

related test method	EN 1364-1: 1999 Fire resistance tests for non-loadbearing elements - Part 1 non-loadbearing walls
subject	Treatment of 'free vertical edges' when testing non-loadbearing walls to EN 1364-1
reference of original query	TC2 N347 Helpdesk 2004-01, TC2 N367

Problem

When testing non-loadbearing walls, the standard requires that the test specimen incorporates a 'free vertical edge', which is designed to simulate a continuous run of horizontal non-loadbearing wall. The 'free vertical edge' is an artificial construction provided by the sponsor/laboratory and can significantly affect the test result depending on how it is constructed. Currently, laboratories are using different types of construction at the free edge and this leads to variations in results.

The potential problems associated with the provision of a 'free vertical edge' are:

- Leakage of gases from the 'free edge' to the inside of the test specimen causing extra damage including e.g. delamination, which would not have happened had the test specimen been continuous
- Leakage of combustible gases from the inside of the test specimen to the outside, thereby potentially failing integrity, which would not have happened had the test specimen been continuous
- Changes to the amount of deformations of the test specimen caused by the sealing method used at the free edge e.g. mineral wool or a metal 'U' channel. The deformation maybe greater or less than that which would result had the test specimen been continuous
- Changes to the insulation of the test specimen at the free edge resulting either from leakage of gases into the specimen as mentioned above or by the sealing method used at the free edge e.g. a metal 'U' channel which may conduct heat around the free edge.

Recommendation

This recommendation provides for principles which shall be followed by EGOLF members when testing non-loadbearing walls. In the case of metal sandwich panels, specific forms of construction are described which shall be used.



Any construction including any sealing of the 'free vertical edge' of any test specimen (which may include the cut edge of a panel) shall:

- Prevent as far as possible, the leakage of hot gases into the test specimen from the furnace via the free vertical edge
- Prevent as far as possible, the leakage of gases out of the specimen (into the furnace or out to the unexposed face) via the free vertical edge
- Prevent as far as possible, the delamination of panels in built-up systems e.g. by 'capping' the edge of the panel using a 'U' shaped channel
- Have as minimal effect as possible on any deformation of the test specimen
- Have as minimal effect as possible on the insulation rating of the test specimen

For metal sandwich panels the following shall also apply;

- A full size (width) panel shall be used at the free edge subject to the requirements of clause 6.3.1 of the standard.
- Where it is impossible to use a full size (width) panel, the panel shall be cut so that there is a gap at the vertical edge between it and the test frame.
- Where the core of the panel is exposed e.g. by cutting (as above) or if complete panels are not sealed at their vertical edges; the free edge shall be capped with a continuous 'U' shaped channel running full height (apart from a small allowance for expansion)
- The channel shall be less than $\leq 1.0\text{mm}$ thick and shall be mechanically fixed to the edges of the panel.
- The 'U' shaped channel shall either:
 - a. be perforated to reduce heat transfer from the exposed to the unexposed face. See fig 2 for examples of perforations,
 - or,
 - b. be insulated on the fire side with mineral wool of density $\geq 35\text{kg/m}^3$ and melting point $\geq 1000^\circ\text{C}$ to prevent heat being transferred to the 'U' shaped channel. See fig 3.
- The gap between the 'U' shaped channel and the test frame shall be packed out with mineral wool of density $\geq 35\text{kg/m}^3$ and melting point $\geq 1000^\circ\text{C}$. It is permissible to use two layers of mineral wool to form the seal for the free edge.
- The gap between the free vertical edge and the test frame should be between 25mm and 50mm.

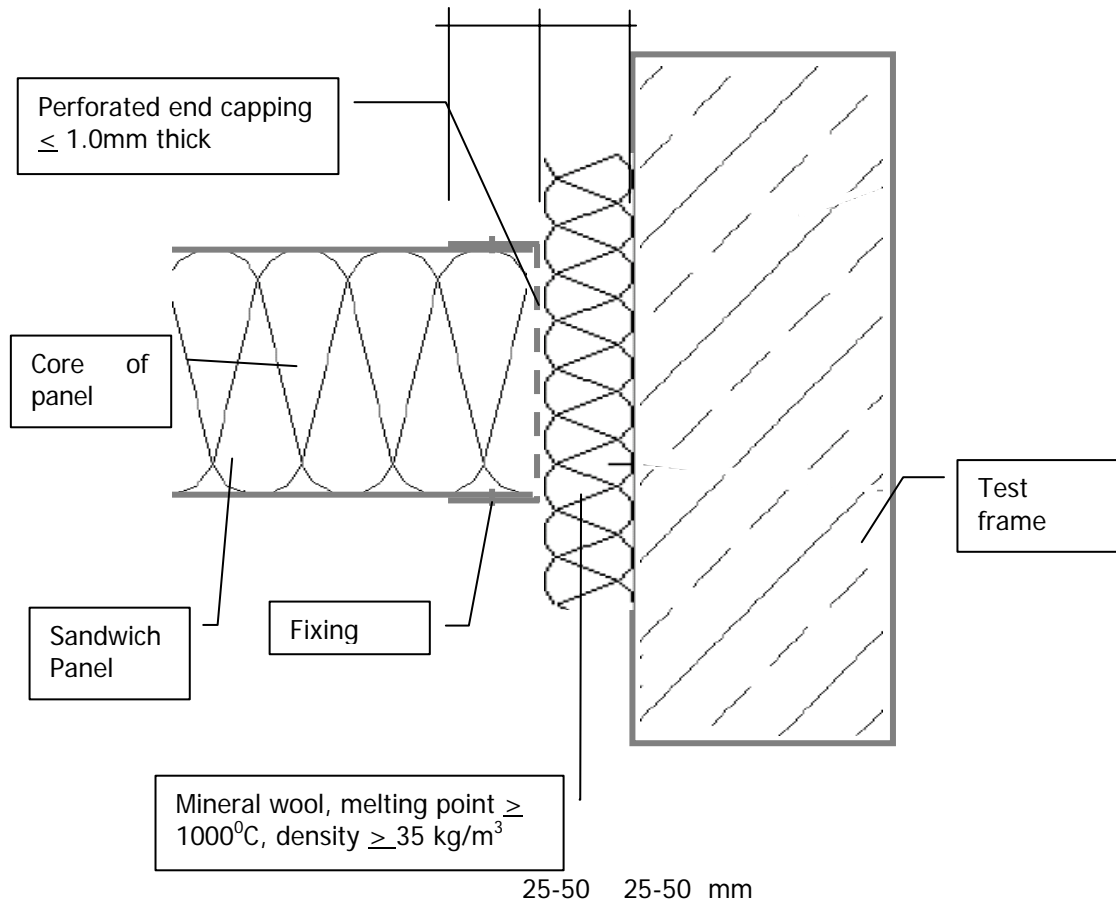


Figure 1 – example of capping of sandwich panels

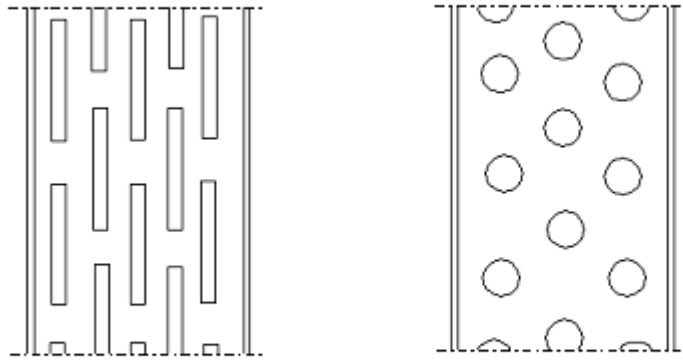


Figure 2 – details of perforated sheets

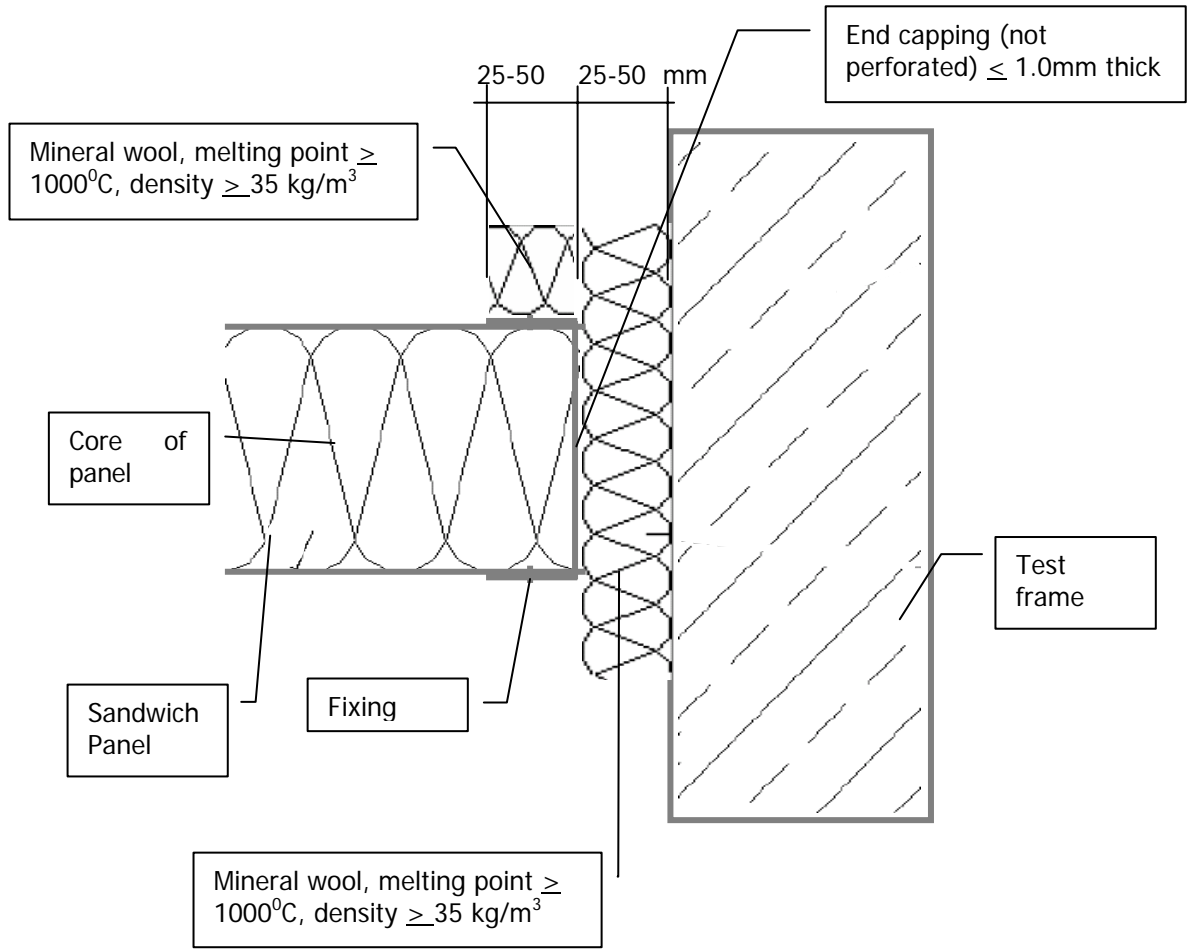


Figure 3 – Alternative example of capping of sandwich panels