

# Improving the efficiency of Home Heating- Combi Boilers



**As energy prices are rising this quick reference guide has been produced to help ensure that your heating and hot water system operates efficiently and to help you save on your energy bills.**

There are multiple factors which affect your heating systems ability to maintain your required comfort levels. Most importantly, **the outside temperature**. This is because heating systems are generally designed (sized) to achieve the required comfort levels in the home when the outside temperature is  $-1^{\circ}\text{C}$  to  $-3^{\circ}\text{C}$  (in some areas this can be as low as  $-6^{\circ}\text{C}$ ). Within the home, key factors in maintaining comfort are the insulation levels within the property and the size of the radiators in each room. These are important in ensuring you maintain an acceptable temperature in every room.

The latest Boiler Plus regulations for new boiler installations require a modulating boiler control. Controls of this type can provide the most efficient performance improvement for an existing boiler system. We would always recommend this as a first consideration.

If you are unsure about any of the steps below contact an expert, such as your local [Gas Safe Registered Engineer](#)

**If you are looking to save energy - whilst looking to maintain acceptable comfort levels the following areas could also be considered:**

- 1- Room temperature settings of the room thermostat
- 2- Duration of the heating cycle of the combination (combi) boiler – controlled by the time switch /programmer.
- 3- The setting of the flow temperature of the combi boiler for heating the radiators (controlled by the boiler thermostat).
- 4- Checking the settings of the individual thermostatic radiator valves (TRV's) on each radiator in each room.
- 5- Under taking an annual service of the heating system (by a Gas Safe registered engineer) including aspects such as appropriate water treatment.

**If considering home and system improvements then:**

- 6- Consider improvements to windows, and increasing the insulation in the loft or cavity walls of the house.
- 7- Consider the upgrading of room thermostats and timer controls to the latest [Boiler Plus](#) standards.
- 8- Consideration of appropriate radiator sizing and any suitably sized replacements.



## Room Thermostat

If you have a simple room thermostat control, a straightforward way to save energy is to review and lower the set temperature.

It is a matter of setting what is right for your comfort and your home to save energy. A room thermostat will turn the heating on until the room reaches the temperature you have set and then off until the temperature drops below your set temperature.

Reducing the temperature of a room thermostat will save energy. Try adjusting the setting to 18 degrees centigrade and if you feel cold adjust it upwards a degree at a time until you reach a comfortable temperature, allowing a few hours for the room to adjust to the new temperature before increasing the setting. Operating instructions will be available directly from the manufacturer.

*Note: The latest technology in room thermostats will automatically support and increase the efficiency of your boiler and heating system. Further information can be [found here](#) and also see the related section below.*



## Heating Schedule

An additional way to save energy is to review the amount of time the heating is on and off during the day. Adjusting the time switch/schedule settings to come on later or switch off earlier in the evening so reducing the amount of time it is on.

It is a matter of setting what is right for your comfort and your home to save energy.

*Operating instructions will be available directly from the manufacturer.*





## Boiler Thermostats



Your combi boiler is usually fitted with two thermostats one for heating and the other hot water. The heating thermostat is usually identified with a radiator symbol and has numbers marked or an increasing scale from minimum (min) to maximum (max). This sets the temperature of the water that will be supplied from the combi boiler and pumped through the radiators.

**The combi boiler heating thermostat that adjusts the flow temperature to the radiators is normally marked with a radiator symbol.**

Adjusting the thermostat on your combi boiler to reduce the flow temperature through your radiators can save energy.

*Note: The latest technology in room thermostats will automatically support and increase the efficiency of your boiler and heating system. See the related section below.*

### Why will it save energy?

Turning down the flow temperature on a combi boiler can make it operate more efficiently as it extracts more energy from the gas that is burnt and uses this additional energy to heat the hot water in the radiators. However, it does depend on what the boiler thermostat is already set to as it may already be set at the optimum. You may have a room thermostat fitted that does this automatically already so see the section below.

*Note - If you have a heating system with a hot water cylinder then we recommend that the boiler thermostat is adjusted to around 65 degrees centigrade. This is a requirement by the Health and Safety Executive for stored hot water. Please refer to the boiler manufacturers instructions.*

### Is it safe to adjust my boiler thermostat?

Your combi boiler will work safely when a lower temperature is set but you may find that your house is too cold if the temperature is set too low, especially if the external temperature is also low. If you do not have the latest type of room thermostat fitted that self regulates then you may find you need to adjust the flow temperature up on the combi boiler when the temperature outside is low then back down again when it is warmer.

[If you have, any concerns contact your local Gas Safe Registered Engineer.](#)



## Thermostatic Radiator Valves (TRVs)

Most homes have TRVs fitted to the radiators and these will regulate the temperature in each individual room, which maintains a set level of comfort and will reduce your energy usage. Consider whether rooms that are used less often/not used at all can have the TRV's set to a minimum.

*Note: Using a system with the latest smart TRVS can be useful especially for people who work from home.*

Learn more about TRVs [here](#).



## Insulation

Insulation prevents heat loss, so adding insulation improvements to your home such as A rated double-glazing; loft insulation and cavity wall insulation all reduce the amount of heat that is required in each room. It will also mean that you can reduce the system temperatures and maximise boiler efficiency.

With today's increasing energy prices, the pay back for the investment in insulation is much quicker. If you would like to learn, more on how insulation can improve energy efficiency of your home then look at the [Heating Up to Net Zero](#) paper.



## Latest Technology

Modern gas combi boilers work more efficiently and can modulate their output to reduce the flow temperature of water through your radiators automatically when connected to a suitable room thermostat to save energy. When your home is cold, the temperature to your radiators will be high for fast heating, but as the room warms up less heat is required and the temperature to the radiators will be automatically reduced.



If you have a new room thermostat that was fitted in the last three years such as an enhanced load or weather compensation control then this type of device will adjust your flow temperature automatically which will save energy in a similar way to reducing the flow temperature manually. The added bonus is that it does not matter what the outside temperatures is so maintaining the desired level of comfort.

### **Enhanced Load Compensation (ErP Class V)**

A modulating electronic room thermostat, for use with modulating boilers. An electronic room thermostat that regulates the temperature of the hot water leaving the boiler and feeding the radiators dependent on the measured room thermostat set point. . When the house is cold, the temperature to the radiators will be high. As the room temperature increases less heat is required and the thermostat communicates with the boiler so the hot water flowing through the radiator is reduces automatically saving energy but still maintaining the required comfort level.

### **Weather Compensation (ErP class II)**

An external weather compensator and room sensor, for use with modulating boilers. The electronic control monitors the outside weather temperature using an external sensor and communicates the information to the boiler to control the temperature of the hot water leaving the boiler and flowing through the radiators. This gives a very accurate setting ensuring you only use as much energy as necessary whilst maintaining the necessary level of comfort.



## **Boiler Servicing**

Most people will take their car for a regular service to keep it running efficiently and to maintain the warranty. The same is true for all gas boilers and we always recommend booking an annual service with a Gas Safe Registered Engineer to ensure it is working at its most efficient. It is worth discussing a full check of the heating system including radiators, thermostats system balancing and controls. System water treatment including checking the water quality, cleaning the system and using an inhibitor can also help support system efficiency.

Always use a Gas Safe registered engineer to ensure that the complete system is working efficiently.

Find out what to expect from an annual service [here](#).

Find out about water treatment [here](#).

Find out about system balancing [here](#).



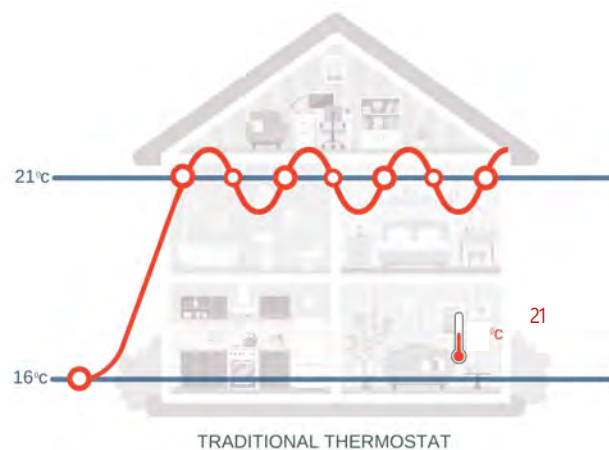
## Further Information and Definitions:

### Government Legislation Boiler Plus

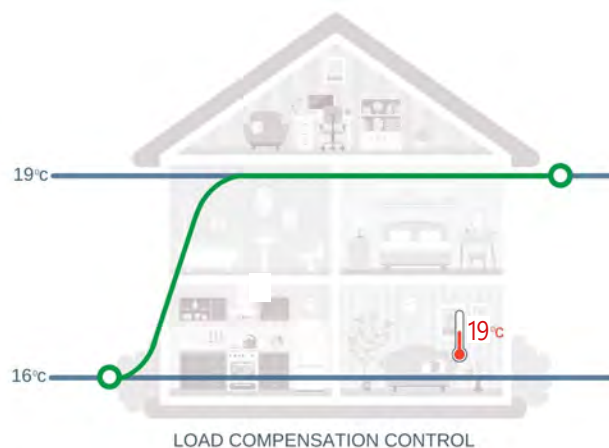
Legislation introduced in April 2018 requires that the latest heating controls that can lower your flow temperatures are fitted when replacing a gas boiler. The entry-level room thermostats that improve the boiler efficiency can be cost effective with savings made over a short period.

*Note: If your boiler was installed prior to 2018 and you want to have the latest thermostat fitted to your boiler to save energy then contact your local Gas Safe Registered Engineer or the manufacturer for more information.*

Figure 1 below shows the cycling range of an old style on off room thermostat compared to an enhanced load compensation control shown in figure 2. As the load compensation control, cycling range is very narrow you can then reduce the temperature the room thermostat is set to but still maintain a similar level of comfort. The Building Research Establishment (BRE) controls report advises that a 1 degree centigrade reduction in the setting of the room thermostat can lead to an additional energy saving of around 10%. ([BRE REPORT](#))



**Figure 1**



**Figure 2**

*Note - More information on the latest legislation for what heating controls must be fitted to a replacement gas heating installation can be found [here](#).*

## Definitions:

**Room Thermostat** - A room thermostat is a remote temperature control that measures the room temperature and communicates with the boiler. Normally located in living rooms or hallways.

**Boiler Thermostat** - A boiler thermostat is located on the boiler and controls the temperature of hot water flowing through the heating system and may be located within a control panel.

**Enhanced Load Compensation** – room thermostat with load compensation that communicates with your boiler so it modulates and adjusts the flow temperature through the radiators or underfloor heating. (ErP Class V)

**Weather Compensation** – Monitors outside temperature and communicates with your boiler so it modulates and adjusts the flow temperature through your radiators or underfloor heating. (ErP Class V1)

**Thermostatic Radiator Valve (TRV)** – Fitted to a radiator and controls the air temperature of a room by automatically adjusting the amount of hot water that enters the radiator.

**Flow Temperature** – Temperature of the water supplying the heating system.

**Any installation, service or repair work for a gas boiler should be carried out by a Gas Safe Registered Engineer. If you have any concerns about your boiler or heating system please contact a Gas Safe Registered engineer who will be able to help you.**

[www.gassaferegister.co.uk](http://www.gassaferegister.co.uk)



**The Heating and Hotwater Industry Council, HHIC, is a not for profit trade association committed to effectively driving, supporting and promoting the sustained growth of the UK domestic heating and hot water industry.**

**[www.hhic.org.uk](http://www.hhic.org.uk)**



info@hhic.org.uk



01926 513777



@hhic

Camden House  
Warwick Road  
Kenilworth  
CV8 1TH