



Greenstore LECP ground source heat pump series



Worcester and you. Making a difference.

As part of the Bosch Group, Worcester products are designed and manufactured to provide customers with the highest levels of quality and reliability which are synonymous with the Bosch name.

Worcester is a part of Europe's largest supplier of heating products and with our UK-based resources as well as the Bosch Group's global infrastructure, we can offer you the value-added solutions you deserve. Worcester employs a nationwide network of Service Engineers and technically trained Field Sales Managers, supported by an

experienced technical services team which is able to provide comprehensive support and advice from designing system layouts through to installation.

Worcester is dedicated to providing high performance, energy efficient heating and hot water systems for a wide range of installations. Our oil manufacturing heritage stretches back to the foundation of the company in 1962 and during this period we have built a reputation for manufacturing products which offer the end user the highest levels of quality and reliability.



BOSCH

Invented for life



The reception and main entrance
at our Worcester headquarters

"At Worcester we recognise the vital role you play in the specification and installation of energy efficient appliances in homes across the UK. We will continue to invest in our products, people, facilities and added value services to ensure you have all you require in order to deliver only the best solutions to your customers' requirements."

Carl Arntzen,
Managing Director,
Bosch Thermotechnology Ltd.

Contents	Page
Greenstore LECP ground source heat pump series	4 - 5
Features at a glance	5
Features and benefits	6 - 7
Improvements to the series	7 - 8
Principles of operation	9
ErP easy as ABC	10 - 11
Renewable Heat Incentive (RHI) Scheme	12 - 13
System layouts	14 - 15
Inside story – System ground source heat pump	16 - 17
Inside story – Combination ground source heat pump	18 - 19
Is a heat pump suitable for the property?	20 - 21
Regulations and standards	22
Groundworks and collectors	23 - 26
Frequently asked questions	27
Accessories	28
Worcester Greenskies solar thermal panels	29
Training	30 - 32
After-sales	33



The Certification Mark for Onsite Sustainable Energy Technologies

Greenstore LECP ground source heat pump series

The Greenstore low energy circulation pump (LECP) ground source heat pump is the latest ground source heat pump range from Worcester to meet future legislation, while allowing consumers to take advantage of renewable and sustainable energy. Our ground source heat pumps make use of the energy emitted from the sun which is absorbed by the earth. This thermal energy is available below the surface and can be extracted by the heat pump.

By utilising the energy stored in the ground, in combination with a refrigerant circuit that is built into the heat pump, the ground source heat pump provides enough heat for the provision of heating or hot water for the home.

The system is made up of an energy collector placed in the ground, a ground source heat pump, a hot water cylinder (System only) and the space heating emitter for the property, preferably an underfloor heating system or, alternatively, radiators designed for the heat loss of each room.

Worcester heat pumps are available in two versions. The system version has been designed for use with a G3 approved Worcester Greenstore solar-ready cylinder for the production of hot water, whilst a G3 approved Combination model is available and includes a built-in 185 litre cylinder.

Reduced requirement for the purchase of fuels

By extracting stored energy from the ground and by using an electrically powered compressor within the unit, the LECP ground source heat pump does not require the use of additional fossil fuels and subsequently, when fitted in a property that is well insulated, helps towards reducing the rising prices that are often associated with them.

Integrated additional heater

Worcester heat pumps should be sized to be the sole source of heating and hot water production for the home giving the homeowner the option of removing the existing heat source from the property. In all our Greenstore products we have an integrated additional heater to supplement in extreme temperatures. Additionally, the Greenstore ground source heat pump can be combined with an external heat source e.g. an oil-fired or LPG boiler, with a maximum input of 25kW. This can be achieved via a 230 VAC connection and an additional I0B board connection.

High performance renewable technology

Greenstore LECP ground source heat pumps feature a highly efficient and effective scroll-type compressor which allows up to 65°C flow temperature from the appliance. This higher output temperature allows Worcester heat pumps to be effectively combined with radiators, which should be designed for the heat loss of each room. Heat pumps run more efficiently when run at lower temperatures i.e. 50°C for radiators and 35°C on underfloor heating.

Grants and incentives

Renewable Heat Incentive (RHI)

Any owner-occupier, private landlord, provider of social housing, third party owner of a heating system and self-builder who is looking to enhance their current heating system with renewable technology, such as a Greenstore ground source heat pump, or who has installed any such technology since 15th July 2009, will be eligible for the tariffs if installed to MCS standard (see pages 12-13 for further details).



Example of horizontal collector system



Example of bore hole collector system

Green Deal

All Worcester Greensource heat pumps are eligible for the Green Deal incentive, providing the installer is an authorised Green Deal installer. For information about the scheme you can visit
www.decc.gov.uk/greendeal

Greenstore LECP ground source heat pumps at a glance

	Greenstore 6 System	Greenstore 7 System	Greenstore 9 System	Greenstore 11 System
Part No.	8 738 203 184	8 738 203 185	8 738 203 186	8 737 203 187
Output kW 0/35°C¹	5.4	6.6	8.7	10.2
Output kW 0/45°C¹	5.1	6.2	8.3	9.6
CoP* 0/35°C¹	3.96	3.82	3.84	3.97
CoP* 0/45°C¹	3.15	2.97	3.15	3.17
MCS certification no.	MCS HP0015/24	MCS HP0015/25	MCS HP0015/26	MCS HP0015/27
ErP Seasonal space heating energy efficiency class (flow temperature °C)	A+ (55°C) A++ (35°C)	A+ (55°C) A+ (35°C)	A+ (55°C) A++ (35°C)	A++ (55°C) A++ (35°C)
Integrated Weather Compensation – additional ErP system efficiency	1.5%	1.5%	1.5%	1.5%

	Greenstore 6 Combi	Greenstore 7 Combi	Greenstore 9 Combi	Greenstore 11 Combi
Part No.	7 716 180 025	7 716 180 026	7 716 180 027	7 716 180 028
Output kW 0/35°C¹	5.4	6.6	8.7	10.2
Output kW 0/45°C¹	5.1	6.2	8.3	9.6
CoP* 0/35°C¹	3.96	3.82	3.84	3.97
CoP* 0/45°C¹	3.15	2.97	3.15	3.17
Storage cylinder capacity	185 litres	185 litres	185 litres	185 litres
MCS certification no.	MCS HP0015/28	MCS HP0015/29	MCS HP0015/30	MCS HP0015/31
ErP Seasonal space heating energy efficiency class²	A+	A+	A+	A++
ErP Water heating energy efficiency class (declared load profile)	B (L)	B (L)	B (L)	B (L)
Integrated Weather Compensation – additional ErP system efficiency	1.5%	1.5%	1.5%	1.5%

Note: 0/35°C is used to designate in a situation where the collector side of the system generates a temperature of 0°C and the flow temperature from the heat pump is 35°C. 1) According to BS EN 14511. *Coefficient of Performance. 2) ErP space heating efficiency measured at 55°C for all Greenstore Combis

Features of the Greenstore LECP ground source heat pump series

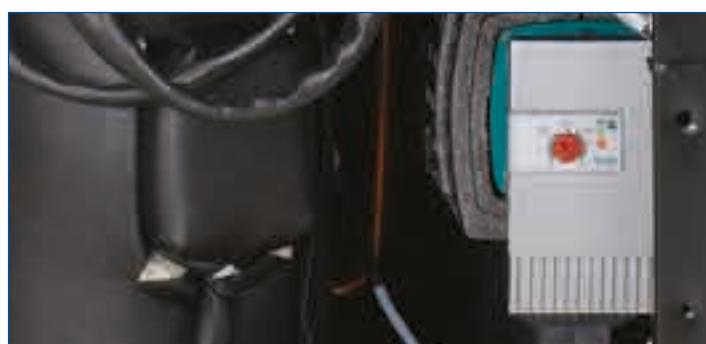


Greenstore LECP System ground source heat pump series

- Illuminated text display menu – easy for the user to operate
- Weather compensation (additional 1.5% ErP efficiency)
- Slow build-up compressor – saves electricity
- Low noise output – quiet operation
- Room controller (accessory) – shows outdoor temperature, as well as the ability to view and change room temperature setting
- Suitable for heating a swimming pool – subject to design conditions (IOB Multi-module box accessory required)
- 2 years' parts and labour guarantee* – peace-of-mind for your customer
- Mixed heating circuits – both underfloor and radiator systems can be combined via an optional accessory
- System heat pump series can be combined with solar thermal.



The Greenstore LECP ground source heat pump can be used to heat swimming pools



The ErP compliant low energy circulation pump means lower energy consumption and higher seasonal performance factors (SPF)

Key benefits for installers

- Ease of siting – no flue system required and no gas or oil-fired boiler needed
- Total heating and hot water solution – compatible with all Greenstar condensing boilers, Greenfloor heating and Greenskies solar water heating collectors and Greenstore compatible 280 litre cylinder (IOB Multi-module box accessory required)
- Expert installation advice – Worcester's design team can produce technical drawings and provide plot-specific schematics in the support of your installation

- MCS approved products – quality assurance (see page 5 for MCS Certification numbers)
- Can be used on mixed heating circuits.

Ease of installation and maintenance

- Easy access to components
- Compact design
- Error codes clearly displayed on Rego 1000 LCD screen.

Improvements to the Greenstore LECP ground source heat pump series

In addition to our own extensive testing and research, we also listen and respond to installers as part of our continuous product development programme.

As a result of such feedback, our latest Greenstore LECP ground source heat pumps incorporate a number of new innovative features which are beneficial to both the installer and the end user.

Annual heating cost reduction

Excellent CoP ratings with the option for an even greater return when combined with solar thermal or underfloor heating.

Improved Seasonal Performance Factor (SPF)

Our ground source heat pumps now use ErP compliant (LECP) low energy Class A circulation pumps for low energy consumption.

LCD controller

A room controller accessory enables flexible customer control from the controller itself and not directly from the heat pump.



Automatic Delta control – modulating pump instead of fixed speed

No speed setting needed to obtain optimum differential between flow and return. The pump will modulate to maintain optimum temperature.

Enhanced Domestic Hot Water (DHW) logic

An innovative DHW logic which increases DHW efficiency by adapting to customer usage (quick or slow tapping pattern) allows for an improved SPF.

Swimming pool control

The Rego 1000 control has the facility to control heat for a swimming pool via an external heat exchanger.

Ability to cascade

The Greenstore heat pumps have the ability to cascade two of the same output[†] up to 22kWs without any additional accessories – perfect for large domestic properties and light commercial/non-domestic properties.



Controls – Rego 1000

Greenstore LECP ground source heat pumps are controlled by the in-built Rego 1000 control unit. The unit ensures that the heat pump runs efficiently and that the hot water heating is given priority over space heating.



Rego 1000 control unit

Standard controls functions

- One unmixed and one mixed heating curve
- Cascade of two heat pumps of the same output*
- Step electrical heater (3, 6 and 9kW)
- DHW circulation
- Summary alarm output
- Delta T control of heating circulating pump.

Dynamic pump control – energy-saving start/stop function

- The Rego 1000 control unit senses when heat is required, while also having the ability to stop the pump during periods when there is no demand.

Accessory control functions – IOB Multi-module control box

The IOB Multi-module control box (part number 8 738 204 316) allows installers to achieve the following:

- Up to three mixed heating curves (two added to standard mixed heating curve, giving a total maximum of three)
- Electric heater in DHW cylinder
- Swimming pool control.



Additional electrical heater in three steps 3/6/9kW that is controlled automatically by control unit

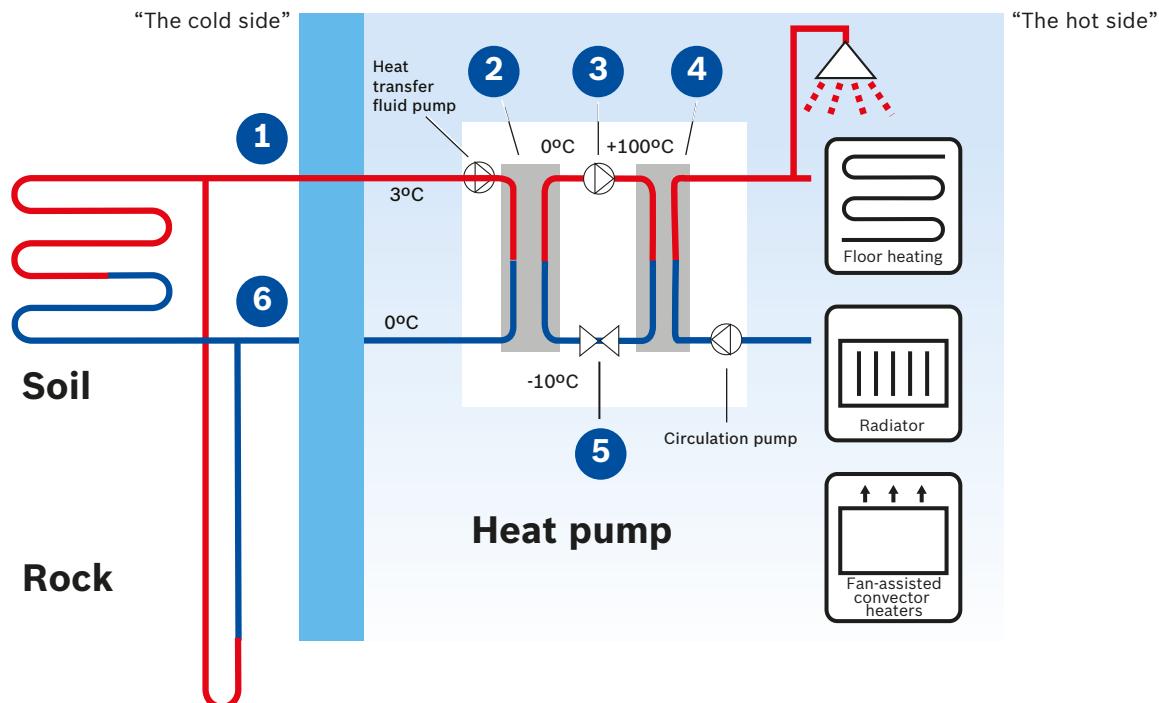
Outdoor sensor

- The heat pump is controlled with an outdoor sensor (fitted on a north-facing wall) which determines the temperature outside the property and relays this back to the heat pump
- The control on the heat pump uses a heat curve to provide a matching flow temperature from the appliance, the heat pump always endeavours to provide the lowest flow temperature possible whilst maintaining the desired room temperatures.

Room sensor

In addition to the outdoor sensor, a room controller (accessory) supplements the control of the heat pump in the property. This allows the controller to compare the internal and external temperatures and to provide the best possible energy savings.

Principles of operation



- 1 As the heat transfer fluid, which is a mixture of water and glycol, goes into the unit, the heat pump collects stored solar energy. This anti-freeze mixture absorbs the heat from the earth and is fed into the evaporator. The temperature is on average around 3-5°C.
- 2 In the evaporator, the heat transfer fluid meets the refrigerant. At this stage, the refrigerant is in a fluid state and is at approximately -10°C. When the refrigerant meets the heat transfer fluid it starts to boil. The subsequent vapour produced, which is approximately 0°C, is fed into the compressor.
- 3 In the compressor, the pressure of the refrigerant increases and the vapour temperature rises from 0°C to approximately +100°C. The hot gas is then forced into the condenser.
- 4 The condenser then transfers the heat to the heating (e.g. underfloor heating or radiators etc.) and hot water system. The vapour is cooled in the condenser and becomes a liquid. The pressure in the refrigerant is still high when it reaches the expansion valve.
- 5 Once in the expansion valve, the refrigerant pressure is lowered and the temperature drops to approximately -10°C. When the refrigerant passes the valve and the evaporator, it changes to vapour again.
- 6 The heat transfer fluid is led out from the heat pump to the ground loop, where it collects the new stored solar energy. The temperature of the fluid is approximately 3°C cooler than the flow in.

ErP easy as ABC

What is ErP?

The ErP Directive, which is a new regulation set by the European Union, is designed to drive improvements in the efficiency and performance of heating and hot water products. Its purpose is to ensure that end users are aware of the level of energy efficiency inherent within their appliances. As such, the Directive will help improve the overall efficiency of the housing stock, while helping homeowners to reduce their energy bills. The ErP regulations cover boilers, combination boilers, water heaters and other heating appliances up to 400kW.



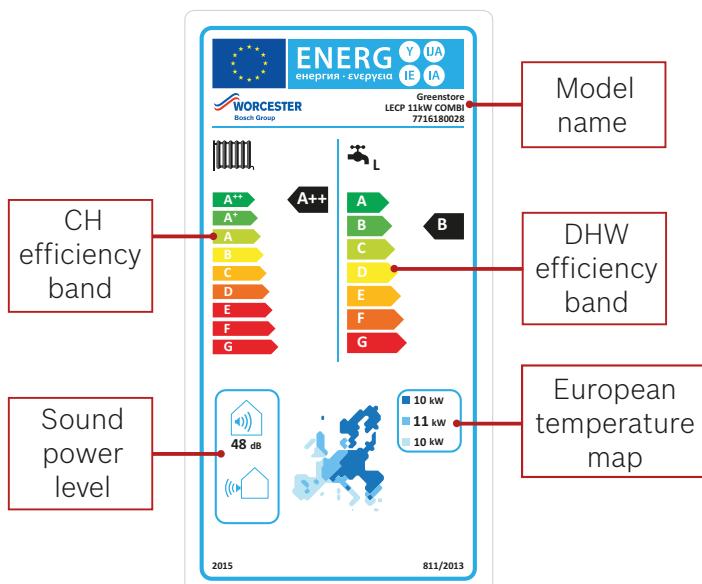
What is Energy Labelling?

The Energy Labelling involves a label which we are familiar with today on washing machines and televisions at the point of sale. The Energy Labelling regulations introduce Europe-wide energy labelling requirements for boilers, combination boilers, water heaters and other heating products up to 70kW and hot water cylinders under 500 litres.

How will the labelling scheme work?

The new Energy Labelling Directive will introduce new efficiency classes with from A++ to G for heating and A to G for hot water, alongside the existing CoP and SCOP ratings for heat pumps in the domestic and light commercial sectors.

Most system heat pumps will likely be in the A+ or A++ bands for central heating (depending on flow temperature). Combination heat pumps, in addition to heating, will typically achieve ErP efficiency class B for hot water production.



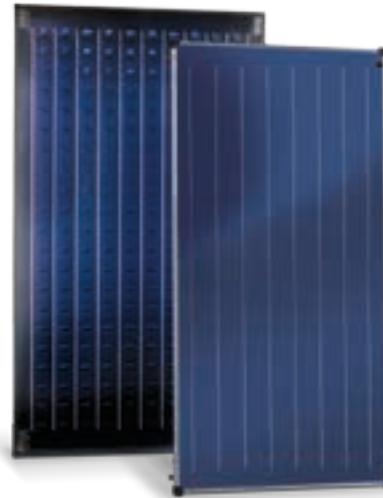
What about systems that contain different products?

In these circumstances, there is a responsibility to provide a system label when combining a heating appliance with a temperature control and/or solar device with a cylinder or a supplementary boiler acting as a back-up heating appliance.

The person who puts that package together will need to produce a package document known as a fiche (data table) and label that provides the combined energy efficiency rating rather than ratings of each individual component.

For example, this could be the merchant's responsibility if they supply a complete package under one part number or the installer if the items are bought individually under separate part numbers.

In either circumstance, Worcester will provide an online tool that makes calculating the overall package efficiency of a Worcester system effortless.



ErP easy as ABC with Worcester

The Energy Related Products (ErP) Directive came into force on the 26th September 2015. Worcester has a number of measures in place to support you including:

- ✓ An **online label generator** which creates product and heating system labels
- ✓ ErP will be covered in all **Worcester training courses**
- ✓ **ErP experts** – our technical and customer support teams can answer all your questions.

ErP Technical Support: **0330 123 3641**

Email: **ErP-advice@uk.bosch.com**





Renewable Heat Incentive (RHI) Scheme for Domestic Properties

Overview

The Renewable Heat Incentive (RHI) scheme for industry, business and the public sector was introduced by the Government in November 2011 as part of its commitment to reduce the country's carbon emissions by 20% by 2020.

The scheme is now extended to domestic users who are able to generate and use renewable energy to heat their properties.

This provides installers with an opportunity to inform homeowners of the RHI scheme and the money they can expect to receive by switching, even in part, to approved renewable energy sources instead of using fossil fuels.

Who is eligible?

The domestic RHI scheme applies to both off-grid and on-grid properties in England, Scotland and Wales.

The scheme covers single domestic dwellings and is open to owner-occupiers, private landlords, registered providers of social housing, third party owners of heating systems and self-builders.

The scheme is open to all of the previous who have had applicable renewable technologies installed since 15th July 2009. However, applications will be dealt with on a phased basis over a period of time by the scheme administrator, Ofgem.

Who isn't eligible?

Housing developers are excluded from the scheme although it is possible that they could be eligible under the existing non-domestic scheme.

Tariffs

When discussing the RHI scheme with your customers, the first question you'll probably be asked is "how much will I get and for how long?"

Tariffs have been calculated by The Department of Energy and Climate Change (DECC) and will change annually in-line with the previous year's Retail Price Index.

All payments are made directly to the homeowner retrospectively every quarter over a period of seven years.

The tariffs are per kilowatt hour of renewable energy produced by each of the following technologies:

Renewable product	Price per kWh
Air Source Heat Pumps	7.42p per kWh
LECP Ground Source Heat Pumps	19.1p per kWh
Solar thermal	19.51p per kWh

Heat pumps and solar tariffs can be jointly claimed providing they are in the same property.

How will the payments be calculated?

Air and ground source heat pumps

The amount of renewable energy qualifying for payment is based on a deemed estimate of the heat demand from the property's Energy Performance Certificate (EPC). This is combined with an estimate of a heat pump's efficiency minus the energy required to run it.

Solar thermal

The amount of renewable energy qualifying for payment is based on a deemed estimate of the solar thermal performance completed as part of a Microgeneration Certification Scheme (MCS) installation.

Metering and monitoring incentive

Heat pump installations should be meter-ready wherever possible. To help improve the performance of renewable heating systems, there is an additional incentive for selected properties to have metering and monitoring service packages installed. For heat pumps this is £230 a year.

Space heating

Applications for space heating systems where there is already a back-up fossil-fuelled heating system in place, for example with a gas-fired condensing boiler, are required to install metering systems on which their RHI payments will be based. This also includes hybrid systems.

What criteria are required to apply for the scheme?

Training

All installations must be carried out by an MCS approved installer and meet the relevant standards for each technology. Worcester runs MCS, Green Deal and individual renewables product courses at each of its training academies. For further information visit www.worcester-bosch.co.uk/training or call 0330 123 0166.

Energy Performance Certificates (EPC)

In situations where the loft and cavity wall insulation have not been installed, the property's EPC will need to be updated when the work has been carried out. In properties where installation is not feasible, an EPC will also be required as proof.

The only exception is for self-builders whose properties will meet Building Regulation requirements for energy efficiency and will therefore already qualify for the scheme. They will, however, require an EPC to enable Ofgem to calculate payments.



Payments for energy from renewable products to householders will be made until 2021.

Please note: Renewable Heat Premium Payments or other public funds previously claimed for a system will be deducted from RHI payments.

System layouts

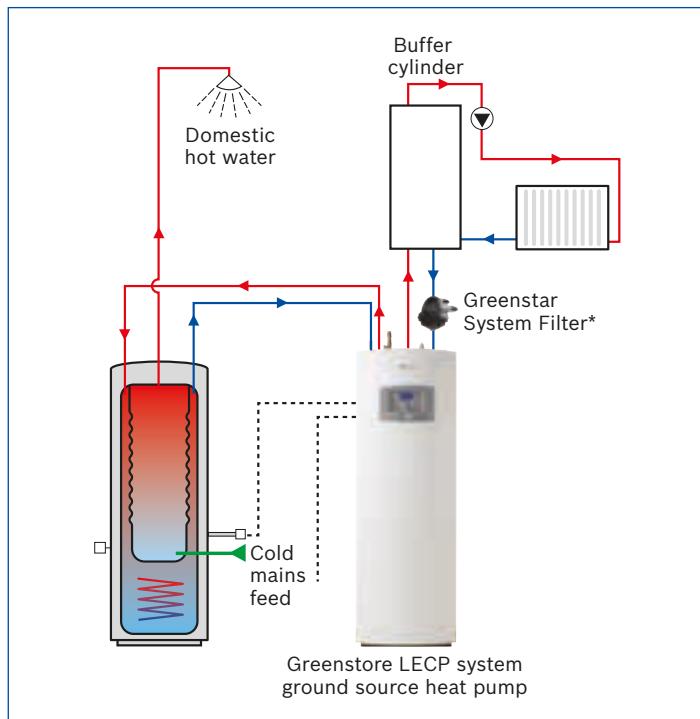
The Greenstore series of heat pumps have the versatility to be used in a variety of different system designs.

The Greenstore Combination models benefit from a built-in 185 litre cylinder of unvented DHW, providing a convenient heating and hot water solution in one product.

Greenstore ground source heat pumps and hot water cylinders

With this in mind, Worcester offers a Greenstore solar-compatible 280l cylinder with a tank-in-tank design for use with Greenstore System series heat pumps.

Hot water cylinders specifically designed for use with heat pumps must have a coil surface area of at least 3.0m² and pre-defined positions for the temperature sensor to ensure effective heat transfer. This ensures that the lower flow temperatures and small temperature differential do not adversely affect the re-heat time. Failure to do so could result in poor domestic hot water performance. This is especially important as the heat pump operates on hot water priority, meaning a long re-heat time would adversely affect household heating.

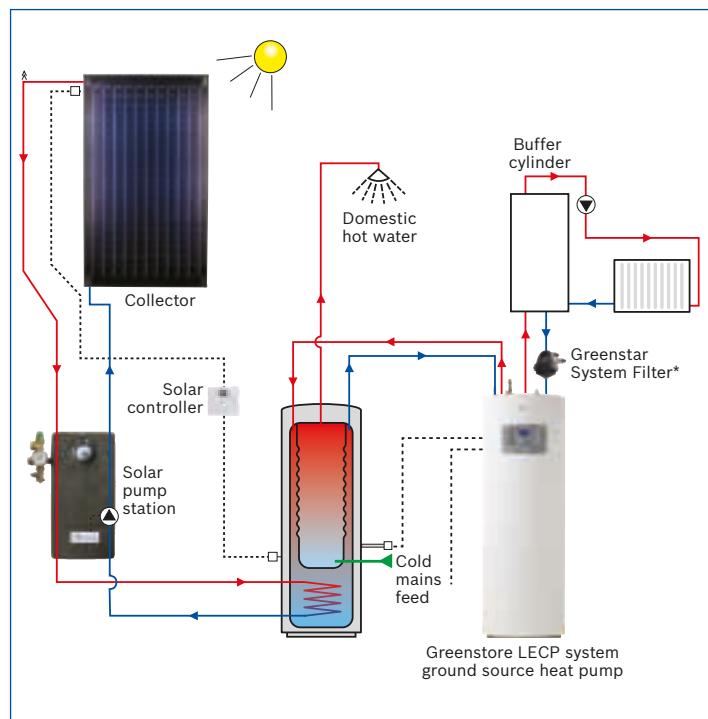


Greenstore ground source heat pumps with solar support

This particular system uses the same products as the previous system layout, but with the solar coil within the cylinder linked to a Worcester Greenskies solar system. The system allows each of the technologies involved to work together seamlessly. The advantage is that the heat pump is not required to be the sole provider of domestic hot water and therefore will have the opportunity to run at lower flow temperatures when the solar system is producing the hot water.

The heat pump will automatically support the solar system with DHW supply if demand means that additional heat is required.

A system like this (with solar integrated) would require an ErP system label and fiche to be produced and handed over to the end user. For more details see page 10.



Performance

Greenstore LECP ground source heat pumps feature a highly efficient and effective scroll-type compressor which allows up to 65°C flow temperature from the appliance if required. Greenstore LECP ground source heat pumps will deliver a higher CoP when used with a low temperature system, such as underfloor heating or appropriately sized radiator systems that are designed for low flow temperatures and have a larger heat exchanger area.

However, wherever possible Worcester recommends an underfloor heating system as the most compatible heat emitter system. The scroll compressor allows Worcester heat pumps to offer excellent CoP ratings.

Coefficient of Performance

The performance and efficiency of a heat pump system is commonly measured by the Coefficient of Performance.

The CoP is a simple calculation which works out how much energy the heat pump is able to extract from the energy source compared to the amount of electrical energy used by the heat pump.

$$\text{CoP} = \frac{\text{Heat output of system (useful heat)}}{\text{Electrical input from compressor and circulating pumps}}$$

$$\text{e.g. } \frac{9\text{kW heat pump}}{2.7\text{kW of electrical input}} = \text{CoP of 3.3}$$

The CoP depends on the temperature that can be extracted from the collector and the temperature required by the heating system of the property. The best combination for a high CoP would be a higher source temperature (e.g. 10°C) and a lower flow temperature for the heating (e.g. 35°C).

The return on the energy employed in this case is higher, since the heat pump has to increase the temperature by only 25°C. If the energy from the source is lower in temperature and the required flow temperature is higher, the CoP will be reduced.

The equation shown opposite results in 2.7kW of heat provided by the pump (which is provided by electrical consumption) and 6.3kW of energy extracted from the ground source.

	Greenstore 6 System	Greenstore 7 System	Greenstore 9 System	Greenstore 11 System
CoP* 0/35°C ¹⁾	3.96	3.82	3.84	3.97
CoP* 0/45°C ¹⁾	3.15	2.97	3.15	3.17

	Greenstore 6 Combi	Greenstore 7 Combi	Greenstore 9 Combi	Greenstore 11 Combi
CoP* 0/35°C ¹⁾	3.96	3.82	3.84	3.97
CoP* 0/45°C ¹⁾	3.15	2.97	3.15	3.17

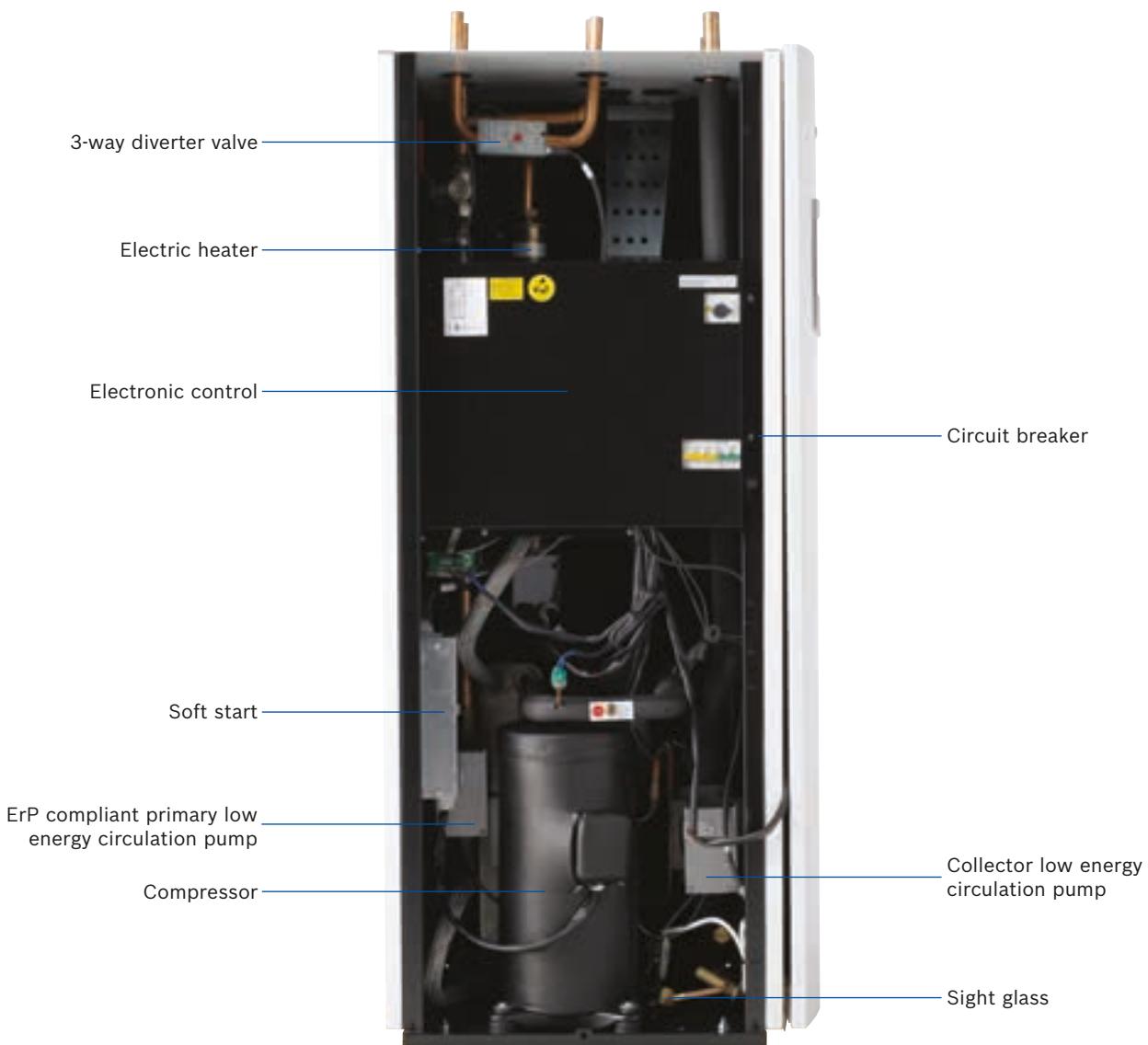
1) According to BS EN 14511

*Coefficient of Performance

Cylinder technical data

Part number	Energy efficiency class	Standing loss	Storage volume
120L buffer tank (for GSHP)			
8 718 544 081	B	52W	120 litres
Greenstore 280L solar compatible cylinder			
7 716 180 018	E	143W	481 litres

Inside story – Greenstore LECP System ground source heat pump



Greenstore LECP System ground source heat pump Rego 1000 control panel

Technical data

Model	Greenstore 6 System	Greenstore 7 System	Greenstore 9 System	Greenstore 11 System
Height	1,520mm	1,520mm	1,520mm	1,520mm
Width	600mm	600mm	600mm	600mm
Depth	645mm	645mm	645mm	645mm
Weight (without packaging)	150kg	155kg	165kg	175kg
Permitted operating temperature	10°C - 35°C	10°C - 35°C	10°C - 35°C	10°C - 35°C
ErP Sound power level (indoors)	44dBA	47dBA	49dBA	48dBA
ErP Seasonal space heating energy efficiency class (flow temperature °C)	A+ (55°C) A++ (35°C)	A+ (55°C) A+ (35°C)	A+ (55°C) A++ (35°C)	A++ (55°C) A++ (35°C)
ErP Seasonal space heating energy efficiency (%) (flow temperature °C)	55°C 35°C	117% 162%	107% 148%	110% 155%
Integrated Weather Compensation - additional ErP system efficiency	1.5%	1.5%	1.5%	1.5%
Mode fluid/water				
Heat output (B0/W35)¹⁾	5.4kW	6.6kW	8.7kW	10.2kW
Heating output (B0/W45)¹⁾	5.1kW	6.2kW	8.3kW	9.6kW
Heat transfer fluid				
Nominal flow (delta_T = 3K²⁾)	0.20 l/s	0.41 l/s	0.50 l/s	0.62 l/s
Permitted external pressure drop²⁾	47kPa	43kPa	80kPa	91kPa
Maximum pressure	4bar	4bar	4bar	4bar
Internal pipework contents	5 litres	5 litres	5 litres	5 litres
Operating temperature	-5°C - +20°C	-5°C - +20°C	-5°C - +20°C	-5°C - +20°C
Connection (Cu)	28mm	28mm	28mm	28mm
Compressor				
Type	Mitsubishi scroll	Mitsubishi scroll	Mitsubishi scroll	Mitsubishi scroll
Refrigerant R407c³⁾	1.6kg	1.6kg	1.8kg	2.4kg
Maximum pressure	31bar	31bar	31bar	31bar
Compressor oil	FV 50S	FV 50S	FV 50S	FV 50S
Heating system				
Nominal flow (delta_T = 7K)	0.20 l/s	0.25 l/s	0.31 l/s	0.38 l/s
Minimum flow temperature	20°C	20°C	20°C	20°C
Maximum flow temperature	65°C	65°C	65°C	65°C
Minimum permitted operating pressure	0.5bar	0.5bar	0.5bar	0.5bar
Maximum permitted operating pressure	3bar	3bar	3bar	3bar
Primary water content	7 litres	7 litres	7 litres	7 litres
Connection (Cu)	22mm	22mm	22mm	22mm
Values for electrical connection				
Electrical supply	230V 1N~50Hz	230V 1N~50Hz	230V 1N~50Hz	230V 1N~50Hz
Fuse, slow; with electric additional heat 3/6/9kW⁴⁾	25/40/63A	32/40/63A	32/50/63A	40/50/63A
Nominal power consumption compressor (B0/W35)	1.17kW	1.48kW	1.78kW	2.09kW
Maximum current with soft starter	<35A	<35A	<35A	<35A
Enclosure class	IP X1	IP X1	IP X1	IP X1

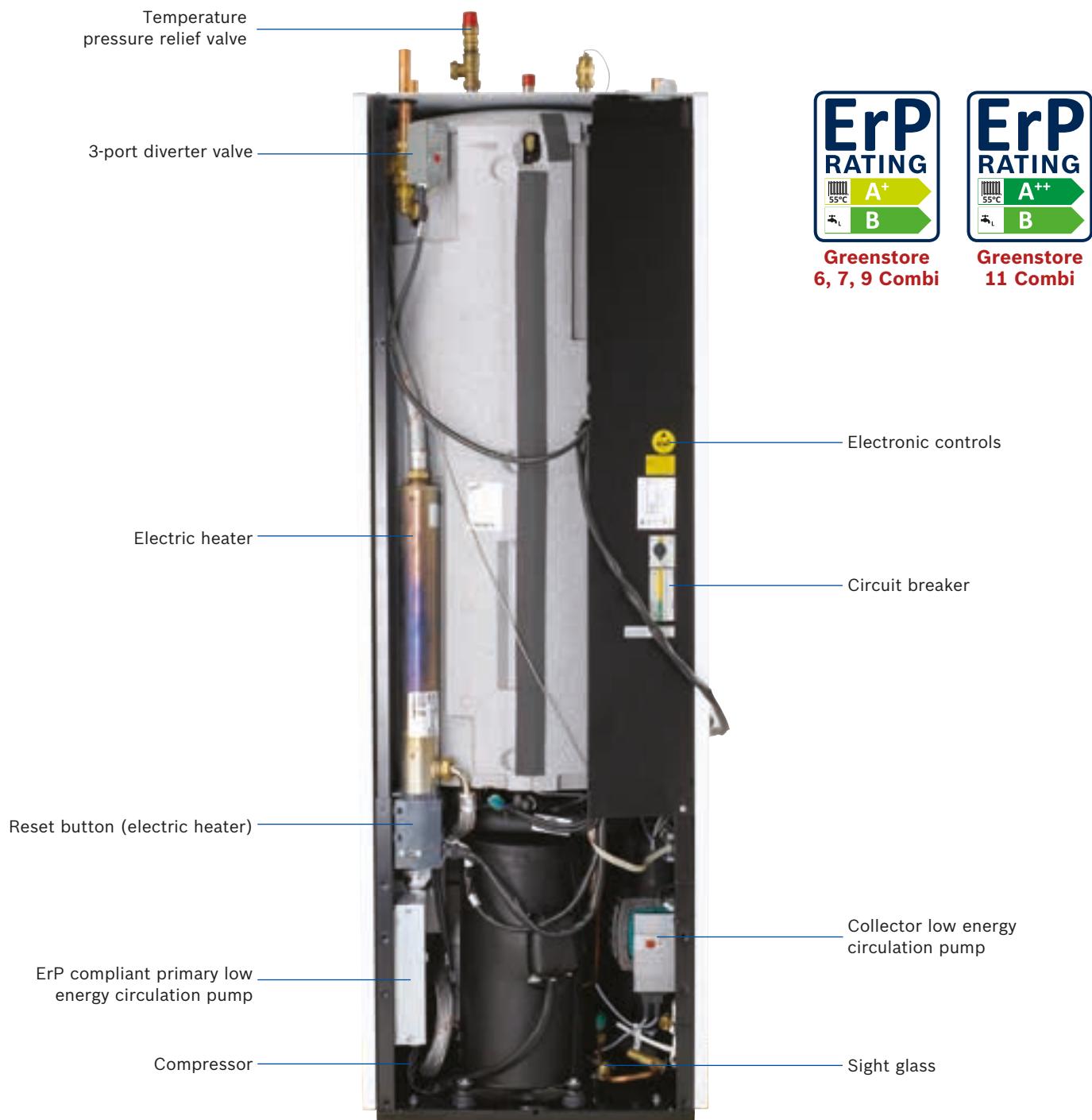
1) With internal pump according to EN 14511

3) Global Warming Potential. GWP₁₀₀ = 1526

2) Glycol mix

4) aM type fuse. D characteristic MCB

Inside story – Greenstore LECP Combination ground source heat pump



Greenstore LECP Combination ground source heat pump Rego 1000 control panel

Technical data

Model	Greenstore 6 Combi	Greenstore 7 Combi	Greenstore 9 Combi	Greenstore 11 Combi
Height	1,800mm	1,800mm	1,800mm	1,800mm
Width	600mm	600mm	600mm	600mm
Depth	645mm	645mm	645mm	645mm
Weight (without packaging)	200kg	202kg	210kg	218kg
Permitted operating temperature	10°C - 35°C	10°C - 35°C	10°C - 35°C	10°C - 35°C
ErP Sound power level (indoors)	44dBA	47dBA	49dBA	48dBA
ErP Seasonal space heating energy efficiency class¹⁾	A+	A+	A+	A++
ErP Seasonal space heating energy efficiency (%)¹⁾	117%	107%	110%	125%
ErP Water heating energy efficiency class (declared load profile)	B (L)	B (L)	B (L)	B (L)
Mode fluid/water				
Heating output (B0/W35)²⁾	5.4kW	6.6kW	8.7kW	10.2kW
Heating output (B0/W45)²⁾	5.1kW	6.2kW	8.3kW	9.6kW
Heat transfer fluid				
Nominal flow (delta_T = 3K³⁾)	0.20 l/s	0.41 l/s	0.50 l/s	0.62 l/s
Permitted external pressure drop³⁾	47kPa	43kPa	80kPa	91kPa
Maximum pressure	4bar	4bar	4bar	4bar
Internal pipework contents	5 litres	5 litres	5 litres	5 litres
Operating temperature	-5°C - +20°C	-5°C - +20°C	-5°C - +20°C	-5°C - +20°C
Connection (Cu)	28mm	28mm	28mm	28mm
Compressor				
Type	Mitsubishi scroll	Mitsubishi scroll	Mitsubishi scroll	Mitsubishi scroll
Refrigerant R407c⁴⁾	1.6kg	1.6kg	1.8kg	2.4kg
Maximum pressure	31bar	31bar	31bar	31bar
Compressor oil	FV 50S	FV 50S	FV 50S	FV 50S
Heating system				
Nominal flow (delta_T = 7K)	0.20 l/s	0.25 l/s	0.31 l/s	0.38 l/s
Minimum/maximum flow temperature	20/65°C	20/65°C	20/65°C	20/65°C
Minimum permitted operating pressure	0.5bar	0.5bar	0.5bar	0.5bar
Maximum permitted operating pressure	3bar	3bar	3bar	3bar
Heating water incl. outer shell hot water heater	47 litres	47 litres	47 litres	47 litres
Connection (Cu)	22mm	22mm	22mm	22mm
Hot water				
Maximum output with/without electric additional heat (9kW)	5.0/14.0kW	6.6/15.6kW	8.7/17.7kW	10.2/19.2kW
Domestic hot water	185 litres	185 litres	185 litres	185 litres
Minimum/maximum permitted operating pressure	2/10bar	2/10bar	2/10bar	2/10bar
Connection (stainless steel)	22mm	22mm	22mm	22mm
Values for electrical connection				
Electrical supply	230V 1N~50Hz	230V 1N~50Hz	230V 1N~50Hz	230V 1N~50Hz
Fuse, slow; with electric additional heat 3/6/9kW⁵⁾	25/40/63A	32/40/63A	32/50/63A	40/50/63A
Nominal power consumption compressor (B0/W35)	1.17kW	1.48kW	1.78kW	2.09kW
Maximum current with soft starter	<35A	<35A	<35A	<35A
Enclosure class	IP X1	IP X1	IP X1	IP X1

1) ErP space heating efficiency measured at 55°C for all Greenstore Combis

2) With internal pump according to EN 14511

3) Glycol mix

4) Global Warming Potential. GWP₁₀₀ = 1526

5) aM type fuse. D characteristic MCB

Is a heat pump suitable for the property?

Pre-installation

Ground source heat pump operation

As the outside temperature gets colder, the heat demand of a property increases and the output of a ground source heat pump will decrease. Eventually it becomes so cold outside that the output of the heat pump alone is not able to heat the building effectively. The Greenstore range of ground source heat pumps therefore allows for monoenergetic and bivalent operation.

Monoenergetic means that in the event of very low external ground temperatures, a 3-stage supplementary electric heater in the indoor unit will automatically be activated to provide additional heat to supplement the heat pump and keep the building warm.

In bivalent operation a second heating appliance (e.g. gas or oil boiler) is used to supplement the heat load.

Selection and sizing of a heat pump

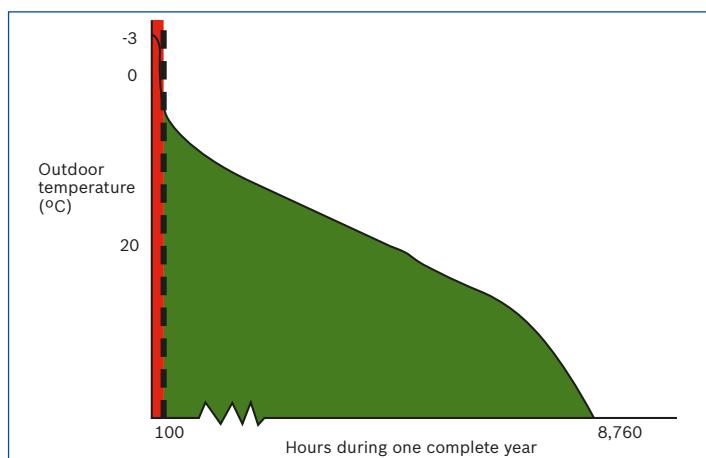
It is essential that heat pump systems are designed to operate efficiently in order to meet the heating needs of the property and the expectations of the customer. In order to achieve this, the following design activities must be completed prior to installation:-

- Pre-design assessment – Determine the suitability of a heat pump system for the building based on the customer requirements, expectations and building type.
- Detailed design – Complete building heat loss calculations and domestic hot water usage assessment.
- Specification – Select a suitable heat pump and system components based on the detailed design. Calculate and communicate the predicted energy use and running costs of the system to the customer.

A suitable design methodology for the above is detailed in MIS 3005, the Microgeneration Certification Scheme (MCS) heat pump installer standard. Worcester, Bosch Group recommended that this standard is followed for heat pump systems. The standard covers the design, installation and commissioning requirements to ensure that 100% of the building heat loss can be met efficiently by the heat pump system. A heat pump system must be designed to this standard to be eligible for government financial incentives e.g Renewable Heat Incentive (RHI).

The graph below is intended to show the principle behind the sizing of heat pumps to take into account the small number of hours where the peak heating load of the property is required. The dotted vertical line shows that there have, in the example shown, only been 100 hours of outdoor temperature below 0°C in the given 8,760 hours.

There are significant climatic differences across the UK and this example is not intended to provide information on any particular installation. The Worcester system design service is able to provide information on an individual basis.



The Worcester Bosch Group design team offer a heat pump sizing service which is MCS compliant. To request this service, download and submit the form using the guidance notes from our website address: www.worcester-bosch.co.uk/hp

Heat loss

The total heat loss of the property is calculated from the addition of fabric and ventilation heat losses. Fabric heat loss is the transmission of heat by conduction through the building structure, i.e. windows, walls, roof and floor. Ventilation heat loss is heated air escaping from the property and being replaced by cold air from outside.



Calculating the heat loss of the property

It is essential to accurately calculate the heat loss of the property to ensure correct sizing of the heat pump system. The heat loss is dependent on the construction of the building, room sizes, external and internal design temperatures and air change rates. The heat loss calculations should satisfy the requirements of BS EN 12831.

Estimating heat loss

Estimating the heat loss of the property is useful in determining the suitability of a heat pump system. However, assumptions based on floor area (e.g. 50 W/m² for new build etc.) and SAP (the governments Standard Assessment Procedure) should not be used for the detailed design and specification stage. It should be noted that the heat loss for non-standard properties i.e. buildings with large areas of glazing, high ceilings, log burners etc. or properties in exposed locations may deviate significantly from any rules of thumb.

In existing properties, boilers are often oversized and should therefore not be used to determine the actual heat requirements of the building. However, estimates may be made on the basis of the existing energy consumption of the space to be heated.

This installation manual does not cover all the necessary details to calculate the heat loss. The information given here is provided to remind the heating system designer and installer of the process and considerations.

Heat emitters

Worcester, Bosch Group heat pumps are fitted with weather compensation controls as standard. However, for a heat pump to perform to its highest energy efficiency, the central heating emitter circuit should be designed so that the flow temperature is as low as possible.

As a guide, the system should be designed using the following maximum flow temperatures:

- Underfloor heating: 35-40°C
- Radiators: 45-50°C

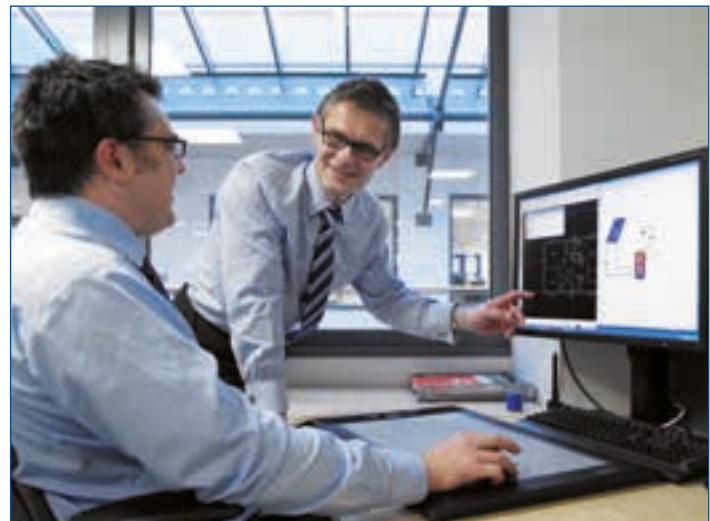
If underfloor heating has been installed, it is important to remember that the underfloor system designer should have been informed that the heat source will be from a ground source heat pump. It is also important to remember that radiators should have been correctly sized to work effectively with lower flow temperatures.

A tool to aid installers and end users to understand the relevance of building heat loss and heat emitter selection on heat pump performance, has been created by the joint trade associations. The 'Heat Emitter Guide' can be downloaded from the following website:

www.microgenerationcertification.org

Worcester Design Service

Worcester's design team offers design support across all of the Worcester, Bosch Group product range. The design team produces technical drawings and provides specification advice for a range of customers. All of our team are authorised SAP assessors and hold a IDHEE Domestic Heating Certificate. Worcester provides a range of indemnified design solutions in support of our core range of Greenstar gas- and oil-fired boilers and a growing portfolio of renewable technologies, including Greenskies solar thermal panels and Greensource air source heat pumps.



The Design Service for Worcester Greenstore ground source heat pumps includes calculations for:

- Heat pump sizing
- Collector sizing
- Estimated annual running costs information to apply for the RHI.

For more information on the suitability of a heat pump for your home, visit www.worcester-bosch.co.uk

Worcester on-site technical expertise

Worcester has a team of technical representatives based at head office for telephone assistance and national coverage of technical representatives available for on-site assistance.

Regulations and standards

Installation of this heat pump should be done in accordance with MCS/MIS 3005.

This appliance must be installed and serviced only by a competent person in accordance with the current: IEE Regulations, Building Regulation, Building Standards (Scotland) (Consolidation), Building Regulations (Northern Ireland), local water by-laws, Health & Safety Document 63S (The Electricity at Work Regulations 1989), IS 813 (Eire) and other local requirements.

The relevant Standards should be followed, including:

- BS7074:1: Code of practice for domestic and hot water supply
- EN:12828: Central heating for domestic premises
- BS7593: Treatment of water in domestic hot water central heating systems
- BS814 EN 14511: Heat pump requirements for space heating
- BS EN 378: Safety and environmental requirements for heat pumps
- The Health and Safety at Work Act 1974
- The Management of Health and Safety at Work Regulations 1999
- The Construction (Health, Safety and Welfare) Regulations 1996
- The Construction (Design and Management) Regulations 1994
- The Lifting Operations and Lifting Equipment Regulations 1998

Where no specific instruction is given, reference should be made to the relevant Codes of Practice.

Potable water: All seals, joints, compounds (including flux and solder) and components used as part of the secondary domestic water system must be approved for use with potable water supplies.

This is to certify that the above ranges of products manufactured by Bosch Thermotechnology Ltd have been tested and found to comply with:

- The requirements of the (Water Fittings) Regulations 1999 for England and Wales, the Water Byelaws 2000, Scotland and the Water Regulations Northern Ireland.
- The requirements of the UK Building Regulations: The Building Regulations 1991 (England & Wales) Requirements G3, L1 and Regulation 7. The Building Standards (Scotland) Regulations 1990. Regulation 10 (B2), 22 (J3.3a and J3.4), 27 and 28 (P2.6 and P3). The Building Regulations (Northern Ireland) 2000.

In accordance with current EU legislation (the F-gas regulation, EC Regulation No 842/2006 which came into effect on 4 July 2006), a heat pump that contains more than 3 kg of refrigerant R410A must be checked regularly by an accredited technician.

The manufacturer's notes must not be taken in any way as overriding statutory regulations.

Groundworks and collectors

Survey

It is strongly recommended that a ground survey is carried out to identify any service/utility pipes or other underground obstacles in the area before any groundworks commence. To ensure accurate sizing of the ground array, for either horizontal collectors or borehole (vertical) collectors, and to determine the Lambda values, a full geological report must be carried out in accordance with MIS 3005.

Groundwork considerations

All groundworks must be carried out with the proper safety considerations appropriate to the depth of any trench work being carried out. Shuttering must be considered on steep sided trenches where people will be working.

Ground loop connections – horizontal and vertical

Pipework connecting collectors to the appliance should be buried to a depth of between 800mm and 1,200mm. It must be insulated in accordance with the recommendations made in the insulation section (see following page).

The minimum permitted bend radius is 1 metre.

Where possible, collector pipework should be run in the longest single lengths possible to reduce the number of connections in the system. The connections in 40mm PEM pipe can be made using ultrasonic welding equipment or using compression fittings.

Collector types

Horizontal collector

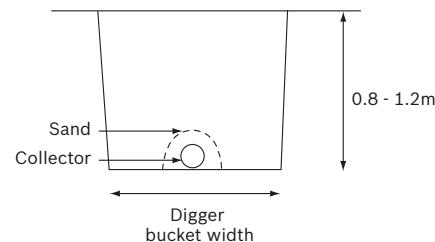
Horizontal collectors were the collection method originally introduced with ground source heat pumps. The horizontal collector recommended should have a 40mm diameter pipe.



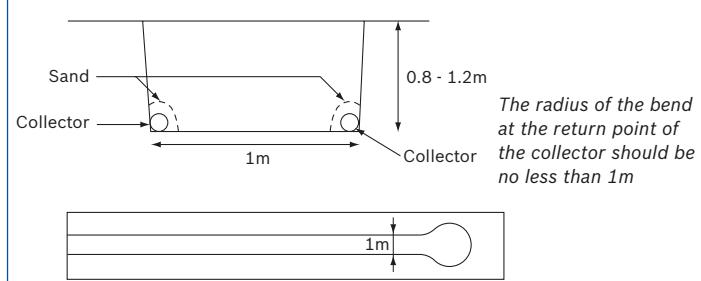
Compared to other options this method has a lower energy yield per metre of collector. As such, a larger collector length is often required.

The collector should be covered with 10cm of sand in case the material used when back filling contains sharp stones which may damage the collector. Sand should not be required where the earth to be backfilled contains smaller round stones.

This type of horizontal system typically provides between 10 and 18W of energy per metre of active collector. The lower figure in the range would apply if the heat pump is running all day whereas the higher figure would be typical of a system running a few hours per day. When sized to 100% of the peak load of the property, the energy drawn from the collector could be around 15W per metre.



Horizontal collector – single array in a trench



Horizontal collector – two pipes within a trench

Borehole (vertical) collectors

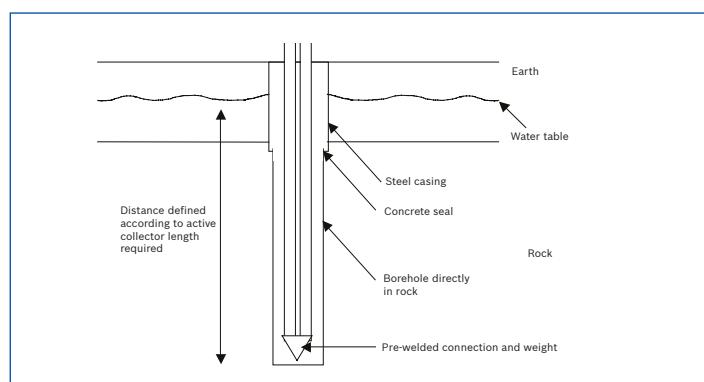
A borehole (vertical) collector allows a ground source heat pump to be installed in a property where the area of land available is insufficient for a horizontal collector.



Vertical collectors typically provide a higher energy yield per metre of active collector when compared to horizontal collectors.

These could provide between 35 and 55 Watts per metre of active collector, which depends on the heat conductivity of the rock into which the hole is drilled. A hard rock such as granite has a better conductivity than a softer rock such as limestone. The actual yield will depend, amongst other factors, on the geological conditions on site.

Pipework for vertical collectors may be supplied by the borehole contractor to the specification indicated in the pipework section.



Borehole (vertical) collectors cross-section

Borehole (vertical) option

This work needs to be carried out by a specialist contractor and we advise that you obtain a clear understanding of the work necessary before commencement.

The Worcester heat pump sizing software program used for estimating the length of boreholes, is based on the ground being rock and soil. Consequently, before proceeding with a borehole it is essential that a full Geological Prognosis Report is obtained from a reputable geological survey company. Your borehole contractor will either arrange this for you or will supply the name of a company they would recommend you use.

The report will provide essential details for the borehole driller with regard to the geological make up of the ground. This will determine the method of drilling, the length of boreholes and, if necessary, the number of boreholes required.

Suggested suppliers

Geological Prognosis Reports can be obtained from Carbon Zero Consulting, Tel: 0844 8550115 or GeoReports (BGS), Tel: 0115 9363143.

Some ground types require longer boreholes to collect the required amount of heat to ensure the heat pump runs effectively and efficiently. Where multiple boreholes serve one heat pump, it is essential as with ground loops, that all loops or boreholes are balanced with each other to give an equal flow rate of heat transfer fluid.

The borehole length specified in the Worcester heat pump sizing calculation is the active collector pipework. Additional pipework will be required to connect the active borehole and heat pump. Active collector describes pipework below the water table or in contact with a suitable thermal grout.

A list of ground work contractors can be found on the GSHPA website: www.gsdp.org.uk.

Sizing the vertical collector to the heat pump

The term active collector is used to denote collector pipe that is in direct contact with the ground source heat pump. For example below the water table or the thermal conductive grout which is in contact with a borehole filling material. Any part of the tube that is in contact with air will not generate a significant yield and must not be included when calculating the energy that the collector will provide.

However, it is a requirement when specifying the total length of tube needed to include the active collector, any inactive pipework (from the property to the borehole and back) and collector system.

It is considered good practice (and a requirement of the Environment Agency) to fill the borehole with a thermal conductive grout (e.g. a cement compound such as bentonite) in order to guarantee conduction of energy to the collector and to guard against disturbing rock strata or ground water layers.

The vertical collector should be filled with glycol mixture before being lowered into the borehole.

Borehole contractors

Specialist borehole contractors will be required for vertical collector installations. Contractors are normally able to drill the borehole and supply, fill and install the collector ready for the connection to be made by the installer. The collector must be filled before being lowered into the borehole. The contractor should be able to provide a geological survey of the area before drilling commences.

Insulation

All pipework from and to the non-active collector must be insulated with Class O insulation (nominal wall insulation of 19mm), especially when there is less than 0.8m separation between the pipes. Insulation which is to be buried must be robust enough to withstand the weight of the earth above it.

All pipework running to and from the collectors inside the property must also be insulated. In addition, all pipework outside the property must be insulated for at least 2 metres from the property. It is recommended that insulation is done prior to clipping pipes to walls to ensure complete coverage.

In some instances on pipework and exposed fittings, condensation may form and should be accounted for when choosing to site the product.

Collector system

Installation and filling

Installation and filling of the collector system should comply with applicable laws and current regulations, the MCS MIS 3005 standard should be referred to for guidance.

Soil used for refilling around the collector hose must not contain stones or other sharp objects.

Pressure test the collector system with water before refilling to ensure that the system is watertight.

When cutting the collector, it is important that no dirt or gravel enters the system. This can lead to blockages in the heat pump and damage to system components resulting in a lower performance from the heat pump. A biocide cleanser can be used to prevent blockages within the system prior to filling.

Filling unit

An in-line filling unit is included in the delivery and should be installed close to the collector circuit inlet.

Care should be taken to ensure that all connections remain clean and free from debris and all pipe ends must be capped when not in use. It is also important to ensure that pipe cuts are cut square and are fully deburred. It is recommended that hose pliers are used to make clean pipe cuts.

A fluid leak test should be made on all connections between the heat pump and the ground loop.

It is recommended that external pipework is marked to ensure that the correct connections are made at the heat pump indicating the flow and return.

Antifreeze/corrosion preventative

Frost protection to -15°C should be ensured. We recommend the primary use of bioethanol, otherwise propylene glycol.

Propylene glycol

Glycol is not normally used in the heating system. In special cases, where increased protection is required, glycol can be added with a maximum concentration of 15%. Heat pump performance will however decrease.

Mixing ratio in litres per metre of coil (40/35mm hose)		
Product	Water (l)	Antifreeze (l)
Propylene glycol	0.65	0.35

Mixing ratio in % by weight	
Product	Antifreeze (%)
Propylene glycol	35/65

For planning regulations and advice please see Energy Savings Trust website: www.energysavingtrust.org.uk and also the Micro Generation website: www.microgenerationcertification.org

Pipework

Appropriate pipework (PEM 40 x 2.4 SDR 11).

Ground loop testing and filling

The collectors should be pressure tested with water in line with MIS 3005 and the latest Building Regulations. A 40mm PEM pipe loop system should be tested to a pressure of 3-4bar over a period of 2 hours.

It is advisable the collector is pressurised (to 2bar) during the back filling process with water.

Care should be taken when disconnecting from the ground loop. Please ensure that the pressure is reduced fully before disconnection.

After filling the system with the required concentration of heat transfer fluid the filling pump should be run for an hour to ensure that all the air has been purged from the system. The system filter should also be checked and cleaned.



Worcester's Greenstar System Filter can be used with the LECP ground source heat pump.

Product info

Part number	7 716 192 609
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Frequently asked questions

What is sustainable energy?

Sustainable energy is best thought of as energy which can be replenished within a human lifetime and which causes no long-term damage to the environment.

Solar energy, wind energy, and geothermal energy, amongst others, are all self-sustaining. They all have sources that cannot be depleted. Extended use of these energy sources aids the conservation of other non-renewable energy sources such as fossil fuels.

How does a heat pump work?

The technology inside a heat pump works on similar principles to the way a domestic fridge works. Heat pumps take advantage of the principles of thermodynamics in order to achieve their results.

A water and glycol mixture is pumped around the collector circuit and causes the refrigerant in the evaporator to turn to gas. This refrigerant passes through the compressor, causing the temperature to rise significantly. The hot gas moves to the condenser where it condenses and the latent energy is released into the heating circuit.

How is energy collected from the ground?

There are two options to obtain the energy from the ground.

In a horizontal collector lengths of pipe are buried underground to a depth of around 1 or 2 metres. This is a good solution if the property in question has enough land to accommodate the collector.

An alternative to the horizontal collector type above is the vertical collector. A bore hole is drilled to a depth of

between 60 and 200m and the collector is fed into the hole. A vertical collector minimises the amount of land required on the surface for a collector.

What is the CoP?

The performance of a heat pump is often shown as the CoP or Coefficient of Performance. This relates to the amount of energy that is extracted from the ground for each unit of energy used to run the pump.

A heat pump could provide between 3 and 5kW of heat for each kW invested. The return is affected by the temperature achieved from the source and the heat required from the appliance to heat the property.

As an example if 3kW is provided by the electrically driven heat pump and 9kW is provided by the ground source the CoP would be 4. This equates to the total energy provided, in this case 12kW, divided by the electrical energy from the heat pump, in this case 3kW, giving the CoP of 4.

Do I still need a boiler?

In contrast to solar thermal which requires a boiler back-up a heat pump, in most circumstances, should be able to provide all of the heating and water required for the home.

What heat delivery method gives the best results?

Ideally a heat pump should be used with underfloor heating to maximize the efficiency of the system.

Can I keep my existing radiators?

Unless the radiators have already been oversized they will probably have to be replaced by larger ones to ensure a higher CoP from the heat pump.

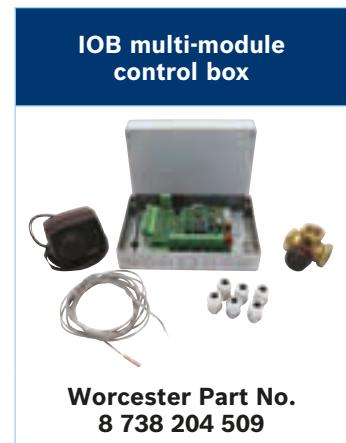
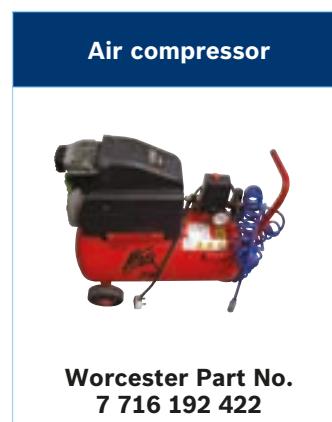
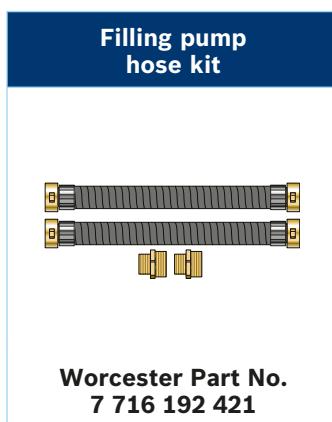
Greenstore LECP ground source heat pump



Heat pump	Part number
Greenstore LECP system ground source heat pump	
Greenstore 6 System	8 738 203 184
Greenstore 7 System	8 738 203 185
Greenstore 9 System	8 738 203 186
Greenstore 11 System	8 737 203 187

Greenstore LECP combi ground source heat pump	
Greenstore 6 Combi	7 716 180 025
Greenstore 7 Combi	7 716 180 026
Greenstore 9 Combi	7 716 180 027
Greenstore 11 Combi	7 716 180 028

Greenstore LECP ground source heat pump accessories





Worcester Greenskies solar thermal panels



Greenskies Solar-Lifestyle

The name, as it suggests, stands for a product which fits in with all of the lifestyle requirements of the homeowner. The Solar-Lifestyle collector boasts a modern, visually stunning one-piece collector design.

This collector is highly versatile as it can be installed in-roof, on-roof, and as a flat-roof or façade. It is also available in a portrait and landscape format. It provides a high level of efficiency and is the optimum choice for most installations.

The Greenskies Solar-Lifestyle collectors feature a whole range of Installer's Choice Design (ICD) accessories which make installation easier.

Best applications:

High performance all-rounder, visually pleasing with in-roof capabilities.



Greenskies Solar-Lito

The Lito collector offers the homeowner affordable solar hot water comfort, whilst also allowing flexible solutions for the installer.

Like the Lifestyle, the Greenskies Solar-Lito collectors also feature an attractive aluminium one-piece construction. This makes the collector lightweight, weighing in at a class-leading 30kg.

Best applications:

Affordable on-roof hot water solutions.

Total training experience from Land's End to John O'Groats

Worcester has always been committed to setting the industry standard for expert professional training and this is reflected in the scope and content of the courses, venues and options available.

We offer training on our entire range of domestic and commercial heating technologies as well as industry-led courses. All tuition is handled by expert heating specialists, combining classroom theory with, practical hands-on experience. Keep up-to-date with legislation and experience hands-on-training with our new technologies.

To increase your skills, expertise and value in the market place, trust Worcester's unique and proven total training concept.

Training centres throughout the UK

Worcester

Worcester's award-winning, state-of-the-art Training Academy is an innovative and spacious high tech training arena at our headquarters in Worcester. Facilities include open-plan domestic training areas with life-size single-storey brick buildings. Here installers can get to grips with Greenskies solar thermal systems working with Greenstar gas appliances, clearly demonstrating the importance of system design and operation.

Wakefield

Opened in Summer 2013, the Wakefield Training and Assessment Academy boasts a large gas laboratory which features our entire range of Greenstar gas-fired appliances, a flushing area, wet and dry boilers and a light commercial area with a cascade of Worcester GB162 boilers. There is a solar room with fully working components from our entire Greenskies solar range and a pitched roof for practical training, as well as a large commercial training room.

West Thurrock and Clay Cross

Further academies are located at West Thurrock in Essex and Clay Cross in Derbyshire, both of which offer a comprehensive choice of courses.

College-linked Learning

As well as offering training at our own centres, Worcester has established close partnerships with many colleges around the UK, equipping them with our latest products.

Worcester has worked closely with leading colleges and independent training centres for more than 20 years – a successful enterprise which in 2007 was enhanced further with the launch of the College Links Learning Scheme.

Mobile training

We can also bring training to you. We have mobile vehicles fully equipped with operational Greenstar gas-fired boilers, dry strip-down models and even a Greensource air to air heat pump. Our 7.5 tonne mobile oil vehicle is also available for hands-on oil product training and OFTEC assessments.

Call now for more information 0330 123 0166.



Heat pump product courses

All academies allow customers to gain hands-on experience with our entire range of renewable products and inform installers about the true benefits of installing heat pumps and underfloor heating. The introduction to heat pumps course is designed for installers and heating engineers who have no experience in installing heat pumps. The various one day heat pump courses are designed for those with more practical experience in heat pump technology.

Renewable courses

- **Introduction to heat pumps.**
- **Greenstore LECP ground source heat pumps.**
- **Greensource air to air heat pumps.**
- **Renewable range overview.**



	Intro to heat pumps	GSHP	AAHP	Renewable Overview
Duration	1 Day	1 Day	1 Day	1 Day
Cost	Free*	Free*	Free*	Free*
Training course covers				
Specification	✓	✓	✓	✓
Installation	✓	✓	✓	✗
Commissioning	✓	✓	✓	✗
Servicing	✓	✓	✓	✗
Maintenance	✓	✓	✓	✗
Product overview	✓	✓	✓	✓
System design	✓	✓	✓	✗
Course locations				
Worcester	✓	✓	✓	✓
Clay Cross	✓	✓	✓	✓
Wakefield	✓	✓	✓	✓
West Thurrock	✓	✓	✓	✓
College Links [†]	✓	✓	✓	✓
Mobile [†]	✗	✗	✓	✗

*A holding fee of £65 applies to free courses and is refunded on attendance of the course. If a booking is cancelled more than 10 working days before the course date, the fee will be fully refunded. The fee is non-refundable if a cancellation is made less than 10 working days before the course date.

[†]Please contact Worcester Training for specific colleges and mobile dates.

To complement the above courses, Worcester also runs the **Hot Water Systems and Safety course, IDHEE domestic heating design, QCF Level 3 Award and MCS Made Easy courses**. For more information turn to page 32.

Please note: it is recommended that unless you have experience installing/commissioning/servicing heat pumps or have worked previously with heat pump technology, that the one day introduction to heat pumps course be attended before commencing with any specific heat pump product courses.



Additional product and industry training courses

The diversity of products in today's heating industry gives you the opportunity to expand your expertise, whilst offering more choice to your customers. Worcester provides comprehensive training from all its academies on its entire range of technologies. Call us on **0330 123 0166** to order a full course training brochure or to book yourself onto a training course, alternatively, you can visit www.worcester-bosch.co.uk/training

Gas-fired condensing boiler courses

- **Greenstar CDi Classic** gas-fired condensing combi boilers.
- **Greenstar CDi Compact** and **Greenstar Si Compact** gas-fired condensing combi boilers.
- **Greenstar i** gas-fired condensing combi boilers.
- **Greenstar system & regular** gas-fired condensing boilers.
- **Greenstar Highflow CDi & FS CDi** Regular floor standing gas-fired condensing combi and regular boilers.
- **Greenstar Controls** (covers MT10, MT10RF, NEW Greenstar Comfort range, NEW Wave internet connected room thermostat, FR10, FR110, FW100, and solar controls).

Oil-fired product courses

- **Greenstar Danesmoor & Heatslave II** high efficiency condensing oil-fired boilers.
- Oil advanced fault finding.
- **OFTEC 50.**
- **OFTEC 101/105e, OFTEC 600a and OFTEC 101/105e/600a.**

Worcester commercial product courses

- **Greenspring CWi47** water heater.
- **GB162 overview.**
- **GB162 domestic.**
- **GB162 commercial.**
- **Greenstar Heat Distribution Unit.**
- Commercial ACS training and assessment – CODNCO1.

Bosch commercial product courses

- **GB312 & GB402 overview.**
- Solar thermal product overview.
- **GWPL Gas Absorption Heat Pumps overview.**
- **CHP overview.**
- Commercial controls overview.

Industry focused courses

- Hot water systems & safety.
- Chemical water treatment.
- Construction skills F-Gas training/assessment certification.
- IDHEE domestic heating design.
- Domestic ACS training and assessment – reassessment. CCN1 + 3 appliances.
- **QCF Level 3 Award**
 - Air source and ground source heat pumps.
 - Air to water and split air to water heat pumps.
 - Solar thermal.
- **MCS Made Easy.**
- **LPG Changeover.**
- **WRAS Water Regulations.**



A complete after-sales service

As part of the worldwide Bosch Group, Worcester strives to maintain the highest possible standards of after-sales care.

Worcester Contact Centre

Should you require support, our award winning Contact Centre team, based at our head office in Worcester, are ready to take your calls. Whatever your query our contact centre operators along with our nationwide team of engineers are ready to help you.

Tel: 0330 123 9559

Opening times

Monday – Friday: 7.00am – 8.00pm

Saturday: 8.00am – 5.00pm

Sunday: 9.00am – 12 noon

Bank Holidays: 8.00am – 4.30pm

Spares

Genuine replacement parts for all supported Worcester products are readily available from stock, or on a next day delivery basis. Visit worcester-bosch.co.uk/spares to find your local stockist.

Customer Technical Support

The Worcester Technical Helpline is a dedicated phone line – committed to providing a comprehensive service to complement the brand name and quality of our products. Our experienced team of technical experts provides answers to queries of a technical nature across the entire Worcester range.

Technical Support

Tel: 0330 123 3366

Fax: 01905 752 741

Email: technical-advice@uk.bosch.com

Opening times

Monday – Friday: 7.00am – 8.00pm

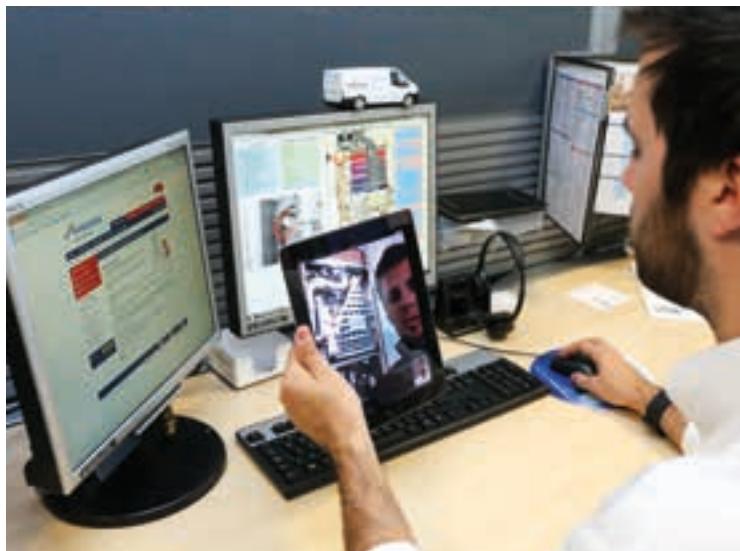
Saturday: 8.30am – 4.00pm

Bank Holidays: 8.00am – 4.30pm

ErP Technical Helpline

Tel: 0330 123 3641

Email: ErP-advice@uk.bosch.com



Notes

Useful numbers

Sales

Tel: 0330 123 9669
sales.mailbox@uk.bosch.com

Spare Parts

Tel: 0330 123 9779
spares.mailbox@uk.bosch.com

Technical Helpline (Pre & Post Sales)

Tel: 0330 123 3366
technical-advice@uk.bosch.com

Renewables Technical Helpline

Email: renewable-advice@uk.bosch.com
or telephone 0330 123 9229

ErP Technical Helpline

Tel: 0330 123 3641
ErP-advice@uk.bosch.com

Training

Tel: 0330 123 0166
training@uk.bosch.com

Literature

Email: brochure-request@uk.bosch.com
or download instantly from our website
or telephone 0330 123 9119

Customer Service

Engineer Appointments

Email: service-appointment@uk.bosch.com
or telephone 0330 123 9339

Service Enquiries

Email: service-enquiries@uk.bosch.com
or telephone 0330 123 9559

Guarantee Registration

To register your Worcester guarantee,
please visit our website
www.worcester-bosch.co.uk/registration,
download our guarantee
registration app or
telephone 0330 123 2552



Guarantee
app

Calls to and from Bosch Thermotechnology Ltd may be recorded for training and quality assurance purposes.

worcester-bosch.co.uk

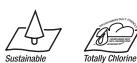


Worcester, Bosch Group is a brand name of Bosch Thermotechnology Ltd.

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