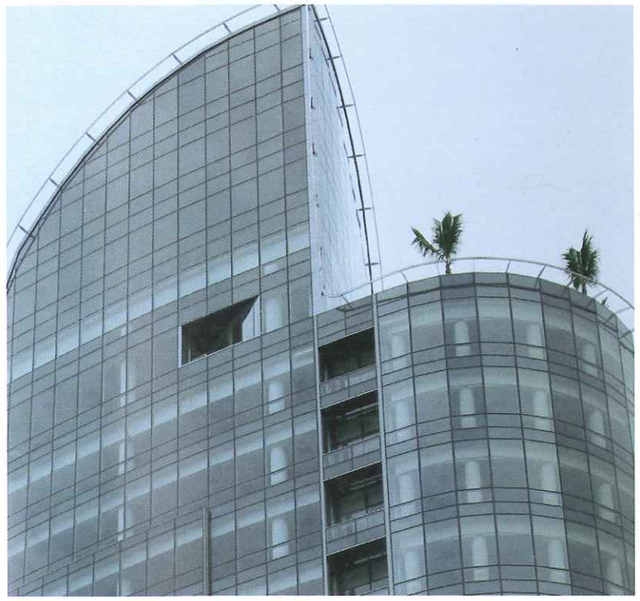
GPGLASS

REFLECTIONS
OF PERFECTION

GOLDEN PHAROS GLASS SDN. BHD.
(265409-W)

SECURITY
& COMFORT



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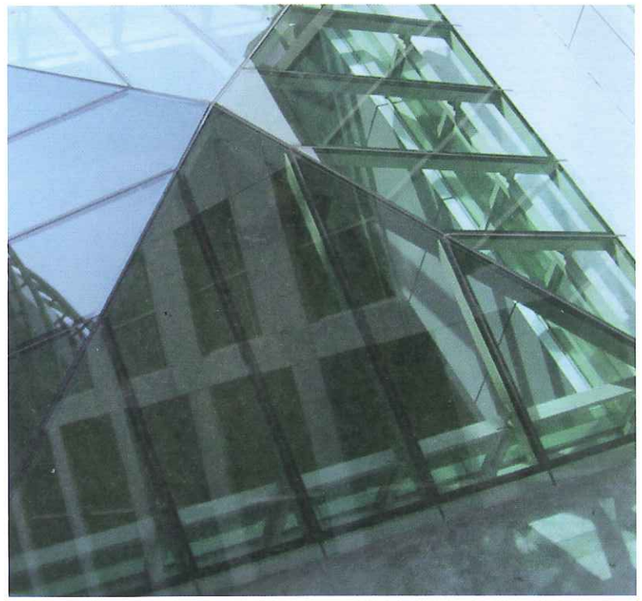
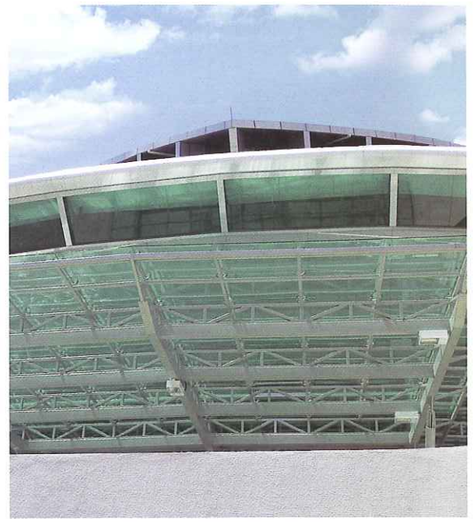


Golden Pharos *Glass Sdn Bhd (**GP** Glass)*
is a wholly owned subsidiary of the
Golden Pharos *Berhad Group*

INTRODUCTION
to our business

Golden Pharos Glass Sdn Bhd (**GP** Glass) is a wholly owned subsidiary of the **Golden Pharos** Berhad Group. Through the years, **GP** Glass has earned the distinction of being one of the leading manufacturers of modern glass in Malaysia. The company is committed to producing excellent quality products that conform to international standards. With a highly skillful team of craftsmen using the latest state-of-the art machinery, customers can always be assured of products that will meet exacting requirements. This commitment to excellent quality and innovation has enabled **GP** Glass to not only cater to the Malaysian market but also to export its products worldwide.



serving domestic and international markets including the US, Britain, Japan, Korea and Thailand

We are in the forefront among Malaysia's glass manufacturers. Serving domestic and international markets including the US, Britain, Australia, Japan and Thailand.

Golden Pharos Glass combines advanced machinery, skilled workforce plus research & development in Tempered Safety Glass.

GP TEMPERED SAFETY GLASS

Product Descriptions

Several times tougher than ordinary glass with residual surface compression in excess of 10,000 psi, **GP** Tempered Safety Glass is heat treated by heating ordinary float glass in high temperature and then cooling it rapidly by blowing air onto its surfaces.

GP Tempered Safety Glass is supplied to comply with either of the folowing standards where specified:

1. ANSI Z97.1:2004
2. BS 6206:1981
3. BS EN12600:2002
4. BS EN12150:2000
5. AS/NZS 2208:1996

Product Features

Strength : 3 to 5 times higher impact and bending strength than ordinary glass.

Heat Resistant : Resistant to rapid temperature changes or thermal shocks which can cause ordinary glass to crack.

Safety : When **GP** Tempered Safety Glass breaks, it will shatter into small blunt pieces, thus preventing serious injuries.

• Tempered Safety Glass

• Fixed Support 12mm Clear Tempered Glass

• Facade System

Product Applications

- Frameless Tempered Glass Doors
- Curtain Walls
- Escalator Side Panels
- Showcases
- Shop Fronts
- Balustrades
- Shower Doors

GP Tempered Safety Glass				
Specification	Production Size (mm)		Production Thickness (mm)	
Type of Process	Minimum	Maximum	Minimum	Maximum
GP Tempered Safety Glass	180 x 180	(W) (H) 2440 x 5100	3	19

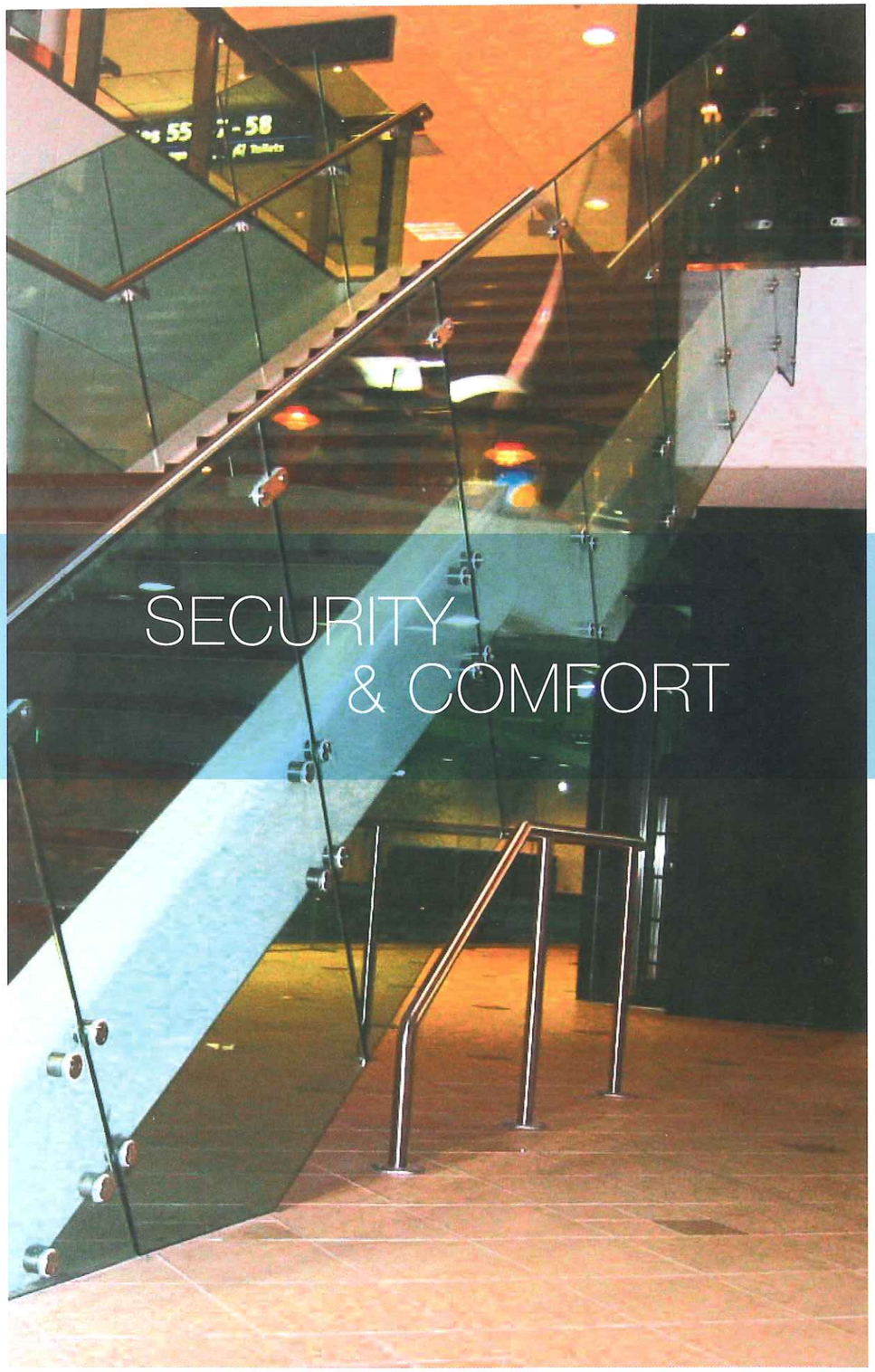
VALUE ADDED SERVICES

Heat Soak Test is an effective test applied onto tempered glass aimed at reducing the risk of spontaneous breakage due to Nickel Sulphide presence. The testing procedure involves heating the tempered glass for several hours towards expediting the aging process, where any Nickel Sulphide content will result in breakage. Thus it is important to detect the presence of any Nickel Sulphide within the tempered glass prior to site installation, as this will reduce the chances (although not 100%) of spontaneous breakage on site.

Heat Soak testing is in accordance to BS EN 14179:2005

• 10mm Tempered Safety Gleass

GP HEAT STRENGTHENED GLASS



Product Descriptions

GP Heat Strengthened Glass are manufactured similar to **GP** Tempered Glass except that the glass cools less rapidly and has residual surface compression greater than 3,500 psi and less than 10,000 psi. If the glass is broken, the break pattern will vary according to surface compression. **GP** Heat Strengthened Glass also offers improved optical viewing quality compared to **GP** Tempered Glass.

Product Features

After being heat treated, **GP** Heat Strengthened Glass cannot be cut, drilled, edged or sanded, hence all dimensions and specifications must be determined prior.

Strength : Twice as strong and possesses greater impact resistance compared to ordinary glass. It also has higher bending strength.

Heat Resistant : It offers good resistance to thermal stress but less than tempered glass.

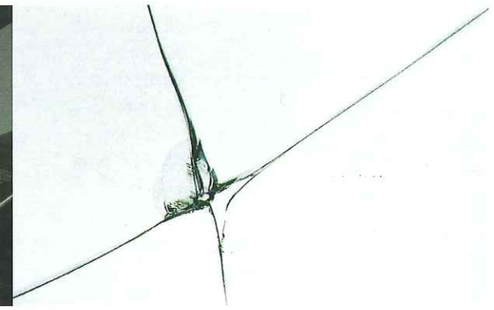
Safety : If **GP** Heat Strengthened glass is broken, the pieces tend to remain on frame and stick together in large pieces.

twice as strong and
possesses greater impact resistance

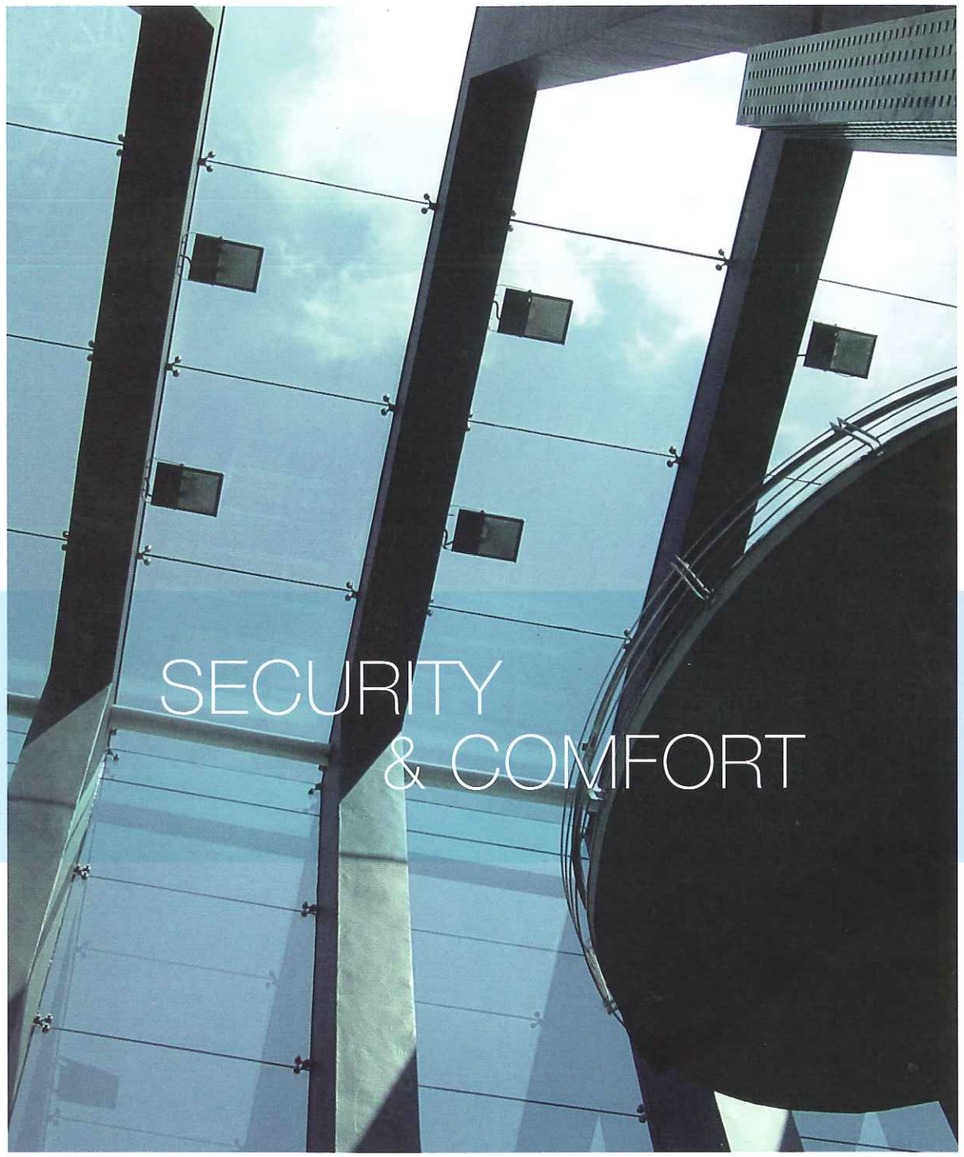
Product Applications

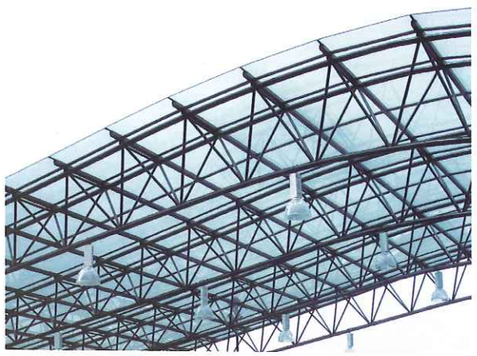
- Windows
- Curtain Walls
- Shop Fronts
- Balustrades

GP Heat Strengthened Glass				
Specification	Production Size (mm)		Production Thickness (mm)	
Type of Process	Minimum	Maximum	Minimum	Maximum
GP Heat Strengthened Glass	180 x 180	(W) (H) 2440 x 5100	4	19



GP LAMINATED SAFETY GLASS





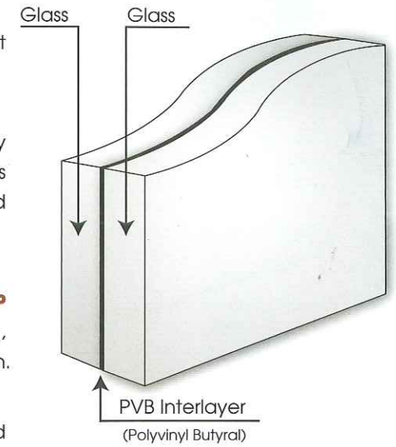
Product Features

Sound Reduction:
GP Laminated Glass is an excellent barrier to noise as it provides a dampening effect on the transmission of sound.

Safety & Security:
If broken, the laminated safety glass will remain firmly bonded to the PVB interlayer, minimizing the risk of injuries while providing protection and resistance to entry and safeguarding the broken area until replaced.

UV Control:
Screening out almost all the sun's damaging UV, **GP** Laminated Glass will provide protection against fading, deterioration of furnishing and artwork caused by UV radiation.

Versatility:
Available in a wide variety of design options, **GP** Laminated Safety Glass may be made with a variety of annealed, heat strengthened, tempered, reflective or Low-E glass, depending on the design needs.



Product Descriptions

At almost the same strength as ordinary annealed glass of the same thickness, **GP** Laminated Safety Glass is produced by permanently bonding two or more sheets of glass with one or more sheets of tough Polyvinyl Butyral (PVB) interlayers under heat and pressure.

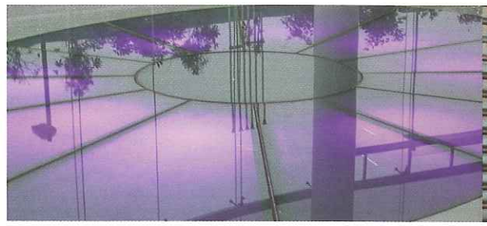
GP Laminated Safety Glass is supplied to comply with either of the following standards where specified:

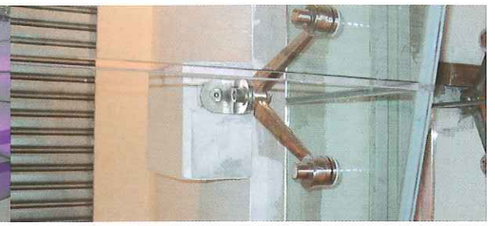
1. BS 6206:1981
2. AS/NZS 2208:1996

Product Applications

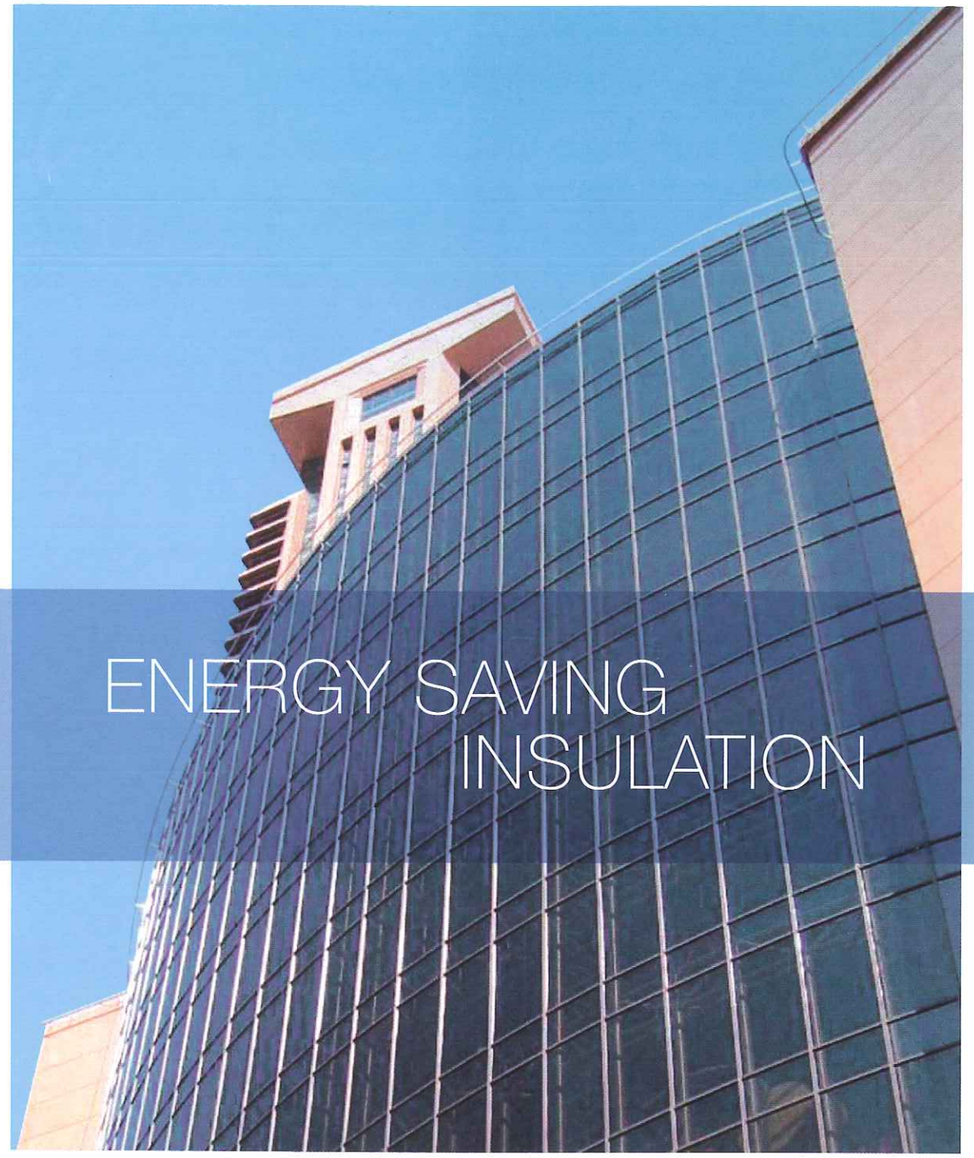
- Skylights, Rooflights
- Slope Glazing
- Curtain Walls
- Balustrades
- Spandrel Glass
- Greenhouse
- Aquarium
- Windows
- Swimming Pools and Gymnasiums
- Building with Security Needs

GP Laminated Safety Glass				
Specification	Production Size (mm)		Production Thickness (mm)	
Type of Process	Minimum	Maximum	Minimum	Maximum
GP Laminated Safety Glass	180 x 180	(W) (H) 2440 x 5100	6.38	80





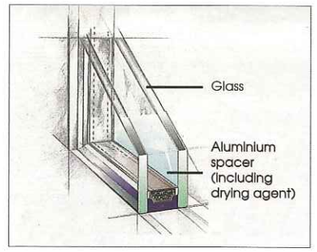
GP DOUBLE GLAZING UNIT



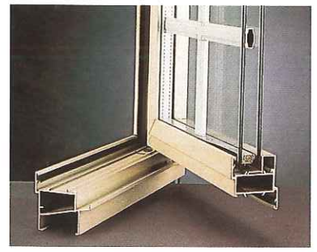
ENERGY SAVING INSULATION

Product Descriptions

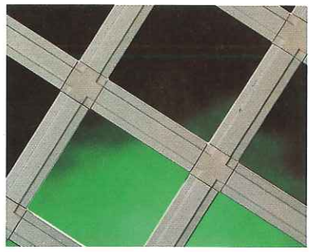
GP Double Glazing Units are in essence two pieces of glass put together under a controlled environment with uniform spacing in between via an aluminium spacer. Sealed to the perimeter in controlled conditions, the spacer contains a dessicant (drying agent) which eliminates moisture vapour in the cavity.



• Double Glaze Profile



• Induction-Welded Decorative Aluminium Profiles



• Georgian Bars

GP Double Glazing Units is in accordance to BS EN1279-1:2002

insulating glass edge seal system

Product Features

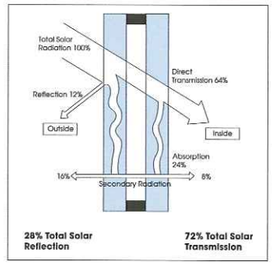
Insulation:
The air pocket inside double glazing units doubles **GP** Double Glazing Unit insulation capability which results in more energy saving compared to monolithic glass.

Dew Condensation Prevention:
The insulating effect of the air pocket featured in **GP** Double Glazing Units prevents condensation on the glass, hence keeping maintenance to a minimum.

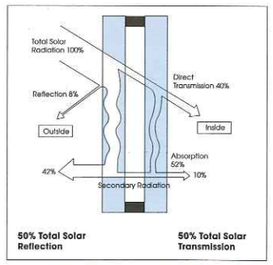
Pleasant Ambience:
Even temperature effect and a pleasant internal environment are the result of high insulation properties of **GP** Double Glazing Units which prevents the occurrence of both cold and warm draughts.

Georgian Bars:
Attractive window and door designs can be created and designed with Georgian Bars within the **GP** Double Glazing Units with the reproduction of practical, elegant and economical traditional Georgian windows which are in high demand in today's modern architecture.

Solar Energy Heat Balance Diagram



FL6 + 12mm Air Space + FL6 - Clear Glass



BZ6 + 12mm Air Space + BZ6 - Bronze Glass

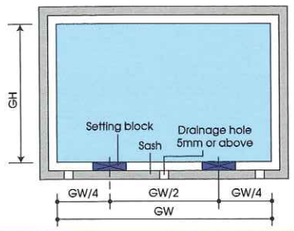
GP DOUBLE GLAZING UNIT

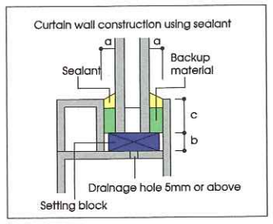
Product Applications

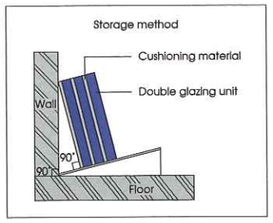
- Hotels & buildings, especially those with high heating or cooling needs.
- Airport control towers and other such environments which require regulated atmosphere and condensation prevention.
- Laboratories and other buildings that require temperature and humidity controls.

Specification	Production Size (mm)		Production Thickness (mm)	
Type of Product	Minimum	Maximum	Minimum	Maximum
GP Double Glazing Glass	250 x 250	1500 x 2500	14	50

Installation diagram







GP Double Glazing Glass is supplied to conform to the following standard when specified:

- Germany Standard (DIN)-1286/52344

Internationally Recognized and accepted standard.

CHOICE OF SASH

a. Always choose a sash with groove wide and deep enough for standard installation.
b. The sash should have holes for water drainage.
c. As Double Glazing Units are double the weight of monolithic glass, it is important to support them with a strong enough sash.
d. The sash used must not have an uneven groove as this will lead to uneven support. Support which prevents optimum performance from the **GP** Double Glazing Units.

AVOIDING THERMAL CRACKS

a. Thermal cracks may occur if heat absorbing glass or wired glass is used.
b. Vents of heating and cooling systems should not directly face the **GP** Double Glazing Unit to avoid thermal cracks from occurring.

STORAGE

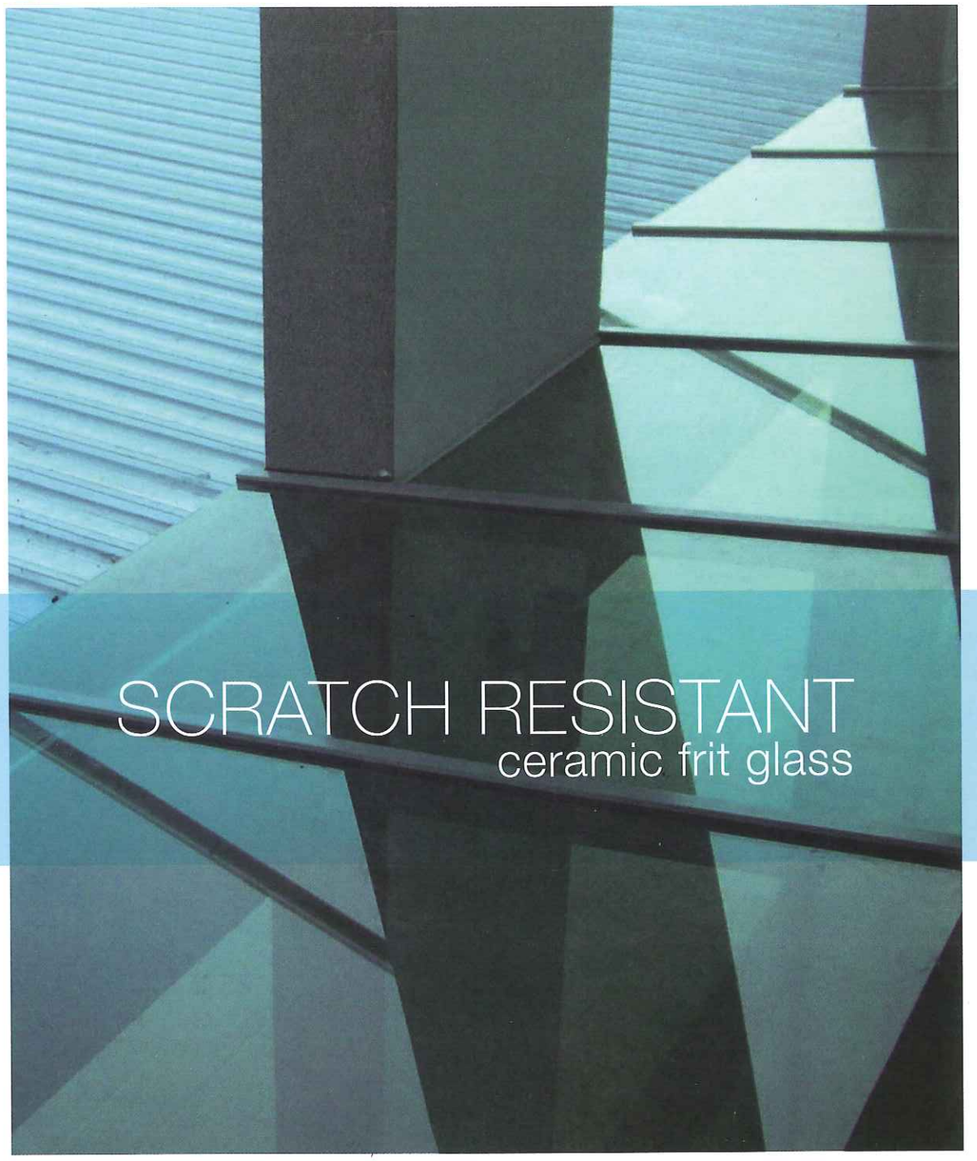
a. Keep the **GP** Double Glazing Unit indoors in a well-ventilated place, away from direct sunlight when storing on-site.
b. Always keep indoors as shown in the diagram (refer to page 13 for diagram) for a long period of time.

THE DESIGN & INSTALLATION

INSTALLATION

a. Strictly follow the Standard method of **GP** Double Glazing Units.
b. The glass should not be scratched or chipped.
c. The groove of the sash must be clean at all times to improve its drainage capabilities.

GP CERAMIC PAINTED GLASS



Product Descriptions

GP Ceramic Painted Glass is produced by a process of silk-screening ceramic colours and patterns onto the glass surface from a wide range of patterns, ranging from company symbols to contemporary art and decorative finishes such as marble, granite and wood grain. **GP** Ceramic Painted Glass can be used monolithically, laminated or double glazed.

Colour Chart

GP Ceramic Painted Glass is in accordance to ASTM C-1048

GP CERAMIC PAINTED GLASS

Product Features

Scratch Resistant:
The permanent non-porous surface is very resistant to scratches and it is impossible to remove patterns on this type of glass without damaging the glass substrate.

Fade Resistant:
The colour of the coating is very durable and will not fade even if subjected to harsh climates.

Reduced Glare & Solar Transmission:
Patterned glass can be designed to reduce glare and solar transmission.

Wide Range of Colours & Patterns:
A wide range of standard colours and patterns are available with a custom pattern colour upon request.

very resistant to scratches
with very durable colour coating

Product Applications

- Bathroom Fittings Such As Shower Screens
- Doors & Sidelights
- Furniture Shelves
- Lead Lighting
- Balustrades
- Internal & External Claddings
- Furniture, Eg: Table Tops
- Kitchen Cabinets And Cutting Boards
- Office & Home Partitions

Specification	Production Size (mm)		Production Thickness (mm)	
Type of Product	Minimum	Maximum	Minimum	Maximum
GP Ceramic Painted Glass	250 x 150	1600 x 3200	3	12

PROPERTIES OF SODA-LIME-SILICA FLOAT GLASS

Modulus of Rupture (MOR): tensile stress at fracture originating in the glass surface, not in the scored and cut glass edge, for 60-Second load duration on weathered, in-service, glass.

Typical Mean MOR (50% Probability of breakage)	6,000	psi	(41 MPa)	Annealed
	12,000	psi	(83 MPa)	Heat-Strengthened
	24,000	psi	(165 MPa)	Fully Tempered
Typical Design Stress (0.8% Probability of breakage)	2,800	psi	(19 MPa)	Annealed
	5,600	psi	(39 MPa)	Heat-Strengthened
	11,200	psi	(77 MPa)	Fully Tempered
Modulus of Elasticity (Young's)	10.4 x 106	psi	(72 GPa)	
Modulus of Rigidity (Shear)	4.3 x 106	psi	(30 GPa)	
Poisson's Ratio	0.23			
Density	156 lb/ft3		(2500 kg/m3)	
Coefficient of Thermal Stress	50 psi/˚F		(0.62 MPa/˚C)	
Thermal Conductivity at 75˚F	6.5 Btu.in/hr.˚F.ft2		(0.937 W.m/m2.˚C)	
Specific Heat at 75˚F	0.21 Btu/lbm.˚F		(0.88 kJ/kg.˚C)	
Coefficient of Linear Expansion (75-575˚F)	4.6 x 10-6 in/in.˚F		(8.3 x 10-6 mm/mm.˚C)	
	e.g. 200" of glass heated 100˚F expands 0.09"			
Hardness (Moh's Scale)	5-6			
Softening Point (ASTM C 338)	1319˚F		(715˚C)	
Annealing Point (ASTM C 336)	1018˚F		(548˚C)	
Strain Point (ASTM C 336)	952˚C		(511˚C)	
Index of Refraction:	(0.5893 µm, Sodium D Line)		1.523	
	(1 µm)		1.511	
	(2 µm)		1.499	
Emissivity (Hemispherical) at 75˚F	0.84			

Raw Material used in Typical Float Glass					
Sand	Soda Ash	Limestone	Dolomite	Salt Cake	Cullet (recycled glass)
SiO_2	Na_2CO_3	$CaCO_3$	$MgCa(CO_3)_2$	Na_2SO_4	

CHEMICAL ANALYSIS OF A TYPICAL CLEAR FLOAT GLASS							
SiO_2 Silica	Na_2O Soda	CaO Calcium Oxide	MgO Magnesium Oxide	AL_2O_3 Alumina	K_2O Potassium Oxide	SO_3	Fe_2O_3 Iron Oxide
72.6%	13.9%	8.4%	3.9%	1.1%	0.6%	0.2%	0.11%

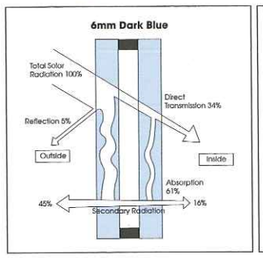
Iron Oxide aids the melting process and produces the green tint seen at the cut edge of a glass plate.

Tinted glass is produced by the addition of small (typically less than 1%) amounts of metal oxides. These small amounts do not change the basic physical properties of the glass, other than the colour and solar/optical transmission/reflection.

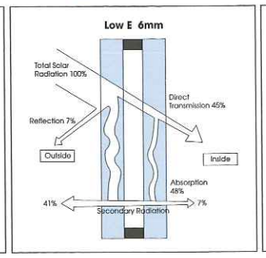
Ref.: "Glass In Building" by Button & Pye, Butterworth Architecture (Reed International Books), 1993.

TECHNICAL DATA

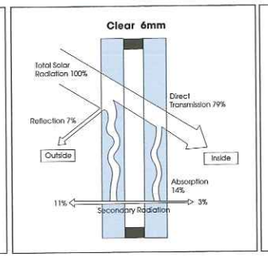
GP Dark Blue



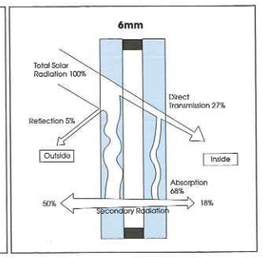
GP Solar Control



GP Clear 6mm



GP Dark Green 6mm



Product	Nominal Thickness (mm)	Visible Light			Solar Radiation				Solar Heat Gain Coefficient	Shading Coefficient	U-Value (W/m2K)
		Transmittance	Reflectance		Transmittance	Reflectance		Absorption			
			Outside	Inside		Outside	Inside				
GP Clear	3	90	8	8	85	8	8	7	0.87	1.00	5.8
	4	90	8	8	83	7	7	10	0.85	0.98	5.8
	5	89	8	8	81	7	7	12	0.84	0.97	5.8
	6	88	8	8	79	7	7	14	0.82	0.94	5.7
	8	87	8	8	75	7	7	18	0.80	0.92	5.7
	10	86	8	8	72	7	7	21	0.77	0.89	5.6
	12	85	8	8	69	7	7	24	0.75	0.86	5.5
	15	84	8	8	64	6	6	30	0.72	0.83	5.5
	19	82	8	8	59	6	6	35	0.68	0.78	5.3
GP Blue	5	78	7	7	61	6	6	33	0.69	0.79	5.8
	6	75	7	7	57	6	6	37	0.66	0.76	5.7
	8	70	7	7	49	6	6	45	0.61	0.70	5.7
	10	66	6	6	43	5	5	52	0.57	0.66	5.6
	12	62	6	6	38	5	5	57	0.53	0.61	5.5
GP Green	5	79	7	7	53	6	6	41	0.64	0.74	5.8
	6	77	7	7	49	6	6	45	0.61	0.70	5.7
	8	72	7	7	42	5	5	53	0.55	0.63	5.7
	10	68	7	7	36	5	5	59	0.51	0.59	5.6
	12	65	6	6	32	5	5	63	0.48	0.55	5.5
GP Bronze	5	52	6	6	48	5	5	47	0.60	0.69	5.8
	6	46	5	5	42	5	5	53	0.56	0.64	5.7
	8	37	5	5	33	5	5	62	0.49	0.56	5.7
	10	30	5	5	26	5	5	69	0.44	0.51	5.6
	12	24	5	5	20	4	4	76	0.40	0.46	5.5
GP Dark Grey	5	19	5	5	40	5	5	55	0.54	0.62	5.8
	6	68	7	7	37	5	5	58	0.52	0.60	5.7
GP Dark Green	5	57	6	6	40	5	5	55	0.54	0.62	5.8
	6	52	6	6	34	5	5	61	0.50	0.57	5.7
GP Dark Blue	5	57	6	6	40	5	5	55	0.54	0.62	5.8
	6	52	6	6	34	5	5	61	0.50	0.57	5.7
GP Low E*	5	82	10	11	67	10	12	23	0.71	0.82	3.6
	6	81	10	11	66	10	11	24	0.70	0.80	3.6
GP Solar-E™ Solar Control Low E*	5	59	7	9	46	7	11	47	0.53	0.61	3.7
	6	59	7	9	45	7	11	48	0.52	0.60	3.7

SOUND INSULATION

The sound reduction index of glazing presented here is deduced from measurement results taking into account the spread in result for nominally identical elements and can thus be considered as being on the safe side.

These values can be used in cases when no other information is available and serve as an indication of what is typical for some types of products.

The sound reduction index is given in octave bands with the single number rating calculated in accordance with EN ISO 717-1. The data represents the average result minus a standard deviation of approximately 1 dB to 2 dB.

Glaxing Type	Sound reduction index (dB)						
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	R_w (C;C_{tr})
Single Panes (mm)							
3	14	19	25	29	33	25	28 (-1;-4)
4	17	20	26	32	33	26	29 (-2;-3)
5	19	22	29	33	29	31	30 (-1;-2)
6	18	23	30	35	27	32	31 (-2;-3)
8	20	24	29	34	29	37	32 (-2;-3)
10	23	26	32	31	32	39	33 (-2;-3)
12	27	29	31	32	39	47	34 (0;-2)
Laminated panes (mm) + plastic laminate (0.5 to 1 mm)							
6+	20	23	29	34	32	38	32 (-1;-3)
8+	20	25	32	35	34	42	33 (-1;-3)
10+	24	26	33	33	35	44	34 (-1;-3)
Double pane units with single of laminated panes (mm); air filled cavity from (6 to 16) mm							
4-(6-16)-4	21	17	25	35	37	31	29 (-1;-4)
6-(6-16)-4	21	20	26	38	37	39	32 (-2;-4)
6-(6-16)-6	20	18	28	38	34	38	31 (-1;-4)
8-(6-16)-4	22	21	28	38	40	47	33 (-1;-4)
8-(6-16)-6	20	21	33	40	36	48	35 (-2;-6)
10-(6-16)-4	24	21	32	37	42	43	35 (-2;-5)
10-(6-16)-6	24	24	32	37	37	44	35 (-1;-3)
6-(6-16)-6+	20	19	30	39	37	46	33 (-2;-5)
6-(6-16)-10+	24	25	33	39	40	49	37 (-5;-5)

NOTE 1: This selection and the values are in accordance with prEN 12758-1. The single number ratings are deduced from results in 1/3-octave bands and therefore single number ratings deduced from the given octave band data might result in value which differ 1 dB at the most.

NOTE 2: Though it is known that for a given double pane unit the sound reduction increases with increasing cavity width, this effect has been found to be too small to take into account here for air-filled cavities in the light of the inherent spread results for nominally identical units.

For a large group of glazing, say R_w less than 37dB, the sound transmission through the window frame can be ignored, if the area of the element is taken as that of the glazing plus frame.

Bending Strength of Glass

Unit: kg/cm²

Glass Type	Thickness (mm)	Average Breaking Stress		Allowable Stress			
				Short Term		Long Term	
		Surface (σc)	Surface (σe)	Surface (σac)	Surface (σae)	Surface (σac)	Surface (σae)
Float	3, 5, 6, 8	500	360	250	180	100	70
	10	450	360	250	180	100	70
	12, 15, 19	375	360	200	180	80	70
Heat Strengthened	6, 8, 10	800	720	450	360	300	250
Tempered	4, 5, 6, 8 10, 12, 15, 19	1500	1100	750	500	500	350

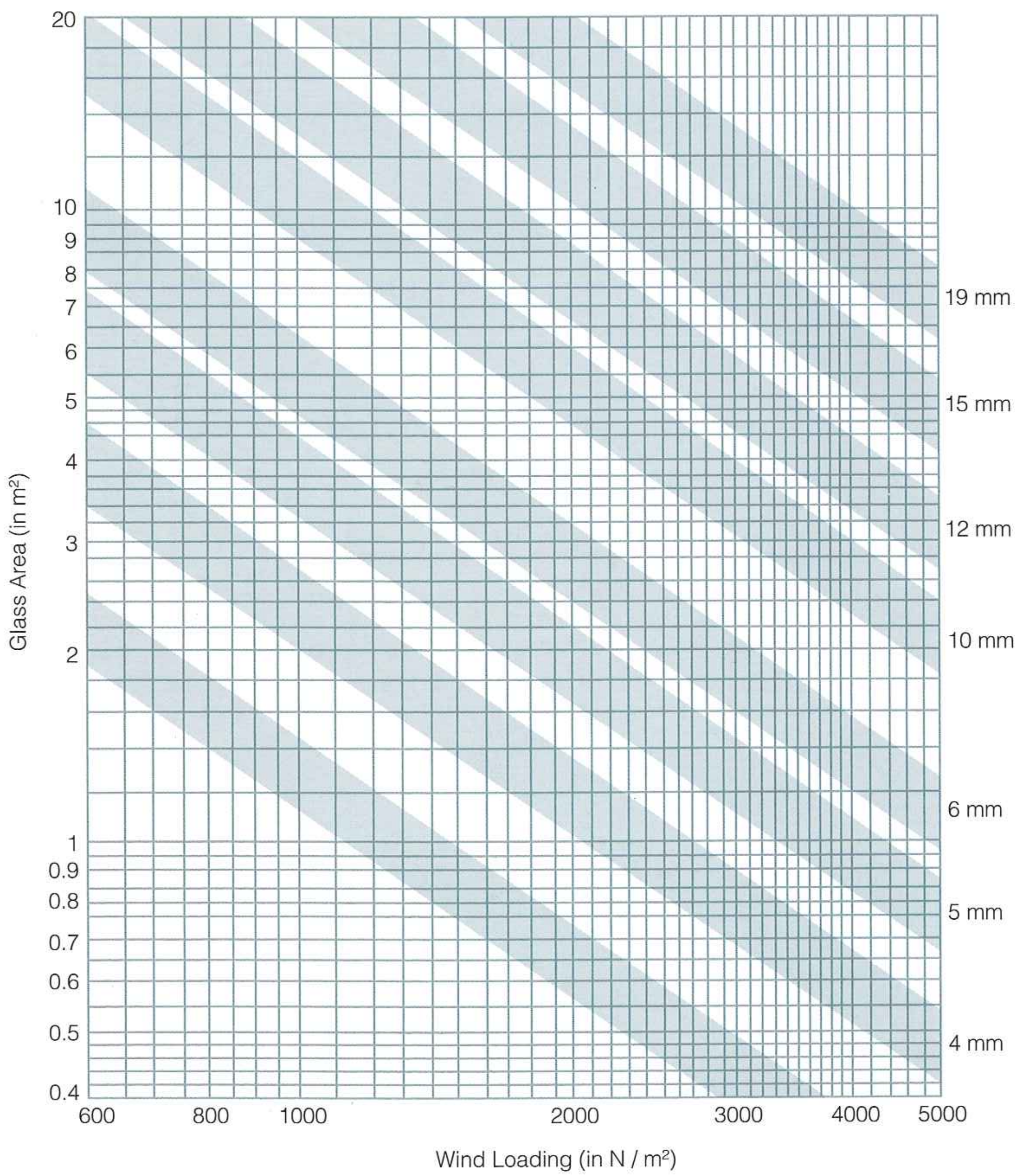
WIND LOAD

In designing and selecting the materials for a new building, the products must be strong enough to resist wind loading.

When considering window, the convention used is that the most severe wind load likely occurs once in fifty years and will strike the building in a three second gust. This is laid down in the British Standard Code of Practice CP3: Chapter V, Part 2.

To calculate the wind load figure for a particular building, a set of tables is used. This calculates the thickness and area of glass required.

It is common practice to denote the area in square meters and the wind loading pressure in Newton per square meter (N/m²). Depending on the type of glass (Laminated, Insulated or Toughened/Tempered), a table similar to the one shown below is used.



QUALITY ASSURANCE

making glass stronger & safer

ISO 9001 : 2008

ISO 14001 : 2004

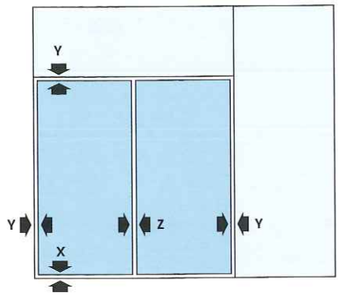
SIRIM - TEMPERED GLASS USED IN BUILDING

SIRIM - INSULATING GLASS USED IN BUILDING

TEST REPORT - LAMINATED SAFETY GLASS

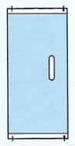
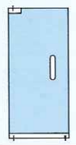
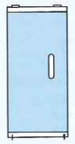
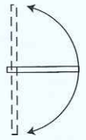
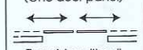
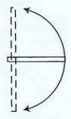
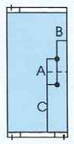
MS 1498 : 2000

SUMMARY OF TEMPERED DOORS



Dimensions:

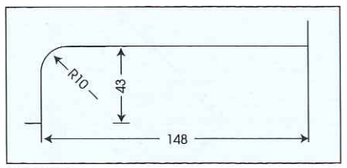
y	2	4 mm
x	7	10 mm
z	3	5 mm

	Standard Type	Combination Type	Patch Type	Sliding Type	Shower Type
Model					
	Swing Open			Side Open	Swing Open
Maximum dimensions *1	DH 2134 X DW 1219	DH 2438 X DW 1067	DH 2438 X DW 1067	DH 2500 X DW 1600	DH 2438 X DW 1067
Type of Glass	12mm Thickness	Clear Float Bronze Float			
Weight of door *2	63kg	57kg	–	63kg	–
	Hairline Stainless Steel Polished Stainless Steel Aluminium Anodised } By Others				
Opening and Closing System	• Floor hinge • Swing-type motor Automatic Swing i) Mat activated ii) Finger pressure activated type iii) Sensory type (Radar activated) } By Other  90° One-side opening  180° free opening			• Slide-type motor) i) Mat activated) type) By ii) Finger) Other pressure) activated) type) iii) Sensory type)  One side pull (One door panel)  Two side split pull (two door panels)	 180° free opening
LOCK	**CYLINDER LOCK**				**NONE**
Hole Position for Handle	 • Standard Position of holes • Number of holes: 2 • Hole diameter: 15mm			Other • Handle Holes position: To Suit • Base for upper suspension: Variable to suit manufacturer's details	Variable to suit manufacturer's details

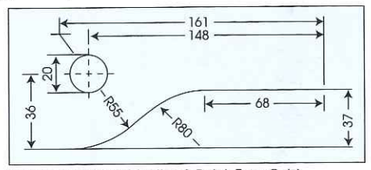
Handle Type	A	B	C
Bar Type	275	100	913

**1 – Door measurements refer to whole door body; including the frame.*
**2 – Door weight refer to the whole door of DH 2134 x DW 762 including frames but excluding door handles.*

Drilling and notching dimensions for Patch Type Tempered door



Lock Patch



Corner Patch (Combination & Patch Type Only)

making Glass Stronger & safer

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