



hansen glass processors

HansenGlass



ThermoCool™ insulating glass - For Environmental Management

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## **Introduction**

ThermoCool™ insulating glass units are high performance, hermetically silicone sealed multiple glazing units, which can fulfil the many requirements placed upon modern glazing. ThermoCool™ incorporates a dual seal and an aluminium, steel, or warm edge spacer, in a variety of colours and widths and with the option of gas filling.

## **Advantages**

- provides a total energy management solution giving significant energy savings and improved thermal efficiency of buildings
- utilises the latest toughenable soft coated low E glasses
- U value performance as low as 1.0 W/m<sup>2</sup>K
- improves thermal insulation and reduces condensation, cold radiation and downdraughts
- gives specifiers freedom of design with an extensive choice of colours, appearance and performance
- the highest quality, conforming to British and European standards
- utilises a seal designed to withstand a wide range of temperatures and which is stable to ultra-violet (UV) radiation
- backed by a comprehensive warranty giving confidence in use
- available in Fort™ toughened or laminated options for safety and security
- can incorporate Ceraphic™ screen printed ceramic and or Cerocco sandblasting to give standard and bespoke design for shading and obscuration
- has a range of matching and harmonising Ceramalite™ spandrel panels
- gives a choice of spacers from 6mm to 20mm, in different colours
- can be used with argon gas filling for extra insulation
- Kitemarked products

## **Product Description**

ThermoCool™ is made to individual order. The panes, which need not be the same glass type or thickness, can be selected from the complete range of glass products from all major manufacturers including:

- Clear float glass
- Low iron glass
- Solar control (coated or body tinted) glass
- Low emissivity glass – soft coated and hard coated
- Patterned glass
- Fort™ or FortPlus™ toughened safety glass
- Ceraphic™ screen printed glass
- Ceramalite™ enamelled toughened glass
- Cerocco sandblasted glass
- Laminated safety and security glass

ThermoCool™ conforms to BS EN 1279 - 2. It is covered by a comprehensive warranty.

ThermoCool™ is available in a wide choice of glass thicknesses and glass types. The insulating glass unit (see Figure 1) incorporates an aluminium spacer in a choice of widths from 6 mm to 20 mm, to separate the two panes. The spacers are available in two standard colours, silver or black, and contain a desiccant to keep the air or gas in the unit dry and free from organic vapours. The perimeter of the unit is





hermetically sealed with a dual seal system incorporating a polyisobutylene primary seal and a silicone secondary seal.

The seal system can withstand a wide temperature range and is resistant to UV light. The units can therefore be used with confidence for spandrel panels, structural sealant glazing and roof glazing in addition to conventional glazing.

All the products are available with one or more panes in annealed, toughened or laminated form.

Units can be supplied with Ceramalite™ enamelled glass or opacified glass and may be specified with insulation, made either of foil backed foam or of foam or mineral wool in an aluminium or steel tray.

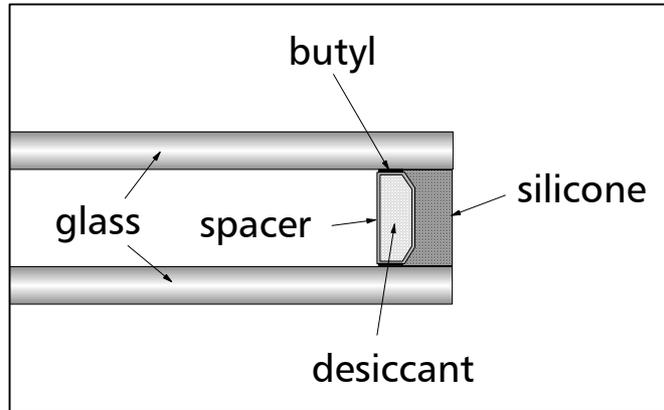
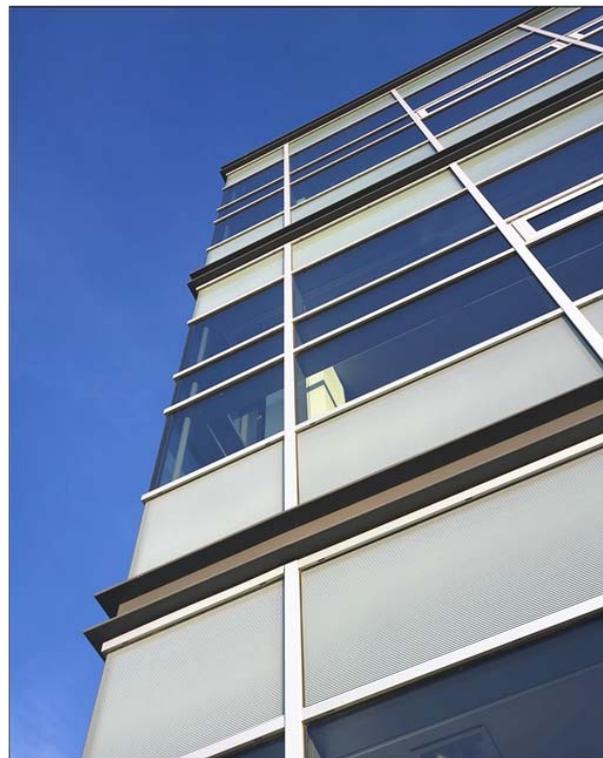
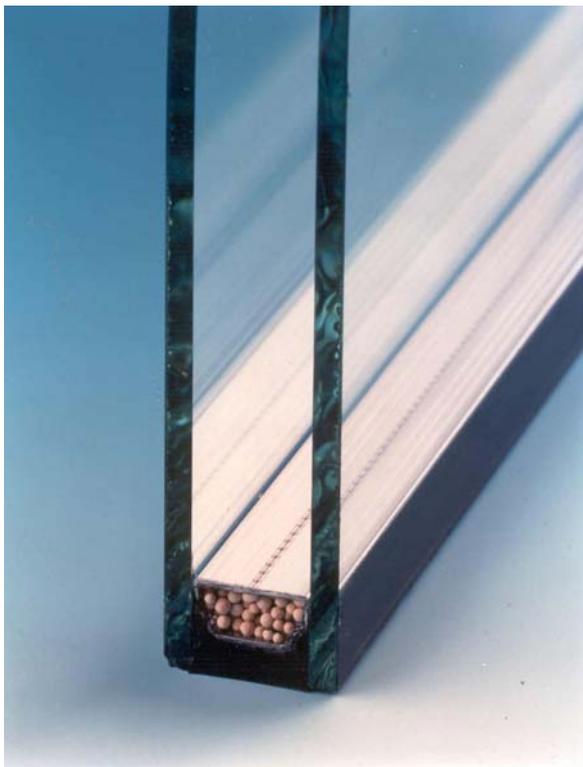


Figure 1. ThermoCool™ Construction

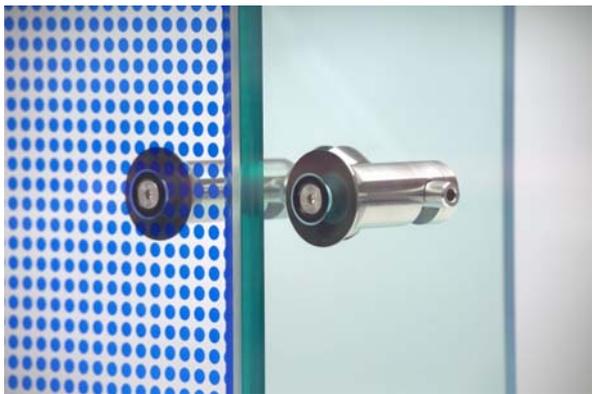




**hansen glass processors**

**ThermoCool™ insulating glass units**

**- For Environmental Management**



Ceraphic™ screen printing in a variety of standard and non-standard patterns and colours can be applied to Fort™ or FortPlus™ component panes.

ThermoCool™ has been successfully tested with Ceraphic™ screen printing and Ceramalite™ enamelled glass on surfaces 2, 3 or both without detrimental effect on the unit edge seal.

ThermoSpan™ insulating glass units are also available in either double or triple glazed options.



**Technical Description**

**Dimension Limits**

Maximum size:	
At least one pane < 6 mm	2500mm x 1500mm
Both panes ≥ 6 mm	4600mm x 2500mm (depending on component dimension limits)
Minimum size	350mm x 400mm
Aspect ratio:	
At least one pane < 6 mm	maximum 8:1
Both panes ≥ 6 mm	maximum 12:1

**Tolerance on size**

up to 3 m <sup>2</sup>	± 1.5mm
over 3 m <sup>2</sup> up to 8.5 m <sup>2</sup>	± 2mm
over 8.5 m <sup>2</sup>	± 3mm

**Spacer**

Sight line	13 ± 2mm from the edge
Aluminium:	Widths 6, 8, 10, 12, 14, 16, 18, and 20mm
	Colour silver or black are standard
Steel:	Widths 12 and 16 mm
	Colour silver
Warm edge:	Widths 12, 16 and 20 mm

<b>Thickness tolerance</b>	both panes ≤ 6 mm	± 1mm
	one pane over 6mm	± 1.5mm

<b>Weight</b>	2.5 kg per m <sup>2</sup> for every mm thickness of glass
Maximum weight	1000 kg

**Strength and Deflection**

Strength depends on the combination of panes, type of load and supporting method.  
Allowable glass deflection L/65 at design load

**Thermal Insulation**

Depending on construction U value from 1.0 W/m<sup>2</sup>K to 3.3 W/m<sup>2</sup>K (see Figure 3)

**Safety**

Fort™ or FortPlus™	Class A to BS 6206
6.4 mm laminated glass	Class B to BS 6206
≥ 8.8 mm laminated glass	Class A to BS 6206

**Sound Reduction**

Depending on construction R<sub>w</sub> from 25 dB to 45 dB (e.g. see Table 1)

**Solar and Optical Performance**

Depending on construction (e.g. see Table 2)	
Light transmission	80% to 9%
Solar direct energy	68% to 4%
Total solar energy	75% to 11%



## Product Performance

### Thermal Insulation

The performance of ThermoCool™ depends on the properties of the glasses, the spacer width and the filling of the cavity. In order to obtain lower U values, ThermoCool™ units may be filled with argon gas. When used with low emissivity glass, U values as low as 1.0 W/m<sup>2</sup>K can be achieved.

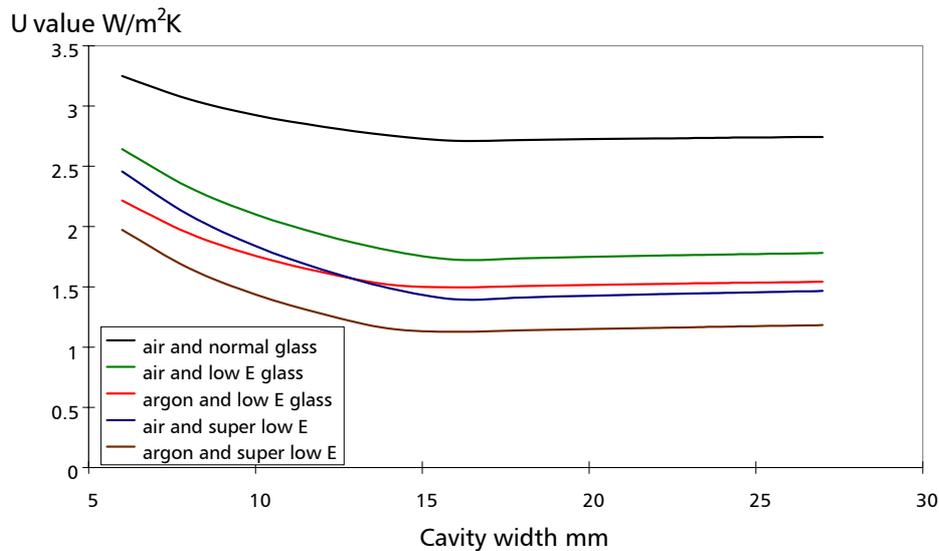
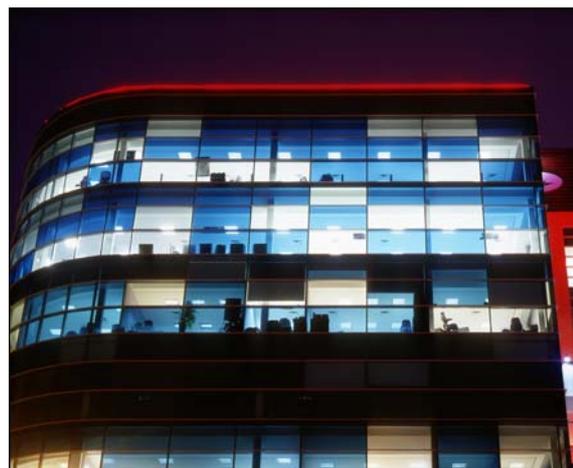


Figure 3. U values of ThermoCool™

### Appearance

The appearance of ThermoCool™ depends on the glass type and colour and on the thickness of the panes used, giving a choice to meet a wide variety of aesthetic needs.

Since ThermoCool™ are hermetically sealed and contain a volume of dry air or other gas, which is sealed within the unit at the conditions of temperature and pressure prevailing at the time of manufacture, subsequent changes in temperature and pressure result in changes in the volume of air within the units. These changes will flex the glass surfaces and some visible distortion of the reflections of adjacent buildings or objects will occur. The distortion depends on the object and viewing distances, and it becomes more noticeable with highly reflective glasses, but cannot be seen in transmission.



The use of toughened or heat strengthened reflective glasses will introduce a degree of distortion visible in reflection and stress patterns can sometimes be seen in polarised light.

The optical phenomenon known as 'Brewster's fringes' may be observed at critical viewing angles. This is a natural phenomenon and cannot be eliminated.



**Sound Reduction**

Table 1 gives a few examples of sound reduction figures for common constructions. Appropriate selection of glass types can give significant benefits in terms of sound reduction, allowing values of  $R_w$  up to 45 dB.

Table 1 Sound reduction values

Band centre frequency (Hz)	Sound reduction (dB) for glass / cavity width / glass (mm)		
	6/12/6	10/12/6	10/12/6.4 pvb
100	18	26	27
125	23	25	24
160	20	24	23
200	15	22	24
250	18	29	30
315	23	30	30
400	26	31	32
500	29	34	35
630	33	36	37
800	37	39	40
1000	39	39	41
1250	39	37	40
1600	37	39	40
2000	33	37	40
2500	32	39	43
3150	36	43	47
4000	40	46	52
$R_w$	31	36	38
C	-1	-1	-1
$C_{tr}$	-4	-3	-5
$R_m$	29	33	35



**Solar and Optical Performance**

Light comfort is achieved when the quantity, quality and distribution of the light meet the needs of the activity being undertaken. Excessive sky and reflected glare can be reduced by using tinted or reflective glasses with low light transmission, which also reduce unwanted solar gain. Light can be maximised against solar gain by using spectrally selective coated glasses.



Table 2 gives a few selected examples to demonstrate the range available.



Table 2. Solar and Optical Properties of a Selection of ThermoCool™ Products

Glass Type	Light		Solar Energy				Shading Coefficients			Code	U value W/m²K
	Trans	Reflec	Direct trans	Reflec	Absorp	Total trans	Short wave	Long wave	Total		
<b>Pilkington glass types with 16 mm air cavity and 6 mm Fort™ clear glass internally</b>											
6 mm Clear Float	0.78	0.14	0.62	0.11	0.27	0.71	0.71	0.10	0.81	78/71	2.7
6 mm Optifloat Green	0.67	0.11	0.36	0.07	0.57	0.46	0.42	0.11	0.53	67/46	2.7
6 mm Optifloat Grey	0.39	0.07	0.36	0.07	0.57	0.46	0.41	0.12	0.53	39/46	2.7
<b>Glaverbel Stopsol glass types with 16 mm air cavity and 6 mm Fort™ clear glass internally</b>											
6 mm Stopsol Supersilver Clear #1	0.58	0.36	0.52	0.28	0.20	0.59	0.60	0.08	0.68	58/59	2.7
6 mm Stopsol Supersilver Dark Blue #2	0.38	0.16	0.26	0.11	0.63	0.36	0.30	0.12	0.42	38/36	2.7
<b>6 mm Fort™ clear glass with 16 mm air cavity and Low Emissivity Products from Various Manufacturers internally</b>											
6 mm Pilkington K	0.74	0.17	0.54	0.14	0.32	0.68	0.62	0.17	0.79	74/68	1.7
6 mm St. Gobain Planitherm Futur N	0.78	0.12	0.47	0.23	0.30	0.59	0.54	0.14	0.68	78/59	1.4
6 mm Interpane Iplus S	0.78	0.11	0.49	0.23	0.28	0.59	0.56	0.12	0.68	78/59	1.4
<b>6 mm High Performance Products from Various Manufacturers with a 16 mm air cavity and 6 mm FortPlus™ clear glass internally</b>											
Pilkington Suncool HP Brilliant 66/33 *	0.66	0.15	0.30	0.30	0.40	0.35	0.34	0.07	0.41	66/35	1.3
St. Gobain Coolite SKN 169 *	0.61	0.16	0.39	0.23	0.38	0.47	0.44	0.10	0.54	61/47	1.4
Glaverbel Stopray Carat *	0.53	0.14	0.21	0.30	0.49	0.27	0.24	0.08	0.32	53/27	1.3
Luxguard SN63 *	0.62	0.14	0.28	0.35	0.37	0.33	0.32	0.06	0.38	62/37	1.4
<b>Note * Figures estimated from manufacturers literature – calculation methods are not necessarily the same</b>											

**Safety**

ThermoCool™ can be manufactured from glass conforming to Class A or Class B of BS 6206 to comply with Building Regulations.

**Shapes**

ThermoCool™ insulating glass units are available as rectangles and a variety of shapes. Full size hardboard templates or detailed CAD drawings are required for complex shapes (any other than right-angle triangles).

Stepped units can be supplied.

Steps have a tolerance of ±2.0mm and the size of step must be clearly specified. For roof glazing, where an exposed bottom edge is required, ThermoCool™ should be stepped by 75mm to 150mm allowing the unit seal to be kept inside the weather seal.

Where a soft coated solar control glass is the larger pane of a stepped unit consideration must be given to the maximum edge stripping that is available from the specified manufacturer.





**Service Life**

A comprehensive warranty is offered. ThermoCool™ are manufactured to BS EN 1279 from the finest quality materials to ensure maximum service life. The silicone dual seal can withstand a wide temperature range and has high resistance to ultra-violet rays. The units can be confidently used for structural and roof glazing and as cladding panels in addition to conventional glazing.

**Thermal Safety**

The possibility of excessive thermal stress being developed in the glass due to solar radiation or other factors should be considered at all stages of design and construction. It is the responsibility of the specifier or glazing contractor to ensure that the glass is thermally safe for each application. HansenGlass can perform thermal safety checks on ThermoCool™ constructions for any particular application, given a completed thermal safety check proforma (forms available on request).

**Handling and Storage**

- **Stack upright, fully support at the back**
- **Stand on wood or felt**
- **Store dry at all times**
- **Store out of sunlight at all times**
- **Check for damage**
- **Handle correctly**
- **Protect from impact**
- **Avoid contamination**

ThermoCool™ should be handled with great care at all times.

Correctly stacking and supporting ThermoCool™, in a manner which prevents the glass from sagging, helps to avoid site breakages. To prevent edge damage, the units must stand on strips of something softer than glass, such as wood or felt.

Water must not be allowed to reach the edges of stacked ThermoCool™ as it can be drawn between the units by capillary action and cause damage to the glass surfaces.

Even temporary exposure to direct sunlight allows insulating glass units to get very hot, which can cause annealed glass to crack from thermal stress or from internal pressure build-up causing mechanical breakages.

Units should be unpacked on arrival at site and checked for conformity to specification. Any damage should be reported immediately.

Use protective clothing and equipment (a minimum of gloves and safety glasses). Lift ThermoCool™ units in a safe manner using appropriate equipment.

Special care must be taken to protect ThermoCool™, especially the edges, from impact damage (knocks, abrasions and excessive local pressure) which can cause breakage, scratches, scars, chips or shells.

Before use, the units should again be checked for damage and the unit size checked with the frame to ensure that the glazing can be carried out as specified. Damaged glass, especially solar control glass, should not be glazed, since the damage may be propagated into cracks by thermal or mechanical stress.

ThermoCool™ must be protected from site contamination™ such as welding spatter, or cementitious or plaster products, or adhesives.



**Glazing**

The life span of all insulating glass units is influenced by:

- the framing or fixing system design;
- the compatibility of the edge seal with glazing materials;
- the quality of the workmanship.

ThermoCool™ units are guaranteed for the durations given in the table, provided they are glazed in accordance with:

- ThermoCool™ Installation and Maintenance Specification; or
- BS 6262: Part 5; or
- BS 8000: Part 7; or
- GGF Glazing Manual section 4.2

<b>Warranty durations</b>	
<b>Timber frames</b>	
Fully bedded	0 years
Undrained	0 years
Drained	5 years
Drained and ventilated	10 years †
<b>PVCu frames</b>	
Undrained	0 years
Drained	10 years
Drained and ventilated	10 years †
<b>Steel or aluminium frames</b>	
Fully bedded	0 years
Undrained	0 years
Drained	10 years
Drained and ventilated	10 years †
<b>Patent Glazing</b>	
Conforming to BS 5516	10 years
<b>Curtain Walling</b>	
Fully bedded	0 years
Undrained	0 years
Drained	10 years
Drained and ventilated	10 years †
<b>ThermoSpan™</b>	
	10 years

For any glazing method not categorised above, the period is 0 years.

Note † These can be extended on application for framing systems conforming to the ThermoCool™ Installation and Maintenance Specification



This publication gives a general description of ThermoCool™. It is the responsibility of the customer to ensure that its use is appropriate for the application and complies with all relevant national and local legislation, standards and codes of practice and any other requirements. Hansen Glass Processing Limited hereby disclaim all liability howsoever arising from any error or omission from this publication and of all consequences of relying on it. Fort™, FortPlus™, FortPlus™ Laminated, ThermoSpan™, ThermoCool™, Tempo™, Ceramalite™, CeramalitePlus™, Ceraphic™, and CeraGrit™ are all trade marks of Hansen Glass Processing Ltd.



**Product Range**

- ThermoSpan™ Structural Glazing
- Fort™ and FortPlus™ Toughened Glass
- Tempo™ Toughened Glass Doors and Entrance Assemblies
- Thermocool™ Insulating Glass Units
- Ceramalite™ Enamelled Spandrel Panels
- Ceraphic™ Screen Printed Glass

**Market Sectors**

- Commercial
- Leisure
- Community and Amenity
- Retail
- Industrial
  - Transportation
  - Utilities
  - Manufacturing
  - Institutions
  - Military

**Services**

- Glass Processing
- Contract Co-ordination
- Site Deliveries
- ThermoSpan™ Detailing
- Technical Support
- After Sales Support

**Technical Services**

- Glass Stress Calculations
- Thermal Stress Calculations
- Glass Environmental Properties
- Glass Acoustics Advice

*Technical Advisory Service (TAS) available at all Group Companies*

## HansenGroup Mission:

To be the Company in the industry above all others

- from whom our customers choose to buy
- with whom people choose a career
- in whom the professionals have confidence
- whom manufacturers choose to distribute their product.

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