

Short cycling, what is it and how to prevent it

Short cycling is when a boiler or heat pump is constantly coming on and off rather than coming on running for a reasonable period and then turning off. *Exceptionally long run time can also be an issue especially for boilers but we don't cover this here.*

The effects of short cycling vary for different appliances.

A heat pump short cycling can increase the use of energy significantly shorten the life of the compressor and associated starting contactors. A gas boiler short cycling can result in gas valve failure and integral pump failures as well as contamination of the heat exchanger, again energy use will be increased.

Oil boilers are particularly vulnerable to short cycling this is because an oil boiler burns its self clean through its run cycle if it short cycles then deposits of oil gum and soot will rapidly contaminate the flue path choking the boiler once this process starts it soon gets to a point where a longer run won't burn it off.

Why does it happen?

It can happen where the demand from a system is very low and the appliance return is line is rapidly up to temperature, or when circulation from the appliance is inadequate and the boiler can't move heat out quickly enough. It can also happen where an appliance is too big for the installation it supplies.

Short cycle is far less likely in inverter heat pumps and gas boilers which can modulate to provide lower outputs when there is lower demand in these appliances it is more likely if the appliance is significantly oversized.

Standard air to water Heat pumps and Oil boilers do not have an ability to modulate so they continue to give full output regardless of the demand placed upon them. Hence they are more likely to short cycle.

How can short cycling be addressed?

For a standard efficiency Heat pump on a low temperature floor system the use of a buffer tank is the best solution the buffer should be fitted with a differential control so it won't call the HP on until there is a demand for a rise of at least 10 degrees (the higher the better)

For Oil boilers a buffer tank is also an option if connected to a floor system as it allows the boiler to heat the buffer to high temperature whilst allowing the draw off to be low temperature via blending the output from the buffer with the return

In radiator systems a buffer is less appropriate (though possible, it would need to be much larger). It is better to ensure the boiler is correctly sized, and that the system has hydraulic separation or at least that some radiators are without thermostatic control and always taking full flow to ensure the boiler flow rate is kept high enough. Thermostatic valves used should have the vent ports open for higher flow.

if an oil boiler is feeding domestic hot water, consideration should be given to its demand it is often advisable that the hot water demand is controlled by differential temperature and or time control to ensure that when there is only hot water demand for example in summer the boiler cycle is extended.