Technical Update: Ceramic floor tiling on domestic timber floors

This technical update provides additional guidance on ceramic floor tiling on timber floor constructions, domestic. It is important that all workmanship carried out during construction is completed in accordance with the relevant tolerances.

Background

Where ceramic tile floor finishes are proposed as part of the 'completed' internal floor finishes, it is a fact that under normal loading, timber floor joists will deflect more than the allowable tolerances that a 'ceramic covering' can accept and cracking in the tiles, particularly at floor board junctions, will occur.

The following solutions are acceptable to meet our warranty Technical Manual requirements:

For new floors:

The guidance below is for ceramic tiling only and does not apply to other heavier tiles such as marble, travertine or stone which would be considered too heavy for a traditional suspended timber floor construction.

The floor must be fit for purpose and should have adequate stiffness to support the tiles and adhesive.

For floors supported by joists up to 600mm maximum centres, the floor decking should be:

- 18mm exterior grade plywood screwed to the joists at 300mm centres with all square edges supported on joists or noggins, or
- Moisture resistant floor decking overlaid with a minimum 10mm exterior grade plywood fixed to joists at 300mm centres, or
- A combination of one of the above with a proprietary separating/de-coupling layer, tile backer board or tile bedding reinforcement sheet used in accordance with manufacturer's recommendations.
- Plywood should be laid with a 1.5mm-2mm movement gap between boards and at abutments
- The length of screw fixings should be at least 2.5 times the thickness of the combined decking material to ensure adequate penetration into the timber sub-floor or joist/strut supports.
- Additional solid timber strutting between the joists will be required to assist in stiffening the floor construction for the entire span of the joists between supports, this may include strutting beyond the area of the tiled room e.g. if the joist span continues over a landing area.
- Tiles should be suitable for laying over a timber base and deformable (flexible) tile adhesive (e.g. C2S1), and grout should be used in accordance with the adhesive manufacturer's recommendations.
- Tiles must be laid to a level finish except where required in a walk in shower/wet room (see below).

For existing floors (e.g. in conversions):

Existing timber floors to be covered by ceramic tiles should be sufficiently strong and rigid, therefore:

- Prove the existing floor construction is able to take the additional dead load of up to 0.8 kN/m2 without excessive deflection. Older properties tend to have smaller depth floor joists than current standards for new joists for the same span. Alternatively replace or strengthen the floor joists, as per a structural engineer's design.
- Existing floor boards should be either removed, or exposed from underneath, to allow the floor to be stiffened with noggins, as described both above and in the 'new homes' section.

- The existing floor covering or new floor covering, dependent upon how the above point is addressed, must then be treated in accordance with the 'new floors' section above.

Walk-in showers and wet rooms

For walk-in showers and wet rooms, timber floor deck substrate is not acceptable.

Ceramic tiling:

- Tiles must be solidly bedded on an approved flexible adhesive/grout.
- They should be slip resistant.
- Laid to a level finish (See the Tolerances section in our Technical Manual).
- Tiles should be suitable for laying over a timber base and flexible tile adhesive (eg. C2S) and grout should be used in accordance with the adhesive manufacturer's recommendations.

De-coupling layers:

De-coupling layers provide an intermediate substrate between the tile covering and load bearing substrate including timber floors and decking materials. They are designed to neutralize lateral stresses that occur between the substrate and tile covering; they are not designed to accommodate differential vertical movement. De-coupling layers are considered to offer a robust approach to preventing ceramic tile failures, where ceramic tiles are laid on a flexible timber substrate. However, it does not preclude the requirement to provide strengthened/stiffened joists and overlay decking (as described above).

Note: For the purpose of this article, we are looking only at providing advice on ceramic tiling proposed on timber floor decks with a timber joisted (solid and I joists) support. Marble, travertine or stone type coverings on either timber, concrete or screeded floor substrates are not discussed.