

The Guide to



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Underfloor Heating Systems

Underfloor heating (UFH) is extremely efficient and comfortable. It was firstly as the electric underfloor heating system. Nowadays there is also available UFH based on a modern water system of pipes, controllers and central heating. Radiators are no longer required as underfloor heating warms the entire floor area and the warmth convects from the surface to gently and evenly warm the entire space. It is the perfect heating solution for people suffering from allergies. Studies show that the ideal air temperature at a home range between 20-24 Celsius degrees and it is easily achieved when the floor is heated in a range between 19-29 Celsius degrees. The UFH provides the healthy home environment. Moreover, the UFH run on low supply temperatures what reduce the energy consumption so it is more eco-friendly than a traditional system.

The new modern way of controlling a temperature through sets of wireless controllers allow reducing the energy consumption through quick heating and cooling.

Important to know before the UFH installation:

- decide between electric or water system
- the number, type and size of rooms where to install UFH
- if there will be any radiators in rooms
- if there is insulation and how energy efficient is the building

Every project requires the separate assessment whether the electric or water based system will be more suitable. The most important fac-

tor to consider before choosing the underfloor heating system is the floor construction. The underfloor heating system can be installed on both concrete and timber suspended floor structures. There are also options for a floating floor structure.

Secondly, the floor finish is also the important factor. It is required to take it into account during the design because for instance carpets need a low tog rating to ensure the warmth is quickly passed over the floor surface. On the other hand, tiles and timber floors seem to be the most popular choice, but architects need to account that overheating of timber floors might lead to the damage. It is important to note that the system combining the insulation and UFH is the most desired as it ensures the heat is passed upwards into the room.



Electric (Dry) UFH

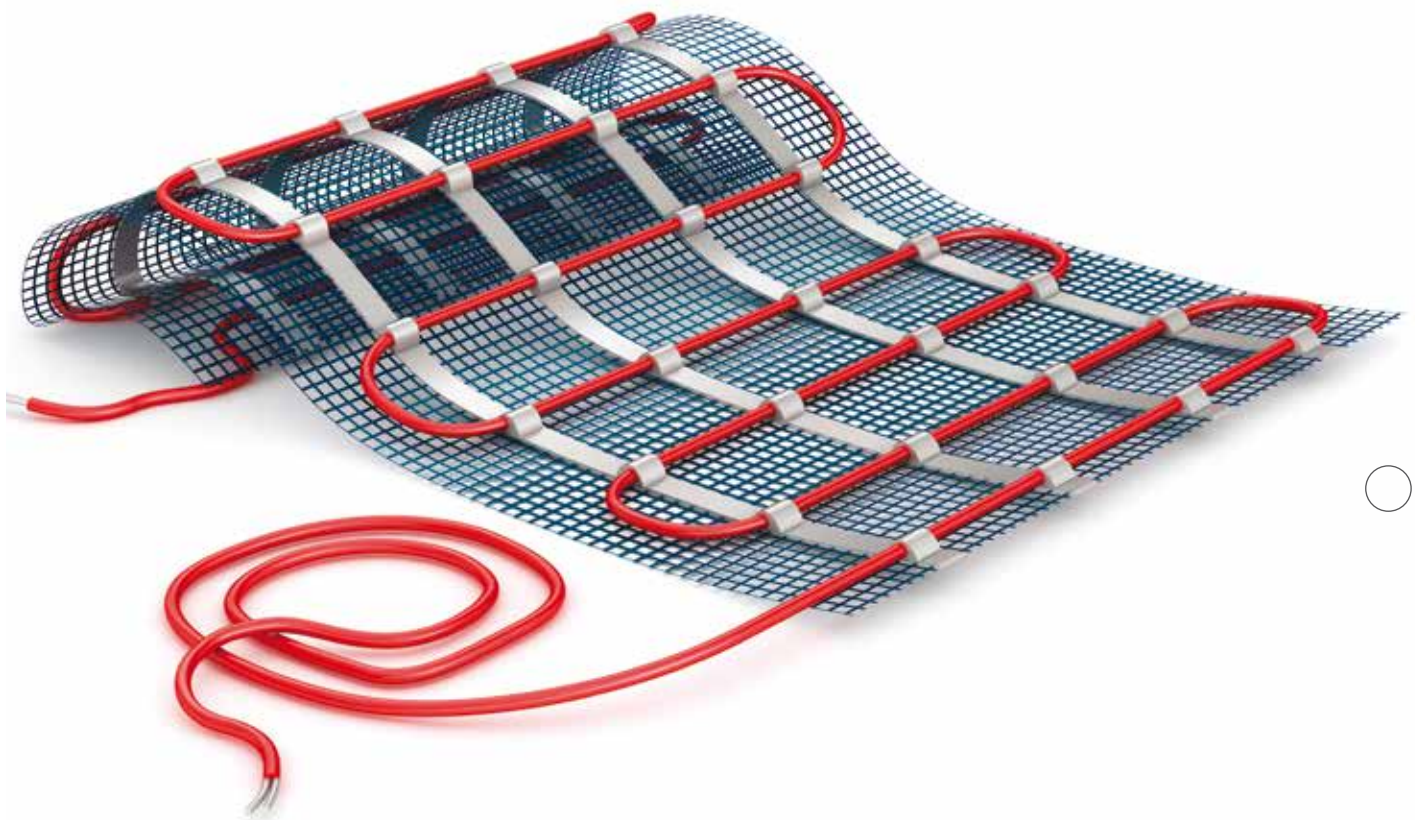
The electric UFH system is built from sets of electric wires installed beneath the finish floor. It can be installed under the tiled, carpeted or timber floor finish. The type of electric UFH depends on the floor structure type, insulation, size and the type of finish. There are options of flexible, loose fit wiring or heating mats rolled out over the larger simple areas. Heating mats tend to be a bit cheaper than

loose wires. The electric UFH is quite thin and easy to install in comparison to water UFH. It makes it cheaper concerning installation costs. However, it is more expensive to run over the longer time so it is not recommended for larger areas.

Installation of electric UFH is straightforward as it is fitted on top of the screed and the layer of insulation. Insulation is necessary to ensure the heat is passed upwards. The system has

to be connected to electric mains supply and a fitted sensor connects the whole system to the thermostat which allows to control the temperature and pre-set system to turn on or off. It is recommended to ask the independent supplier or installer what type of electric underfloor heating mat should be used for any particular flooring type as there are different wattage outputs of heat mats.





The price of electric UFH for roll-out mats start at approximately £180 per 10 square metres. There are also costs of insulation boards, screed and heating controls.

Installation step by step

The area of the floor is measured, and the design determines the size of the UFH system required with marked places indicating the position of its power supply connections. Electric UFH system mats can be fitted on the timber or concrete floor structure. Tiles can be installed straight away on mats. There are different types of mats for electric or water system. All matting or wiring is laid out and planned where it should be fitted before applying the adhesive, including all the wiring for controller and sensor. A multi-meter should be used to check the continuity of current along the heating cables and the resistance of the cable as per limits specified in the instruction. If the mat is laid correctly, it is a time to install the tiles or other floor finish. The flexible floor adhesive is recommended while when laying tiles onto a plywood floor the special adhesive for wooden floors and mesh installation is advised.

Water (Wet) UFH

The water-based UFH system is built from the pipes connected to the boiler which circulates warm water through the whole space to heat the floor. The wet UFH pipes can be connected to the solar heating system, air source or ground source heat pump. The heat is evenly distributed so the water can be at a lower temperature what makes the system very efficient. The price of installing the wet UFH system depends on the room features and how far it is from the boiler.

Installation step by step

For the installation of water UFH, there is required to have a pre-assembled manifold, a thermostat, pump, isolation and water temperature control valves suitable for screed floors, typically providing an output of up to 100watts per square metre. There are multi-zone and single zone UFH systems.

1. Clean the subfloor of all debris and install a damp proof membrane (DPM) if necessary. Any sharp irregularities

should be removed either by filing, grouting or cutting away.

2. Lay the floor insulation. Tape the joints and lay polyethene or DPM to stop the screed going under the insulation.
3. Install the pipework to the insulation at 90 degrees to the direction that the pipe is going to lay.
4. Install the manifold on a wall in a suitable location. Mount the manifold before laying pipe work. Place the manifold controller above the manifold.
5. Make sure the underfloor heating pipe is fitted to the flow side of the manifold.
6. The UFH pipework is connected to the existing heating system via a manifold. The pipe needed to be laid out from the manifold to the furthest point of the room and returned to the manifold in a 'snake-like' pattern with approximately 200mm spacing between each run of pipe. Lay each loop in equal lengths (not exceeding the maximum length of circ. 80m). Fix the pipe down with the clips.

Underfloor heating
- the Pros and Cons

Underfloor heating is a high-spec feature that allows heating a room efficiently. The heat is passed upwards slowly and evenly while radiators heat the isolated areas so cold spots might occur. UFH system can work on its own and radiators can be fully omitted. UFH system can heat the larger areas quicker than conventional radiators. UFH is a flexible heating option and can be used in a new or existing buildings. It is hidden out of view and does not take too much space. The UFH might enhance the house selling price.

However, the UFH can take longer to heat than the conventional radiators system. Radiators heat quickly to very high temperatures. This is why in some situations UFH cannot replace radiators. The disadvantage of UFH system is also the price in cases of a retrofit installation, maintenance and running.

Comparison

Electric underfloor heating system v water based underfloor heating system

Type of installation

The choice of electric or water based UFH depends on the project type- whether it is a renovation project or a new build. The electric UFH requires less space and can be installed underneath the floor finish. The water UFH is fitted in screed and needs more depth. This is why in the case of renovation the electric UFH might be more suitable. However, there are a low profile water based UFH systems available too.

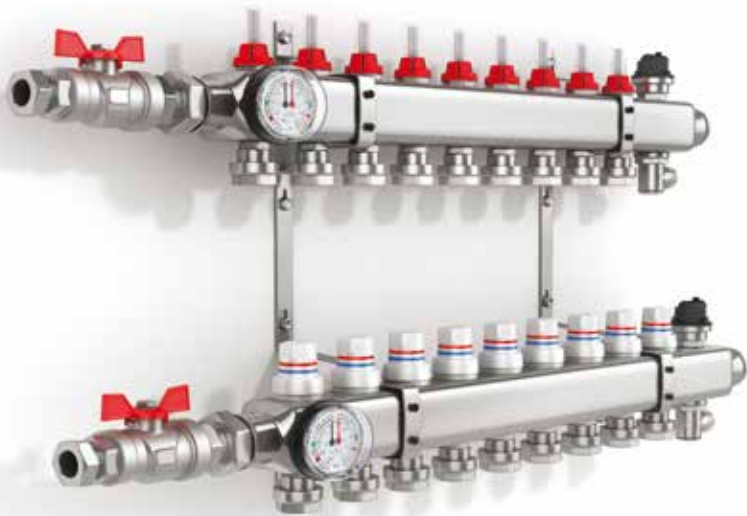
Location

Water UFH system is recommended on the ground floors with proper insulation. If the sub-floor is not insulated and it is a renovation project the low profile water UFH might be not efficient enough to heat the uninsulated floor. On the other hand, the electric UFH will be more costly in case of larger areas. The heat loss calculations are necessary to establish which system will be more desired for the particular project.

Costs

The cost of UFH will depend on the type of system, whether it will be a retrofitted or new room and what is floor structure and finish. It is recommended to take into account costs of installation of electric and water UFH systems regarding la-

bour costs. Electric or plumber quotes might vary depending on the project. Moreover, it is worthy to estimate the running costs of both systems over the longer period. These costs will vary for various projects. A water underfloor heating system is more expensive to install due to more difficult installation. The price can also be affected by such factors as whether the room is on the top floor or near the heating system. However, the electric UFH is quite thin and easy to install in comparison to water UFH, what makes it cheaper regarding installation costs. However, it is more expensive to run over the longer time so it is not recommended for larger areas. It is advised to check the tariff before the decision to install the electric UFH. Generally, how much we can save thanks to UFH system depends on how energy efficient is the house.



ELECTRIC UFH	WATER UFH
running costs depend on tariff or solar panels etc.	requires professional installers, not suitable for DIY
cheaper to install in smaller areas eg. kitchens, bathrooms	cheaper to run than electric UFH
increases floor height only approximately 3cm	cheaper to install in larger areas eg. new builds, extensions
does not interfere with existing heating system	requires larger depth for installation
stetting allow to chose the wattage output	low energy usage
works at low temperatures	ideal for multiple rooms and large spaces
can be used as an addition to central heating or as a separate heat source	pipes are expensive to replace and it is difficult to reach pipes in case of damage
10 years guarantee	benefit from renewable heat sources like Air Source Heat Pump (ASHP) and Ground Source Heat Pump (GSHP), Biomass or thermal dynamic panels
waterproof cables with earthing to ensure no danger in case of flooding	10 years guarantee
easy installation, suitable for DIY	