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Dedicated to heating comfort



Heating and
hot water guide

Getting the most out of your heating system

Today we all have far greater awareness of global warming, climate change, the need to greatly reduce ‘greenhouse gas’ emissions into the atmosphere, and the need to develop and utilise alternative renewable energy sources whenever and wherever we can. There’s also the increasing need to counter the effects of unstable energy prices governed by supply, demand and world events beyond our control.

This booklet offers you a few simple guidelines on how to keep the heating system and its components in optimum working condition, and maximise their reliability and reduce running costs.

The heart of your heating system

The boiler is at the heart of any central heating system. However, all the other components i.e. radiators, timers, radiator valves etc., are all vital to the overall comfort levels required in the home.

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The heart of your heating system



1 *Thermostatic Radiator Valve (TRV)*

2 *Lockshield radiator valve*

3 *Air release vent*



Radiators

In each of the rooms that require heating will be one or possibly more radiators. The function of the radiator is to convert the hot water generated by the boiler into the air temperature of the room. It therefore stands to reason that the hotter the radiator temperature then generally the hotter the room temperature.

Radiator components

There are 3 major components connected to the radiator. For the radiator to function to its design it must always be free of air and full of water. The air release vent is, as its description implies, where any air within the radiator can be released by using a special air vent key.

Please note that it is most important that your installer has instructed you on how to replenish the water levels within a sealed heating system before you attempt to release air from radiators.

Your installer should have regulated the lockshield valve so that there is an 'even heat up' that takes place throughout the radiator, generally with an approximate 10°C - 12°C (20°C for condensing boilers) difference between the incoming flow of water and the outgoing returning water.

See page 24 for notes on removing radiators.

Radiators

Radiator operation

More often than not the radiators will be sited underneath a window, so the warm air of the radiator heats the colder incoming air



Thermostatic Radiator Valve (TRV)

from the window. The performance of the radiator will be affected if curtains or shelves are fitted above it. The positioning of furniture and tables in front of the radiator should also be avoided.

Thermostatic Radiator Valves

The radiators in your home should be fitted with Thermostatic Radiator Valves (TRVs) which will enable you to control the temperature of each room individually. As well as helping to maintain your comfort levels at different times of the day, TRVs also provide a simple means of reducing running costs.

The higher the number shown on the TRV, the hotter the room should get, up to a maximum of around 22°C. The TRV should

preferably be well exposed and not hindered by furniture or curtains so it can accurately detect the room temperature. Do not be too concerned if the whole of the radiator is not as hot as uncontrolled radiators, it is likely that the TRV has temporarily shut the radiator off as the room is up to temperature. A TRV should not be fitted on the radiator in the room with the room thermostat.

Maintenance of radiator valves

It is advisable to manually adjust all radiator valves every 2-3 months to prevent them sticking. It is also important that the plastic tops of all valves are always in position and not cracked or damaged so as to prevent accidents. Care should be taken when vacuum cleaning carpets so as to avoid damage to valves and pipework.

Turning off radiators

The heating system and the outputs of the radiators have been carefully selected by your installer. The temperature obtainable in any given room is dependent on all the radiators being operated at the same time. If you decide to turn off radiators in unused rooms, spare bedrooms etc., you may experience slightly lower room temperatures in rooms adjacent to unheated rooms.

Heating controls

If your boiler has been installed during the last few years your central heating system should include a timer or programmer, a room thermostat as well as Thermostatic Radiator Valves (TRVs) on the radiators in most of the rooms. Each of these components of the heating system can play an important role in improving your comfort levels and running costs.



Worcester TD200 text display programmer

Heating controls

Timer

The timer or programmer brings the heating system on for set periods of time. The timer can be either wall mounted remotely from the boiler or attached to the fascia panel of the boiler itself. The timer can be either mechanical (with a dial) or digital. There will be a separate instruction manual telling you how to set the actual time of the programmer and the times you wish the central heating to be on.

Depending on the insulation of the house and the outside temperature it will take at least 30 minutes to bring the house up to the desired temperature.

Consequently if you require the temperature in the house to be at a certain level first thing in the morning, the programmer needs to bring the boiler on at least 30 minutes before that time. Please note that the actual time of the programmer will require re-setting at the start and end of British Summer Time, unless it is one of Worcester's latest programmers that does this automatically.



Worcester D10RF Digistat 24-hour programmable room thermostat

Room thermostat

The room thermostat dictates how hot the air temperature in the house will be. Generally the thermostat is sited in the hall or landing or in an unheated room. They can be either mechanical (with a dial) or digital. For the



Worcester RT10 room thermostat

thermostat to be able to detect the temperature in the house accurately it should be sited away from direct sunlight and not be covered by curtains, furniture etc. Whilst the insulation characteristics of houses are all different the thermostat should generally be set to between 18°C and 21°C.

Programmable room thermostat

Depending on the age of your heating system and boiler, you may have installed a programmable room thermostat. This allows the time and temperature levels of the house to be programmed to different levels throughout the day. Again, a separate instruction booklet will have been supplied with this.

Frost thermostat

In certain circumstances your installer may have fitted a frost thermostat to the system. This can be sited either outside or in an unheated space, garage etc. If the weather conditions are extreme, the function of the frost thermostat is to bring the boiler and heating system on (even though the programmer may be in an off position) so as to prevent the system and pipework being subjected to frost.



Worcester MT10 mechanical timer



Combi boiler domestic hot water operation

As well as generating heat for the central heating system, a combi boiler also heats water directly from the mains. This of course eliminates the need for a hot water storage cylinder and cold water storage cisterns in the roofspace. Consequently it is more efficient. Depending on the output of the boiler and whether it is floor standing or wall mounted, one or more taps or showers may be operated simultaneously.

The temperature of the hot water and the heat up time from cold depends upon the position of the boiler and whether the central heating is on or off at the time.

Boiler off (no central heating)

When the boiler has been off for some time it will generally take longer to heat any domestic hot water to the desired

temperature. This delay is dependent on the temperature of the incoming mains and the length of pipework from the boiler to the outlet. This time delay can be greatly reduced if, after turning on the tap or shower to a full rate, the tap or shower is then reduced to a slower rate until the temperature is achieved.

Boiler on (central heating on)

In this operating condition there will generally be an initial draw-off of cooler water before the desired temperature is delivered to the tap or shower.

Showering

One of the major benefits of a combi boiler is impressive mains pressure

showers. All Worcester wall-mounted combis have a very consistent and minimal temperature fluctuation. Providing your shower is suitable for mains pressures and is either thermostatically controlled or of a pressure balancing type, the water temperature should be very stable. If this is not the case then it is likely the shower may not be of a suitable type.

Bathing

With most wall mounted combis the hot water flow rate available from the taps is slightly slower than with a conventional hot water system, this is generally only noticeable when filling a bath. When running a bath the following will help:

1. Run only the hot water tap into the bath.
2. Check the temperature of the bath water rather than seeking the temperature of the discharging water from the tap.
3. Depending on the boiler type, allow a slightly longer period of time to fill the bath to the desired temperature and level.
4. To save energy if the bath is of a cast iron or pressed steel type it may be worth insulating underneath the bath behind the bath panel with a suitable insulation.

General water conditions

Hard water areas

Generally Worcester combi boilers will operate successfully and efficiently in all areas of the country. There are certain areas and districts however, that experience very hard water conditions. Hard water can lead to scale forming within the heat exchanger of the appliance, reducing the efficiency and possibly the flow rate. In areas where the temporary hard water count exceeds 200ppm (parts per million – you will need check this with your local water company) it is suggested that a scale prevention device or water softener is fitted to the incoming mains.

Cloudy water

In certain areas of the country and perhaps at certain times of the day it is possible that the heated domestic hot water has a cloudy or milky appearance. This appearance can be off-putting. However, it is nothing to worry about as this cloudy appearance is simply millions of air bubbles created by the calcium present within the water being heated. This can be demonstrated by filling a glass whereupon the bubbles can be seen to disperse.

A typical example of a heavily corroded pipe. In extreme cases the build-up of hard water limescale in a hot water pipe can cause heavy corrosion and severely reduce the performance and efficiency of your heating system.

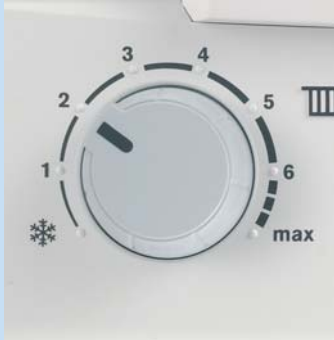


General boiler and heating system care

Your boiler is a precision-made appliance which generally requires little or no user attention. The following tips may be of assistance in getting the best from your boiler and heating system.

Temperature controls

Depending on the boiler model you have installed there will be a central heating temperature control knob and possibly a domestic hot water temperature control knob. The more clockwise the temperature knob is turned, the hotter the temperature of the function. This is very much a “trial and error” exercise until you find the most suitable level for your needs. ‘E’ indicates ‘Economy’ mode. At this temperature the boiler operates in full condensing mode (if you have a condensing boiler installed).



Temperature knob

Pressure gauge

If you have a combination boiler or a system boiler installed it is likely that there will be a pressure gauge mounted in the fascia of the appliance. The pressure gauge should be set at around 1bar in pressure when the boiler is cold.



Pressure gauge

When the boiler operates the gauge is likely to rise to 1.5bar or more. When the system cools back down the pressure gauge should maintain itself at around 1bar. If it is noticed over a period of time that the pressure gauge drops below this, it would indicate that there is a small leak on the system and the



Filling link

sealed system water pressure needs topping back up to the 1bar level.

Depending on the boiler type and the installation method chosen there are 2 ways of filling the heating system.

Sealed primary system

This is now by far the most common arrangement of heating system with a combi boiler. Within the system (either within the boiler hydraulics or within the system pipework) will be a filling link. This allows mains water to enter the system pipework and radiators via a temporary hose connection or key, filling the system with water until the pressure gauge reads generally around 1bar. When the heating or hot water system is on, the gauge will rise.

However, when the boiler system is cold, the gauge should revert to around 1bar. Your installer should have instructed you on how to operate the filling link.

Open vent primary system

An open vent system has a small feed and expansion cistern connected to the boiler and is generally located in the roofspace.

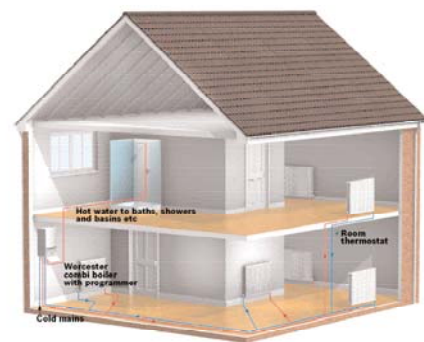
This type of arrangement automatically fills the heating system and removes the need for a pressure gauge.

General boiler and heating system care

Combi boilers and water meters

Generally, combination boilers do not store any water; they heat the water instantly from the mains, upon demand. There are some exceptions to this and generally speaking floor standing, oil- or gas-fired combi boilers have a store of water, but the majority of wall-mounted boilers are instantaneous versions. When a hot water tap is operated and subsequently turned off, a small amount of expansion of that water takes place. Within the water regulations it is permissible for this expanding water to travel back down the water mains. If, however, a device has been fitted to prevent the water flowing back down the mains e.g. a water meter, a build up of pressure could occur between the

turned off hot water tap and the meter. This could lead to the pressure rising to a high enough level to make taps or showers start to drip. Consequently, if you have a combi boiler and a water meter has been installed after the boiler was installed, it is important to check with your installer that an additional expansion vessel has been fitted to the mains water pipework. This will absorb all of the expansion water created by the generation of hot water.



Flue 'pluming'

If you have had a boiler installed since April 2005, it is more than likely to be a high efficiency condensing appliance. Condensing boilers operate more efficiently than non-condensing appliances as they extract more heat from the flue gases. Lowering the heat of the flue gases can make the flue 'plume' under certain weather conditions, particularly when it is cold. Please do not be alarmed by the 'plume' or low temperature water vapour exiting the flue terminal, it is quite natural and shows how efficiently your boiler is operating.

What happens to the boiler if I run out of gas or oil?

With a natural gas-fired boiler you are connected to the mains gas supply line, so unless for some reason the gas line is interrupted you are unlikely ever to run out of gas. If, however, you have an LPG or oil-fired boiler you will need to order the LPG or oil as and when required i.e. when the level of fuel in the tank becomes low. If, for whatever reason, you run out of LPG or oil the fuel supply line to the boiler from the tank will need to be purged of air. It is advisable to call your installer or service engineer to carry this out before you attempt to use the appliance. The longer the oil or LPG supply line from the tank to

General boiler and heating system care

the boiler, the more air there will be to purge. This is particularly apparent with oil-fired boilers, where the bleeding of the oil pump can take some time. Please be observant of the oil or LPG levels within your tank and make sure that you order sufficient deliveries well in advance of the supply running out.



Condensate discharge pipes

As part of the condensing process, condensing boilers produce a small amount of liquid (condensate) which is run via a pipe to a drain system. Commonly this is done within the room in which the boiler is located. However, it is possible to run the condensate pipe into an external waste pipe or drain. Where this is the case there is the possibility of the condensate freezing within

the pipe in extreme weather conditions, particularly in freezing temperatures where there is a wind chill as well. To prevent condensate freezing within the boiler or within the pipe it is advisable that the pipe diameter is increased in diameter from the normal 21mm connection. Alternatively, the externally run pipe work could be insulated to lessen the likelihood this happening.

If your boiler does not function in extreme temperature conditions it is very likely that the condensate has frozen within the pipe and this needs to be rectified by a competent person prior to the boiler being able to function again.

Power cuts

In the event of the electricity supply being interrupted, any digital programming device

would normally retain its settings for around a month. If the timer is of the mechanical analogue type with a clock face, it will stop at the point the power is interrupted. When the power is restored it will be necessary to re-set a mechanical timer to the correct time. Once the timer has been re-set the boiler can be operated as normal.

System flushing and cleansing

If your boiler has been installed over the last year or two then it is more than likely that the heating system has been flushed and cleansed by your installer. If, however, you are experiencing boiler noise or your radiators are hot at the bottom yet cold at the top it is possible that the cleanliness of the system water is not up to standard. This can be remedied by flushing the

system with a chemical cleanser. This can be flushed through either via a gravity style method or more successfully with a special power flush machine. Your installer will be able to advise you on the benefits and the cost of power flushing the system. This would return the boiler and the system back to its design efficiency and operation.

System flushing equipment



General boiler and heating system care



Radiator removal for decorating

When decorating a room it is more convenient to remove the radiator from its brackets to paper or paint behind it more thoroughly. Usually this means isolating the two valves either side of the radiator and opening the union nut connection will allow the water in the radiator to be drained into a container. The radiator can then be removed. Replacing the radiator after the work has been completed means tightening the union nuts back to the radiator valves and then turning the valves back to where they were previously set. If, however, the boiler is a combi and is run on a sealed system, the system will need re-pressurising as described in the section 'Sealed primary system' on page 19.

Annual servicing

To ensure your boiler functions most efficiently it should be serviced annually by a CORGI-registered or oil (OFTEC) engineer. Annual servicing of your heating system and boiler can also prevent breakdowns of the boiler and inconvenient malfunction.

Worcester, Bosch Group operates a number of maintenance contracts and schemes. Telephone **08457 256206** for further information.

Cleaning of your boiler

The boiler should ideally be kept in a dust-free environment. The cabinet and side panels should be cleaned with a damp cloth if necessary.



Annual servicing will help keep your boiler in good working order



Renewable energy

solar water heating – a sustainable option

If your current central heating boiler provides a store of hot water in a cylinder ie. a regular or system boiler, a solar water heating system could provide a golden opportunity to ‘go green.’ Solar thermal products work by harnessing freely available energy from the sun. This simple, clean and efficient technology absorbs sunshine and converts it into heat that is pumped directly into your hot water cylinder.

Solar thermal panels operate on the principle of daylight absorption and don’t depend on long spells of unbroken sunshine. A special coating on the absorber ensures that the system performs efficiently – even on cloudy days. The panels harness the power in both direct and diffused sunlight to convert the sun’s energy into hot water for your home and are designed to complement existing heating and hot water systems.

Used in conjunction with a regular or system boiler, a typical solar thermal system could provide around 50-70% of your home’s annual domestic hot water requirements – in the summer months this could be as high as 80-90%.

To operate a solar system with a central heating system you will need to have a hot water cylinder with two heating coils inside – one running from the heating system and the other from the solar system.

Grants* from the Government are usually available towards the cost of installing a solar water heating system. To find out more visit www.est.org.uk



Ground source heat pumps are available as heating only or combined heating and hot water models

Ground source heat pumps – can provide sustainable heat for your home

Ground source heat pumps are relatively new to the UK but their proven technology has been used for many years in northern Europe. These innovative products tap into energy from the sun – which is absorbed by the earth. The ground source heat pump system simply extracts the energy trapped below the surface of the land adjoining your property and turns it into heat for your home. The system works on similar principles to a fridge but in reverse.

Ground source heat pumps work most effectively with underfloor heating systems but they can also be used with radiators, although there may be a need to

increase the size of the radiators to obtain the maximum benefit from the system.

Although ground source heat pumps have been designed to be the only source of heating and hot water for your home, they can be used in conjunction with solar thermal panels.

Again, there are usually grants* available to help towards the cost of a ground source heat pump for your home. Visit www.est.org.uk for more information.

**Correct at the time of printing*



8 simple tips

for saving energy and reducing running costs

Roof insulation

Around 30% of the heat loss from a property is through the roof. Replace any old insulation with new insulation, preferably of around 200mm thickness or more.

Window frames

Single glazed windows, particularly those with steel frames, can lose a great deal of heat. Consideration should be given to replacement with PVCu or wooden framed double glazed units.

Curtains

Lined curtains, or the heavier full length curtains, can provide excellent insulation. However, always ensure that the curtains do not drape over radiators.

Draughts

Try to ensure that draughts around doors, windows, letterboxes and keyholes etc., are reduced by using a suitable draught excluder. **WARNING** – Do not block or seal any air vents that are installed to ensure the central heating boiler operates safely.

Room thermostats

Reducing the setting of the room thermostat by 1°C can reduce fuel consumption by up to 10%.

New control systems

Upgrade your heating control system with the latest equipment available. The minimum level of control for a combi boiler or fully pumped

system is a programmer, interlocking room thermostat and thermostatic radiator valves.

Radiators

If radiators are fitted on an outside wall, fitting reflective foil paper to the wall behind the radiator will reduce heat loss through the wall behind the radiator.

Solar panels

The addition of solar water heating panels to your system could provide up to 70% of your annual hot water requirements from a renewable and free energy source.

The famous Bosch quality

As part of the worldwide Bosch Group, Worcester is renowned for superlative quality, reliability and customer service.



Working for a cleaner environment

Worcester is also providing further significant energy-saving and environmental benefits through the introduction of a range of renewable technology products for UK homes.

All the reassurance of a complete after-sales service

Worcester quality applies not only to the design and manufacture of

every boiler, but also to standards of after-sales service, expert help is only a telephone call away. Along with excellent parts availability, your guarantee and the extended warranty options, it is further proof that a boiler made by Worcester is made to be the best.

Picture a greener future

To help children understand the impact of global warming and the ways in which we can all help to reduce energy wastage and harmful emissions in



everyday life, Worcester has produced a children's book. If you would like a free copy, simply call 01905 752556 or visit www.worcester-bosch.co.uk

Visit the website

Our website at www.worcester-bosch.co.uk has useful information including downloadable operating instructions for your boiler and controls. There is also a section where you can locate an installer in your area.