# Underfloor heating
# Comfortable, stylish and efficient

Centre for Sustainable Energy

**Underfloor heating is a common feature in many Northern European homes and is becoming increasingly popular in the UK as an alternative to traditional radiators.**

Unlike central heating with radiators which primarily generate rising convection currents of hot air, underfloor heating provides a mix of radiated and convection heat creating a comfortable and constant temperature between the floor and ceiling.

**When combined with a condensing boiler underfloor heating can achieve energy efficiencies of over 90% and be cheaper to run than radiators.**

Underfloor heating systems can be run using most heating fuels. A conventional gas, oil or solid fuel boiler can be used with a 'wet' system. Alternatively, the underfloor heating can be powered by renewable technologies such as a heat pump which are more efficient at the lower temperatures at which underfloor heating systems operate. A biomass boiler could be used and the system may even be supplemented by a solar thermal panel. Underfloor heating can also be electrically powered.

## 'Wet' underfloor heating systems

Heated water is circulated along reinforced polythene piping with separate circuits for different rooms and areas. Each circuit is connected to a manifold with regulating valves and a thermostat so different rooms can be heated to different temperatures and at different times, minimising unnecessary energy use.

The manifolds distribute water at temperatures of 35-60ºC which in turn heats the floor to a comfortable constant between 18-29ºC. When the room reaches a pre-set temperature the thermostat signals to a valve on the manifold to close the circuit in that room.

There are three main types of wet underfloor heating:

### 1) Solid floors

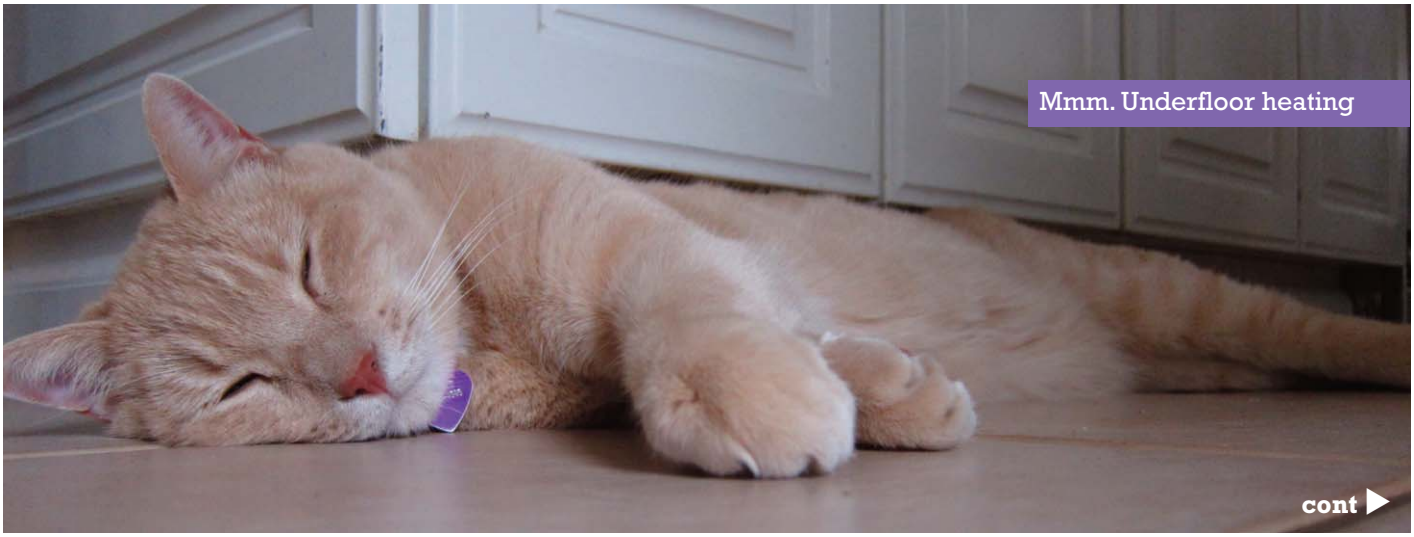
This is the common choice for new build properties. The underfloor heating is permanent as it is built into concrete or screed floors. Insulation is laid first, with the pipes then put down in a specific pattern before the concrete or screed is poured. Many types of floor finish can then be overlaid including wood, stone, tiles, vinyl or carpet, though careful consideration is needed to ensure it will not be affected by the heat and/or will not insulate against it.

### 2) Suspended floors

The heating system is inserted between the joists or battens in the suspended floor, with suitable insulation below. The casing usually consists of a tongue and groove floor board to allow a range of floor coverings to be fitted, with the same considerations as above.

### 3) Floating floors

This is the quickest type of underfloor heating to install as there is no requirement for screed or concrete to set. This



Mmm. Underfloor heating

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system can also be used above an existing solid or wooden floor and so is ideal for retrofitting. However, the floor level could be significantly raised. The pipes are inserted into preformed heat plates which rest in grooves in the insulation.

### Electric underfloor heating

Electric underfloor heating uses electric wires that heat up when electricity is provided. In new builds a screed finish is usually used and for existing builds electric matting or tiles are used.

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

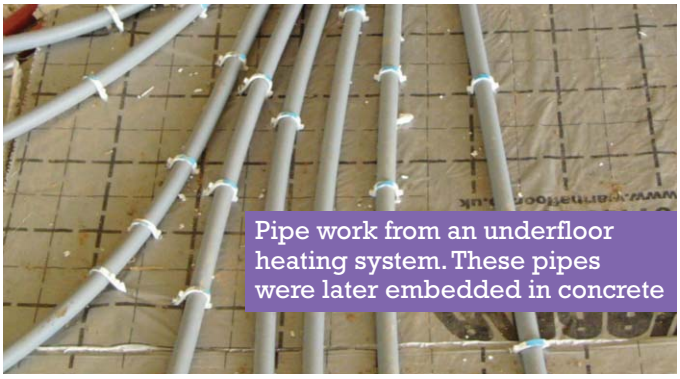
### Cost and benefits

There are many factors that will determine cost but a good estimate is £20 per square meter. Once installed underfloor heating is almost entirely maintenance free and systems are likely to last for up to 25 years. With no radiators there is more wall space and greater choice in where to locate items of furniture.

### Other considerations

Underfloor heating generally takes much longer to heat up and cool down than radiators. This is partly due to the 'thermal mass' of the screed or concrete in which it is embedded combined with the lower operating temperature. It is therefore critical to ensure your property is well insulated to minimise heat loss and reduce the heating up time.

This 'lag time' can be an advantage when the building is consistently occupied but may not be desirable for buildings that are intermittently used, such as houses that are only occupied for a few hours in the morning and evening. In these cases or when the property is not well insulated, the underfloor heating system alone may not be adequate to provide sufficient warmth.



Pipe work from an underfloor heating system. These pipes were later embedded in concrete

# Tips for lower energy bills

**Happy paying more for your electricity and gas than you need to?** Course not. So here's how you can cut your bills:

**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.

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

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

**Buying a new washing machine, TV or dishwasher?** Look out for the Energy Saving Trust logo.

**Don't over-fill the kettle** (but do make sure you cover the metal element at the base).

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

**Turn your heating down by 1 degree.** You'll hardly notice the change in temperature.

**Sleep tight.** Make sure all the lights are turned off when you go to bed. If you want to light a child's room or a landing, use a low-wattage night light.



The Centre for Sustainable Energy's **Home Energy Team** offers free advice on domestic energy use to householders in Bristol and Somerset (including the unitary authorities of North Somerset and Bath & North East Somerset).

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