

### General

The base product for Kite toughened glass is annealed soda-lime silica glass. The raw material is subjected to a heat treatment process, which induces a compressive stress to the surfaces of the glass panel. This increase in compressive stress increases the resistance to mechanical forces.

### Strength

Generally, toughened glass is five times stronger than the same thickness of annealed glass. Surface resistance to scratching and abrasion does not change and the edges of a panel of toughened glass have the same vulnerability to those of non-toughened glasses.



Glass toughening furnace

### Manufacture

Toughened glass from Kite Glass is produced on a horizontal roller hearth furnace, designed and built by EFCO. By subjecting annealed glass to a controlled heating and cooling process, safety glasses of between 4mm and 25mm thick can be produced.

### Fracture

In the event of breakage, glass toughened by Kite Glass fragments into small relevantly harmless pieces with dulled edges, minimising the risk of serious injury. The actual fracture pattern conforms to the relevant standard to which the glass is produced.

### Heat Soaking

Kite Glass are able to heat soak toughened glass in their specially designed, fully calibrated ovens. Heat soaking is a thermal process for the selective destruction of toughened glass panels which may contain harmful Nickel Sulphide particles liable to cause breakage. The process time and temperature profiles used are determined by the customer. Currently Kite Glass can heat soak in accordance with prEN14179 (the norm) and the older DIN 18516 pt 4. The heat soak process vastly reduces the risk of spontaneous breakage of toughened glass.

## CHARACTERISTICS

### Loading

Although Kite toughened glass is much stronger than the annealed glass from which it was processed, the modulus of elasticity (Young's) is the same, the deflection characteristics, between alike substances are identical. It may therefore be necessary to restrict deflection to visual acceptance criteria rather than design strength criteria.

### Light and Heat Transmission

The light transmission and solar radiant heat properties of toughened glass are identical to those of the annealed glass before toughening.

### Work-on

Toughened glass cannot be cut, drilled or edge worked after toughening. All such operations and surface treatments must be carried out before toughening.

### Glass Range

Kite Glass produce toughened glass as follows:-

- Clear float (4mm to 25mm)
- Tinted float (4mm to 12mm)
- Low emissivity hard and soft coated (4mm & 6mm)
- Patterned glasses
- Surface modified glasses, including screen printed (may modify optical qualities).

### Bow

It is not possible to produce consistently a toughened glass as flat as annealed glass. Deviation or bow will vary dependant on thickness, size and other factors. Bow should be measured with glass in the vertical plane supported at the quarter points. The maximum difference is measured between the true vertical line and the concave surface of the glass. The normal maximum bow is 2mm per metre dimension.

### Handling and Fixing

The edges of toughened glass, as with all glasses, are vulnerable and care must be taken at all times during handling, storage and fixing. It must be stored in dry conditions, set on wood (or similar) supports in the near vertical position with sufficient support to prevent bowing. In glazing, edge clearances must be allowed and suitable packing should be fitted to prevent glass contact with hard materials. Glass to metal contact should never be allowed. Glazing and fixing should be in accordance with British Standards BS6180, BS6262, or other British or other Standards relative to the end use of toughened glass.

### Optical / Visual Quality

The toughening process will inevitably result in a product whose optical quality is not as high as that of the glass from which it is produced. Surface distortion is produced and can be seen particularly in reflection. This is exacerbated when the toughened glass is body tinted, surface coated or incorporated into sealed double glazing units. Because of the nature of the toughening process the distortion will take the form of 'bands' approximately 250/300 mm apart.

The pattern of stresses in toughened glass may also be seen in certain light conditions and viewing angles. This pattern is usually noticed in strong sunlight.

These and the 'bands' are inherent characteristics of horizontally toughened glass.

## Quality Standards

Kite Glass manufacture their toughened glass to the Quality Standards shown below, for which they hold licences from the British Standards Institution, M.S.A. and V.C.A.

It is the responsibility of the Buyer to ensure that the correct glass is specified for any particular use and that such use complies fully with all relevant British Standards, Building Regulations, Codes of Practice, or other Regulations.

This Data Sheet is presented in good faith and gives a general description only of the product. No liability, however arising, is accepted.

All quotations are given, orders accepted and glass supplied strictly subject to our Conditions of Sale.

Sizes	Dimensional Tolerances (Length, width & squareness)		
	Nominal Dimension	Dimension Tolerance	Squareness
Minimum: 100mm x 400mm (420mm across diagonal) Maximum: 2240mm x 4500mm – depending on substance & end use	Less than 2000mm	+1 / -2mm	4mm
	Greater than 2000mm but less than 4000mm	+2 / -2mm	5mm
	Greater than 4000mm	+3 / -3mm	8mm

**NOTE:** Tighter tolerances can be achieved.  
Please refer specific requests to us giving glass substance, thickness, size and type of edgework required



BS6206  
Specification for Impact Performance Requirements for Flat Safety Glass for use in Buildings



BS EN 12150  
Thermally Toughened Safety Glass for use in Buildings



BS 857  
Specification for Safety Glass for Land Transport



BS EN 14179  
Heat Soaked Thermally Toughened Safety Glass for use in Buildings



BSAU178a  
Specification to Road Vehicles Safety Glass



BS EN 1863  
Heat Strengthened Glass for use in Buildings

**'E' Mark  
Reg. 43**

European Specification for Safety Glazing in Power Driven Vehicles and their Trailers



BS EN 12543  
Laminated Safety Glass for use in Buildings



BSMA 24/25

BSMA24/25 Specifications for Ship's Side Scuttles and Windows



## Kite Glass

29 Avro Way, Brooklands Business Park, Weybridge, Surrey, KT13 OYZ  
 Tel: 01932 336080 Fax: 01932 347080  
 Email: [sales@kiteglass.co.uk](mailto:sales@kiteglass.co.uk)  
[www.kiteglass.co.uk](http://www.kiteglass.co.uk)