ThermoSpan™ structural glazing - For Elegance and Strength
Introduction

ThermoSpan™ structural glazing offers architects and specifiers opportunities for creating original designs in glass in any plane from vertical through to horizontal.

Unique mechanical fixings create clean and uninterrupted glass structures without any external framing. ThermoSpan™ Double Skin allows the complete structure to be designed with insulating glass units to meet the latest legislative requirements. ThermoSpan™ Laminated adds a further dimension in terms of safety, particularly where the glass is used in roof structures, canopies and atria.

ThermoSpan™ structures are normally constructed from FortPlus™ and Fort™ heat soaked toughened glass. They can be used in conjunction with the Tempo™ and ColourLine door range to provide a complete glass entrance façade.

The wide range of ThermoSpan™ options gives specifiers freedom of design with an extensive choice of colours and performance.

Advantages

- Frameless glass structures giving a completely flush exterior, unlike any other structural glazing
- Maximises daylight penetration
- Can be installed in any plane
- Insulating glass unit, laminated and single glazed options
- Use FortPlus™ and Fort™ heat soaked toughened glass for safety
- Available with a laminated option for additional safety in overhead glazing
- Tamper resistant bolts
- Extensive range of environmental performance characteristics
- Choice of spacers from 12 to 20mm, in silver or black
- Seal design to withstand a wide range of temperatures
- Supplied with a seal stable to ultra-violet (UV) radiation
- ThermoSpan™ Double Skin is a licensed structural glazing product
- Ceraphic™ screen printing and Cerocco sandblasting can be applied to give manifestation, decoration, privacy, diffuse lighting or solar control
- Comprehensive warranty
- Conforms to British and European standards
- Competitive lead times
- Kitemarked products
- Highest quality standards
Applications

- Vertical, inclined and twin facades
- Roof glazing
- Atria
- Canopies
- Brise soleil
- Feature entrance boxes
- Balustrading
- Lift shafts
- Flooring

Product Description

ThermoSpan™ Double Skin

ThermoSpan™ Double Skin has a specially designed fitting. The DG30 fitting is attached through the inner glass only, which avoids cold bridging thus giving better thermal insulation; leaving the outer pane free from any surface interruptions, giving a completely flush external finish. The outer pane is attached by a structural insulating glass unit seal, in the same way as insulating glass units are manufactured for structural sealant glazing.

ThermoSpan™ Double Skin is supplied with the anchor inserts factory fitted into the glass and hermetically sealed. The rest of the fitting is supplied for simple attachment on site.

The DG30 fitting has two main components, the hermetically sealed anchor insert and the fixing body.

The anchor insert is factory fixed to the inner glass and forms a hermetic seal within the glass giving an integral anchorage for connection to the fixing body, which is fitted at the site.

The fixing body can then be connected to the supporting structure through a bracket. Silicone rubber spacer diaphragms on either side of the bracket allow sufficient rotational flexibility and translational movement to minimise stresses around the hole in the glass.

The outer pane is attached by the unit seal, which is specially designed to perform this role in addition to its normal function of maintaining the hermetic seal to the unit.
The outer pane can be any of a wide variety of products from all the major European glass manufacturers:

- Fort™ or FortPlus™ clear float glass
- Fort™ or FortPlus™ body tinted solar control glass
- Fort™ or FortPlus™ on-line soft coated solar control and low emissivity glass
- manufacturer’s own brand toughened off-line coated solar control and low emissivity glass
- various laminated glass products.

ThermoSpan™ Double Skin has been tested to BS 5368 and BS 6375.

**ThermoSpan™ Laminated**

ThermoSpan™ Laminated has been designed to combine the strength of toughened glass, the safety of laminated glass and the versatility of bolted assemblies. The fitting is designed to avoid penetration of the external surface, providing a completely uninterrupted frameless structure allowing great design freedom.

ThermoSpan™ Laminated can be used in structural overhead glazing, where it retains its integrity even after one of the two plies of Fort™ or FortPlus™ heat soaked toughened glass has shattered.

In vertical glazing, ThermoSpan™ Laminated combines the functionality of a mechanical fixing method, with the aesthetic appeal of the flush exterior of structural sealant glazing.

ThermoSpan™ Laminated has a primary ply of 12mm FortPlus™ heat soaked thermally toughened clear float glass with factory fitted L20 inserts. The fittings are positioned such that the hole centre is at least 60mm from the edges of the glass.

The L20 fitting attaches to the same range of bracketry as ThermoSpan™ Single Skin.

A second glass is laminated to the primary ply using a 1.5mm thick CIP (cast-in-place) polyester resin interlayer. At the edge of the interlayer a 6mm wide acrylic tape serves the dual purpose of defining the 1.5mm thick gap while the interlayer is poured.
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The second glass ply can be between 6mm and 12mm thick selected from a range of glass types (as either Fort™ or FortPlus™ heat soaked thermally toughened glass or heat strengthened glass) from most of the major European manufacturers, including:

- Clear float glass
- Low E glass
- Solar control pyrolitically coated glass (where the coating will normally be on surface 2)
- Solar control body tinted glass
- Ceraphic™ screen printed or Cerocco sandblasted glass (surface application)

Ceraphic™ screen printing or Cerocco sandblasting can alternatively be applied to the exposed surface of the 12mm primary glass (surface 4 of the laminate) if desired.

ThermoSpan™ Laminated can be used instead of 10mm or 12mm FortPlus™ as the inner pane of ThermoSpan™ Double Skin (but using the L20 fitting rather the DG 30 fitting) with the same wide choice of external panes and an extensive choice of inner panes. Cavity widths can be from 12 mm to 20 mm.

**ThermoSpan™ Triple Skin**

ThermoSpan™ Triple Skin offers another dimension in insulating glass units with a U value as low as 0.8 W/m²K. As in ThermoSpan™ Double Skin, the DG30 fixing is attached through the inner most pane leaving the outer and middle panes free from any form of penetration.

The inner pane is typically a 10mm or 12mm thick clear float FortPlus™ heat soaked toughened glass. The cavity width is only available in 12mm.

The DG30 fitting attaches to the same range of bracketry as ThermoSpan™ Single Skin.

**ThermoSpan™ Single Skin**

ThermoSpan™ Single Skin is made from 10mm to 25mm FortPlus™ heat soaked toughened glass connected to the structure by means of specially designed stainless steel bolts.

Two types of bolt head are used. The G10 countersunk fitting gives a totally flush external appearance.

The 50mm diameter disc of the G11 fitting gives a more conventional appearance to a glass fitting.
The panes of glass can be selected from the complete range of glass products from most major manufacturers including:

- Clear float glass
- Solar control coated glass
- Solar control body tinted glass

**ThermoSpan™ Opening Vents**

ThermoSpan™ is available with opening vents that can utilise either manual or automatic opening gear. The vents come complete with an aluminium bonded frame to minimise the framing lines and maximise the all glass appearance of the ThermoSpan™ product. Framing is available in anodised and polyester powder painted options.
**Technical Description**

**Normal Dimension limits**
- Maximum size: 4600mm x 2440mm
- Minimum size:
  - Single skin: 450mm x 350mm
  - Double skin: 450mm x 350mm
  - Laminated: 450mm x 350mm

**Aspect ratio:**
- Single skin: maximum 20:1
- Fins: maximum 20:1
- Double skin: maximum 12:1
- Laminated: maximum 12:1

**Tolerance on dimensions**
- Single skin:
  - Up to 1 m: ± 1mm
  - Over 1 m: ± 2mm
- Double skin and Laminated:
  - Up to 1 m: ± 1.5mm
  - Over 1 m and up to 3 m: ± 2.5mm
  - Over 3 m: ± 3mm

**Spacer**
- Widths: 12, 14, 16 and 20mm
- Colour: silver or black
- Sight line: varies with design, usually 22mm ± 2mm

**Thickness tolerance**
- Single: as BS EN 572
- Max. overall thickness: 50mm

**Weight**
- All thicknesses: 2.5kg per m² for every mm thickness of glass

**Maximum weight**
- Single Ply: 500kg
- Multiple Plies: 1000kg

**Strength and Deflection**
- Allowable stress: 90N/mm²
- Allowable glass deflection: L/65 at design load

**Thermal Insulation**
- Depending on construction:
  - Single: U value 5.6 W/m²K
  - Laminated: U value 5.3 W/m²K
  - Double: U value from 1.1 W/m²K to 2.8 W/m²K

**Safety**
- Class A to BS 6206

**Sound Reduction**
- Depending on construction:
  - 10 mm Single: 33 dB
  - 12 mm Single: 34 dB
  - 10 mm + 6 mm Double: 36 dB
  - 19.5 mm Laminated: 40 dB

**Solar and Optical Performance**
- Depending on construction:
  - Light transmission: 84% to 8%
  - Solar direct energy: 68% to 4%
  - Total solar energy: 75% to 11%

**Fittings and bracketry**
- Grade 316 stainless steel

**Additional information on Fort™ Distortion**
- Bow: 2mm/m
- Roller wave and edge dip:
  - For™: 4mm, 6mm
  - Roller wave: 0.3mm, 0.15mm
  - Edge dip: 0.5mm, 0.25mm

**Additional information on FortPlus™ Distortion**
- Roller wave: 0.10mm, 0.05mm
- Edge dip: 0.25mm, 0.25mm

**Additional information on Cerocco Sandblasting**
- Normal Dimension limits:
  - Maximum size: 3000mm x 2250mm
  - Minimum size: 450mm x 350mm

**Additional information on Ceraphic™ Screen Printing**
- Print parameters:
  - Maximum size: 4600mm x 2440mm
  - Minimum size: 500mm x 300mm
  - Standard Colours: Polar white, Acid etch effect
  - Non-standard colours can be supplied.

**Image**
- Standard dot patterns: 31% and 39% cover
- Standard inverted dots: 61% and 69% cover
- Standard line patterns: 33%, 50% and 67% cover
- Full cover: 100% cover
- Variable cover and non-standard images can be produced from specification or artwork.
Ceraphic™ standard images

**Micropoint 4** - 4mm printed points in a 5 spot pattern at 6.4mm centres giving 31% cover.

**Micropoint 6** - 6mm printed points in a 5 spot pattern at 8.5mm centres giving 39% cover.

**Micropoint Contour 4** - 4mm clear points in a 5 spot pattern at 6.4mm centres on a printed background giving 69% cover.

**Micropoint Contour 6** - 6mm clear points in a 5 spot pattern at 8.5mm centres on a printed background giving 61% cover.

**Microline 5/5 and Microline 10/10** - 5mm printed lines with 5mm gaps or 10mm printed lines with 10mm gaps, both giving 50% cover.

**Microline 10/5 and Microline 5/10** - 10mm printed lines with 5mm clear lines giving 67% cover or 5mm printed lines with 10mm clear lines giving 33% cover.

**Support Methods**

The bolt connection to structure is usually via special bracketry in aluminium, mild steel or stainless steel. The bracketry design varies from simple angles to machined, fully adjustable brackets.

In addition to the standard fixings, the technical team can design special bolt and/or brackets.

Lateral support is afforded either by FortPlus™ heat soaked toughened glass fins, together with the relevant fittings, supplied by HansenGlass, or by steel structures from other manufacturers.
Supporting Fins

FortPlus™ fins in thicknesses from 12mm to 25mm can be used to achieve the ultimate frameless effect. Supporting fins can be designed to span heights of up to 20m, depending on the construction.

Three basic types of fin are available:

- cantilevered fins;
- full height simply supported fins;
- full height propped cantilever fins.

The FortPlus™ fins can be spliced to create longer lengths.

The depth of the supporting fin depends on the fin thickness, the type of fin design, the size of the façade panes and the design loads to which ThermoSpan™ is subjected.
Cantilevered fins and propped cantilever fins exert considerable turning moment at the fin root angles where they are attached to the structure. The building structure must take this into account.

Supporting fins can be used in non-vertical ThermoSpan™ applications, but there are additional design restrictions and the scope may be limited.

Supporting Bracketry

All bracketry is manufactured from stainless steel type 316 and can be provided in satin, bright and electro polished finishes. In addition to the standard range of bracketry offered HansenGlass can accommodate clients’ specific bracketry designs with full engineering calculations and testing.

Supporting bracketry can be used with all ThermoSpan™ glass products.

Aspect Normal

Manufactured from 80mm x 80mm stainless steel angle section the bracketry is drilled and machined to suit fixing requirements of the ThermoSpan™ bolts and the clients fixings back to the building structure. The bracket can be finished in a No.4 satin finish or a No.8 polished finish.
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Aspect Profile

Also manufactured from 80mm x 80mm stainless steel angle section the bracketry is then profiled prior to drilling and polishing. The bracket can be finished in a No.4 satin finish or a No.8 polished finish.

Morphic Bespoke Bracket

Produced through the investment casting technique from stainless steel, the Morphic range of brackets is ever changing to meet our clients’ requirements. HansenGlass will assist the client with their design and produce drawing details and working models of the finalised bracket design. The Morphic bracket has an original backplate design that allows for ease of installation whilst giving additional movement to accommodate interfacing tolerances.

Hooke:Pin Bracket

The Hooke bracket range offers a minimalist appearance with the inherent strength of stainless steel. A unique assembly method allows this bracket to be used with all ThermoSpan™ glass products.

Product Performance

Thermal Insulation

The performance of ThermoSpan™ depends on the construction and on the properties of the glasses, the spacer width and the filling of the cavity. In order to obtain lower U values, ThermoSpan™ Double Skin may be filled with argon gas. When used with low emissivity glass, U values as low as 1.1 W/m²K can be achieved. U values are indicated in the Technical Description section.

It is generally accepted that gases such as argon will be slowly lost over a period of several years depending on the unit size and construction. The rate of loss is known to be slow.
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.

Table 1 Sound reduction values

<table>
<thead>
<tr>
<th>Band centre frequency (Hz)</th>
<th>Sound reduction (dB) for various ThermoSpan™ glass thicknesses (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12mm Single Skin</td>
</tr>
<tr>
<td>100</td>
<td>24</td>
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<tr>
<td>125</td>
<td>29</td>
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<td>160</td>
<td>31</td>
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<td>200</td>
<td>28</td>
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<td>250</td>
<td>29</td>
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<td>315</td>
<td>31</td>
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<td>400</td>
<td>29</td>
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<td>500</td>
<td>33</td>
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<td>630</td>
<td>32</td>
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<td>800</td>
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<td>1250</td>
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<td>1600</td>
<td>36</td>
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<td>2000</td>
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<td>2500</td>
<td>42</td>
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<td>3150</td>
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</tbody>
</table>

Safety

All ThermoSpan™ constructions conform to Class A of BS 6206 and thus comply with BS 6262: Part 4 and Building Regulations.

Shapes

ThermoSpan™ is available as rectangles and various geometric or irregular shapes, based on the supply of

- appropriate computer files; or
- accurate scale drawings

The tolerance on dimensions and hole positions may be higher for complex shapes.

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, while 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 ThermoSpan™ Products

<table>
<thead>
<tr>
<th>Glass Type</th>
<th>Light Trans</th>
<th>Light Reflec</th>
<th>Solar Energy Direct trans</th>
<th>Solar Energy Reflec</th>
<th>Shading Coefficients Absorp</th>
<th>Total trans</th>
<th>Short wave</th>
<th>Long wave</th>
<th>Total</th>
<th>Code</th>
<th>U value W/m²K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilkington glass types with 16mm air cavity and 10mm FortPlus™ clear glass internally</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>6mm Clear Float *</td>
<td>0.76</td>
<td>0.14</td>
<td>0.57</td>
<td>0.11</td>
<td>0.32</td>
<td>0.69</td>
<td>0.65</td>
<td>0.14</td>
<td>0.79</td>
<td>76/69</td>
<td>2.7</td>
</tr>
<tr>
<td>6mm Optifloat Green *</td>
<td>0.66</td>
<td>0.11</td>
<td>0.33</td>
<td>0.07</td>
<td>0.60</td>
<td>0.45</td>
<td>0.38</td>
<td>0.14</td>
<td>0.52</td>
<td>66/45</td>
<td>2.7</td>
</tr>
<tr>
<td>6mm Optifloat Grey *</td>
<td>0.38</td>
<td>0.07</td>
<td>0.33</td>
<td>0.06</td>
<td>0.61</td>
<td>0.45</td>
<td>0.38</td>
<td>0.13</td>
<td>0.51</td>
<td>38/45</td>
<td>2.7</td>
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<tr>
<td>Glaverbel Stopsol glass types with 16mm air cavity and 10mm FortPlus™ clear glass internally</td>
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<tr>
<td>6mm Stopsol Supersilver Clear #1 *</td>
<td>0.57</td>
<td>0.36</td>
<td>0.48</td>
<td>0.27</td>
<td>0.23</td>
<td>0.58</td>
<td>0.55</td>
<td>0.11</td>
<td>0.66</td>
<td>57/58</td>
<td>2.7</td>
</tr>
<tr>
<td>6mm Stopsol Supersilver Dark Blue #2 *</td>
<td>0.38</td>
<td>0.16</td>
<td>0.24</td>
<td>0.11</td>
<td>0.65</td>
<td>0.35</td>
<td>0.28</td>
<td>0.12</td>
<td>0.40</td>
<td>38/35</td>
<td>2.7</td>
</tr>
<tr>
<td>Low Emissivity Products from Various Manufacturers with 16mm air cavity and 10mm FortPlus™ clear glass internally</td>
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<tr>
<td>6mm Pilkington K *</td>
<td>0.72</td>
<td>0.15</td>
<td>0.49</td>
<td>0.12</td>
<td>0.39</td>
<td>0.62</td>
<td>0.34</td>
<td>0.16</td>
<td>0.72</td>
<td>72/62</td>
<td>1.7</td>
</tr>
<tr>
<td>6mm St. Gobain Planitherm Futur N</td>
<td>0.76</td>
<td>0.12</td>
<td>0.43</td>
<td>0.21</td>
<td>0.36</td>
<td>0.54</td>
<td>0.50</td>
<td>0.12</td>
<td>0.62</td>
<td>76/54</td>
<td>1.4</td>
</tr>
<tr>
<td>6mm Intercane Iolus S</td>
<td>0.77</td>
<td>0.11</td>
<td>0.45</td>
<td>0.21</td>
<td>0.34</td>
<td>0.57</td>
<td>0.51</td>
<td>0.15</td>
<td>0.66</td>
<td>77/57</td>
<td>1.4</td>
</tr>
<tr>
<td>High Performance Products from Various Manufacturers with a 16mm air cavity and 10mm FortPlus™ clear glass internally</td>
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</tr>
<tr>
<td>6mm Pilkington HP Brilliant 66/33 **</td>
<td>0.65</td>
<td>0.15</td>
<td>0.27</td>
<td>0.30</td>
<td>0.43</td>
<td>0.36</td>
<td>0.31</td>
<td>0.11</td>
<td>0.42</td>
<td>65/36</td>
<td>1.3</td>
</tr>
<tr>
<td>6mm St. Gobain Coolite SKN 169 **</td>
<td>0.60</td>
<td>0.16</td>
<td>0.35</td>
<td>0.24</td>
<td>0.41</td>
<td>0.46</td>
<td>0.41</td>
<td>0.12</td>
<td>0.53</td>
<td>60/46</td>
<td>1.4</td>
</tr>
<tr>
<td>6mm Glaverbel Stopray Carat **</td>
<td>0.52</td>
<td>0.14</td>
<td>0.19</td>
<td>0.30</td>
<td>0.51</td>
<td>0.27</td>
<td>0.22</td>
<td>0.09</td>
<td>0.31</td>
<td>52/27</td>
<td>1.3</td>
</tr>
<tr>
<td>6mm Luxguard SN63 **</td>
<td>0.61</td>
<td>0.14</td>
<td>0.25</td>
<td>0.35</td>
<td>0.40</td>
<td>0.34</td>
<td>0.29</td>
<td>0.10</td>
<td>0.39</td>
<td>61/34</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Note * Total solar energy transmission calculated using heat transfer coefficients conforming to BS EN 410
Note ** Figures estimated from manufacturers literature – calculation methods are not necessarily the same

Ceraphic™ screen printing also improves solar control, depending on the percentage cover. For example, in clear float glass, 10mm ThermoSpan™ Single Skin has a light transmission of 84% and a total solar energy transmission of 76%. Applying 100% polar white Ceraphic™ reduces these figures to 23% light transmission and 32% total solar energy transmission.

Appearance

The appearance of ThermoSpan™ depends on the construction, 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.

Heat treated glass, such as Fort™ and FortPlus™ can never attain the same flatness as float glass. The common distortions are bow and roller wave. These irregularities in flatness cannot be avoided and introduce a degree of distortion visible in reflection. HansenGlass endeavour to control these distortions to better than industry standards. Bow and roller wave distortion is not usually noticeable when looking through the glass except at very acute angles.

Stress patterns in toughened and heat strengthened glass can sometimes be seen in polarised light.

Since ThermoSpan™ Double Skin is hermetically sealed and contains 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 unit. 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 phenomenon known as ‘Brewster’s fringes’ may be observed at critical viewing angles. This is a natural phenomenon and cannot be eliminated.
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ThermoSpan™ Laminated may also show distortion when viewed in transmission. This is due to the process of laminating two panes of glass, which are not completely flat. Although the laminating process can cope with this, since the resin simply fills the gap, whether or not it is exactly 1.5mm wide, the resulting product does not have perfectly parallel external surfaces. The resulting visual effect may be more like that observed with sheet glass, where images viewed through the glass show some distortion. Small cracks occasionally occur in the resin at the bolt positions. These are not structurally significant.

Although the edge tape used is clear, the refractive index of the tape differs to that of the glass and a line appears at the interface of the two materials. Under some lighting conditions the line may display a pale blue interference effect.

Specification and Tender Process

Enquiries must be submitted to HansenGlass and should include information such as: -

- performance specification documents
- relevant drawing details – elevations, plans and cross sections

HansenGlass will discuss the application and the performance requirements with the client to determine an appropriate solution in terms of strength, safety and any other specification requirements. This may include detailed CAD drawings depending on the depth of the study and complications of the application.

A quotation for supply and delivery of the ThermoSpan™ components will be prepared at this stage, together with a list of ThermoSpan™ installers, if applicable.

Following acceptance of the proposal and placing of an order, HansenGlass would then review the installer’s glass worksheets for compliance with the specification and processing suitability.

Service Life

A comprehensive warranty is offered.

ThermoSpan™ is manufactured from Fort™ or FortPlus™ toughened glass to BS 6206 Class A and ThermoSpan™ Double Skin conforms to the requirements of BS 5713.

The finest quality materials are used to ensure maximum service life. The silicone dual seal can withstand a wide temperature range and has high resistance to ultra-violet rays.
Handling and Storage

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

ThermoSpan™ should be handled with great care at all times. Correctly stacking and supporting ThermoSpan™, in a manner which prevents the glass from sagging, helps to avoid site breakages. To prevent edge damage, the glass must stand on strips of something softer than glass, such as wood, rubber or felt.

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

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

Use protective clothing and equipment (gloves, safety boots, safety glasses and a hard hat). Lift ThermoSpan™ in a safe manner using appropriate equipment.

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

Before use, the glass should again be checked for damage and the size and fitting positions checked with the supporting structure 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.

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

Glazing

Installation

ThermoSpan™ should only be installed by competent glaziers who have been fully trained in the installation procedures.

Inspection and Maintenance

All glazing is subject to some degradation with time by the action of the elements and building movement.

Periodic inspection must be carried out and maintenance executed as required or specified. The frequency of the operation depends on the condition of exposure and the location on the building.

Inspections should be undertaken at least annually on the following:

- bolt tightness
- weather seals integrity
- ThermoSpan™ Double Skin edge seal for adhesion
- ThermoSpan™ Laminated interlayer for delamination

ThermoSpan™ may not necessarily require maintenance or repair at every inspection.

Loose bolts should be tightened to the specified torque if necessary. With slight adhesion loss, the weather seal should be raked out or sealant cut back to a depth of 6mm and replaced with similar fresh product. Loss of edge seal adhesion, or delamination in an interlayer, should be reported immediately to the installer.

Cleaning

ThermoSpan™ needs no special cleaning and normal glass cleaning materials and equipment can be used.
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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