Heat Strengthened Glass

What is Heat-Strengthened Glass?

Heat-strengthened glass is a heat treated glass which retains the normal properties of ordinary float glass. It is similar to tempered glass except that the cooling is done slower than toughened glass but faster than annealed glass. Heat strengthening increases resistance to mechanical and thermal stress up to 130 Degree Celsius. While Heat Strengthened Glass is twice as strong as annealed glass, its fragmentation pattern is the same as annealed glass.

What is Tempering vs Heat Strengthening?

Heat Strengthened Glass is cooled down with much less pressure. The critical aspect in manufacturing is how to create sufficient stress level (not force of cooling co-efficient). The force of stress created depends on correct & even temperature of glass and heat transfer coefficient during cooling. It is difficult to control cooling coefficient during heat strengthening.

What are the characteristics of Heat Strengthened Glass?

Heat-strengthened glass provides higher resistance to thermal stress when compared to annealed glass.

When producing Heat-strengthened laminated glass in comparison with Tempered Laminated glass, Heat-
strengthened glass allows the interlayer to laminated glass to adhere more evenly because of a flatter finish surface.

As against toughened glass, Heat-strengthened glass - with its flatter surface - also results in the facade having less optical distortions.

This glass is difficult to break compared to ordinary annealed glass, but unlike toughened safety glass, breaks typically edge to edge and in fragments.

What are the properties of Heat-Strengthened Glass?

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<tr>
<th>Properties</th>
<th>Heat strengthened glass</th>
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<tr>
<td>Thermal Shock Resistance</td>
<td>Up to 1300°C</td>
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<tr>
<td>Mechanical strength</td>
<td>Two times stronger than annealed glass</td>
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<tr>
<td>Tensile strength</td>
<td>40 – 55 MPa</td>
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<td>Bending strength</td>
<td>40 N/mm2</td>
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<td>Design Stress for Architectural purposes</td>
<td>17 MPa</td>
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<td>Fragmentation</td>
<td>Knife edges</td>
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What are the benefits of Heat-Strengthened Glass?

Heat-strengthened glass differs from tempered glass in surface compression; its mechanical strength is about 2 times that of annealed glass.

Compared to annealed glass, Heat-strengthened glass has higher thermal stability.

Heat-strengthened glass is 3 times more resistant to thermal stress in comparison to normal annealed glass.

While ordinary annealed glass can withstand up to 40°C, Heat-strengthened glass can withstand a temperature difference of up to 1500°C.

Heat strengthened glass is far less susceptible to spontaneous breakage.

What are the applications of Heat-Strengthened Glass?

Heat-strengthened glass is popular among design professionals for vertical vision spandrel areas and for laminated sloped glazing. It is valued for its mechanical strength, which is twice of normal annealed glass, though half of fully tempered glass.

Heat strengthened glass has a comparatively flatter finish than fully tempered glass. Therefore, it has lesser optical distortions and can be used in places where high optical quality is required.

It can be used for general glazing where additional strength or resistance is required for mechanical/thermal loads caused by certain tinted or coated glass. The glass can also be used in high wind load areas, but cannot be used in any safety glazing applications, due to its breakage pattern similar to annealed glass.

Heat-strengthened glass is widely used in laminated glass for additional strength, such as in overhead and sloped glazing.