8400 | ✉ info@natglass.co.za | 🌐 www.natglass.co.za



**NATIONAL GLASS**  
DISTRIBUTION

### Balustrade Pre-Testing Checklist

Customer Order Zone: ☒ orders@natglass.co.za | ☎ +27 (0) 10 591 5660 | 🌐 <http://portal.natglass.co.za>

#### Balustrade Impact Test

With Balustrades, we need to determine whether we need to apply a 200J or 400J impact test.

- The decision to base the design on either 400J or 200J is dependent on the approach distance to the balustrade as determined in SANS 10160-2:2010 below;
- “ 9.4.7 Resistance to impact will be proven by testing using an impact of 400 J delivered by means of a 250 mm diameter bag filled with dry sand to a mass of 30 kg, representative of the most severe conditions likely to occur. The impact test may be reduced to 200 J for instances where the perpendicular approach distance is less than 1,5 m. ”
- The drop height is determined by the level of impact that needs to be tested and the actual weight of the drop bag.

**The required drop heights for a 30kg bag and a 40kg bag are as follows:**

Drop Height - 30kg Bag

- For a 400J impact test – the drop height is 1360mm + the centre dimension of the glass
- For a 200J impact test – the drop height would be 680mm + the

☎ +27(0)10 593 8400 | ☒ info@natglass.co.za | 🌐 [www.natglass.co.za](http://www.natglass.co.za)



**NATIONAL GLASS**  
DISTRIBUTION

### Balustrade Inspection Report

Customer Order Zone: ☒ orders@natglass.co.za | ☎ +27 44855 | 🌐 <http://portal.natglass.co.za>

#### FOR OFFICE USE ONLY

Customer: \_\_\_\_\_ Date: \_\_\_\_\_ Location: \_\_\_\_\_  
Contact: \_\_\_\_\_ Contact No: \_\_\_\_\_ Project: \_\_\_\_\_

#### Test Rig Information:

Glass Thickness  mm  
Moment Line Load:  kN/m  
Modulus Rupture:  kN/m  
Weight of Bag:  kg  
Impact Test ☐ 200J ☐ 400J  
Drop Height [Joules/(Bag Weight x 9.807) =]  m  
Height to Centre impact point:  m  
Overall drop height (Drop height + height to centre impact point)  m

#### Balustrade Information:

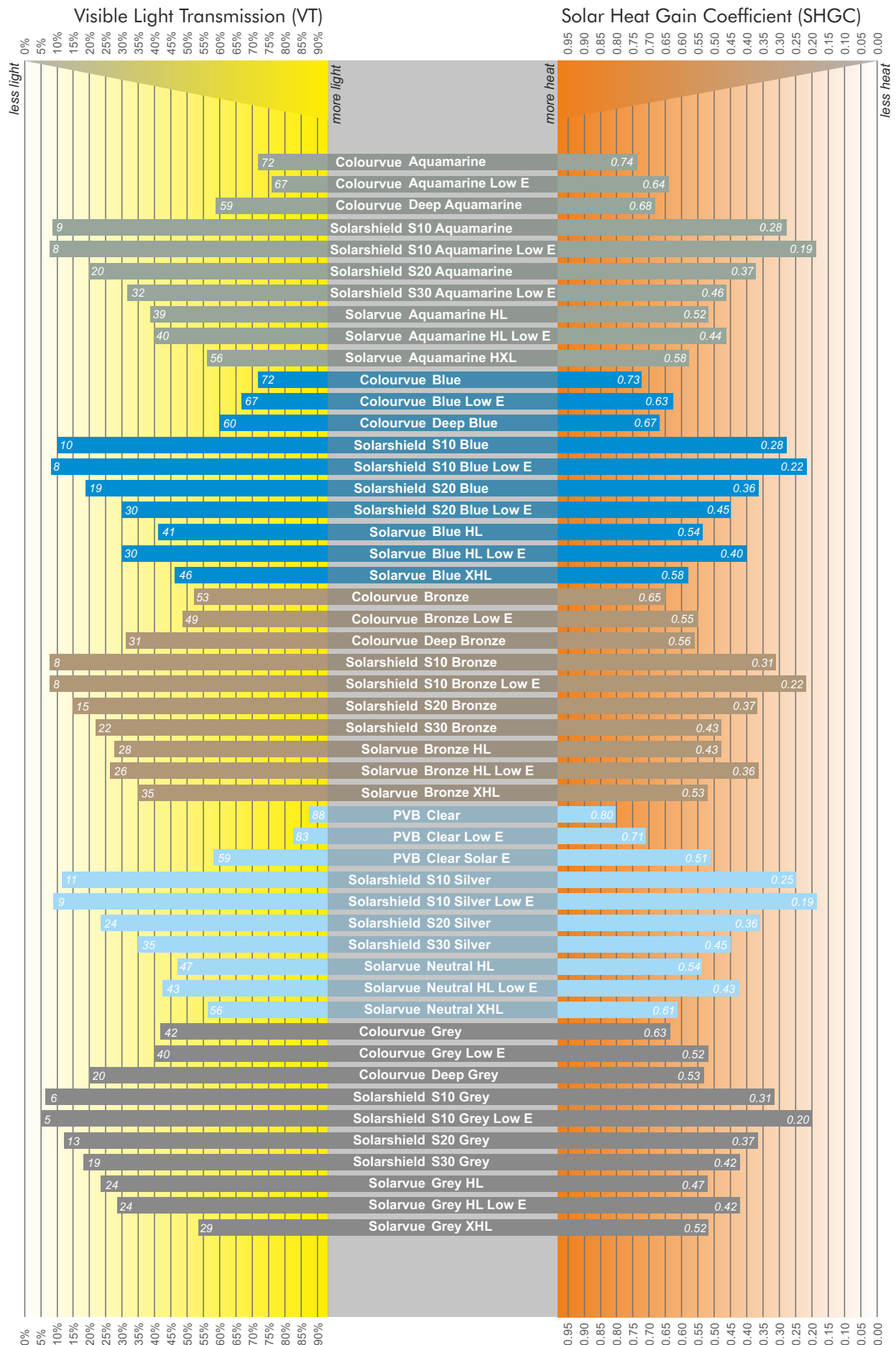
- ☐ Frameless Sunken  
☐ Frameless Side-mounted  
☐ Frameless Bottom Channel  
☐ Frameless Surface Spigot  
☐ Two Edge Supported Channel  
☐ Two Edge Supported Clamped  
☐ Four Edge Supported  
☐ Hand Railing Yes ☐ No

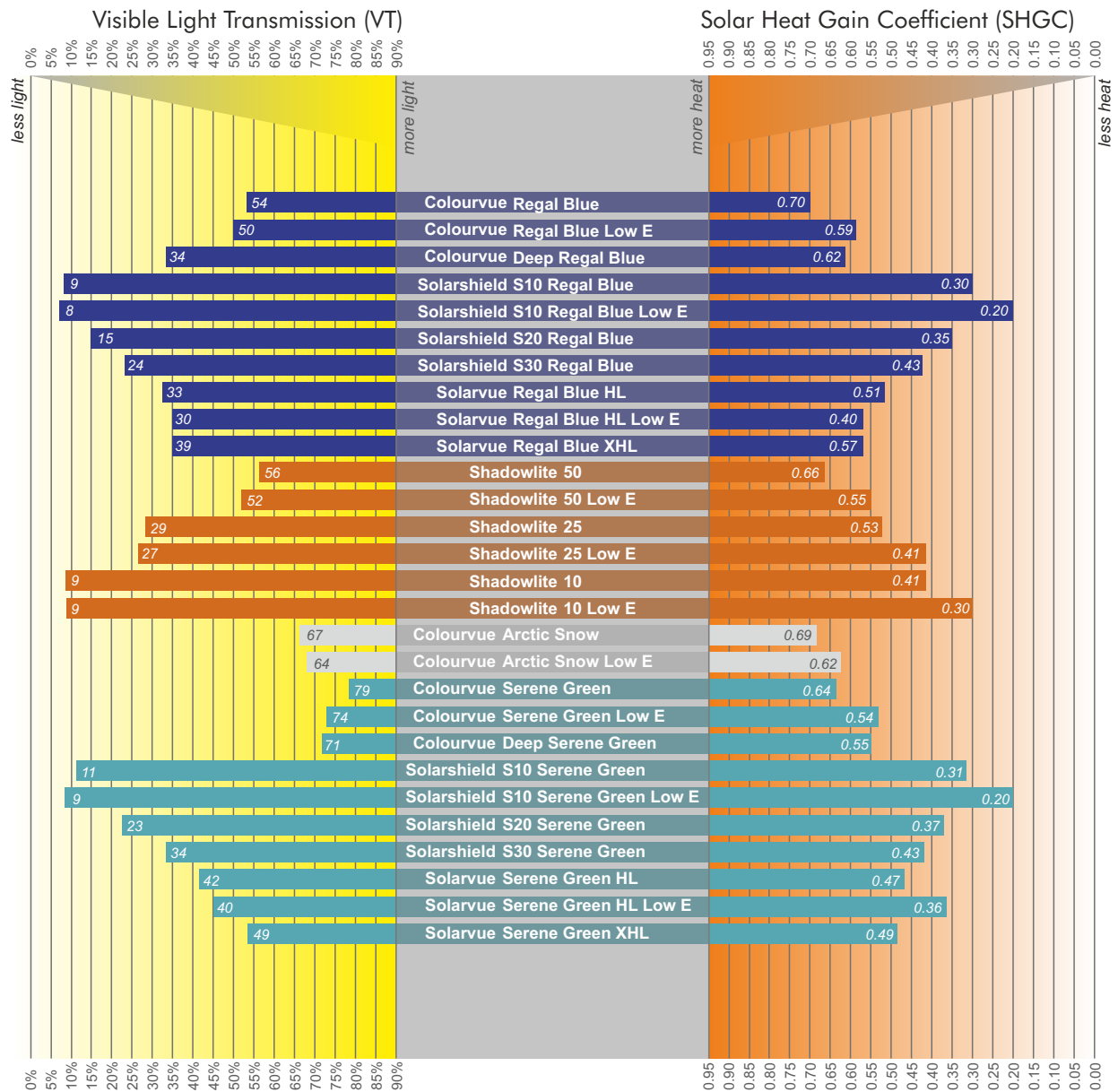
#### Hand Rail Details:

Indicate: Dimensions of fixings and positions, handrail and supports.

Result: \_\_\_\_\_ CPG1: \_\_\_\_\_ Print Name: \_\_\_\_\_  
Videos (Y/N): \_\_\_\_\_ CPG2: \_\_\_\_\_ Print Name: \_\_\_\_\_

☎ +27(0)10 593 8400 | ☒ info@natglass.co.za | 🌐 [www.natglass.co.za](http://www.natglass.co.za)







Tel: +27(0)10 593 8400 | Fax: +27(0)10 591 5660  
info@natglass.co.za | www.natglass.co.za