A guide to

wet central heating systems

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energy agency



SevernWye energy advice

Types of heating

There are two main ways that homes may be heated:

1) A central heating system where the heat is produced centrally and then distributed around each room (usually using radiators).

2) Heat is produced individually by heaters or fires in each room.

This leaflet is aimed at those with central heating. If you have individual heaters or fires in each room, please see our leaflet on 'Heaters and fires'.

What is a wet central heating system?
With a wet central heating system, a central heat source (usually a boiler) produces hot water which is distributed around the property, heating radiators and becoming available for use from hot taps and showers.

This is generally considered the most cost effective and efficient way to provide heat and hot water for a property and is the most common form of heating in UK homes today with over 90%*[1] having a central heating system.

References

*For details of the references used in this document please scan the QR image, visit **www.warmandwell.co.uk/warm-and-well/advice-materials.html** or call us on 0800 500 30 76

Boilers

In most wet systems, a boiler heats the water that feeds the system. The boiler will most commonly use gas as a fuel to do this, but it is also common to see oil or LPG (Liquid Petroleum Gas) used as a fuel where mains gas is not available.

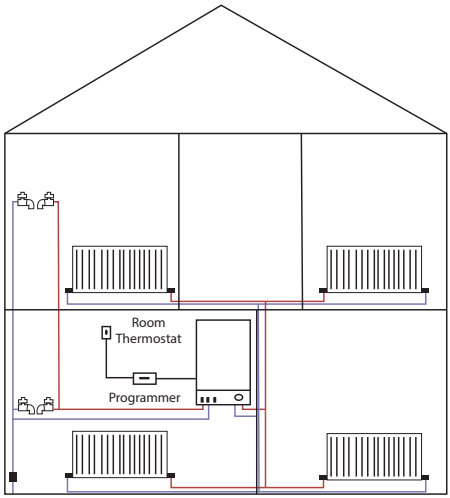
Types of boilers

There are two main types of boilers:

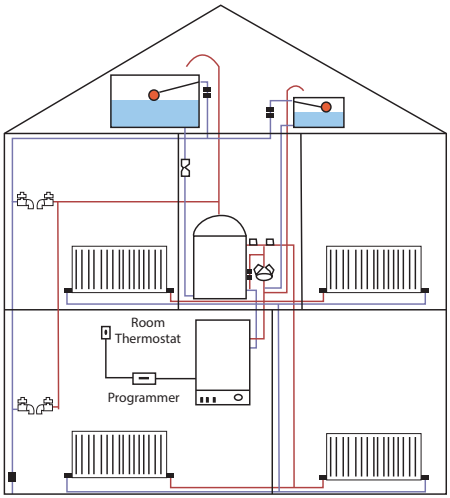
- Standard
- Combination (or 'combi')

Combination boilers, commonly known as 'combi' boilers for short, are the most popular type in the UK. They provide hot water on demand without the need for a header tank or cylinder, therefore saving space. Standard boilers have a cylinder where the hot water is stored ready for use.

In most cases, heating water instantly is more energy-efficient than 'stored' hot water systems. It also ensures that you don't run out of hot water and have to wait for it to be reheated. However, the flow of hot water may slow if lots of hot water taps are used at the same time.



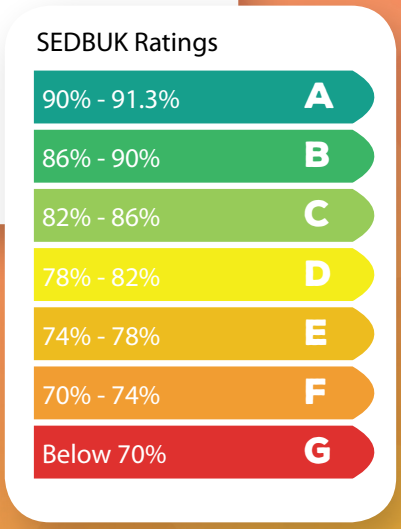
Combination Boiler System



Conventional Stored Water System

Boiler efficiency
Most boilers of both types purchased today will be condensing boilers. These are more energy efficient because they capture some of the heat which would normally escape from the flue and re-use it.

Like many appliances today, boilers are rated for efficiency from A to G according to their efficiency:



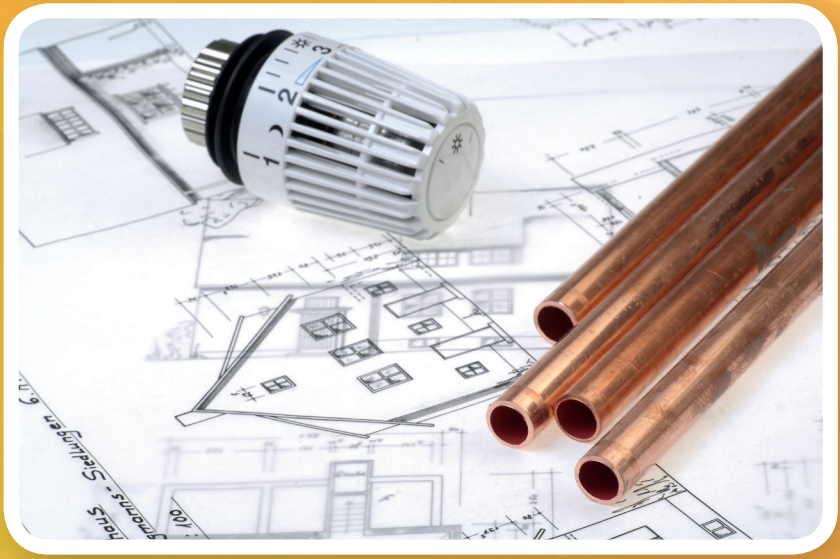
A new A-rated gas, oil or LPG boiler will be more than 90% efficient*[2]. This means that they will use at least 90% of the energy stored in the fuel to heat the water in the system.

Getting your boiler serviced each year will help to maintain its efficiency. This will also ensure that it is operating safely, avoiding the creation of dangerous gases such as carbon monoxide.

When you come to get your boiler serviced, ensure you use a Gas Safe engineer if you have a gas or LPG boiler or an OFTEC registered engineer for an oil boiler.

However, even a well-maintained boiler will become less efficient over the years and if your boiler is over 15 years old or is running at a very low efficiency (ask your heating engineer when they service your boiler) you may wish to consider replacing it with a condensing boiler. You can find the efficiency of most boilers at **www.homeheatingguide.co.uk/efficiency-tables.html**.

Upgrading from a G-rated boiler to a modern A-rated boiler can save as much as £340 per year on your fuel bills*[3].



Controlling your wet central heating system



With the average UK household spending more than 50% of their annual fuel bill on heating and hot water*[4], large savings can be made by making best use of the heating controls you have available.

Effective use of heating controls can also increase levels of comfort, helping to ensure that people stay warm and well.

Common heating controls

Most 'wet' central heating systems will have one or more of the following controls:

- A boiler thermostat
- A programmer or timer
- A room thermostat
- Thermostatic Radiator Valves
- A hot water cylinder thermostat (standard boilers with hot water storage only)

Boiler thermostat

Most boilers have a dial, marked with either numbers or a scale from Min to Max. This controls the temperature at which the water leaves the boiler. If it is not set high enough, your system may struggle to heat rooms to the desired temperature. However, if there are young children or vulnerable people in the household, ensure that radiators do not get so hot that they may cause a danger if touched.

In most boilers, the boiler thermostat controls the temperature of water sent to both the hot water cylinder and the radiators. With 'combi' boilers, the temperature for the heating and hot water can often be set separately.



Programmer or timer

Programmers or timers let you set when you want the heating to be on. It is more energy efficient to only have the heating on when the house is occupied. It is a myth that it uses less energy to leave the heating on constantly (even if reduced to a lower temperature when the building is not occupied)*[5].

However, remember that it will take some time for the house to heat up and that it will retain the heat for some time after the heating is switched off. Therefore, factor in these warm up and cool down times when setting your timer.

Remember, you can also turn your heating off when you go away on holiday. If it is very cold, leave on a low temperature just to ensure that the pipes don't freeze (unless your system has automatic frost protection).

If you have a standard boiler, it is likely that your programmer will control the hot water as well. You can sometimes set the hot water times separately. It is best to set the hot water to only be on for as long as required to produce the amount of hot water you need. Experiment with reducing the amount of time the hot water is on each day to find the minimum amount of time it can be on whilst still producing enough hot water for your needs.

Most programmers also have some form of over-ride allowing you to turn the heating (and hot water if applicable) on or off manually as required. This can be useful when your occupancy patterns change from the norm.

Types of programmer
There are two main types of programmer:

Mechanical programmers usually have a set of sliders (called 'tappets') which you move around a clock face. You use these to set the times of day you'd like the boiler to switch on and off.

Digital programmers display information on a screen. You can often set different time patterns for different days of the week.





Most programmers allow you to set the heating (and hot water) to turn on and off several times during the day. They vary in the degree of flexibility they offer. Some only allow a single setting which applies to every day of the week. Others allow you to set different times for weekdays and weekends. The most advanced allow you to set different times for every day of the week. If you have irregular occupancy patterns during the week, it may be worth considering upgrading to a programmer that offers a greater flexibility of control.

Room thermostat

A room thermostat allows you to set the desired temperature using either a dial or a digital display. The thermostat senses the temperature of the air around it and sends a signal to the boiler to switch off once the desired temperature is reached.

It is worth bearing in mind that you set the temperature of the area where the thermostat is located. If this is not your main living area, you may need to experiment with the setting to get the temperature in your main living area just right.

In terms of saving energy, it is best to have the temperature as low as possible whilst keeping the temperature in the house comfortable. Each 1°C reduction results in an approximately 8% saving in heating consumption*[6]. Be aware that this should never be done at the expense of health. Public Health England recommends that main living areas are heated to at least 18°C. However, the very young, elderly and vulnerable may require a higher temperature.

It is important to remember that turning the thermostat up higher won't make the building heat up any quicker. It will take the same amount of time to heat up but will then carry on getting hotter, making rooms too hot and wasting valuable energy.



Thermostatic Radiator Valves (TRVs)



TRVs are particularly useful because they can be used to control the temperature in each individual room (where a TRV is present). The higher the number selected, the hotter the radiator will get.

TRVs measure the air temperature and so should not be covered up or enclosed. Being boxed in behind a cupboard or covered by a curtain will restrict the TRVs ability to control the radiator.

TRVs can be set fairly high in rooms that are frequently occupied but can be set much lower in rooms that aren't used for any significant period of time (e.g. toilets, utility rooms, spare rooms etc.). However, be careful that rooms don't become so cold that condensation begins to form.

Just as with room thermostats, setting them higher won't make a room heat up any quicker. It just means that the room will eventually become too hot, wasting precious energy.

Hot water cylinder thermostat



If you have a standard boiler, you will also have a hot water cylinder that stores hot water for hot taps and showers. A thermostat is usually fitted between ¼ and ½ the way up the cylinder and is marked with a temperature scale. This should be set to 60°C which is hot enough to kill any harmful bacteria without using excessive energy. If the water produced is too hot, you could consider installing a thermostatic mixing valve which will automatically ensure that hot water comes out of taps and showers at a safe temperature.



Boiler thermostat

- Controls the temperature at which the water leaves the boiler
- This can be turned down if radiators are getting too hot and posing a danger to children or vulnerable householders



Programmer

- Allows you to set the times the heating (and possibly hot water) is on
- Only have the heating on when the house is occupied bearing in mind warm up and cool down times



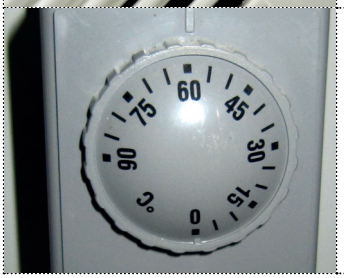
Room thermostat

- Controls the temperature
- Set the temperature as low as possible whilst keeping the temperature in the main living areas comfortable



Thermostatic Radiator Valve (TRV)

- Allows you to control the temperature in different rooms
- Set these fairly high in the main living areas and lower in bedrooms and rooms that are not used very often



Hot water cylinder thermostat

- Controls the temperature hot water is stored at
- Set to 60°C. This is hot enough to kill off harmful bacteria whilst not using excessive energy

What else can I do to improve my central heating system?

Insulate your hot water cylinder.
Most modern cylinders are factory insulated which helps to keep the water at a higher temperature. However, some older cylinders are not well insulated and you can buy a hot water tank jacket to improve the insulation for around £15 from most DIY stores. This could cut heat loss from the cylinder by more than 75% and could save you around £25-£35 a year, which is more than the cost of the jacket*[7].

Bleed radiators regularly.
Air can become trapped in the heating system, preventing radiators from working effectively. This can easily be remedied by bleeding the radiators to allow the air to escape. For detailed instructions see **www.uswitch.com/energy-saving/guides/how-to-bleed-a-radiator**.



Energy saving tips

- Only have the heating on when someone is home.
- Work out your warm up and cool down times to help you set your timer effectively.
- Have the hot water on for just long enough to produce the amount of hot water you need each day.
- Turn your heating off when you go on holiday. If it is very cold, leave on a low temperature just to ensure that the pipes don't freeze.
- Check that the clock is set correctly and remember to adjust it when the clocks change (if it doesn't do this automatically).
- Try reducing the temperature your thermostat is set to. Each 1°C reduction results in an approximately 8% saving in heating consumption*[8]. However, be aware that this should never be done at the expense of health, particularly where there are young children or elderly people present.
- If you are cold, try putting on a jumper before resorting to turning the heating up (bearing in mind the advice above).
- Avoid opening external windows and doors whilst the heating is on as this lets valuable heat escape (however, some ventilation is required in order to avoid the build-up of condensation).
- Make sure that heaters are not covered and have plenty of space around them to allow the heat to circulate effectively.
- Avoid covering heaters or radiators with curtains. Either tuck them behind or you can purchase 'radiator shelves' which the curtains can 'sit on', encouraging the heat to circulate more effectively.
- Fit reflective foil behind your radiators to reflect heat back into the room.
- Set Thermostatic Radiator Valves to a lower setting in rooms which are not used very often.
- Set your hot water cylinder to 60°C which is hot enough to kill off any bacteria whilst not wasting valuable energy.
- Insulate your home – It will warm up faster and retain the heat for longer, saving energy and money. See our separate leaflets on insulating your home.

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Severn Wye Energy Agency is a not-for-profit company and charity (charity no. 1083812), established in 1999 under the European Commission SAVE programme to promote sustainable energy and affordable warmth through partnership, awareness-raising, innovation and strategic action.

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Warm and Well has been running for over 10 years and has helped thousands of people tackle their energy bills and make their homes more comfortable. Our friendly advisors provide free advice on reducing energy use and on the grants and incentives available.

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This fact sheet is part of a series that includes information on heating and hot water, home power generation, lighting and electrical appliances and reducing heat loss.
The full series of fact sheets can be found at:
www.warmandwell.co.uk

Large print copies are available on request

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