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 shortening the life of the compressor and associated starting contactors. A gas boiler short cycling can result in gas valve failure and integral pump failures, fan failures and electronic board problems 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 as an oil boiler burns itself cleans through its run cycle. If it short cycles then deposits of oil gum and soot will rapidly contaminate the burner and flue path choking the boiler once this process starts it worsens and soon gets to a point where a longer run cant burn it off.

Why does it happen?

It happens when demand from a system is very low compared to the appliances output capacity, or when circulation from the appliance is inadequate.

Short cycle is less likely in inverter heat pumps and gas boilers which can modulate output to provide lower outputs when there is lower demand in these appliances. it is more likely if the appliance is significantly over sized or in the case of gas boilers has not been range rated as part of the commissioning process.

Non inverter air to water Heat pumps and Oil boilers do not have an ability to modulate, they provide 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 recommended when 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 from the system. In radiator systems with oil boilers a buffer is not usually required for smaller systems but strongly recommended for large systems over 30Kw where system demand may be much lower than the boiler capacity,

If an oil boiler is supplying domestic hot water via a cylinder, consideration should be given to its demand it is advisable that the hot water demand is controlled by differential temperature thermostat and time control to ensure that when there is only hot water demand, in summer for example, the boiler cycle is extended.