



System shown: Red Floor Panel

## Underfloor heating for solid or screeded floors

**Predominately installed in new build or renovation** where a floor requires excavation - Polypipe Underfloor Heating offers three systems for solid or screeded floors: the unique Polypipe Red Floor Panel system which ensures accurate installation and positioning, and also the more traditional rail and staple systems.

### Red Floor Panel

For optimum performance, Polypipe has the perfect solution for installing underfloor heating into solid or screeded floors. Utilising our unique lightweight plastic floor panels, which are quick and easy to cut to size, it is possible to fit Polypipe Underfloor Heating into any shaped room.

The lightweight plastic floor panels also nest for easy storage and carrying. Polypipe Red Floor Panels form a simple grid to ensure the fastest possible pipe laying and also provide a precise guide for the pipe, ensuring that the minimum pipe bending radius is achieved.

The panels are laid above pre-installed insulation and the system includes edge expansion strip to ensure maximum performance and efficiency.

### Clip rail and staple system

We also provide a range of rail and staple systems that fit directly onto the insulation, offering a more traditional alternative to installing underfloor heating in solid or screeded floors.

 **Optimum performance system**

### All systems

Solid floor systems are compatible with our 15mm, 16mm and 18mm pipe ranges.

Polypipe Underfloor Heating Systems can be used with the following solid floor constructions:

- Sand and cement screed (4:1 mix)
- Fine or heavy concrete
- Pumped screed systems (anhydrite etc.)
- Polymer modified screeds

**NOTE:** Once a screed is poured, the red floor panel will take up 15% of the volume of the screed.

## Design and materials

	RED FLOOR PANEL	CLIP RAIL	STAPLE SYSTEM
<b>KEY DESIGN INFORMATION</b>			
Typical heat output at 50°C mean water temperature	91W/m <sup>2</sup> at 100mm pipe spacing	76W/m <sup>2</sup> at 200mm pipe spacing	76W/m <sup>2</sup> at 200mm pipe spacing
Recommended design flow temp.	50°C	50°C	50°C
Maximum circuit length	100m	100m	100m
Maximum coverage per circuit	12m <sup>2</sup> at 100mm centres 22m <sup>2</sup> at 200mm centres 30m <sup>2</sup> at 300mm centres* *(18mm pipe only)	22m <sup>2</sup> at 200mm centres 30m <sup>2</sup> at 300mm centres* *(18mm pipe only)	12m <sup>2</sup> at 100mm centres 22m <sup>2</sup> at 200mm centres
<b>MATERIAL REQUIREMENTS (APPROX)</b>			
Pipe	8.2m <sup>2</sup> /m <sup>2</sup> at 100mm centres 4.5m <sup>2</sup> /m <sup>2</sup> at 200mm centres 3.3m <sup>2</sup> /m <sup>2</sup> at 300mm centres* *(18mm pipe only)	4.5m <sup>2</sup> /m <sup>2</sup> at 200mm centres 3.3m <sup>2</sup> /m <sup>2</sup> at 300mm centres *(18mm Pipe only)	8.2m <sup>2</sup> /m <sup>2</sup> at 100mm centres 4.5m <sup>2</sup> /m <sup>2</sup> at 200mm centres
Floor panel usage	1 panel/m <sup>2</sup> allowing for cutting (Actual 1.2m <sup>2</sup> /panel)	N/A	N/A
Clip rail usage	N/A	1 x 1m rail/1m <sup>2</sup> of floor area	N/A
Fixings	N/A	1 x bag (250 per 50m <sup>2</sup> floor area)	N/A
Staple usage	N/A	N/A	1 box (300) staples for every 150m of pipe
Edge expansion strip	1.1m/m <sup>2</sup>	1.1m/m <sup>2</sup>	1.1m/m <sup>2</sup>
Conduit Pipe	2m/circuit	2m/circuit	2m/circuit
Product dimensions	1.2m x 1m (Height 30mm)	1m lengths	60mm/40mm

## Installation

Prior to installation it is recommended that the building is secured against the elements and that the sub floor is level, free from any mortar or plaster residues and is swept clean.

### Solid floor - All systems

#### Fitting insulation

##### Step 1:

In accordance with Part 'L' of the current Building Regulations, a suitable layer of insulation material should be included within the floor construction. It is the responsibility of the architect or builder to ensure compliance. However, in all instances insulation must be installed beneath the underfloor heating system in order to ensure that any downward heat loss does not exceed 10W/m<sup>2</sup>, in accordance with BS EN 1264.



#### Fitting the edge expansion strips

##### Step 2: Laying the insulation panels

When laying the insulation boards, ensure that the joints of each board are staggered and securely taped so as to minimise any risk of movement.



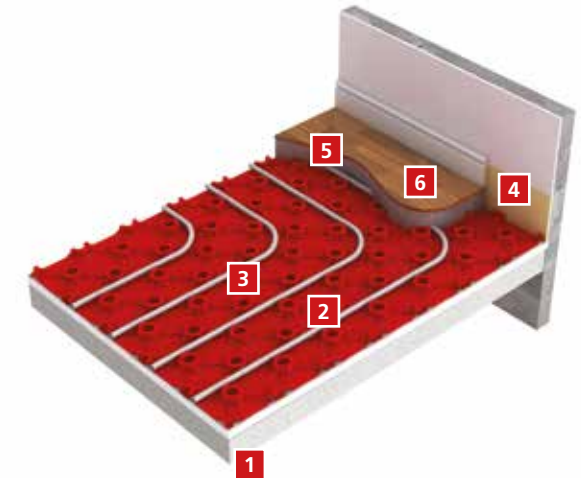
##### Step 3: Fitting the edging strip

Using the edge expansion strip allows the free expansion of the floor screed. The expansion strip comes with a self-adhesive strip which bonds the panel to the wall, it should be installed around the perimeter wall and around fixed constructions such as columns, steps and access doors. The edge expansion strip also comes with a plastic skirt which lays over the top of the insulation to prevent the screed seeping in to the join between the insulation panel and edge expansion strip. Edge expansion strip should be fitted in addition to perimeter insulation required by Building Regulations.



## Solid floor - Panels

- 1 Insulation
- 2 Pipe
- 3 Red Floor Panel
- 4 Edge expansion
- 5 Screed
- 6 Finished floor



#### Panels step 4: Fitting the floor panels

The floor panels are laid over the pre-installed insulation and should be overlapped at the edges.



#### IMPORTANT Note:

The ½ castellation should overlap the ¾ castellation. The first panel should be laid with the ½ castellation edge against the wall. Panels can be cut by simply using a saw or snip, or it can be overlapped to the nearest castellation fit.

Floor panels should not be used at the base of the manifold as pipes need to be closer together than the floor panels allow. Pipes around this area should be secured using pipe clips which can also be used intermittently to secure the clip panel to the insulation. The plastic skirt should be laid over the floor panel and the outside run of pipe pushed into the skirt covered castellations to create a seal around the edge of the area.

When a pumped (liquid) screed is to be used it is essential that all of the panel joints are made correctly and that no panels are allowed to simply 'butt-up' as this may allow the screed to penetrate below the underfloor heating system and cause the panels to rise up. Similarly the panels should be firmly secured around the perimeter of the room using staples so as to prevent possible risk of the panels lifting.

#### Panels step 5: Preparing the pipe

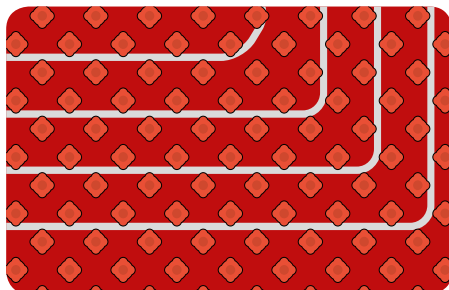
You will need to remove the coil from the bag, leaving the shrink wrap on, uncoiling from centre of the coil.





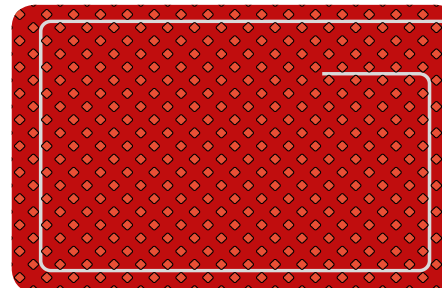
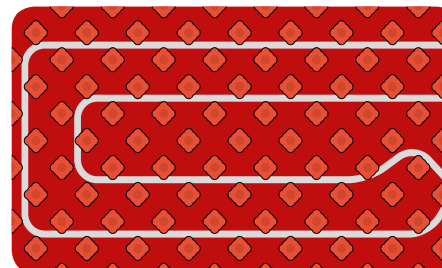
**Panels step 6: Laying the pipe**

Once you have completed laying the solid floor panels the pipe can be fitted starting at the manifold position in line with the pre-designed centres. 15mm and 18mm pipe can be laid at 100mm or 200mm centres as required, 18mm pipe can also be laid at 300mm centres. The minimum bend radius is achieved by encircling two castellations for a 90° bend or three castellations for a 180° bend.



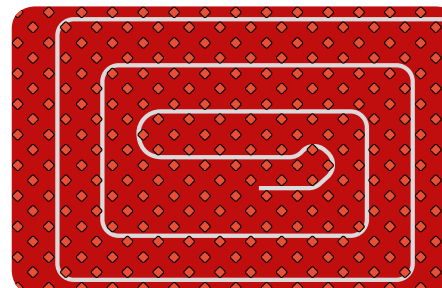
**Panels step 7:**

Circuits being laid at 100mm or 200mm centres must be laid in a spiral configuration. The first loop of pipe should be laid around the perimeter of the area to be covered by that circuit. The next loop of this circuit should be laid either 200mm from the first loop of pipe for 100mm centres or 400mm from the first loop of pipe for 200mm centres.



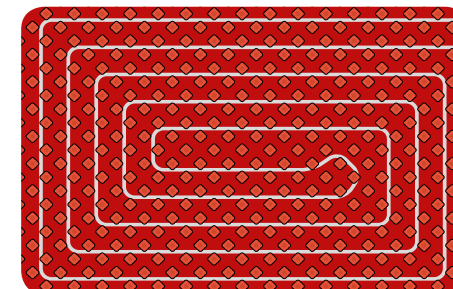
**Panels step 8:**

Continue to loop the pipe into the centre of the panels leaving enough space to form a double return ('S' shape in the centre of the loop).



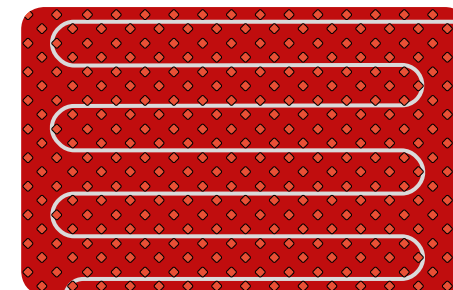
**Panels step 9:**

Now work back out from the centre by filling the space between the inwardly spiralling loop of the primary circuit ensuring the pipe is laid at the correct spacing centres.



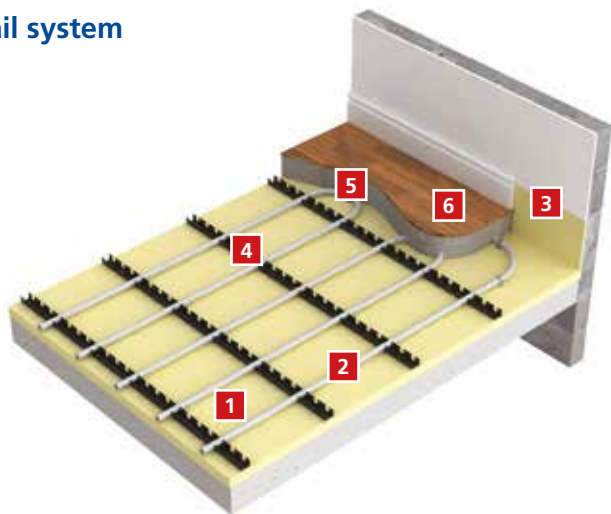
**18mm pipe installation formation**

Where 300mm centre spacing is required (18mm pipe systems only) a meander pattern can be used. The pipe simply crosses the room from one side to the other encapsulating 3 castellations at each return bend.



## Solid floor - Clip Rail system

- 1 Insulation
- 2 Pipe
- 3 Edge expansion
- 4 Clip rail
- 5 Screed
- 6 Finished floor



### Step 1 - Step 3:

Follow steps 1, 2 and 3 from page 44 of the Solid Floor Systems section.

### Rail step 4: Fitting the clip rails

Secure the clip rails to the insulation board by using the clips (PB02911). Firmly push the clips downwards into the insulation at 200mm centres so as to ensure that the clip rail is fully secured and lays flat to the insulation.



Continue to fit the clip rail across the room at 1m intervals making sure that sufficient space is left around the perimeters of the room (approx. 800mm) so to accommodate any pipe returns or connection lengths back to the manifold. Care should also be taken to ensure that the clipping alignment is maintained.



It is not necessary to overlap the clip rails. They can be clipped together end to end to form longer lengths.



### Rail step 5: Laying the pipe

Fit the pipe into the clip rails at 200mm centres in a serpentine pattern and then bend the pipe at 180° at the end of each circuit ensuring that the edge of the bend is parallel with the adjacent circuit.



Continue to lay the pipe in this serpentine pattern until you have reached the end of the circuit.



If necessary use an additional clip or pipe staple (PB02930) to firmly secure the 180° return bends.



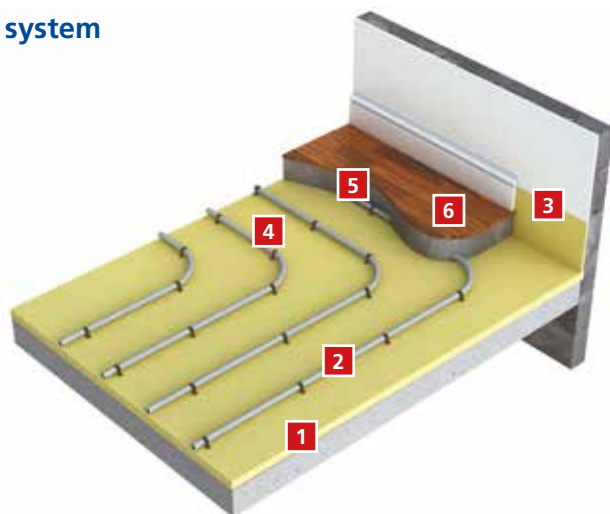
Continue to fix the pipe down using the pipe staples as you exit the pipe from the circuit. The plastic skirt should be laid over the insulation and the outside run of pipe stapled into the skirt covered insulation to create a seal around the edge of the area.





## Solid floor - Staple system

- 1 Insulation
- 2 Pipe
- 3 Edge expansion
- 4 UFCH Staple Clip
- 5 Screed
- 6 Finished floor



### Step 1 - Step 3:

Follow steps 1, 2 and 3 from page 44 of the Solid Floor Systems section.

### Staple step 4: Using the Staple Gun

Load the staples from the top and secure with the plastic weight so to ensure the staples stay in position.



### Staple step 5: Fitting the pipe

The pipe should be laid in the same spiral or serpentine pattern as the panel system with the staples fixed at a minimum of 500mm centres.



The pipe should be installed at 200mm centres.



The plastic skirt should be laid over the insulation and the outside run of pipe stapled into the skirt covered insulation to create a seal around the edge of the area.

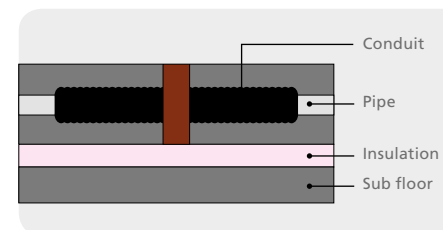
## All solid floor systems

### Conduit Pipe

A 400mm length of conduit pipe should be fitted over the underfloor heating pipe in any situation where damage may be caused to the pipe i.e. where the pipe passes through internal walls or doorways, where the pipe emerges through the floor up to the manifold or where the pipe passes through either an expansion or day joint. Preformed long radius bends can also be used to provide a neater solution if required.

A section of conduit pipe 400mm long should be fitted around the heating pipe where the pipe passes through the edge expansion strip, e.g. room to room, or through expansion joints within the floor.

Conduit pipe should also be used where the pipe leaves the floor adjacent to the manifold. This can be threaded down the pipe after the pipework has been installed.



### Expansion joint

BS EN 1264-4 recommends that an expansion joint is constructed in stone and ceramic finished screeds for every 40m<sup>2</sup> of floor area at a maximum length of 8m and an aspect ratio of 2:1. An expansion joint is also required in long narrow areas such as corridors etc.

The image (to the left) shows a typical arrangement where the pipes pass through either an expansion or a day joint. A strip of edge expansion is used to provide the expansion capacity.

For further information regarding floor screeding requirements for underfloor heating systems please refer to BS8204-1 or the BISRIA Guide: Screeds with Underfloor Heating.



### Step 9: Testing

BS EN 1264-4 recommends that an expansion tightly compacted around the pipe to ensure that no voids are present. The system should remain under pressure (6 bar) in order to prevent the risk of any damage being caused to the walls of the pipe whilst the screed is being applied.

### Step 10: Laying the screed

The overall quality and thickness of a sand and cement screed should meet the requirements of BS8204-1 which stipulates that in domestic or light commercial applications a minimum thickness of 65mm should be used. The thickness of alternative coverings, such as anhydrite or polymer modified screeds, may differ depending on construction requirements. This information should therefore be provided by the specialist screed manufacturer/supplier.

Under no circumstances should the underfloor heating system be used to artificially dry/cure the screed as this could cause the screed to crack and seriously undermine the integrity of the floor construction. Once the screed has fully cured, the underfloor heating system can be switched on and the manifold flow temperature slowly increased up to the calculated design temperature.

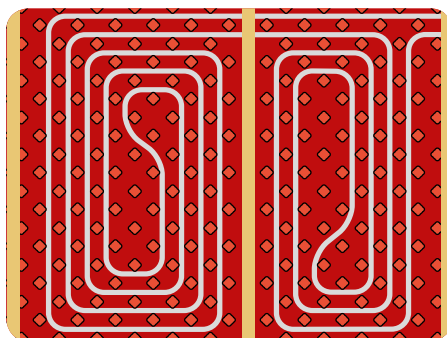
## Finishing

### Timber floors

The use of timber flooring is perfectly acceptable with our solid floor underfloor heating systems. However, care must be taken to ensure that the product being used is suitable for use with underfloor heating (please consult your specialist flooring supplier). It is essential that the new screed floor is allowed to dry out completely before the timber flooring product is laid. It is recommended that the underfloor heating system be run for at least two weeks to completely dry out the subfloor prior to the laying of the timber flooring product.

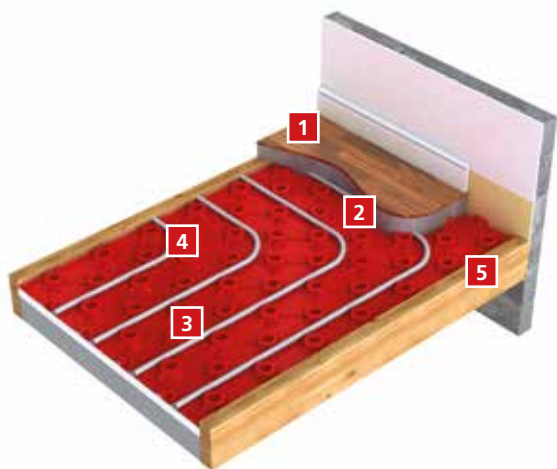
If you are using a natural timber flooring product then it should be allowed to acclimatise sufficiently prior to installation. The timber floor can be either 'floated' or 'glued' to the screed floor depending on the product type and installation preference.

When designing the system, care must be taken to ensure that floor surface temperature (on top of the timber finish floor) does not exceed 27°C.



### Application of timber floors over solid floor systems

Where solid oak flooring is to be laid on a solid floor, joists can be fitted at 1m centres to provide a fixing point for the boards. Insulation, solid floor panels and pipe can be laid between the joists and screed laid level with the top of the joists (see diagram above). Individual circuits of pipe are then laid between each set of joists with care being taken to ensure the screed is completely dry prior to fitting the solid oak covering (see diagram below).



- 1 Timber floor covering
- 2 Screed
- 3 Pipe
- 4 Solid Red Floor Panel
- 5 Joists at 1m spacings

