



Underfloor heating

Comfortable, stylish, efficient ...

Underfloor heating systems can be run using most heating fuels, which means it is an option available to most homes ...

Unlike central heating with radiators which mostly heat air that then travels round your home (by convection), underfloor heating transfers heat through both convection and radiation helping to create a comfortable and constant temperature in the room.

Underfloor heating systems come in two types, wet and dry. Below are the advantages and disadvantages of each system, along with what they cost to run and install, so you know which option might be suitable for you.

‘Wet’ underfloor heating systems

Wet or hydronic systems can be run using a mains gas boiler or a heat pump, with the latter being especially efficient as it produces the lower-temperature heat appropriate for underfloor heating systems. Oil or solid fuel boilers can also be used but the existing boilers should be checked to see if they are compatible with the lower temperatures needed for underfloor heating.

In wet systems, heated water is circulated through reinforced polythene piping, usually with separate circuits for different rooms or areas. Each circuit is connected to a control unit - called a manifold - which has regulating valves and a thermostat so different rooms can be heated to different temperatures and at different times. A circuit will close when a room reaches the desired temperature and open again when it falls below.

‘Dry’ underfloor heating systems

Dry underfloor heating uses electric wires that heat up when electricity is switched on. The system will either come as ready-made mats or loose wires that need to be fitted. Dry underfloor heating should be connected to individual room thermostats so that each room or area has its own temperature.

Electric underfloor heating is often preferable for existing builds as it's easier to install than water pipes and can also fit more awkward spaces. It's also likely to be more responsive than wet systems so a room will warm up quicker. But, electricity is considerably more expensive as a heating fuel than gas, so it's likely that these systems will be more expensive to run.



There are three main types of wet underfloor heating. The one you use depends on the type of floors that your building has:

1) Solid floors

Solid floors are the common choice for new builds or large refurbishment projects. Here, the underfloor heating is built into concrete or screed floors, making it a permanent feature. Insulation is laid first, with the pipes then put down in a specific pattern before the concrete or screed is poured. Many types of floor finish can be laid over it, including wood, stone, tiles or vinyl (also carpet, though careful consideration is needed to ensure it won't be affected by the heat or insulate against it).



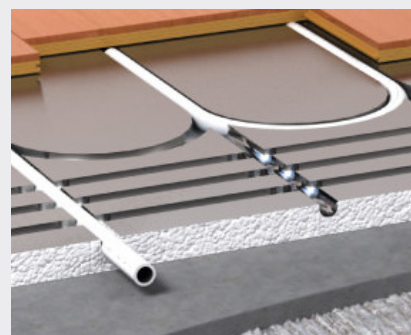
2) Suspended floors

The heating system is installed by laying the pipes between the joists in the suspended timber floor; it is very important that there is suitable and adequate insulation below otherwise heat could be lost to the space below. Aluminium spreader plates can also be installed with the pipes to help distribute the heat more evenly.. A tongue and groove floorboard casing is then installed that allows a range of floor coverings to be fitted on top, with the same considerations as for solid floors.



3) Floating floors

Floating floor is the quickest type of underfloor heating to install. It can be used above an existing solid or wooden floor, making it ideal for renovation. Here the pipes are inserted into preformed heat plates that rest in grooves in the insulation. As the system is fitted on top of your floor, be aware that this can significantly raise the floor level.



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Cost of underfloor heating

Installation costs can vary hugely, depending on the type of system installed, the size of the room(s) or area to be heated, whether the system is for a new-build home, extension or an older building, and what kind of flooring you have.

The electric underfloor heating system is cheaper to install with costs estimated to be between £60-85 per square metre. This type of system is an option for a skilled DIY-er, which would help keep costs down, but a qualified electrician would need to connect it to the mains electricity. Although these systems are cheaper to install, they are generally more expensive to run.

The cost of installing a 'wet' system is estimated to be between £90-110 per square metre plus there could be extra labour costs on top of this as it is more complicated to install. It's a good idea to speak to an engineer to help you decide whether the work and cost of the system will make it suitable for your home. Although more expensive to install, these systems tend to have lower running costs. All information on costs has been taken from [Checkatrade](#).

Advantages, disadvantages and considerations for underfloor heating

The chief advantage of underfloor heating is that it feels comfortable. This is because the larger surface area distributes heat evenly around the room.



Another advantage is that because of the large surface area your central heating can run at a lower temperature, saving you money.

Underfloor heating in wet systems generally takes much longer to heat up and cool down than traditional radiators. This is partly due to the heat store or thermal mass* of the screed or concrete in which most underfloor systems are embedded. In addition, the water in wet underfloor systems is cooler than the water in radiators because the heat is spread over a larger surface area, so it takes longer to warm up.

**how a material stores and releases heat.*

For the system to provide adequate heat and be cost-effective, it is critical to ensure your property is well insulated and draught-proofed, to minimise heat loss and reduce the heating up time.

Due to the lag time described above, underfloor heating is best left on a low temperature for a longer period of time and is generally more suited to homes where people are in most of the day. If it is only used in the morning and evening an underfloor heating system alone may not provide sufficient warmth.

If the underfloor heating is covered by surfaces such as timber or vinyl which react quicker to changes in temperature, then this may be a solution. But the running cost is likely to be higher, as you don't have the advantage of a heat store to help retain and balance the room temperature.

Underfloor heating is expensive and disruptive to retrofit, so is usually only a good option if you are already undertaking significant building work.

Running costs will vary considerably, depending on what fuel you are using to heat the system, what kind of floor covering is used and how well insulated the home is. Electricity will be the most expensive, but there are ways to bring the running costs down if you're able to consider renewables.

How renewable energy works with underfloor heating

Wet underfloor heating

Air or ground source heat pumps are particularly effective when used with wet underfloor heating. That's because heat pumps are also designed to be left on for longer periods of time and to operate at lower temperatures. Heat pumps still need some electricity to run – you could generate that electricity via solar panels.

Dry underfloor heating

Solar panels and heat pumps could also be used with a 'dry' electric underfloor heating system. The use of a battery to store any excess solar electricity would make this even more efficient as you would be able to power the heat pump or electric underfloor heating system when electricity is not being generated, e.g. in the evening.



Installation of underfloor heating



A few ways to cut your electricity and gas use, and save money ...



Give your clothes a day in the sun; and give your tumble drier a break. Clothes dried in the fresh air feel great, and there are drying days in winter, too.

When you're cooking, keep the oven door shut as much as possible; every time you open the oven door, a lot of the heat escapes.



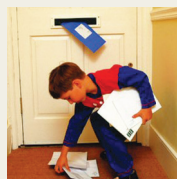
Food in the oven cooks faster when the air inside flows freely, **so don't put foil on the racks.**

Don't leave your phone on charge all night. It only needs three hours – and try not to leave the TV and other kit on standby.



Encourage your children to switch off electric toys and lights that they're not using. They'll soon get the hang of saving energy.

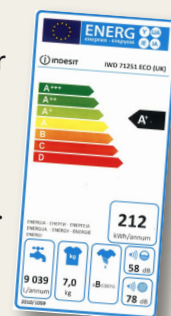
Cup of tea or coffee? Only fill the kettle with as much water as you'll actually use (but make sure you cover the metal element at the base).



Draught-proof!

Fit draught-excluders to your front door, letter box and key hole, and draw your curtains at dusk to keep the heat in.

Buying a new appliance? Check the energy label and buy A-rated goods for the most efficient.



Be a friend to your freezer. Defrost it regularly to help it run more efficiently.

Turn your heating down by just 1 degree. You'll hardly notice the change in temperature, but it'll make a big difference to your heating bill.



Wait until you have a full load before running the dishwasher or washing machine. One full load uses less energy (and water) than two half-loads.

Sleep tight. Make sure all the lights are turned off when you go to bed, or use a low-wattage night light if you do need to leave one on.



New computer? Laptops typically use around 85% less energy than a new desktop PC.



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We're a charity (298740) supporting people and organisations across the UK to tackle the climate emergency and end the suffering caused by cold homes.

Our Home Energy Team offers free advice on domestic energy use to people in central southern and southwest England.

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See all our energy advice pages at www.cse.org.uk/advice