

Can heat pumps and radiators work effectively together?

Some media and manufacturers report that heat pumps and radiators work very effectively together, but that is not strictly true; the relationship between the two systems is slightly more complicated.

The problem is that each system is effective at a different optimum temperature; radiators are designed to work with gas boilers that deliver water at higher temperatures, around 60–70°C, while heat pumps work best at significantly lower temperatures, around 38–55°C.

Some heat pumps will produce water that reaches 75°C but as the water temperature rises, the heat pump's efficiency drops (because it consumes more electricity) and so its running costs rise – potentially to more than 50 percent above what it would cost the homeowner to run a gas boiler.

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In Georgian or Victorian homes - which are ubiquitous across the UK - simply swapping out a boiler for a heat pump



without taking account of the emitter (radiators) has a high risk of not working.

Can you ever pair a radiator with a heat pump?

You can install a radiator that works at 50–55°C, but they will need to be far larger to warm the room effectively (ie. to an ambient 20°C) than would

be the case if the water temperature was 70°C. In other words, if you lower the water temperature and you need to increase the surface area of the radiator to comfortably warm a room.

A larger radiator doesn't necessarily just mean in terms of width and height – it may also mean more heat sections, or 'fins'

within its core. Unfortunately, both options are likely to mean the radiators become so big that they are obtrusive, and this can be an aesthetic problem for homeowners.

Plus, there is an additional cost to replace all the existing radiators with larger ones.

The reason why underfloor heating works so well with a heat pump is because underfloor heating is designed to disseminate heat over a large surface area, hence they operate very effectively at lower water temperatures.

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How will I know if my paired heat pump/radiator system is set up correctly?

The Microgeneration Certification Scheme (MCS) has templates that offer detailed sizing, efficiency and output calculations for heat pumps and paired emitters – whether these emitters are underfloor heating or radiators.

How heat is distributed by radiators and underfloor heating

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Radiators mainly work through a heat transfer process called convection. When water in the radiator is heated, the surrounding air is also heated up (via convection). It then rises and is then moved around the room.

Radiators therefore deliver high heat locally and rely on the air circulation they create to distribute this warmth around the room.

Underfloor heating produces predominantly radiant heat through the floor, at a lower temperature. This heat is then distributed more uniformly across a wider area. This more even spread creates a far more comfortable internal environment.

Radiators come in many sizes and configurations, including fan-powered units – but this increase in output comes with an additional cost to run the electric fan.

Developers of new homes will have employed an MCS-registered installer for their heat pumps, and they will use these calculations as a basis to spec and size the system.

Unfortunately, there is no requirement for an MCS-registered installer to retrofit a system onto an older/existing homes, unless the homeowner is looking to claim the £5,000 Government Boiler Upgrade Scheme (BUS) voucher to off-set the installation cost. In which case, MCS registration is a requirement to qualify for the funding.

If a homeowner chooses to use a non-registered MCS installer, then it really is a case of caveat emptor. Pair a heat pump with the wrong, or wrongly sized, emitter and that really is a choice that they are likely to come to regret.

In summary

Heat pumps and radiators are both very effective at the jobs they do, but they are designed to work optimally at different temperatures. If this difference is not accounted for in the installation process, then the owner is likely to be both cold and face significantly higher heating bills.

That is a serious concern because it is likely to be viewed as a failure of heat pump technology rather than of the heating system as a whole. If this means consumer confidence is dented, there is a strong chance that the uptake of heat pumps will stall as a result – impacting both people and the planet.

For full peace of mind, we will correctly pair a heat pump with the right heat emitter, ensuring efficiency and cost-effectiveness.