

Thermal Stress Guide

Why glass cracks from heat alone, and when toughening is required

What Causes Thermal Stress Fracture

Thermal stress fracture happens when different parts of the same pane reach different temperatures at the same time. The centre of a pane in direct sun heats up and expands; an edge shaded by a frame, blind or building shadow stays cooler and does not expand at the same rate. The resulting tension at the boundary between the hot and cold zones can exceed the strength of annealed glass, causing a crack that typically starts at the edge and runs roughly perpendicular to it. This is a real risk even on glass that is structurally undamaged and correctly installed — it is a property of annealed glass under an uneven temperature load, not a manufacturing defect.

Thermal Shock Tolerance by Glass Type

Glass Type	Thermal Shock Tolerance
Annealed (standard float)	~40°C max differential
Heat strengthened	~100°C max differential
Toughened	~200°C max differential

Toughened glass tolerates a far greater temperature differential than annealed glass, which is why we recommend toughening for any pane at meaningful risk of partial shading or high solar absorption.

Higher-Risk Situations

- **Partial shading:** external blinds, internal furniture, adjacent buildings or trees casting a shadow across part of a pane.
- **Dark tints and solar control coatings:** glass that absorbs more solar energy runs hotter, widening the temperature differential across the pane.
- **Large panes (over 1.0 m²):** more area means a bigger potential temperature gradient across the glass.
- **South and west orientations:** highest direct solar loading, particularly in summer afternoons.
- **Glass close to radiators or heating vents:** localised heating from indoors, not just sun from outside.

Toughening is strongly recommended for panes over 1.0 m² in partially shaded locations, south/west orientations, or with dark tints such as bronze or grey.

How to Order

Contact our sales team: 020 8574 9342 | 07305 993794 | sales@csultd.co.uk | csultd.co.uk — quotes returned within 2 business hours (Mon-Fri, 8am-5pm).