FIS | Information

KNOWLEDGE HUB

Spontaneous Breakages of Toughened Glass

Spontaneous breakages of toughened glass can occur for a variety of reasons:

- Impact from an object: often sharp, but the edge of a chair is not unusual
- Glass in contact with an exposed fixing or metal glazing bead: this could be a structural bolt or even direct glazing without a gasket
- Damaged or shelled edge: often caused after toughening either in the factory or in transport, on-site storage and handling or installation
- Misaligned fixings which cause the glass to twist
- Incorrect processing of the glass
- Nickel sulfide (NiS) and other inclusions or contaminates.

Breakages caused by NiS inclusions are sometimes hard to differentiate from breakages caused by other factors because the glass shatters and often falls into a pile of small cube shaped pieces on the floor.

Occasionally it is possible to identify the cause as NiS inclusions because although the inclusion might be microscopic, it can occasionally be seen as a small 'dot' or 'dark stain' situated at the center of a characteristic 'figure of eight' or 'butterfly' pattern at the origin of the break.

These breakages can occur months and even years after the glass has been installed. However, a figure of eight or butterfly shape is not, by itself, automatic proof of an inclusion. Only when the butterfly and a dot or a dark stain occur together is it likely that the failure mechanism was due to some type of particle inclusion. Only through laboratory analysis can an inclusion be accurately identified as NiS.

It is possible to reduce the risk of NiS causing spontaneous breakages through a secondary process called Heat Soaked Testing (HST). Here, toughened glass is put through a

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heating cycle where the glass is heated then held at a temperature for two hours before being allowed to cool to an ambient

temperature. It is a destructive process because a large percentage of glass where NiS inclusions are present and the glass is at risk of breaking will break. However, this is not a reliable process and some glass may still spontaneously break. As it increases cost and lead time it is often not taken up by clients who may not be aware of the risks.

To avoid potential claims relating to spontaneous breakage of toughened glass, it is vital that companies supplying glass products include an appropriate clause in their terms of business. The clause should clearly state the problem of NiS inclusions, confirm that HST can reduce (but not eliminate) the risk, and that you take no responsibility for any costs incurred by their client if such spontaneous breakage occurs.

Such a clause would be known as an exclusion clause and you need to draw your client's attention to it, otherwise it may be ineffective. We would advise a note at the start of your terms which should be included in any quotation that states "the client's attention is particularly drawn to clause __"

Exclusion of liability for spontaneous breakage of glass caused by nickel sulfide (NiS) inclusions

The presence of nickel sulfide (NiS) inclusions may cause toughened glass to spontaneously break after installation. This is a rare but naturally occurring phenomenon in the float glass manufacturing process. The risk of toughened glass spontaneously breaking due to the presence of critical NiS can be reduced (but not eliminated) by subjecting the glass to heat soaking testing (HST). The Contractor shall not be liable for any losses, claims, damages, liabilities, cost or expense incurred by the Client or by any End User as a consequence of any defects existing in toughened glass (whether heat treated or not) caused by its manufacturing process".

More information here http://specfinish.co.uk/technical-spontaneous-breakages-in-toughened-glass/

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