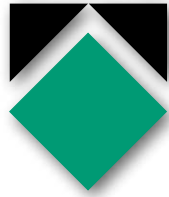


PFG



Laminates

HIGH QUALITY LAMINATED GLASS SOLUTIONS

Intruderprufe[®]



www.pfg.co.za



CONTENTS

- Introduction 4
- Manufacture of Laminated Safety Glass 5
- PFG Laminated Safety Glass Performance Benefits 6
- PFG Standard Laminated Glass Products 8
- Decorative - Vanceva 9
- Safety 10
- Security 11
- Sound Control 12
- Ultraviolet Protection 14
- Solar Control 15
- Optical and Solar Performance 16
- Definitions 17
- ColourVue - Optical and Solar Performance Data 18
- Vanceva - Optical and Solar Performance Data 19
- SolarVue - Optical and Solar Performance Data 19
- Solarshield - Optical and Solar Performance Data 20
- Thermal Insulation and Energy Efficiency - E Range 20
- ColourVue E Range - Optical and Solar Performance Data 21
- SolarVue E Range - Optical and Solar Performance Data 21
- Solarshield E Range - Optical and Solar Performance Data 22
- International Glazing Database 22
- Disclaimer 23



INTRODUCTION

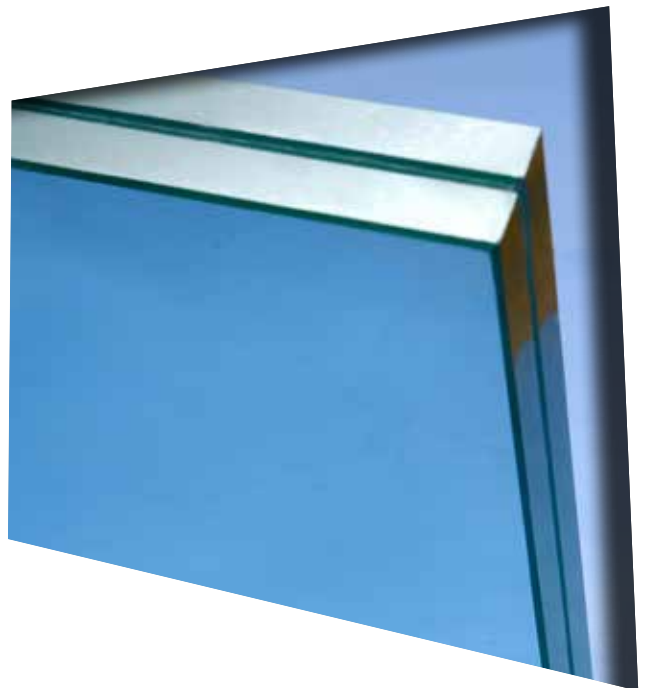
AFRICA'S LEADING MANUFACTURER OF LAMINATED SAFETY GLASS

PFG is part of the PG Group, a leading figure in Africa's glass industry with an expanding global footprint in the building and automotive sectors. The company operates two modern float glass manufacturing lines, with ancillary lines, continuously for 365 days a year.

PFG is based in Springs, just outside Johannesburg, from where our products are exported around the world. PFG is an ISO 9001 (quality management system) and ISO14001 (environmental management system) certified company. We manufacture approximately

260 000 tons of high quality float glass a year, for supply in to the building and automotive industries worldwide. This float glass is used to produce PFG's value-added products – specifically our market-leading laminated safety glass, mirrors at the ISO 14001 PFG mirror plant, and automotive quality float glass which is supplied to local and international auto glass manufacturers.

PFG supplies customers in the building and automotive sectors of southern Africa, Europe, the USA and other export markets.



What is laminated glass?

Laminated glass is a type of safety glass that remains intact when shattered. When broken, it is held in place by an interlayer, typically polyvinyl butyral (PVB), between its two or more layers of glass. The interlayer keeps the layers of glass bonded even when broken, and its high strength prevents the glass from breaking up into large sharp, dangerous shards. This produces a characteristic 'spider web' crack pattern when the impact is not enough to completely pierce the glass.

Laminated glass is normally used when there is a possibility of human impact or where the glass could fall if shattered.

Skylight glazing and automobile windshields typically use laminated glass. It is also used extensively in shop fronts, curtain walls and windows. The PVB interlayer also gives the glass a higher sound insulation rating, due to the damping effect, as well as increased protection against UV radiation.

BENEFITS OF LAMINATED SAFETY GLASS	
Safety	Security
Sound control	UV protection
Solar control	Thermal insulation




















MANUFACTURING LAMINATED SAFETY GLASS

PFG produces a range of quality laminated glass products, for use in buildings, homes and decorative applications. PFG laminated glass, branded **Intruderprufe**, is manufactured to world class standards. Laminated glass is produced when two sheets of ClearVue glass are thermochemically bonded together by a clear or tinted polyvinyl butyral (PVB) interlayer.


The laminated glass then passes through a series of rollers to expel the trapped air between the layers, in order to bond the layers together. This is followed by a cycle of heat and pressure in an autoclave to complete the lamination. The result is a high-performance glass material that can withstand numerous blows from a solid object. Should a pane of laminated glass break, the glass fragments adhere to the interlayer, thereby maintaining the integrity of the glass.










































PFG LAMINATED GLASS PERFORMANCE BENEFITS

	SECURITY	SAFETY	SOLAR CONTROL
			
Vanceva			
Intruderprufe			
ColourVue			
SolarVue			
Solarshield			
Soundprufe			

PFG LAMINATED GLASS E-RANGE PERFORMANCE BENEFITS

Intruderprufe			
ColourVue			
SolarVue			
Solarshield			

UV PROTECTION	SOUND CONTROL	DECORATIVE	ENERGY EFFICIENCY
			
			
			
			
			
			
			

PFG STANDARD LAMINATED GLASS PRODUCTS

Intruderprufe

Sub (mm)	Length (mm)	Width (mm)	Intruderprufe	Plates / pack
4.38	1 830	1 550	A	30
5.38	2 000	1 550	A	24
6.38	2 440	1 830	A	20
6.38	2 440	2 000	A	20
6.38	2 440	2 134	A	20
6.38	2 700	2 025	A	10
6.38	3 210	2 250	A	10
6.38	3 210	2 440	A	10
6.38	3 660	2 440	A	10
8.38	3 210	2 250	A	15
8.38	3 210	2 440	A	15
8.38	3 660	2 440	A	15
10.38	3 210	2 250	*	
10.38	3 210	2 440	*	
10.38	3 660	2 440	*	
12.38	3 210	2 250	*	
12.38	3 210	2 440	*	
12.38	3 660	2 440	*	

A = standard product supplied ex stock in full packs. Other thicknesses are available on request.

* Made to order products supplied loose.

Performance laminates

Sub (mm)	Length (mm)	Width (mm)	ColourVue							Solarshield S10					SolarVue	Plates / pack
			Aquamarine	Cool Grey	Cool Blue	Cool Bronze	Serene Green	Arctic Snow	Shadow 25	Silver	Bronze	Aqua	Blue	Grey	HL Neutral	
6.38	2 440	1 830	*	*	*	*		*	*	*	*	*	*	*	*	
6.38	2 440	2 000	*	A	*	A		A	A	A	A	*	A	A	A	10
6.38	2 440	2 134	*	*	*	*		*	*	*	*	*	*	*	*	
6.38	3 210	2 250	*	*	*	*	*	*	*	A	*	*	*	*	A	10
6.38	3 210	2 440	*	A	*	*	*	*	*	A	A	*	*	*	A	10
6.38	3 660	2 440	*	*	*	*		*	*	*	*	*	*	*	*	
8.38	3 210	2 250	*	*	*	*	*	*	*	*	*	*	*	*	A	10
8.38	3 210	2 440	*	*	*	*		*	*	*	*	*	*	*	*	
8.38	3 660	2 440	*	*	*	*		*	*	*	*	*	*	*	*	
10.38	3 210	2 250	*	*	*	*	*	*	*	*	*	*	*	*	*	
10.38	3 210	2 440	*	*	*	*	*	*	*	*	*	*	*	*	*	
10.38	3 660	2 440	*	*	*	*	*	*	*	*	*	*	*	*	*	
12.38	3 210	2 250	*	*	*	*	*	*	*	*	*	*	*	*	*	
12.38	3 210	2 440	*	*	*	*	*	*	*	*	*	*	*	*	*	
12.38	3 660	2 440	*	*	*	*		*	*	*	*	*	*	*	*	

All the above are also available with multiple vinyls – HPR, HR and HI.

SolarVue range is available in HL andXHL coating densities.

Solarshield range is available in S10, S20 and S30 coating densities.

A = standard product supplied ex stock in full packs.

* Made to order products supplied loose.

The standard sheet size for Low-E laminates is 3 210 mm x 2 250 mm.

The standard sheet size for Serene Green laminates is 3 210 mm x 2 250 mm and 3 210 mm x 2 440 mm.

Other make-ups are available on a made-to-order basis.

DECORATIVE LAMINATED GLASS

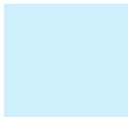
Vanceva

PFG offers the Vanceva laminated glass range of coloured PVB interlayers that provides a palette of unique, distinctive colours that are not readily available in standard float glass.

A kaleidoscopic range of colours can be achieved by combining different vinyl interlayers.



Coral Rose
Layer code: 1



Aqua Blue
Layer code: 2



Smoke Grey
Layer code: 3



Sahara Sun
Layer code: 4



Ruby Red
Layer code: 5



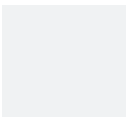
Sapphire
Layer code: 6



Evening Shadow
Layer code: 7



Golden Light
Layer code: 8



Cool White
Layer code: A



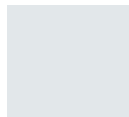
Dark Red
Layer code: C



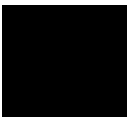
True Blue
Layer code: D



Tangerine
Layer code: E



Polar white
Layer code: F



Black
Layer code: G

Note: These colours are approximate. Please check samples for a more accurate colour.

BENEFITS OF LAMINATED SAFETY GLASS

SAFETY

Laminated glass is designed to minimise serious injury to humans that may accidentally collide with glass. The virtually inseparable thermochemical bond between the PVB interlayer and glass causes the glass to adhere to the PVB interlayer, holding the glass sheets together.

A typical laminate makeup is 3mm glass / 0.38mm interlayer / 3mm glass. This gives a final product referred to as 6.38mm laminated glass. Multiple layers of vinyl and thicker glass increase the strength of the finished product.

The swing bag test

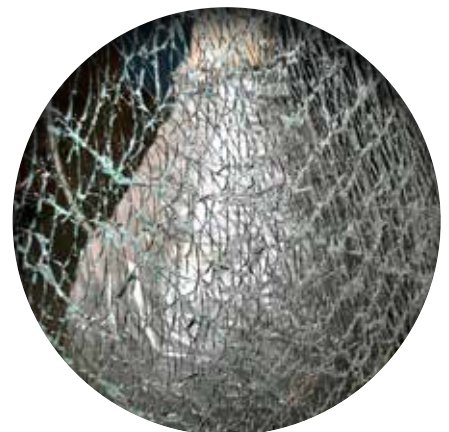
The South African National standard SANS 1263 Part 1:2013 is the basis for compliance with the stringent requirements for safety glazing materials.

All laminated safety glass manufactured by PFG satisfies the requirements of SANS 1263 Part 1:2013 and in terms of this certification every sheet of laminated glass manufactured by PFG carries the SABS mark of approval. SANS 1263 Part 1 requires that a lead filled bag weighing 45kg is dropped through a pendulum arc from a height of 450mm and strikes the centre of the test glass with an impact force of 203 Joule. In order to comply with the safety glass regulations the glass should break safely. In the case of laminated glass, the impact of the swing bag should not rupture the interlayer to allow a 75mm sphere to pass through the laminated glass.

The practicality of this test is that should a human collide with the glass, injury will be minimised.



Intruderprufe®



BENEFITS OF LAMINATED SAFETY GLASS

SECURITY

For glass applications that require greater resistance to forced attack than what normal strength laminated safety glass offers, increasing the thickness of the PVB interlayers provides additional protection to people and assets.

The following table illustrates the resistance to typical hammer blows (by a person of average strength), before the interlayer is ruptured, comparing different thicknesses of PVB interlayers for the same glass combination:

Degree of security	PVB thickness	Number of impacts
Low	0.38mm	3
Medium	0.76mm	8
High	1.52mm	24

Additional layers of vinyl increase penetration resistance exponentially. Thicker glass imparts greater structural strength and increased wind resistance.

The drop ball test

Compliance with SANS 1263 Part 2: 2013 Security Glazing Materials is the basis for all High Impact strength laminated security glass products that are manufactured by PFG.

To satisfy the requirements of this standard test, the glass must withstand the impact of a 2.25kg steel ball dropped five times from a height of 3m and once from a height of 9m.



BENEFITS OF LAMINATED SAFETY GLASS

SOUND CONTROL

Glass has a critical role to play in reducing excessive noise to acceptable levels that can enhance a pleasant living and working environment.

The design professional's choice of high quality sound attenuating glass is influenced by:

- External noise sources
- Internal desired sound levels
- Thick glass configurations
- Asymmetric glass make-ups
- Wide airspaces between panes
- Gases in airspaces
- Standard or acoustic performance polyvinyl butyral interlayers in laminated glass

For superior sound insulation performance, PFG offers a vast range of laminated glass combinations that incorporate standard and acoustic clear and tinted PVB interlayers. The PFG range of acoustic laminated glass is branded Soundprufe.

A combination of these acoustic laminated glasses in insulating glass units and wide airspace double glazing, can further reduce the ingress of unwanted noise and enhance thermal insulation and solar heat control of glazing designs.

A measure for the sound insulation of glass is expressed as R_w , which is an average value measured in decibels (dB) that takes into account the sensitivity of the human ear to sound volumes, frequencies and pitch. The higher the R_w value, the better the noise reduction of the glass.



SOUND PERFORMANCE DATA OF GLASS CONFIGURATIONS

Indicative sound control performance data

MONOLITHIC	R _w
3mm float	28
4mm float	29
5mm float	30
6mm float	31
8mm float	33
10mm float	35
12mm float	36
15mm float	38
19mm float	40

LAMINATED IGU	MAKE-UP	R _w
16.38mm IGU	6.38/6as/4	34
23.76mm IGU	6.76/12as/5	37
24.38mm IGU	6.38/12as/6	35
24.76mm IGU	8.76/12as/4	36
24.76mm IGU	6.76/12as/6	37
25.52mm IGU	7.52/12as/6	38
28.76mm IGU	10.76/12as/6	39

LAMINATED GLASS	MAKE-UP	R _w
6.38mm PVB laminated	3/0.38/3	33
6.76mm PVB laminated	3/0.76/3	34
7.52mm PVB laminated	3/1.52/3	35
8.38mm PVB laminated	4/0.38/4	34
8.76mm PVB laminated	4/0.76/4	35
10.38mm PVB laminated	5/0.38/5	35
10.76mm PVB laminated	5/0.76/5	36
10.52mm PVB laminated	5/1.52/5	37
12.38mm PVB laminated	6/0.38/6	37
12.76mm PVB laminated	6/0.76/6	38
13.52mm PVB laminated	6/1.52/6	39

ACOUSTIC LAMINATED	MAKE-UP	R _w
6.50mm Acoustic PVB	3/0.50/3	35
8.50mm Acoustic PVB	4/0.50/4	36
10.50mm Acoustic PVB	5/0.50/5	37
12.50mm Acoustic PVB	6/0.50/6	38

ACOUSTIC LAMINATED IGU	MAKE-UP	R _w
24.50mm Acoustic IGU	6.50A/12as/6	41
26.50mm Acoustic IGU	8.50A/12as/6	41
28.50mm Acoustic IGU	10.50A/12as/6	42
28.50mm Acoustic IGU	8.50A/12as/8	44

INSULATING GLASS UNITS	MAKE-UP	R _w
14mm IGU	4/6as/4	29
18mm IGU	6/6as/6	31
20mm IGU	4/12as/4	30
21mm IGU	4/12as/5	31
22mm IGU	5/12as/5	32
24mm IGU	6/12as/6	34
26mm IGU	6/16as/4	35
31mm IGU	6/19as/6	37
28mm IGU	6/12as/10	38

KEY
as = airspace
A = acoustic
IGU = Insulating Glass Unit
PVB = Polyvinyl Butyral
R _w = Sound insulation of glass

The higher the R_w value, the better the noise reduction of the glass.

The above sound performance data is based on a range of published data from testing laboratories and serves as a guide for comparison only. Test reports for specific glass configurations are available on request.

BENEFITS OF LAMINATED SAFETY GLASS

UV PROTECTION

Ultraviolet radiation exists in the wavelength band of 300 to 380 nanometres in the solar spectrum. Long term exposure to UV radiation can lead to fading and discolouration of fabrics, artworks and the deterioration of plastics and timber.

The PVB interlayers in laminated glass serve to protect interior furnishing and fittings against the damaging effects of ultraviolet radiation by eliminating up to 99% of UV rays.

Fading is also exacerbated by high levels of visible light and infrared radiation. In order to combat the degradation of materials, the light transmission and solar heat can be reduced by means of tinted PVB interlayers, heat reflecting coated glass, or combinations of both.

The ISO Damage Weighted Transmittance (Tdw-ISO) values illustrate the functionality of glass to reduce fading by taking into consideration the transmittance of both UV and visible light in the wavelengths from 300 to 600 nanometres. The shorter wavelength UV has a higher weighted damage factor than the longer wavelength visible light, and the sum of these wavelength specific factors results in a Damage Weighted Transmittance for each glass type.

Tdw-ISO values for glass can be obtained using the Lawrence Berkeley National Laboratory's Window thermal analysis software, in accordance with NFRC 200-2010 methodology.

The table below indicates that ColourVue Serene Green tinted laminated glass allows less of the damaging wavelengths of solar energy responsible for fading than Intruderprufe clear laminated glass – a reduction of 11%. Similarly, when a tinted glass (or tinted vinyl) is introduced to a solar controlling neutral coated laminated glass, the reduction of damaging radiation improves to 17%.

The reduction of damaging rays is even more pronounced when Intruderprufe is compared with SolarVue HL Neutral – 44% reduction. And when ColourVue Serene Green is compared with SolarVue HL Serene Green, a reduction of 48% is achieved.

Comparing Intruderprufe Clear with SolarVue HL Serene Green, the reduction of damaging wavelengths is 54%. That is, 63% minus 29% Tdw-ISO.

Non-coated laminates (6.38mm)	Tdw-ISO	Coated laminates (6.38mm)	Tdw-ISO	% Reduction of fading
Intruderprufe Clear	63%	SolarVue HL Neutral	35%	44%
ColourVue Serene Green	56%	SolarVue HL Serene Green	29%	48%
% reduction of fading	11%		17%	

The ISO Damage Weighted Transmittance for the range of PFG laminated glass products appears in the performance data tables on pages 18 to 22.



BENEFITS OF LAMINATED SAFETY GLASS

SOLAR CONTROL

COLOURVUE COOL TINTS

- * Tinted PVB interlayers or green glass
- * Medium glare control
- * Medium light transmission
- * Medium solar control
- * SHGC ranges from 0.77 to 0.53
- * Low reflectivity



COLOURVUE DEEP COOL TINTS

- * Double tinted PVB interlayers or green glass
- * Good glare control – softens bright daylight
- * Low light transmission
- * Best solar control of tinted glass
- * SHGC ranges from 0.73 to 0.42
- * Ultra low reflectivity



SOLARVUE

- * Clear or tinted PVB interlayers or green glass
- * Excellent glare control
- * Efficient solar control
- * SHGC ranges from 0.61 to 0.43
- * Medium reflectivity
- * Medium to high light transmission coatings:
 - High Light (HL)
 - Extra High Light (XHL)



SOLARSHIELD

- * Clear or tinted PVB interlayers or green glass
- * Superior glare control
- * High performance solar control
- * SHGC ranges from 0.46 to 0.25
- * High reflectivity
- * Low to medium light transmission coatings:
 - S10, S20, S30



OPTICAL AND SOLAR PERFORMANCE

The optical and solar performance data of the laminated glass products that are featured in this brochure are based on environmental conditions defined by the National Fenestration Rating Council (NFRC).

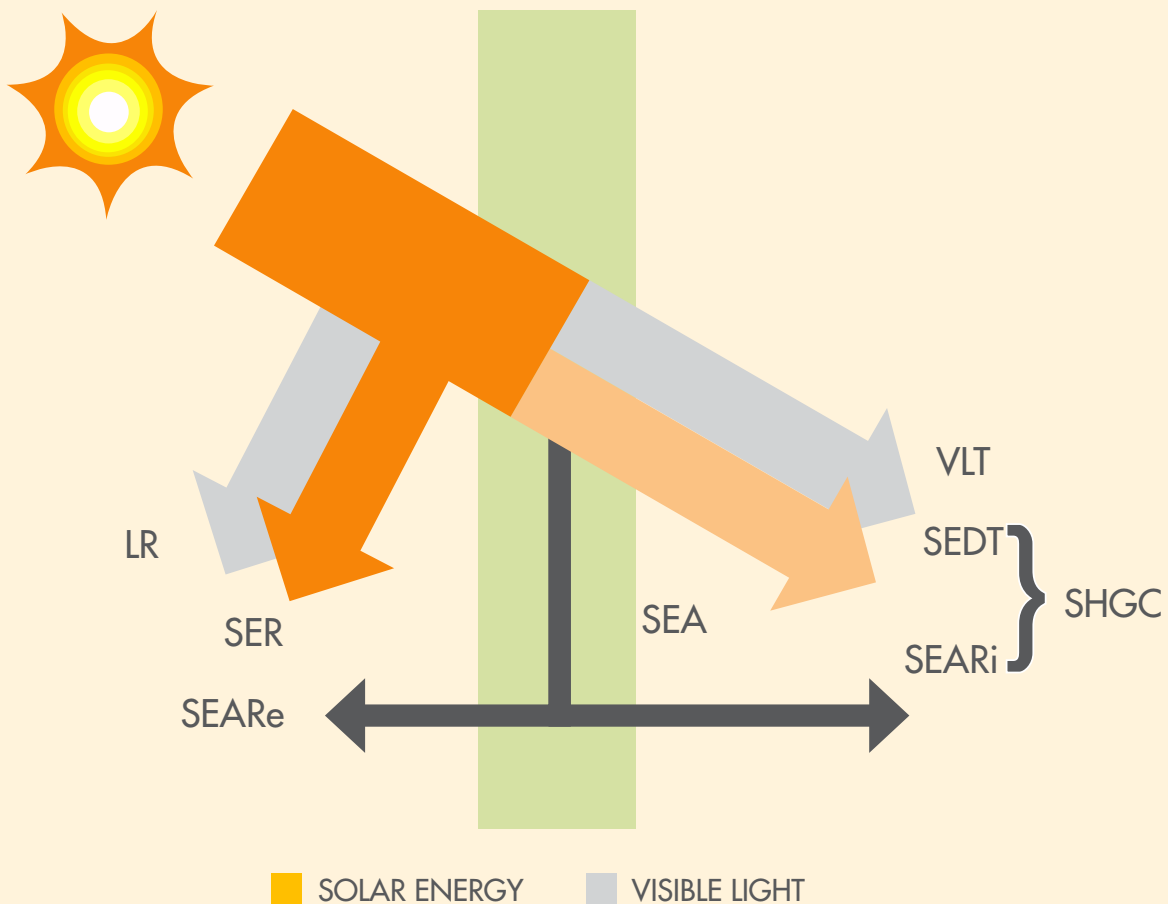
The spectral data were derived using the methodology of NFRC 200 – 2010 for Solar Heat Gain Coefficient and NFRC 100 – 2010 for the U-value.

All Solarshield and SolarVue embedded coating laminated glass products are listed on the International Glazing Data Base, and the respective IGDB codes appear in the

tabulations that follow. These products are also listed on the South African Glass Data Base and are referenced with IGDB codes.

All ColourVue, Vanceva and Intruderprufe laminated glass products are listed on the South African Glass Data Base and are referenced with SAGDB codes. The optical and solar performance values are derived from the respective glass and interlayer data on the IGDB using the Lawrence Berkeley National Laboratory (LBNL) WINDOW and OPTICS software to simulate the centre of glass performance values.

VISIBLE LIGHT AND SOLAR ENERGY FACTORS



LEGEND:

LR	= visible light reflection
VLT	= visible light transmission
SER	= solar energy reflection
SEA	= solar energy absorption

SEARi	= solar energy absorption radiated internally
SEARe	= solar energy absorption radiated externally
SEDT	= solar energy direct transmission
SHGC	= solar heat gain coefficient



DEFINITIONS:

Visible light transmission (VLT)

The percentage of visible light that is transmitted through the glass. Irrespective of weather conditions the external light level is taken as 100%. Visible light transmission is measured in the 380 nanometre to 780 nanometre wavelength range perpendicular to the glass surface.

Visible light reflection (VLR)

The percentage of visible light that is reflected by the glass, measured in the 380 nanometre to 780 nanometre wavelength range, perpendicular to the glass surface.

Solar heat gain coefficient (SHGC)

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 building space. SHGC is a measure of the direct heat transmittance plus that proportion of the solar heat that is absorbed by the glass, and that is re-radiated into the building interior. The lower the SHGC value, the better the glass restricts total solar heat transmission.

Shading coefficient (SC)

The ratio of the total solar heat gain - SHGC - that is transmitted through a particular glass, to that of 3mm clear float glass, which has a SHGC of 0,867. The shading coefficient of 3mm clear float glass is thus 1.0 and represents a basis for comparing the total solar heat transmission of any glass product. The lower the value of the shading coefficient, the lower the amount of total solar heat that is transmitted through the glass.

The shading coefficient of any glass is calculated as:

$$SC = \frac{\text{SHGC of a particular glass}}{0.867}$$

U-Value

The measure of the degree of heat gain, or heat loss, through glass due to the thermal conductance of the glass and the difference between indoor and outdoor temperatures. U-value is expressed as Watts per m² per degree Kelvin. The lower the U-value, the less conducted heat is transferred, and hence the better the thermal insulation of the glass.

THERMAL INSULATION FACTOR U-VALUE W/m²K

Cold
Temperature T1

Warm
Temperature T2

T2 > T1



U-value

PFG LAMINATED GLASS PERFORMANCE DATA

The performance data in these tabulations are for 6mm nominal thickness

COLOURVUE™

Product		Visible Light		Solar Energy					Shading Co-efficient	U-Value	Damage Weighted Transmittance
SAGDB No.	COLOURVUE™	Transmission	Reflection	Total Elimination	Reflectance	Absorption	Direct Transmission	SHGC	Ratio	W/m ² .K	Tdw-ISO
ZA100100	Intruderprufe	88	8	20	7	19	74	0.80	0.92	5.8	63%
ZA100200	Cool Aquamarine	78	7	23	7	24	69	0.77	0.88	5.8	52%
ZA100201	Cool Blue	74	7	24	7	26	68	0.76	0.87	5.8	57%
ZA100202	Cool Bronze	53	6	34	6	42	53	0.66	0.75	5.8	35%
ZA100203	Cool Grey	42	5	37	5	46	48	0.63	0.72	5.8	32%
ZA100204	Cool Regal Blue	54	6	30	6	35	59	0.70	0.80	5.8	46%
ZA100205	Shadowlite 10	9	4	58	4	80	16	0.42	0.48	5.8	4%
ZA100206	Shadowlite 25	29	5	47	5	62	33	0.53	0.61	5.8	16%
ZA100226	Shadowlite 50	56	6	34	6	41	53	0.66	0.76	5.8	36%
ZA100239	Serene Green	79	8	36	6	44	50	0.64	0.73	5.8	56%
ZA100228	Deep Cool Aquamarine	69	7	27	6	29	64	0.73	0.84	5.8	42%
ZA100229	Deep Cool Blue	63	6	29	6	32	61	0.71	0.82	5.8	50%
ZA100230	Deep Cool Bronze	35	5	43	5	56	39	0.56	0.65	5.8	19%
ZA100231	Deep Cool Grey	20	5	47	5	62	33	0.53	0.60	5.8	16%
ZA100232	Deep Cool Regal Blue	34	5	38	5	47	48	0.62	0.72	5.8	33%
ZA100240	Deep Serene Green	71	7	45	5	58	36	0.55	0.63	5.8	49%

COLOURVUE ARCTIC SNOW™

Product		Visible Light		Solar Energy					Shading Co-efficient	U-Value	Damage Weighted Transmittance
SAGDB No.	COLOURVUE ARCTIC SNOW™	Transmission	Reflection	Total Elimination	Reflectance	Absorption	Direct Transmission	SHGC	Ratio	W/m ² .K	Tdw-ISO
ZA100207	Arctic Snow	68	7	29	6	33	61	0.71	0.82	5.8	46%
ZA100241	Cool Aquamarine Arctic Snow	60	6	32	6	38	56	0.68	0.78	5.8	37%
ZA100242	Cool Blue Arctic Snow	57	6	33	6	39	55	0.67	0.77	5.8	40%
ZA100244	Cool Bronze Arctic Snow	41	5	41	5	52	43	0.59	0.68	5.8	25%
ZA100245	Cool Grey Arctic Snow	33	5	43	5	55	40	0.57	0.66	5.8	23%
ZA100243	Cool Regal Blue Arctic Snow	42	5	37	5	46	48	0.63	0.72	5.8	33%
ZA100225	Serene Green Arctic Snow	61	6	43	5	54	40	0.57	0.66	5.8	40%

VANCEVA™

Product		Visible Light		Solar Energy					Shading Co-efficient	U Value	Damage Weighted Transmittance
SAGDB No.	VANCEVA™	Transmission	Reflection	Total Elimination	Reflectance	Absorption	Direct Transmission	SHGC	Ratio	W/m².K	Tdw-ISO
ZA100214	True Blue	12	5	42	5	53	42	0.58	0.67	5.8	23%
ZA100215	Aqua Blue	72	7	26	6	29	65	0.74	0.85	5.8	52%
ZA100216	Tangerine	42	6	33	6	39	55	0.67	0.77	5.8	11%
ZA100212	Sahara Sun Yellow	78	7	27	6	29	64	0.73	0.84	5.8	24%
ZA100218	Smoke Grey	78	7	24	7	25	68	0.76	0.87	5.8	55%
ZA100213	Sapphire Blue	52	6	32	6	38	56	0.68	0.78	5.8	50%
ZA100211	Ruby Red	48	6	27	6	30	63	0.73	0.84	5.8	38%
ZA100217	Golden Light Yellow	86	8	23	7	24	70	0.77	0.88	5.8	41%
ZA100210	Evening Shadow	50	6	37	5	46	49	0.63	0.73	5.8	32%
ZA100209	Dark Red	15	5	44	5	56	39	0.56	0.65	5.8	8%
ZA100219	Cool White	82	8	24	7	25	69	0.76	0.88	5.8	56%
ZA100208	Coral Rose	76	7	22	7	22	71	0.78	0.90	5.8	56%

SOLARVUE™

Products			Visible Light		Solar Energy					Shading Co-efficient	U Value	Damage Weighted Transmittance
IGDB No.	SOLARVUE™	Range	Transmission	Reflection	Total Elimination	Reflectance	Absorption	Direct Transmission	SHGC	Ratio	W/m².K	Tdw-ISO
16060	Neutral	HL	47	12	46	11	50	39	0.54	0.62	5.8	35%
16097		XHL	56	10	39	9	44	47	0.61	0.70	5.8	40%
16103	Aquamarine	HL	39	10	48	10	56	34	0.52	0.59	5.8	29%
16089		XHL	48	8	42	8	50	42	0.58	0.66	5.8	35%
16117	Blue	HL	41	11	46	10	53	37	0.54	0.62	5.8	33%
16091		XHL	46	8	42	8	50	42	0.58	0.67	5.8	37%
16057	Bronze	HL	28	7	57	6	75	19	0.43	0.50	5.8	19%
16093		XHL	35	6	47	6	59	35	0.53	0.61	5.8	24%
16059	Grey	HL	24	7	53	8	66	26	0.47	0.54	5.8	19%
16095		XHL	29	6	48	6	61	33	0.52	0.60	5.8	22%
16061	Regal Blue	HL	33	8	49	9	58	33	0.51	0.59	5.8	28%
16099		XHL	39	7	43	7	53	40	0.57	0.65	5.8	32%
16116	Arctic Snow	HL	33	16	54	14	58	28	0.46	0.53	5.8	23%
16106		XHL	41	13	48	11	54	35	0.52	0.60	5.8	28%
16062	Serene Green	HL	42	9	53	6	69	25	0.47	0.54	5.8	29%
16101		XHL	49	9	51	9	61	30	0.49	0.57	5.8	35%

Products			Visible Light		Solar Energy					Shading Co-efficient	U Value	Damage Weighted Transmittance
IGDB No.	SOLARSHIELD™	Range	Transmission	Reflection	Total Elimination	Reflectance	Absorption	Direct Transmission	SHGC	Ratio	W/m².K	Tdw-ISO
16111	Silver	S10	11	43	75	38	53	9	0.25	0.29	5.8	8%
16122		S20	24	28	64	25	56	19	0.36	0.42	5.8	18%
16054		S30	35	19	55	18	54	28	0.45	0.52	5.8	26%
16112	Aquamarine	S10	9	29	72	28	64	8	0.28	0.32	5.8	7%
16118		S20	20	20	63	21	62	17	0.37	0.42	5.8	16%
16045		S30	32	13	54	13	60	27	0.46	0.53	5.8	25%
16022	Blue	S10	10	29	72	30	61	8	0.28	0.32	5.8	8%
16034		S20	19	27	66	26	57	16	0.34	0.40	5.8	16%
16115		S30	30	17	56	17	57	26	0.44	0.51	5.8	25%
16024	Bronze	S10	8	16	69	19	74	7	0.31	0.35	5.8	5%
16036		S20	16	12	63	13	72	14	0.37	0.43	5.8	11%
16047		S30	22	9	57	10	68	21	0.43	0.49	5.8	16%
16026	Grey	S10	6	13	69	18	75	7	0.31	0.35	5.8	5%
16038		S20	13	9	63	13	74	14	0.37	0.43	5.8	11%
16049		S30	19	8	58	10	70	20	0.42	0.48	5.8	15%
16028	Regal Blue	S10	9	20	70	25	67	8	0.30	0.34	5.8	8%
16040		S20	15	15	65	19	67	14	0.35	0.40	5.8	13%
16051		S30	24	11	57	13	64	23	0.43	0.50	5.8	21%
16110	Arctic Snow	S10	10	38	74	36	56	8	0.26	0.30	5.8	7%
16119		S20	25	24	62	23	57	20	0.38	0.44	5.8	19%
16120		S30	34	17	55	16	56	27	0.45	0.52	5.8	25%
16030	Serene Green	S10	11	32	69	18	75	7	0.31	0.35	5.8	8%
16042		S20	23	21	63	13	73	14	0.37	0.43	5.8	18%
16053		S30	34	15	57	10	70	21	0.43	0.49	5.8	25%

THERMAL INSULATION AND ENERGY EFFICIENCY WITH PFG E RANGE LAMINATED GLASS

The solar performance of the ColourVue Cool Tints, ColourVue Deep Cool Tints, Solarshield and SolarVue can be combined with the energy efficient, thermally insulating, low emissivity properties of a pyrolitic low-E glass.

The PFG E-range of high performance laminated glass is the ideal solution for meeting and exceeding energy efficiency requirements. They provide the highest level of thermal insulation, in the form of U-value, in single glazed form. In winter months and cool summer nights, low-E glass reflects long wave radiated heat, generated internally, back into the building space. This greatly reduces heat loss as compared with non low-E glass. In hot summer months, low-E glass helps to reduce the transmission of direct solar

radiation, resulting in lower solar heat gain coefficients (SHGCs) than non-low-E coated glass. In addition, low-E coated glass helps to reduce the transmission of direct solar radiation from the hot exterior to the cooler interior, due to the excellent thermal insulating properties of the low-E coating.

PFG energy-performing laminated glasses combine solar heat control through tinted interlayers or tinted glass, with embedded solar heat reflecting metallic coatings, in combination with thermally insulating low-E coatings. These serve to substantially reduce cooling and heating loads, as well as air conditioning costs, resulting in overall energy savings and lower CO₂ emissions.

PFG LAMINATED GLASS PERFORMANCE DATA

Low E Range

COLOURVUE™ LOW E

Products		Visible Light		Solar Energy					Shading Co-efficient	U Value	Damage Weighted Transmittance
SAGDB No.	COLOURVUE™ Low E	Transmission	Reflection	Total Elimination	Reflectance	Absorption	Direct Transmission	SHGC	Ratio	W/m ² .K	Tdw-ISO
ZA103200	Intruderprufe	83	10	29	9	24	66	0.71	0.81	3.7	58%
ZA100220	Cool Aquamarine	73	9	33	9	30	62	0.67	0.77	3.7	55%
ZA100221	Cool Blue	69	9	34	9	31	60	0.66	0.76	3.7	52%
ZA100222	Cool Bronze	52	7	44	7	46	47	0.56	0.64	3.7	35%
ZA100223	Cool Grey	40	6	48	7	51	42	0.52	0.60	3.7	29%
ZA100224	Cool Regal Blue	50	7	41	8	40	52	0.59	0.68	3.7	42%
ZA100227	Shadowlite 10	9	4	70	5	82	13	0.30	0.34	3.7	4%
ZA100246	Shadowlite 25	27	5	59	6	66	29	0.41	0.48	3.7	15%
ZA100247	Shadowlite 50	52	7	44	7	46	47	0.56	0.64	3.7	33%
ZA100238	Serene Green	74	9	46	7	49	44	0.54	0.62	3.7	51%
ZA100237	Deep Cool Aquamarine	65	8	36	8	35	57	0.64	0.73	3.7	51%
ZA100236	Deep Cool Blue	58	8	38	8	38	55	0.62	0.71	3.7	46%
ZA100235	Deep Cool Bronze	33	5	54	6	60	34	0.46	0.53	3.7	21%
ZA100234	Deep Cool Grey	19	5	59	6	66	28	0.41	0.48	3.7	14%
ZA100233	Deep Cool Regal Blue	32	5	48	7	51	42	0.52	0.60	3.7	31%

SOLARVUE™ LOW E

Products		Visible Light		Solar Energy					Shading Co-efficient	U Value	Damage Weighted Transmittance	
IGDB No.	SOLARVUE™ Low E	Range	Transmission	Reflection	Total Elimination	Reflectance	Absorption	Direct Transmission	SHGC	Ratio	W/m ² .K	Tdw-ISO
16003	Neutral	HL	43	14	57	12	56	32	0.43	0.49	3.7	31%
16098		XHL	54	10	49	9	49	42	0.51	0.59	3.7	38%
16055	Aquamarine	HL	40	10	56	9	59	32	0.44	0.50	3.7	29%
16090		XHL	44	9	54	8	57	35	0.46	0.53	3.7	31%
16056	Blue	HL	30	8	60	9	64	27	0.40	0.46	3.7	24%
16092		XHL	46	9	51	9	53	38	0.49	0.56	3.7	36%
16058	Bronze	HL	26	8	64	8	69	23	0.36	0.42	3.7	18%
16094		XHL	32	6	58	6	65	29	0.42	0.48	3.7	21%
16104	Grey	HL	24	7	63	7	70	23	0.37	0.42	3.7	18%
16096		XHL	28	6	59	6	66	28	0.41	0.47	3.7	21%
16004	Regal Blue	HL	30	8	60	9	64	27	0.40	0.46	3.7	24%
16100		XHL	34	7	57	8	61	31	0.43	0.50	3.7	27%
16105	Serene Green	HL	40	10	64	7	72	21	0.36	0.41	3.7	28%
16102		XHL	46	9	60	7	66	27	0.40	0.46	3.7	32%

SOLARSHIELD™ LOW E

Products		Visible Light			Solar Energy					Shading Co-efficient	U Value	Damage Weighted Transmittance
IGDB No.	SOLARSHIELD™ Low E	Range	Transmission	Reflection	Total Elimination	Reflectance	Absorption	Direct Transmission	SHGC	Ratio	(W/m²).K	Tdw-ISO
16032	Silver	S10	9	39	81	35	58	7	0.19	0.21	3.7	7%
16044		S20	24	27	71	23	60	17	0.29	0.33	3.7	18%
16002		S30	34	17	63	17	57	26	0.37	0.43	3.7	25%
16021	Aquamarine	S10	8	27	81	28	66	6	0.19	0.22	3.7	6%
16033		S20	19	19	72	19	67	15	0.28	0.32	3.7	15%
16046		S30	28	14	66	13	65	22	0.34	0.40	3.7	21%
16023	Blue	S10	8	31	81	32	61	7	0.19	0.22	3.7	7%
16035		S20	18	21	73	22	64	14	0.27	0.31	3.7	15%
16001		S30	29	14	65	14	63	22	0.35	0.40	3.7	23%
16025	Bronze	S10	8	15	78	17	76	7	0.22	0.25	3.7	6%
16037		S20	16	11	72	13	74	13	0.28	0.32	3.7	11%
16048		S30	19	9	69	10	74	16	0.31	0.35	3.7	13%
16027	Grey	S10	5	14	80	20	75	5	0.20	0.23	3.7	4%
16039		S20	13	9	73	12	76	12	0.27	0.31	3.7	10%
16050		S30	18	8	69	10	74	16	0.31	0.36	3.7	14%
16029	Regal Blue	S10	8	20	80	24	69	7	0.20	0.23	3.7	7%
16041		S20	15	14	73	17	70	13	0.27	0.31	3.7	13%
16052		S30	23	10	67	12	68	20	0.33	0.38	3.7	19%
16031	Serene Green	S10	9	33	80	17	78	5	0.20	0.23	3.7	6%
16043		S20	22	20	73	13	75	12	0.27	0.31	3.7	16%
16121		S30	33	17	64	16	60	24	0.36	0.42	3.7	23%



International Glazing Data Base

The total heat transmission (solar heat gain coefficient) and the insulating (U-value) properties of glass are key when determining what glass should be used in building projects aiming for energy efficiency. The US-based National Fenestration Rating Council (NFRC) has prescribed testing methods for the characterisation of fenestration components, including glazing. Although it is relatively easy to test a sample in a laboratory, the validity of these results is uncertain because different equipment is used and the interpretation of results may be inconsistent.

It is for this reason that the Lawrence Berkeley National Laboratory has been mandated to maintain an International Glazing Database (IGDB), which houses some 4 000 characterised glazing components. These glazing components were submitted by members (manufacturers or data submitters on behalf of manufacturers) after successfully completing an inter-laboratory comparison test to confirm the validity of the results obtained from the equipment used to characterise the glazing components.

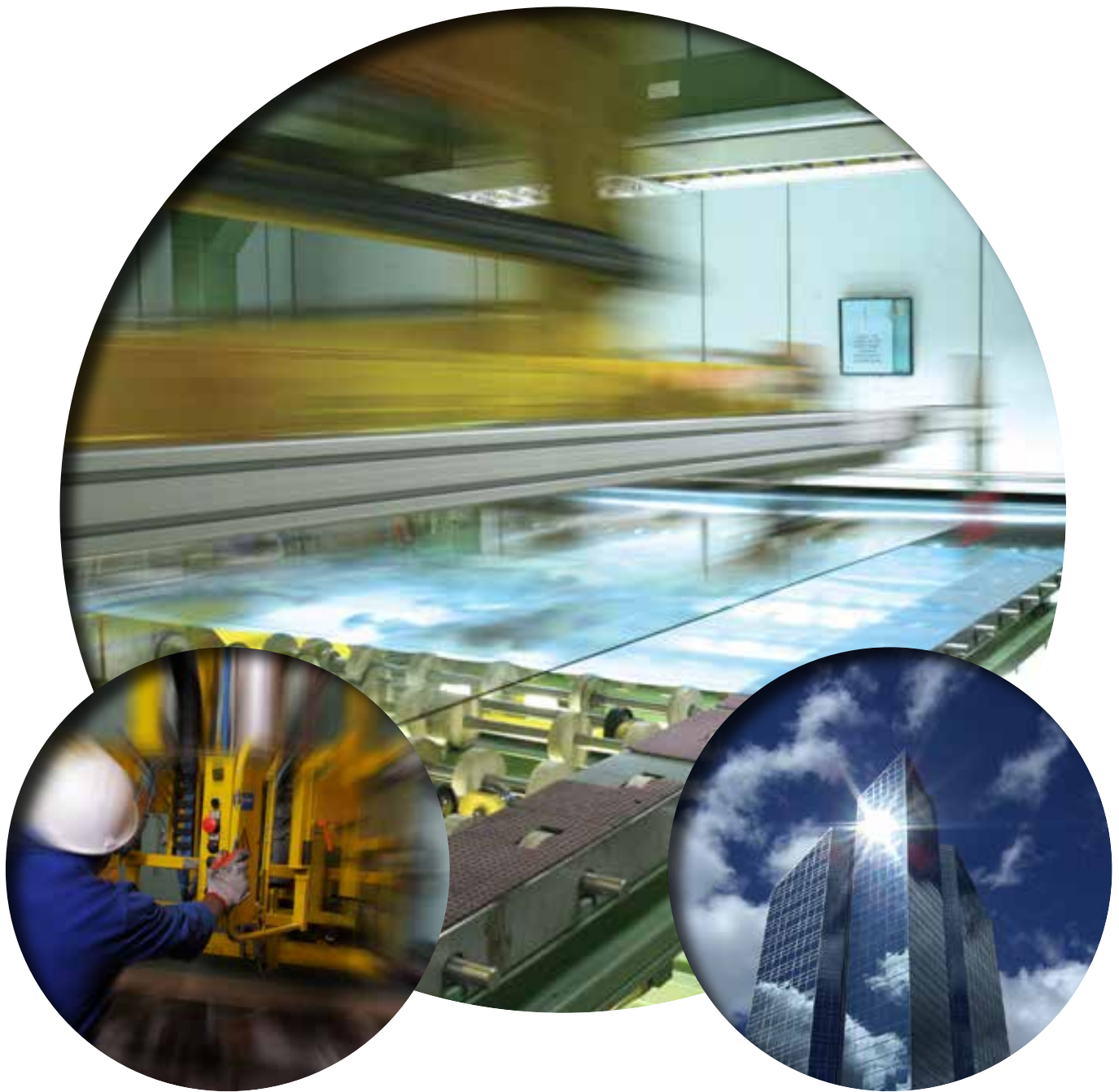
With the IGDB, all manufacturers worldwide have access to the database and the ability to compare glass options.

PFG has the advanced equipment needed to measure the full solar range – wavelengths from 300nm to 2 400nm. With this in-house testing expertise, we offer a world class measuring solution that is accredited in terms of NFRC criteria. This gives the South African glass industry convenient, local access to an accredited spectrophotometer – with the confidence that results are compared on a like-for-like basis. Samples can be tested locally. PFG has characterised over 130 of its products, including its leading ClearVue, SolarVue and SolarShield range of products.



DISCLAIMER:

The information contained in this brochure is offered for assistance in the application of PFG laminated glass products. It does not constitute a warranty of merchantability or fitness for any particular purpose. Actual performance of glass products may vary in particular applications.



High performance | Superior benefits | Lasting quality



Tel: +27 (0) 11 360 1000
www.pfg.co.za