SATRA SPOTLIGHT

The safe use of glass in furniture

Examining the requirements for glass in furniture.

In Europe, the safety of furniture is addressed by the General Product Safety Directive (2001/95/EC), which requires that all products are safe – given their intended end use and also considering foreseeable misuse. In the UK, this is implemented through the General Product Safety Regulations SI 2005 no.1803 (GPSR).

It is advisable for the manufacturer, supplier or distributor to ensure that he or she can demonstrate an appropriate level of safety. This can be achieved through testing of the product using appropriate test standards and methods. One of the first considerations when using glass in furniture is an understanding of the different types of glass available and where they should be used.

Glass types

'Ordinary', or 'annealed' glass, will break into dagger-like shards, and so is often not suitable for use in furniture. However, the absence of stress in such glass means that it can be worked (cut, polished and drilled), even after bending and annealing.

'Toughened' ('safety' glass) is formed from a prepared sheet of ordinary glass which has been first cut to size, processed and edge-worked as necessary. The glass sheet is then heated and rapidly chilled with cold air,

which is blown onto the surfaces. This heating and rapid cooling process results in the outer surfaces cooling more quickly than the inner parts of the sheet. The result is that these outer surfaces will contract and solidify before the interior, thereby inducing permanent compressive stresses into the surfaces of the glass. This results in the increased strength and safe breakage characteristics observed with this type of glass. When the glass is broken, the stress is explosively released, producing the fracture characteristics of small, cube-like fragments (often referred to as 'dice') that are relatively harmless.

'Laminated' glass, as the name suggests, consists of two or more layers of glass which may be of any type. These are permanently bonded together by one or more interlayers of normally transparent plastic. Once manufactured, the laminate is considered to be one piece of glass. The plastic interlayers are intended to hold glass fragments in place if the glass is broken, making injury less likely to occur.

'Film-backed' glass has a film of flexible plastic applied to the back of the glass to hold the pieces together if it is broken.

'Decorated' glass is a product that has been worked – for example, by acid-etching, embossing, sandblasting, cutting or engraving, to give a decorative effect.

Glass in furniture must be safe

The General Product Safety Regulations places a duty of care on manufacturers, producers and distributors to ensure products supplied to consumers are safe. See box 1 for some common faults with glass in furniture.

Box 1: Common faults with glass in furniture

- incorrect product information or instructions present, or none provided at all
- incorrect glass type
- incorrect glass thickness – for example, too thin
- contact with other hard materials such as glass, metal or stone
- lack of support or insufficient attachment of glass, leading to instability.

UK enforcement authorities expect all glass used in tables and storage units to be safe. This needs to be established before a product is launched onto the market, and can be achieved through compliance with relevant standards. It is important to stress that, in general, these standards address the performance of the finished product, irrespective of the materials used in the construction.

Tables

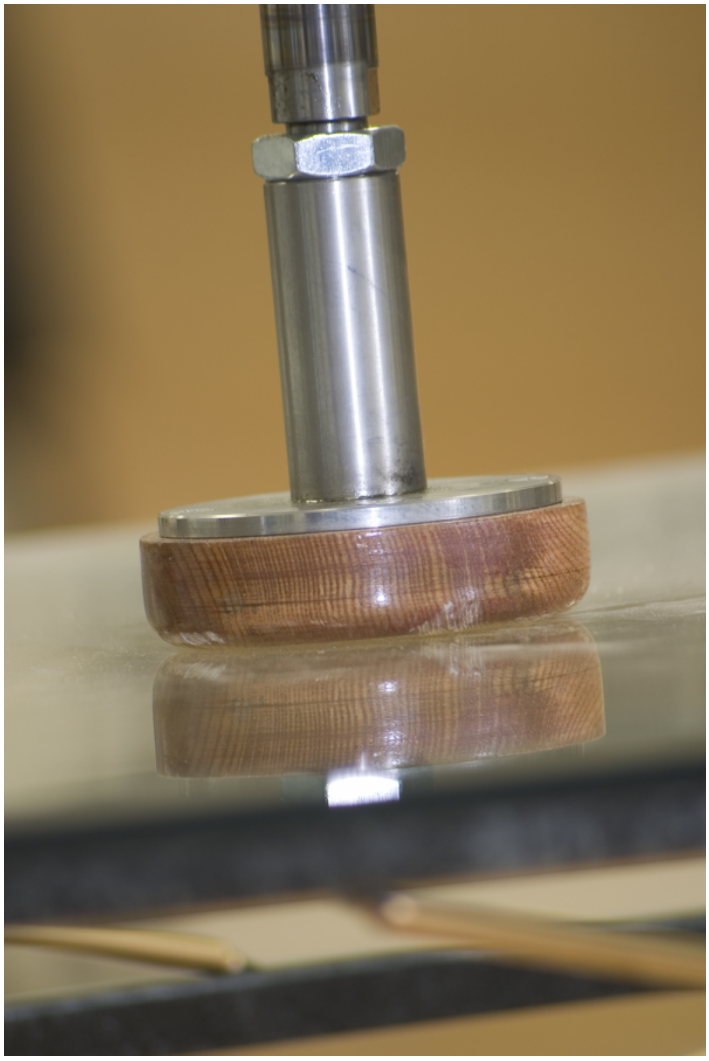
There are two European standards covering tables: EN 12521:2015 and EN 15372:2016. Both standards include vertical impact tests for where glass is and is not used in the construction of the table.

EN 12521:2015 – 'Furniture. Strength, durability and safety. Requirements for domestic tables' splits tables into two basic types: i) those that can be set to a height of 950 mm or less and ii) those that can be set to a height greater than 950 mm.

As the title of EN 15372:2016 – 'Furniture. Strength, durability and safety. Requirements for non-domestic tables' states, this is for non-domestic furniture applications – for example, contract or hotel applications. Here,

the strength and durability requirements are split into three levels of test severity, depending on the expected end use:

- light (such as hotel bedrooms, churches and libraries)
- general (including general hotel use, cafés, restaurants, public halls, banks, bars and meeting rooms)
- severe (for instance, night clubs, police stations, transport terminals, hospital public areas, casinos, homes for the elderly, sports changing rooms, prisons and barracks).



Static load on glass testing for product safety

EN 15372 states that, where glass is used, the vertical impact test used is determined by the type of glass present. If safety glass is being used, the drop height is either 180 mm or 240 mm, depending on the level of test severity, and testing is carried out in accordance with clause 6.6 of EN 1730:2012. Within EN 15372:2016, glass is considered safety type if it fulfils the requirements in EN 12150-1:2015, Clause 8 fragmentation test, or where the mode of breakage (β) according to EN 12600:2002 is Type B or Type C. For other glass types, the drop height in EN 15372:2016 is either 180 mm or 240 mm, depending on the level of test severity, and the testing is carried out in accordance with clause 6 of EN 14072:2003.

There is no requirement in either EN 12521 or EN 15372 to supply specified information or warnings relating to the glass used. However, the General Product Safety Regulations 2005 requires a producer to place only safe products on the market, and to provide relevant information to enable consumers to assess the risks inherent in the product. It is recommended that all items – especially tables, mirrors and storage units containing glass – are supplied with suitable information and warnings.

Storage units and cabinets

Glass is often present in storage units and cabinets, either as shelves or in glass doors. BS 4875-7:2006 – 'Strength and stability of furniture. Domestic and contract storage furniture. Performance requirements' provides requirements for the strength and durability of the structure of storage furniture. All items of furniture that are covered by the scope of this standard should meet with those applicable criteria, irrespective of the materials used in the construction. BS 4875-7:2006 is still used to test domestic storage furniture, but it is not normally used now for non-domestic items.

EN 14749:2016 – 'Furniture. Domestic and kitchen storage units and worktops. Safety requirements and test methods' includes a requirement for impact resistance of non-backed glass used in external vertical surfaces (such as doors). However, this only applies where the area of glass is in excess of, or equal to, 0.1 m^2, the smallest dimension is greater than or equal to 200 mm, or when any part is less than 900 mm above the floor.

For non-domestic storage units and cabinets, EN 16121:2013 – 'Non-domestic storage furniture requirements for safety, strength, stability and durability' also includes an impact resistance test.

BS 7449:1991 – 'Specification for inclusion of glass in the construction of furniture, other than tables or trolleys, including cabinets, shelving systems and wall hung or free standing mirrors' addresses the use of glass in these types of items. However, this was withdrawn in May 2006 following the publication of EN 14749:2016. Despite this withdrawal, BS 7449:1991 is still used, and includes information on labelling and marking of glass used in furniture.

Standards provide methods for evaluating performance relating to stability, structural strength and durability. Some complex products, or those using glass in novel ways, may require a risk assessment to identify any further hazards to users.

Regular testing backed up by relevant documentation – test reports, product information and suitable user instructions – is the best means of ensuring product safety.

How can we help?

Readers interested in having their furniture materials or products assessed or tested should contact email furniture@satra.com