

## Technical Update 20

### Structural calculations – CE marking of curtain walling



CE marking of curtain wall kits requires verification and declaration of the:

- Resistance to wind load,
- Resistance to dead load,
- Resistance to horizontal live load.

Resistance to wind load is determined by testing, and where the geometry of the wall differs from the tested arrangement, calculation of deflections and resistance of the framing members. Calculation is based on the appropriate Eurocode for the framing material.

Resistance to dead load and horizontal live load should be calculated in accordance with the Eurocode appropriate to the framing material used.

In the case of aluminium, the appropriate code for structural calculations is Eurocode 9 (BS EN 1999-1-1).

The current curtain wall Product Standard (BS EN 13830:2003) refers to the assessment of performance as initial type testing (ITT) which should be performed by a Notified Body. ITT is deemed to include both calculation and physical testing. ITT may be carried out at a system level where the assessment can be applied to different applications of the system within limits specified by the Standard. For some characteristics ITT may have to be carried out for different applications of the system.

This requirement causes difficulties for a number of reasons:

- It is not clear if there are any Notified Bodies across Europe who are able to carry out calculations of structural performance. These calculations would normally be carried out by a structural engineer. Structural engineers are unlikely to be able to act as Notified Bodies as Notified Bodies are not permitted to carry out consultancy work.
- As these calculations would have to be carried out for each arrangement of framing members, they would have to be carried out on a project-by-project basis requiring a large volume of work by Notified Bodies.

The revised Product Standard (due 2016) refers to type testing rather than ITT but with the same meaning.

The requirement for a Notified Body to undertake these calculations seems unnecessary as standard calculation methods are used to evaluate the structural performance characteristics described above. These calculations are repeatable and thus may be subsequently checked/scrutinised.

It is therefore recommended that the assessment of characteristics relating to the structural performance required for CE Marking of curtain wall kits is carried out by the manufacturer (ie the façade contractor) or their consultant, in accordance with the relevant Eurocode. The calculations should be carried out by a competent person and records of the calculations should be kept.

In the Product Standard, horizontal live load due to building occupants is represented as a line load acting at cill height which is taken as being within 1200mm above the finished internal floor level. In the UK cill height is taken as 1100mm above floor level for full height glazing but may be taken at a lower level for some balustrade applications.

For CE marking in accordance with the current Product Standard, resistance to horizontal live load should be declared as a value in kN at a stated distance above floor level, ie assessed as a point

load. It is more appropriate to give the horizontal live load as a line load in kN/m and this has been adopted in the revised Product Standard.

In the UK the horizontal live load may also be represented by a point load or uniformly distributed load on the infill below cill level. These load cases should be checked but are not required for CE marking.

It should be noted that if the wind load established by calculation in accordance with BS EN 1991-1-4 is greater than that applied during the wind loading test then the wind load on the declaration of conformity will be limited to that applied during the test.

The revised product standard refers to type calculations carried out by a Notified Body. Where system suppliers provide software, design charts and/or look up tables for their fabricators to use, it may be argued that these should be produced/verified by a Notified Body as they form part of the ITT.

It is not clear whether or not any Notified Bodies are qualified to do this.

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