Heat pumps are the hottest topic in the heating industry at the moment, a new technology that should first of all help Earth by reducing energy consumption and lower all sorts of nasty emissions associated with it. This should also help us as consumers by reducing the cost of heating our homes.

So we wanted to provide a bit more information about the heat pumps, as you can imagine there are many points to cover with this advancing technology. We will make this a summary rather than a deep dive and also reference what you need to consider when it comes to the radiators in your home.

A little bit about heat pumps and the delta T.

Firstly a heat pump can be a ground source heat pump or an air source heat pump, ground source tend to be quite invasive as they require deep excavation and as such quite a lot of land as the name implies. They use thermal energy from the ground to generate the heat/energy. So in the main in the UK air source heat pumps are likely to be the system used, they are mounted to the home outside and usually a box around 1.5 metres by 1.5 metres.

An air-source heat pump takes heat from the air and boosts it to a higher temperature. There are two main types of air-source heat pumps; air-to-water and air-to-air. Air-to-water heat pumps take heat from the outside air and feed it into your wet central heating system (similar to existing gas central heating). The energy saving aspect comes from the fact at maximum efficiency they can take 1 Watt of energy and produce 4 Watts of heat.

At this point they sound like the perfect solution but there are some caveats, initial cost to buy and install is high, in the region of £12,500, which is offset at the moment with a government backed subside of £7,500. It is still a considerable amount when a gas boiler install is approximately £2,500.

The aim of the air source heat pump is to use water in the heating system that is a lower temperature, here again we save energy consumption by not heating the water to a higher temperature. A gas boiler is typically 75 degrees, an air source heat pump typically 45 degrees.

The running temperatures are lower with heat pumps which means you need to oversize the radiator to achieve the required outputs.

So if you take the same size radiator and use a normal boiler the heat output of that same radiator will be higher with a boiler than on a heat pump simply because the water running through the radiator is hotter coming from the normal boiler than you can achieve with a heat pump.

To achieve the same sort of heat using the heat pump the only way to do it is to increase the size of radiator. Science says, the surface area of a radiator increases the heat output of a radiator. The lower temperature of the water means you need to increase the surface area

of the radiator to achieve the same output as would have been achieved by using a normal boiler.

So in 90% of heat pump installs be it ground or air source the radiators need considering too as they need to be large enough to ensure they heat your home taking into account the lower water temperature.

This is where something called Delta T comes into play. The delta T of a system is worked out by taking the flow temperature of the water from the boiler before it sends it to the radiators and the return temperature on its return to the boiler after it has been flowing through the radiators to provide the mean water temperature and then taking off the target room temperature. A modern boiler will normally achieve delta t 50.

To work out the mean water temperature add the flow temperature and return temperature together and divide it by 2. So if you have a central heating system with a flow temperature of 75°C and a return temperature of 65°C the mean water temperature is 70 (75 + 65 divided by 2 = 70). To work out the delta t you then take off the target temperature of the room which if 20°C would make a delta t of 50 (mean water temperature of 70 minus 20). If the target temperature of the room was less, so let's say 18°C for a bedroom then the delta t would be 52 (mean water temperature of 70 less 18 = 52).

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So on a heat pump the flow rate may well be 45°C for example and the return 40°C, with a target room temperature of 20°C this would mean the Delta t rating would be 22.5. This is basically the mean water temperature of 42.5°C (45 + 40 divided by 2) minus the target room temperature of 20°C to make the delta t of the system 22.5.

If you are looking to get 1000 Watts of heat at delta t 22.5 you need to divide the 1000 Watts required by the conversion factor of 0.354 which will give you the heat output figure and size of radiator you need to be looking at (its equivalent delta 50 output on our website). In this case it is 1000 divided by 0.354 = 2825 Watts, meaning you need a radiator providing 2825 Watts at delta t 50 to provide 1000 Watts at delta t 22.5. Likewise if you want to know what a radiator at 2825 Watts at delta t 50 provides at delta t 22.5 then you would multiply the 2825 Watts by 0.354 = 1000 Watts.

On our website we go to Delta T30 soon to go down to DT20, below is a table to help up until the change is made.

Delta T	Correction Factor
20	0.302
21	0.322
22	0.342
23	0.363
24	0.383
25	0.404
26	0.426
27	0.447
28	0.469
29	0.491