



## TOUGHENING

### Thermal process

By heating the glass to a temperature just below the softening point, then rapidly cooling, the surface compressive stress of the glass is greatly increased, this has the effect of raising the bending strength by up to five times and enhancing the thermal endurance, the amount of stress increase is dependent on the co-efficient of expansion of the material.



When using toughened glass care should be taken to ensure that the temperature is not permitted to rise above the point where stress release starts to occur.

### Typical example for Soda Float

Fully Toughened 11,200 psi (77 MPa)  
Heat-Strengthened 5,600 psi (39 MPa)  
Annealed 2,800 psi (19 MPa)

Thicknesses from 3mm to 25mm can be toughened thermally using either our 650 flatbed, or rotary toughening plants.

Heat strengthened glass is also available using the thermal process.

### Chemical Strengthening

This process is carried out by immersing the glass in a bath containing molten (450°C) potassium salt, where an exchange takes place between the potassium ions from the salt and the smaller sodium ions in the glass, on cooling this creates a compressive stress at the surface of the glass.

The process is only effective for thin section glass with high soda content, and the resulting stress is not visible in polarised light.

Our plant can handle thicknesses from 1-6mm.

