Underfloor Heating & Renewables

UltraRail

In Screed UFH

Installation Guide

UNDERFLOOR HEATING | GROUND SOURCE HEAT PUMPS | AIR SOURCE HEAT PUMPS | SOLAR THERMAL PANELS

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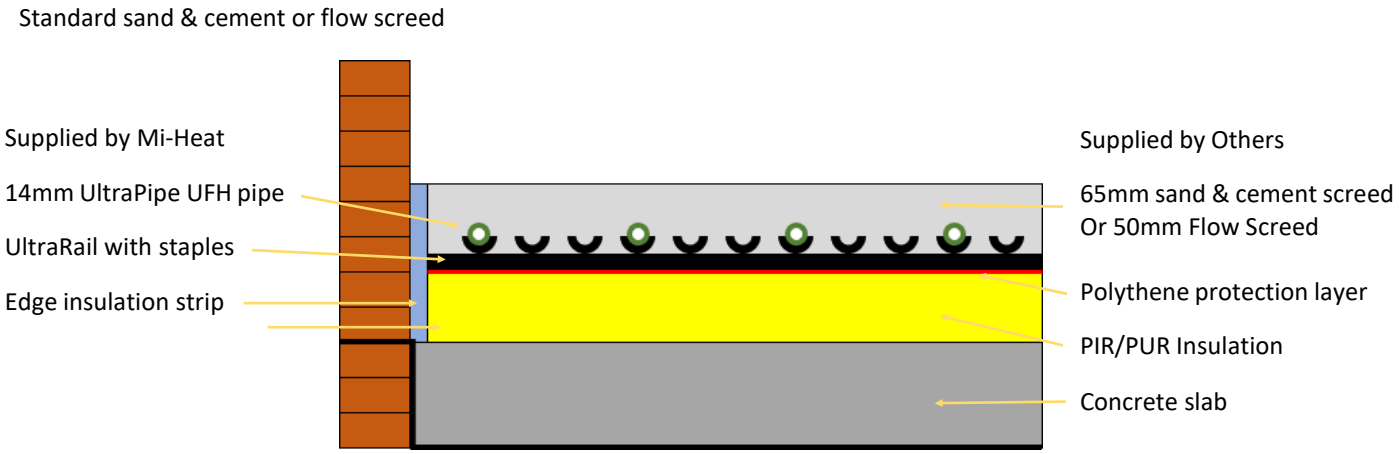
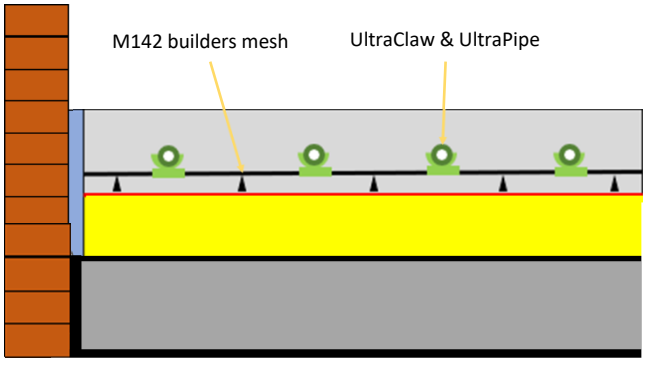


Technical Information

UltraRail

The standard screed used in domestic dwellings is a 65mm sand and cement mixture, usually 4 to 1 sand/cement. The depth can be made greater than this; however, this would increase the mass and would therefore become less reactive to the heat produced by the system. For non-domestic areas, the depth can be increased from between 75mm—100mm depending on its use.

For other areas where there is likely to be commercial or vehicle traffic, the floor will likely need to be reinforced with builders mesh. The industry standard builders mesh is A142. With this mesh, the UFH pipe can be secured directly to the mesh with UltraClaw. UltraClaw is a fixing method unique to Mi-Heat. This fixing method clips onto the A142 mesh and holds the pipe above and away from it, to ensure the pipe does not come into contact with the steel mesh. This fixing method is regarded as a reliable, quick and easy fixing method. For larger projects a fixing tool can be used which makes the installation even quicker and easier.



An alternative in fixing the UFH pipe to the steel mesh is to use plastic ties. These can be used to strap the pipe directly onto the builders mesh. However, in doing so, this can lead to abrasions on the pipe before screeding if treated poorly.

Flow Screeds

Flow screeds have the advantage of having a lower height build up, usually 50mm or less. It has three distinct advantages; firstly it can increase the output of the UFH by as much as 40%. Secondly, the floor becomes much more reactive, meaning that any sudden changes in atmospheric temperature in the room, the UFH can react and change much more rapidly. This is useful in spring and autumn where the difference between daytime and night time temperatures can be quite significant. Thirdly, drying times can be dramatically cut.

There are several types of flow screed, Anhydrate and Cementitous. Anhydrate flowing screeds are manufactured from a recycled calcium sulphate binder (a by-product of the production of Hydrofluoric acid), selected aggregates and additives to produce a free-flowing, self-compacting screed. Cementitious flowing screed is a formulated cement based liquid screed that is self-compacting and free flowing that is chosen for its quick drying nature.

Insulation

On ground floors, the insulation beneath the floor should conformto the current Building Regulations. For most installations this is usually a minimum of 100mm PIR/PUR rigid insulation to prevent downward migration of heat.

For upper floors, such as beam & block, 30mm insulation is normally used, however this has more to do with sound insulation rather than migration of heat.

If upper floors are over an unheated space, such as a garage, warehouse or basement, then treat the floor as a ground floor, which should be well insulated to avoid downward heat losses.

Polythene Protection Layer

It is part of the Building Regulations to lay a 125-250 µm protective polythene layer on top of the rigid insulation. This is critical when using a flow screed and protects the insulation from the screed and causing chemical reactions.

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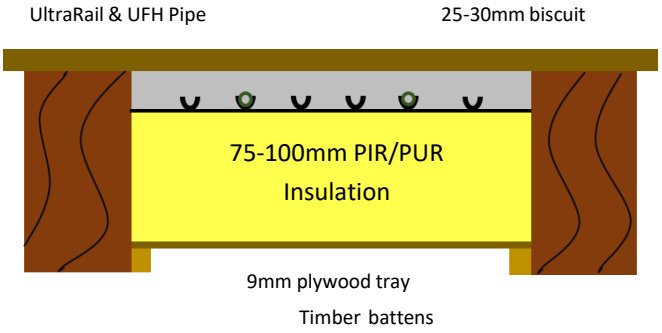
Between Joists— Biscuit/Pug Screed



For existing homes where there is a timber suspended floor, a dry sand and cement mixture can be laid between the existing joists.

The recommended make-up of the floor is for battens to be screwed ornailed to either side of the joists with a 9mm plywood tray laid on top to provide a rigid and solid base.

PIR/PUR insulation is then laid between the joists, usually a minimum of 75mm. The UltraRail is then installed on top of the insulation at 1m intervals.

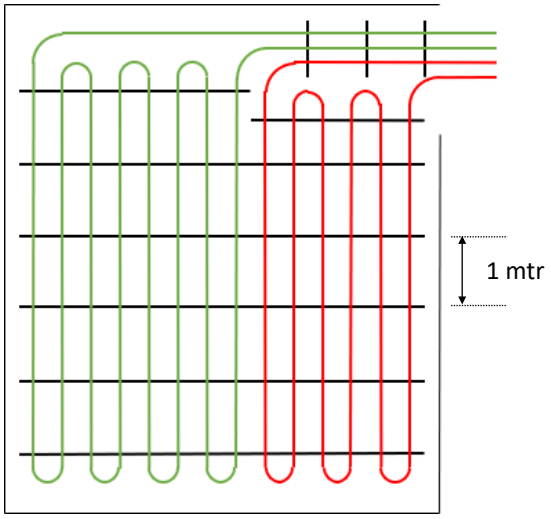
The biscuit/pug screed is dry mixed and laid over the UltraRail and pipe so as to be level with the top of joist. It is important that the floor boards must be touching the screed so as to ensure heat transfer.

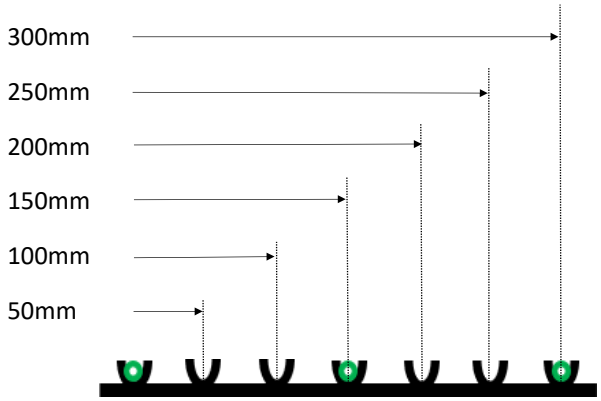
Pre 1930's properties usually have 150-200mm joists depths, so the above method is suitable. However, many properties built after the 1930's used 100mm joists built over sleeper/dwarf walls. In these cases it may be more difficult in using the biscuit/ pug screed. Adding to the depth of the joists, either above or below the joists, may be a solution.

Consideration should be given to the weight of the sand/cement mix, which would add considerable strain to the timbers. 1m² is equivalent to around 20-25kg. If in doubt, seek the advice of a structural engineer.

INSTALLATION

1. Fit the edge expansion strip to all the sides of the room.
2. Lay the PIR/PUR floor insulation.
3. Cover the insulation with a 125-250µm polythene layer. Overlap the sheets by at least 65mm. This is to protect the insulation from the screed.
4. Fix the UltraRail across the room being served, and should be laid at 1m intervals. These are sticky backed, so just peel away the paper and stick down on the polythene layer. These can also be secured with the clips provided.
5. UltraRail clip spacings are 50mm centre to centre, so it is easy to count the spacings to 150mm, 200mm or 250mm.
6. Use the UltraRail to track from the room served to the manifold and along corridors as indicated on the CAD drawings, making sure you haveenough space to fit all the UFH pipes from the manifold to all the different zones.
7. UltraRail can also be offset so that 25mm interval spacings can be used.





UltraRail clip spacings—50mm

UltraRail can be offset to achieve 25mm spacings

PIPE LAYING

Once the UltraRail has been completed, the UltraPipe can now be laid. Using a pipe de-coiler will aid the installation of the pipe considerably.

1. Connect one end of the UltraFlex pipe to the manifold and label the pipe clearly with the room being served using a marker pen on the pipe.
2. Follow the CAD drawings provided and lay the pipe from the manifold to the zone using the quickest and most direct route possible which is shown on the drawings.
3. Push the pipe firmly into the UltraRail tracks as you uncoil the pipe. On reaching the room being served, make sure you follow the correct pipe spacings for each room, as depending on the room's size and heat loss, this could be 150mm, 200mm or 250mm. These pipe centres will be clearly marked on the CAD drawings.
4. Be careful to only use as much pipe for that circuit as indicated on the drawings, and when you have judged there is enough left to return to the manifold, start back so that the pipe reaches the length indicated for this circuit. (This is important for the balancing of the system). The pipe has markings each metre in order to determine lengths.
5. Connect the return pipe to the manifold.
6. Enough pipe clips have been supplied to secure pipes where necessary, such as at the turns each end of the room.
7. Repeat for each circuit in that room until the floor is completely and evenly covered by the pipe. Then move onto each room in turn until the whole project is complete.
8. Flush the system through with clean water and pressure test the UFH system via the manifold. The system should be left under pressure during the screeding process to allow for expansion when the system is operational.

Notes:

1. On floor areas over 40m2, expansion joints should be used. Where pipe crosses these expansion joints a protective sleeve is recommended.
2. The UltraFlex pipe should never be kinked as this will restrict flow and damage the pipe. The properties of all plastic piping is such that the pipe becomes less flexible the cooler the atmosphere. If laying pipe in very cold weather, caution needsto be exercised when making bends, especially at 150mm centres or less. Warming the pipe with your hands, using warm water or using a hot air gun will aid this procedure.
3. Once the full system has been laid and pressure tested, making sure that all connections are completely water tight at the manifold, laying of the screed can be undertaken. It is usual to allow pressure testing at least overnight. Pressure should be at least 1barwhen the screed is being laid.

BEFORE FLOOR COVERINGS ARE LAID

Before floor coverings can be laid, all screed **must be completely cured and any excess moisture evaporated.** The normal way of determining this is to follow the following guidelines: For traditional screeds, the general rule is to allow 1 day per millimetre for the first 40mm of screed, and 1 day for every 0.5mmthereafter. A 65mm sand & cement screed would be as follows:

40mm x 1mm = 40 days

25mm x 0.5mm = 12.5 days

Total Drying Time = 62.5 days

Additives may be introduced that can decrease drying times. When doing so, please follow the manufacturer's instructions.

For Flow screeds of 50mm or less, please follow the manufacturer's guidance.

Once the screed has been dried and fully cured, the floor can safely be covered.

FLOOR COVERINGS

Ceramic Tiles:

Virtually any floor covering can be used, however the best to use are those that have little resistance to heat transference, such as stone, ceramic tiles and laminate flooring solutions. If using tiles, a de-coupling layer should be laid before tiling so as to avoid tiles cracking.

Engineered Wood:

Engineered wood flooring is also an excellent choice, and because of its laminate construction, it is very stable. A floor limiting probe may be supplied to limit the floor output to 26-27°C in order to protect the wood floor if required.

Solid Wood:

Greater care should be taken when using solid wood flooring, which should have a low moisture content. Before installation, natural wood needs to be acclimatised to the climactic conditions in the property. A floor limiting probe may be supplied to limit the floor output to 26-27°C in order to protect the wood floor if required.

Vinyl & Linoleum:

Vinyl and Lino flooring, such as Amtico and Karndean, is also another popular choice. A floor limiting probe may be supplied to limit the floor output to 26-27°C in order to protect the vinyl/linoleum floor if required.

Carpets:

Carpets can be used but the Tog value needs to be taken into consideration. When combined with an underlay, the recommended Tog should be lower than 1.5 Togs. When achieving higher than 1.5 Togs; reaction time to heat the room will decrease, and the room may fail to reach the designed temperature.

Note: If the system is powered by a heat pump rather than a traditional gas or oil-fired boiler, greater restrictions apply as the flow temperature is much lower, usually 45°C rather than 55°C.