

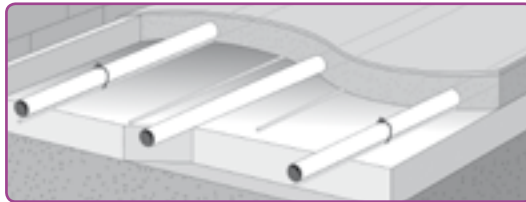
# Uponor

## PEX 20 UNDERFLOOR HEATING

### Screed & Concrete Floors

There are several methods available for securing the underfloor heating pipe work within a screed or concrete floor. The different fixing systems can be used individually or in any combination to suit the building design. The most convenient and appropriate method should be chosen for the individual project.

#### A Steel Grid Fixing



Recommended for standard sand/cement screed.

The above floor section incorporates the following:

- 1 Structural concrete slab or oversite.
- 2 Sub-floor insulation in accordance with Building Regulations.
- 3 Polyethylene sheet.
- 4 Steel grid (usually A142 mesh).
- 5 Uponor PEX pipe secured with wire or plastic ties.
- 6 Finishing screed or concrete. Recommended thickness 75mm from top of insulation.
- 7 Final floor finish laid in direct contact with the screed/concrete.

#### B Plastic Clamp Track Fixing



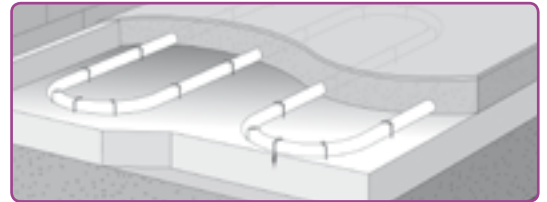
Recommended for sand/cement or liquid flow screeds.

The above floor section incorporates the following:

- 1 Structural concrete slab or oversite.
- 2 Sub-floor insulation in accordance with Building Regulations.
- 3 Polyethylene sheet.
- 4 Flat plastic clamp track with clip positions every 150mm.
- 5 Uponor PEX pipe snapped into cliprail or secured with individual U-clips.
- 6 Finishing screed or concrete. Recommended thickness 75mm from top of insulation.
- 7 Final floor finish laid in direct contact with the screed.

The plastic track illustrated is in 600mm sections with hinged joints for easy handling. Fixed onto EPS 150 polystyrene insulation board with 'u' holding clips. Please check suitability of other types of insulation. Individual fixing clips can also be supplied for the location of single pipes in any position.

#### C Rolltec Insulation with Clamp Track or Staples



Recommended for sand/cement or liquid flow screeds.

The above floor section incorporates the following:

- 1 Structural concrete slab or oversite.
- 2 Rolltec insulation with supplementary insulation to comply with Building Regulations. Foil to be taped on every joint (flow screeds).
- 3 Uponor PEX pipe secured with Clamp Track or Kombi Klips.
- 4 Finishing screed or concrete. Recommended thickness from the top of the insulation depends on type of screed.
- 5 Final floor finish laid in direct contact with the screed or concrete.

## Floor Construction

There are many different types of floor construction which use screed or concrete and these can be of the in situ poured types or alternatively in the form of pre-cast units. Most types of construction require insulation below to meet the requirements of the Building Regulations. In all cases, insulation must be provided under the floor heating system to reduce downward heat transmission and to improve response time and running costs. The insulation must as a minimum be sufficient to comply with the Building Regulations.

Various types of floor insulation are available on the market and can be selected to suit the project. Uponor recommend the purpose designed Rolltec insulation boards, which form an integral part of the pipe fixing system. Supplementary insulation may be required to meet Building Regulations and it is the responsibility of the Architect/Builder to ensure compliance.

## Installation Notes

### 1. Moisture Control

When using sub-floor insulation ensure that the screed or concrete cannot bridge the gap between insulation panels. This is important to limit both sound and thermal bridging and to reduce the risk of excessively wetting the insulation. Insulation panels should be covered with a protective sheet of polythene and the edges overlapped and taped particularly where flow screeds are used. The protective polythene sheet should not be regarded as the damp-proof membrane (DPM). In all cases, the DPM should be incorporated separately and is normally installed above or below the structural slab. In the case of Rolltec, a protective sheet is already glued onto the board and so a separate layer of polythene sheet is not required. Edges should be taped.

### 2. Edge Isolation (Edge Insulation)

To comply with Building Regulations and relevant Codes of Practice, it is important to ensure that the screed or concrete does not form a thermal bridge to either external or internal walls. To avoid thermal bridging, Uponor edge insulation has a flap of polythene which is designed to be lifted and laid on the floor insulation to stop screed bridging the gap between the edge of the wall and the floor insulation. Any surplus material can be simply trimmed once the screed has cured.



### 3. Mesh

The A142 mesh described in Method A is used simply to provide a grid to which the pipes can be fixed in position prior to screeding. Underfloor heating itself does not require the floor to be reinforced and the mesh described in Method A is not intended to be reinforcing. Any reinforcement for the floor should be specified and designed by others as required for the floor construction and floor finish, e.g. ceramic tiles. Underfloor heating pipe work can be fixed to reinforcing mesh or part way up the screed / concrete slab. For an even floor temperature there should be sufficient screed/concrete cover over the UFH pipe work. The cover should be between 35 and 70mm from the top of the pipe. The overall thickness of the slab should not exceed 100mm.

### 4. Insulation

Floor insulation supplied by Uponor for underfloor heating will normally meet the requirements of BS EN 1264. However, it is the responsibility of others to ensure that sufficient insulation is supplied to meet the requirements of the building regulations Part L and Part E (England and Wales). Note:

1. The relevant Building Standard codes for other countries are:  
Northern Ireland - Technical Booklets F (Conservation of Fuel and Energy) and G (Sound).  
Republic of Ireland - Parts L (Conservation of Fuel and Energy) and E (Sound)  
Scotland - Sections 6 (Energy) & 5 (Sound).
2. In addition to complying with the relevant Building Regulations, floor insulation should be installed to ensure that downward heat losses do not exceed 10 W/m<sup>2</sup>.

### 5. Screed Thickness

The overall thickness of sand/cement screeds should meet the requirements of BS 8204, which specify a minimum thickness of 75mm except for domestic or light loading applications where a thickness of 65mm is acceptable. The thickness of other screeds, e.g. anhydrite flow screeds, should be determined with reference to the manufacturer.

In all cases, professional advice should be sought where unusual constructions are being used or where special consideration is required for floor and edge insulation such as raised ventilated floors which may have higher than normal downward losses.

### Screed and Concrete Mixtures

Uponor underfloor heating systems can be covered by all types of solid material including :

- Sand/cement screeds (usually 4:1)
- Fine and heavy duty concrete
- Anhydrite screeds
- Polymer modified mixtures
- Epoxy resin materials
- Compacted sand

Uponor PEX pipe does not impart any excess stress to the screed or the concrete and in no way possesses the strength to crack a screed or concrete floor at the temperatures used. For this reason it is not necessary to reinforce the normal floor because of the underfloor heating system.

### General Guide on Floor Laying

The floor should be constructed in the normal way and in accordance with the relevant British Standards together with the following advice (for sand/cement screeds):

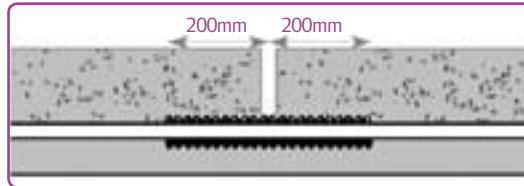
1. Floor laying should take place as soon as possible after an underfloor heating zone is laid and pressure tested.
2. Pressure gauges should be fitted to the manifold(s) and checked periodically.
3. Ensure that the insulation, mesh and pipework are laying flat and that adequate cover of material over the pipes is possible across the entire floor.
4. Boards should be laid to allow for wheelbarrows to be walked over the system without causing damage.
5. The screed or concrete should be well compacted around the pipes to ensure there are no voids or hollows.
6. Take care when using shovels and trowels so as not to damage the system.

### Floor Joints

Day joints can be made in the screed as required without reference to the location of pipes, however where purpose made construction joints are being inserted within the floor then the following recommendations should be followed:

- Ensure the Uponor pipe layout is designed to avoid crossing or if unavoidable then only the minimum number of times.
- Any crossing of a construction joint should be at 90° to the line of the joint.
- Where the pipes cross the joint they should be sleeved with conduit or insulation.

The following illustration shows a typical arrangement of crossing a construction joint.



### After Floor Laying

The floor should be covered with a membrane to retard the drying out process particularly in warm weather. The floor should be allowed to cure and dry naturally until full strength is reached in accordance with relevant British Standards and manufacturers' instructions. The time that this will take will depend upon the floor material used, together with the thickness laid, but for an ordinary sand/cement screed laid 70mm thick a period of 28 days would be normal.

The Uponor underfloor heating system **must not** be used to dry standard sand/cement or concrete floors since the rapid migration of moisture can lead to excessive cracking and a weak floor.

When the underfloor heating is switched on, the water temperature should be increased slowly over a period of days during the initial phase and should operate 24 hours per day with adequate ventilation of the building to enable moisture to escape.

Most types of floor finishes can be laid over a Uponor underfloor heating system including carpet, vinyl, ceramic tiles, stone, timber etc., as long as it does not act as an insulator.

It may be necessary with certain types of floor finish such as vinyl or timber to ensure that the moisture content of the floor meets the manufacturer's recommendations. Please inform Uponor which covering is to be used and ensure that Uponor are given any special instructions from the floor manufacturer, including any temperature limitations.

Provided the screed or concrete is fully cured and dry then it is acceptable to run the underfloor heating system to assist in laying floor coverings.

## Materials Supply and Installation Guide

	Supplied By		Installed By	
	Uponor PEX	Others	UFH Installer	Others
Uponor PEX Pipe	✓		✓	
Pipe bend support	✓		✓	
Manifold Components	✓		✓	
Insulation, A142 Mesh & Protective sheet		✓	0	0
Rolltec	✓		0	0
Clamp track, Staples	✓		0	0
Additional Insulation		✓	0	0
Edge Insulation	0	0	0	0
Controls	0	0		✓
Screed or Concrete		✓		✓
Floor Finishes		✓		✓
Flow & Return to manifold	0	0		✓
Boiler		✓		✓
Timer/Programmer	0	0		✓

Key: 0 denotes items which can be offered by Uponor or by UFH installer on request.

### Heat Output

Due to the considerable number of floor constructions possible it is difficult to give precise heat outputs.

The output from any radiant underfloor heating system is approximately  $11 \text{ W/m}^2\text{K} \times \Delta t$  where  $\Delta t$  is the difference in temperature between the surface of the floor and the air temperature. This means for example that an output of approximately 100 Watts/m<sup>2</sup> can be achieved with a surface temperature of 29°C and a design air temperature of 20°C. All outputs should be checked against the heat losses given by the Architect and or Consulting Engineer. It is assumed that all buildings will comply with current Building Regulations whether new or refurbished.

Note that the choice of floor finish and/or adhesive may restrict the heat output because of any temperature limitations imposed by the manufacturer. In order to achieve the required surface temperature it is necessary to calculate the flow temperature required which will vary dependent upon the following factors:

- Amount and type of sub-floor insulation
- Uponor PEX pipe size and centres laid
- Thickness of screed/concrete over pipe
- Thermal resistance of floor covering
- Required air temperature.

For a system designed by Uponor these will all be calculated carefully using our computer system and design department who will provide a computer printout with the required calculations completed. These will include flow rates and pressure drop calculations for each loop and manifold. In the absence of any special floor finish requirements calculations would be based upon a standard floor covering with a resistance equal to a carpet finish.

### Compliance and Warranties

The Uponor PEX pipes carry a full 25 year warranty against all manufacturing defects and meets all current international standards & UK requirements with full compliance and/or certification by the following :

- ISO 9001 and ISO 14001
- WRC (Water Research Council)
- BBA (British Board of Agrément)  
Certificate N° 05/4235
- DIN 4726 (Oxygen diffusion)

Copies of all certificates relating to the above can be supplied upon request.

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