



BATHROOM FLOOR TILES AND HEATING

Under-tile heating systems are popular in bathrooms to combat cold tiles and provide heating. However, the components must be installed in the correct sequence to keep the system safe and fully waterproof.

By Alide Elkink, Freelance Technical Writer, Wellington

Refurbishing a bathroom provides the opportunity to change fittings and finishes including the type of flooring and heating system. Tiles are a popular choice for bathrooms but they can be cold underfoot, and waterproofing must also be considered.

Waterproofing and floor wastes

Under New Zealand Building Code Clause E3 *Internal moisture*, wet area floors and wall surfaces that are likely to be splashed, such as in kitchens, bathrooms and laundries, must be impervious. E3/AS1 sets out minimum requirements for waterproofing all wet area floors subject to the possibility of regular wetting and for waterproofing around baths, showers and bath/shower combinations.

Tiles with a maximum 6% moisture absorption and waterproof grout are an acceptable finish to areas subject to water splash under E3/AS1. A waterproofing membrane is required in shower areas (floor and walls) and around baths. In water splash areas, the tiles provide adequate protection where the floor is concrete; however, manufacturers of particleboard require the whole wet area floor to be waterproofed, including under baths and vanities. BRANZ also recommends all wood-based and fibre-cement wet area floors are waterproofed. The membrane should have a sufficient perimeter upstand.

Compliance document E3/AS1 only requires a floor waste in locations where the accidental overflow of a sanitary fixture may cause damage to a separate tenancy, but BRANZ recommends floor wastes are installed in all wet areas, particularly ones that aren't on the ground floor. A water barrier should also be created at door openings.

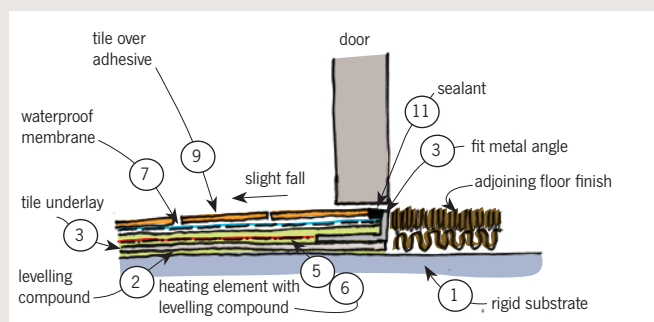
Elements recommended under waterproofing

Water and electricity do not mix so it's important to keep them separate. Cables can be laid either on top of or under the waterproof membrane, but laying underneath is recommended. This way, waterproofing is done after the electrical trades work, allowing all penetrations to be sealed.

If cables are laid after waterproofing, there is the risk that the waterproofing will be damaged.

Step 1 – Rigid substrate

Ensure the timber or particleboard floor is sufficiently rigid for a tiled finish. Additional nailing or screwing may be required to remove squeaks or prevent movement. Framing may need to be strengthened. Some older floors may have too much deflection for a tiled finish – maximum deflection is 1/360th span.



Edge detail at door openings for floors with a fall. Numbers refer to the steps in the text. (Note that open showers require a 1:50 fall according to E3/AS1.)

Step 2 – Remove uneven areas

Remove areas of uneven floor by applying levelling compound to fill dips or hollows. Sanding or grinding may be used to remove small high areas. The floor must be left clean, dry and free of dust and debris.

Step 3 – Install tile underlay

Install a minimum 6 mm thick rigid, stable tile underlay, such as fibre-cement sheet, over the existing suspended floor if required to provide an even floor. Tile underlay is always required over levelling compound. Fix by gluing, nailing or screwing to the substrate at the spacings recommended by the manufacturer. Heads must be flush with the surface. Seal underlay to the wall junction. Fit trim angles at door edges.

Step 4 – Prime

Prime substrate with the waterproofing system's recommended primer, and fill the gap at the base of the wall lining and the floor with the recommended sealant.

Step 5 – Lay heating system

Under-tile heating systems available may use either a continuous wire heating element or a mesh heating element.

Heating wires should be spaced in accordance with the manufacturer's instructions. Determine the required set-out and spacings, and mark these out on the floor. Then lay the heating element out evenly across the floor. It may be necessary to rearrange some wiring to get an appropriate layout.

Remember, elements:

- should not be spaced closer than 50 mm
- should not cross over each other
- should not be laid under wall framing or where there will be floor fixings. →

Tape element securely with adhesive tape as required in accordance with the manufacturer's recommendations.

Once installed, avoid traffic over the floor until the element is protected.

Step 6 – Apply levelling compound and prime

Protect outlets to prevent levelling compound entering them. Apply levelling compound in accordance with the manufacturer's instructions to ensure a level base for the tiles. The levelling compound also provides protection to the element or mesh until the tiling has been completed. Allow a minimum 24 hours for the levelling compound to cure or in accordance with the manufacturer's instructions.

Prime the levelling compound.

Step 7 – Apply waterproofing

The waterproofing used must be suitable for use with the heating cables. Apply waterproofing over the levelling compound, as per the manufacturer's instructions.

Common waterproofing systems include:

- two-part cement-based
- liquid-applied rubber emulsion
- cold-applied liquid polymer (acrylic) gel
- glass fibre-reinforced resin or acrylic
- solvent- or water-based polyurethane membrane
- peel-and-stick membrane.

Step	Procedure
1	Ensure existing flooring is rigid and securely fixed.
2	Apply a levelling compound to remove low points and/or sand high points.
3	Install a tile underlay.
4	Prime if necessary.
5	Lay out and secure heating element.
6	Apply self-levelling compound and prime.
7	Apply waterproofing membrane.
8	Flood test if possible.
9	Apply tile adhesive and lay tiles.
10	Grout tiles.
11	Apply sealant at junction between vertical and horizontal tiles. Add finishing strips as required.

Step 8 – Flood test

Where possible, carry out a flood test. Good tiling practice requires this.

Step 9 – Apply adhesive and lay tiles

Progressively apply a compatible tile adhesive over the waterproofing membrane.

The first step in laying the tiles is to mark out the centre of the room (or centre of the tiling if the room is an uneven shape) with string in both directions. Check that the strings intersect at 90°. Mark the string line locations with chalk, ensuring they are straight and true, as they set the benchmark for the tile laying. Starting from the centre and working to the outside, set the tiles out on the floor to determine patterns and efficient cutting.

In some situations it may be preferable to start by laying full tiles at a visible location of the room such as the doorway and working from this point. Before laying out tiles, locate movement control joints. Check the batch numbers on the boxes of tiles and where they differ, select tiles randomly from boxes. If tiles are patterned, lay the tiles pattern-to-pattern as appropriate.

Step 10 – Grouting

Check tiles and grout for compatibility before beginning the grouting. Apply grout between tiles by spreading diagonally across tiles. Ensure grout is forced into all joints. Remove excess grout with a damp sponge.

Step 11 – Finishing

Apply a suitable sealant at junctions between horizontal and vertical tiles and where there is a movement control joint in the floor. Finish the top of upstand tiles with brass, aluminium or PVC quarter round strip.

Also consider...

Specific points to consider when including under-tile heating in a wet area tiled floor:

- Allow for a greater level of thermal expansion and contraction than would be required with unheated tiled floors.
- Avoid damaging cables during the installation.
- Ensure substrate compatibility, for example, particleboard is not recommended where a heated floor is installed.
- Allow sufficient time for curing before turning the heating system on. When first used increase the temperature slowly.
- Limit the upper temperature on the under-tile heating thermostat. ◀