Technical and Specification Information

Greenstar CDi Classic
Regular Series

Greenstar Ri Series

Best Buy
Which?
Gas Boilers September 2014

Greenstar regular gas-fired condensing wall mounted boiler range

NEW
Greenstar
Comfort
controls

WORCESTER
Bosch Group

Worcester and you. Making a difference.

BOSCH
Invented for life

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 throughout the world.

As part of Europe's largest supplier of heating products, Worcester, Bosch Group has the UK-based resources and support capability to 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 energy efficient gas- and oil-fired condensing boilers, as well as an extensive range of renewable technologies. All of our products have been developed and introduced with the aim of helping the UK to achieve the Government's efficiency targets.

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.

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The Greenstar regular boiler range

The Greenstar regular range is part of a market-leading range of energy-saving condensing wall-mounted gas-fired boilers.

Higher efficiency, highly cost-effective

Greenstar regular boilers have an annual efficiency (SEDBUK 2005 value) of over 90%, efficiently producing heat for your heating and/or hot water system. Non-condensing boilers achieve around 78% efficiency.

Combining a new Greenstar 27Ri or 30Ri with the latest Worcester plug-in digital and wireless controls*, or using external controls with the other Greenstar regular boilers, could reduce a household's heating and hot water bills by around £300† per annum.

To these major benefits you can add yet more; with renowned Worcester quality and reliability, outputs to satisfy the heating demands for a variety of households and truly exceptional all-round value for money.

Why choose a regular boiler?

A regular boiler is an ideal replacement for an existing non-condensing regular boiler, delivering over 90% efficiency (SEDBUK 2005 value) with minimal installation requirements.

When combined with Worcester Greenstore unvented hot water cylinders they provide a complete package for properties requiring stored hot water. Using an unvented cylinder, rather than a vented cylinder, results in a fast hot water response time at the taps, more powerful showers and faster-filling baths – all with more economical running costs. They can also be integrated with a Worcester Greenskies solar thermal system to provide a total heating and hot water solution, which will reduce running costs, as well as being more environmentally friendly.

*When used with an optional Worcester Greenstar Wiring Centre. ***†Source: Energy Saving Trust. Based on replacing a G-rated gas-fired boiler with a new A-rated gas-fired condensing boiler and full set of heating controls in a typical 3 bedroom semi-detached home.***

Greenstar 27Ri

The Greenstar regular range at a glance

		30CDi Classic Regular	40CDi Classic Regular	12Ri	15Ri	18Ri	24Ri	27Ri	30Ri
Part No.	**NG**	7 738 100 245	7 738 100 232	7 716 130 137	7 716 130 153	7 716 130 155	7 716 130 138	7 716 130 244	7 716 130 246
	LPG	7 738 100 235	7 738 100 234	7 716 130 151	7 716 130 154	7 716 130 156	7 716 130 152	7 716 130 245	7 716 130 247
Output kW to central heating (CH)	**Min**	7.7kW	9.4kW	4kW	5kW	6kW	8kW	7.03kW	7.03kW
	Max	30kW	40.8kW	12kW	15kW	18kW	24kW	27kW	30kW
CH temperature control		✓	✓	✓	✓	✓	✓	✓	✓
DHW temperature control		–	–	–	–	–	–	✓*	✓*
Modulating control		✓	✓	✓	✓	✓	✓	✓	✓
Natural gas		✓	✓	✓	✓	✓	✓	✓	✓
LPG boiler		✓	✓	✓	✓	✓	✓	✓	✓
Electronic ignition		✓	✓	✓	✓	✓	✓	✓	✓

**When an optional Worcester Greenstar Wiring Centre is used.*

Key features of the range

Why choose Worcester Greenstar regular boilers?

Worcester's extensive range of regular boilers, now with Central Heating (CH) outputs from 12kW to 40kW, deliver high energy-efficiency and lower running costs for homeowners. They also achieve higher SAP or NHER ratings for new build properties when used in conjunction with a Greenstore unvented cylinder.

The Greenstar 12Ri-24Ri, CDi Classic Regular & 27-30Ri range

In well-insulated new homes, where hot water performance is more of a factor than heating, the combination of a Greenstar boiler and Greenstore unvented cylinder may enable a regular boiler with a lower CH output to be used. This lowers energy consumption further, while reducing the need for larger diameter gas pipes for an easier installation.

Winner of Which? Best Buy awards in 2011, 2012, 2013 and 2014

For four consecutive years, in a survey of Which? members, the Worcester Greenstar gas-fired condensing boiler range has been presented with Best Buy awards.* In the latest survey, no other manufacturer scored higher for reliability and customer satisfaction.

Greenstar Wiring Centre

An optional Worcester Greenstar Wiring Centre is available for use with the new 27Ri and 30Ri models, enabling a range of Worcester plug-in controls, including wireless models, to be used. A useful feature for installers is the ability to wire the pump into the wiring centre. This results in a quick and simple installation with a potential time saving of up to half a day (see page 20 for details).

Enhanced efficiencies and features

All Worcester Greenstar regular boilers feature an advanced heat exchanger design, including the revolutionary WB7 friction-stir welded heat exchanger in the 27Ri and 30Ri models. Primary heat exchangers come with a full 10 year guarantee and all boilers in the range feature anti-cycling and modulation control. The Greenstar 27Ri-30Ri models are compact enough to be installed in a standard kitchen cupboard without the need for ventilation.

The complete system solution

Our Greenstore unvented and solar compatible unvented hot water cylinders provide fast re-heat times with excellent heat retention properties. The combination of a Greenstar regular boiler and a Greenstore unvented cylinder delivers hot water to the taps at mains pressure, filling baths quickly and ensuring that showers are powerful and invigorating. For more information on our Greenstore unvented cylinder range, see pages 18-19.

NEW Worcester Greenstore unvented cylinder range

*Source: Which? 2014 survey published in Sept 2014.

Solar thermal heating

When used in conjunction with a Greenstore solar compatible unvented cylinder, Greenstar regular boilers can be fully integrated with Greenskies solar water heating systems, which have the potential to provide up to 60%** of annual hot water requirements. So even if solar water heating is not required at the time of installation, installing a solar compatible unvented cylinder will enable the system to be upgraded easily in the future.

Greenskies Solar-Lux, Solar-Lifestyle, Solar-Lito and Greenstore solar compatible unvented cylinder

Fluing options

The Greenstar regular range features 2 different sizes of multi-directional room sealed flue (RSF) systems, 100mm or 125mm diameter. Flues can be run horizontally or vertically, with additional 90º or 45º in-line bends allowing changes of direction, to provide an extremely flexible and versatile fluing system. This enables the appliance to be sited virtually anywhere. More details are shown on pages 36-48.

Gas and LPG options

Greenstar regular boilers are manufactured in both natural gas and Liquid Petroleum Gas (LPG) variants. This gives a full range of fuel options and eliminates the need for fuel conversion.

5 year guarantee

All Worcester Greenstar regular boilers are offered with a full 5 year guarantee* on parts and labour as well as 10 year guarantee* on the primary heat exchanger*.

The Greenstar condensing regular range – features and benefits at a glance

Energy-saving & environmental

- SEDBUK A rating of 90.1% and above (2005 value)
- Simple and intelligent control options are available to optimise boiler efficiency††
- Low electrical consumption in standby mode
- Aluminium-silicon heat exchangers deliver high efficiency and reliability
- Anti-cycle control
- The Greenstar CDi Classic Regular, new 27 and 30 Ri models and 12Ri deliver NOx values below 40mg/kWh – achieving 3 credits under The Code for Sustainable Homes.

Time- & labour-saving installation

- Wall frames and jig allow space for pipes behind the boiler as standard
- Greenstar 27 and 30Ri models come pre-wired
- Full range of Condensfit II™ flue options
- Multi-directional fluing means boiler can be sited in a wider variety of places
- Optional wiring centre accessory on 27Ri and 30Ri models.

End user comfort and convenience

- Full 5 year guarantee on parts and labour as well as a 10 year guarantee on the primary heat exchanger*
- Boiler protection plans available for both new and out-of-guarantee Worcester Greenstar boilers
- Bosch renowned quality and reliability
- Built-in boiler frost protection
- Compact dimensions – Ri models
- Controls behind flap on CDi Classic Regular, 27Ri and 30Ri models– aesthetically pleasing and minimises the risk of tampering with controls
- Now includes a larger condensate siphon to reduce the risk of condensate freezing.

*Subject to terms and conditions. **Source: Energy Saving Trust.
†Source: Which? 2014 survey published in Sept 2014. ††When installed with optional Greenstar Wiring Centre.

Greenstar CDi Classic Regular

Features and benefits

With CH outputs of 30kW and 40kW, Greenstar CDi Classic Regular boilers are our top-performing wall-mounted regular boilers. Their impressive heating outputs make them an excellent choice for installation in larger properties.

The Greenstar Classic Regular boilers use the proven Worcester WB5 aluminium-silicon heat cell, which features an extra-large surface area to optimise combustion efficiency. Other energy-saving features include low electrical consumption in standby mode, electronic ignition and anti-cycle control. The result is an energy efficiency rating of over 90% (SEDBUK 2005) for both appliances.

These boilers have a built-in fascia-mounted heating temperature control knob and a neon, operational status indicator.

To simplify commissioning, the heat cell is factory set and 100% tested. The heat exchanger requires minimal servicing which means fewer spare parts during its lifetime. The heat cell can be cleaned in situ via an inspection hatch, saving time during service.

Greenstar CDi Classic Regular is available with CH outputs of 30 and 40kW

Installation benefits

- Boiler design and wall-mounting frame allows space for pipes to go behind the boiler
- Steel, robust wall-mounting bracket
- Does not require compartment ventilation as long as minimum installation and service clearances are maintained
- Compatible with S and Y plan systems
- A rigid 22mm compression gas connection, eliminating the need for pre-fabricating the gas pipe onto the isolating valve
- Multi-directional fluing enables boiler to be located in a wider variety of places
- Full range of Condensfit II™ flue options in both 60/100mm and 80/125mm diameters with optional plume management kit available
- Clear display on fascia for temperature and commissioning settings
- Short-circuit proof PCB design that removes the need for fuses in the low voltage circuits.

Environmental benefits

- SEDBUK A ratings of over 90% for both models (2005 value)
- Low NOx and low CO_2 emissions
- WB5 heat exchanger delivers high efficiency
- Low electrical consumption when the boiler is in standby mode
- Compatible with Worcester Greenskies solar thermal
- Electronic ignition which eliminates the need for the pilot light
- Anti-cycle and modulation control
- All boilers and components are 100% recyclable.

NEW features based on installer feedback

Following on from your feedback, new features have been added to the CDi Classic including a larger condensate siphon which reduces the risk of frozen condensate, and in most cases means an external CondenseSure will not be required. The CDi Classic range also includes a paper wall mounting template to aid installation, an electrical cross bonding strip attached to the hydraulic assembly and an internal drain facility linked to the condensate outlet.

WB5 heat exchanger

The Worcester WB5 heat exchanger has been designed to optimise clean burning combustion over an extra- large surface area. Each heat exchanger is factory set and 100% tested so, as long as the gas inlet pressure is correct, commissioning is straightforward. The heat exchanger requires minimal servicing which means fewer spare parts during its lifetime. The heat exchanger can be cleaned in situ via an inspection hatch, again saving time during service.

WB5
Heat Exchanger

On the primary
heat exchanger*

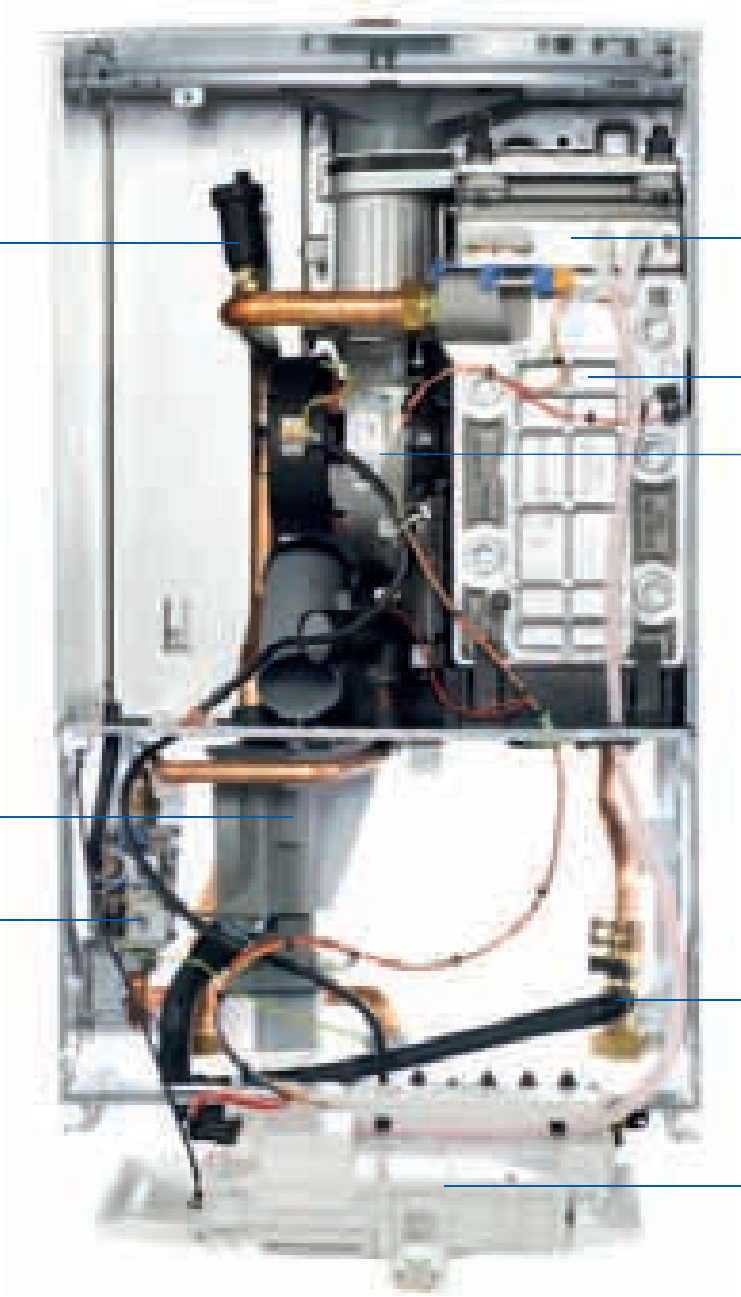
End user benefits

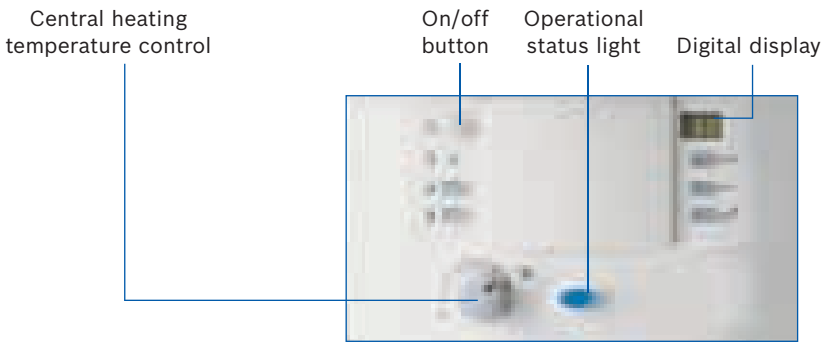
- Highly reliable heat exchanger
- Modulation control reduces electrical consumption
- Built-in frost protection of the boiler and surrounding pipes
- All models are available as natural gas and LPG
- Full 5 year guarantee on parts and labour*
- 10 year guarantee on Worcester primary heat exchanger*
- Boiler protection plans available
- Bosch-renowned quality and reliability
- Which? Best Buy award winning quality.

The Greenstar CDi Classic is recommended by the Energy Saving Trust (EST). The Energy Saving Trust is a non-profit organisation that provides free and impartial advice on how to save energy.

*Terms and conditions apply.

Inside story –
Greenstar CDi Classic Regular





Greenstar CDi Classic Regular fascia

Technical data

Boiler	Greenstar 30CDi Classic Regular	Greenstar 40CDi Classic Regular
Height	760mm (max)	760mm (max)
Width	440mm	440mm
Depth	360mm (max)	360mm (max)
Weight – dry	39.5kg	39.5kg
2005 SEDBUK value – natural gas	90.2% / A rated	90.1% / A rated
2005 SEDBUK value – LPG	92.1% / A rated	92.0% / A rated
2009 SEDBUK value – natural gas	89.2%	89.2%
2009 SEDBUK value – LPG	90.2%	90.2%
Heating flow / return connections	22mm compression	22mm compression
Condensate connection	22mm plastic pipe	22mm plastic pipe
Gas connection	22mm compression	22mm compression
Output to central heating	7.7 - 30kW	9.4 - 40.8kW
Wall mounting jig	✓	✓
Fault diagnostic display	✓	✓
Flow and return pipes supplied to allow pipes behind installation	✓	✓
Maximum vertical flue (100mm dia.) inc. terminal	9,400mm	7,500mm
Maximum vertical flue (125mm dia.) inc. terminal	18,500mm	16,000mm
Maximum horizontal flue (100mm dia.)	7,900mm	6,000mm
Maximum horizontal flue (125mm dia.)	18,500mm	12,500mm
NOx classification – natural gas	33.3mg/kWh	32.2mg/kWh
NOx class	5	5
Ingress protection (IP)	X4D	X4D

Greenstar Ri regular

Features and benefits

The Greenstar Ri is available in 6 models with CH outputs of 12kW, 15kW, 18kW, 24kW, 27kW and 30kW, making the range suitable for an even wider range of households with stored hot water systems.

Greenstar Ri
27 and 30kW models

All Greenstar Ri boilers are compact enough to be installed in a standard kitchen cabinet and are a one-man lift, with the 12kW to 24kW models weighing just 22.6kg, the lightest in their class.

The 12kW to 24kW models have a fascia-mounted heating temperature control and neon operational status indicator, while the 27kW and 30kW models feature the Heatronic 4i control box which, for the first time, enables an optional Worcester plug-in control to be used with a regular boiler*.

By using the optional Greenstar Wiring Centre, the 27kW and 30kW boilers can be used with a choice of Worcester controls, including wireless models, for added energy savings and end-user convenience. See page 20 for more details on the Greenstar Wiring Centre.

Greenstar Ri boilers can be used with our range of Greenstore unvented and solar compatible unvented cylinders for boiler only and boiler/solar water heating systems.

All boilers feature reduced electrical consumption in stand-by mode, anti-cycling and modulation control.

Installation benefits

- Robust, steel wall-mounting frame allows space for pipes behind the boiler
- One man lift
- Compatible with S and Y plan systems
- All models available as natural gas and LPG
- Full range of Condensfit II™ flue options in both 60/100mm and 80/125mm diameters
- Multi-directional fluing enables boiler to be located in a wider variety of places.

Environmental benefits

- SEDBUK A rating over 90% (2005 values) for all models
- Digital and wireless programmers and room thermostats, optimising boiler efficiency and fuel consumption*
- Low electrical consumption when the boiler is in standby mode
- Heat exchangers deliver high efficiency and reliability
- Compatible with Worcester Greenskies solar thermal
- Electronic ignition which eliminates the need for the pilot light
- Anti-cycle and modulation control
- 12, 27 and 30kW models have low NOx emissions – 3 credits under Code for Sustainable Homes.

With installation of optional Greenstar Wiring Centre on 27 and 30kW models.

WB3 heat exchanger

Greenstar Ri 12, 15, 18 and 24kW boilers use the proven WB3 aluminium/silicon heat exchanger. The heat cell has an extra-large surface area for enhanced heat exchange efficiency.

WB7 heat exchanger

Greenstar Ri 27kW and 30kW models feature the new WB7 heat exchanger which uses advanced friction stir welding^ manufacturing technology to create more passageways than traditional heat exchangers. As a result, the WB7 heat exchanger delivers high outputs relative to its size.

Quality guaranteed

As part of our Total Quality Initiative programme, Worcester tests its boilers and heat exchangers using its own formula to replicate contaminated heating system water. This contains iron dust, quartz sand, hemp fibre and other contaminates found in such system water samples. This testing procedure ensures that all of our heat exchangers are proven to be robust and efficient over the boiler's lifetime.

WB3 Heat Exchanger | WB7 Heat Exchanger | On the primary heat exchanger†

The Greenstar Ri 12 to 24kW models

End user benefits

- Extremely reliable and efficient heat exchangers
- Compact dimensions – can be installed in a standard-sized kitchen cupboard
- Option of digital and wireless programmers and room thermostats for higher efficiency and user comfort*
- Built-in frost protection of the boiler and the surrounding pipes
- Full 5 year guarantee on parts and labour†
- 10 year guarantee on Worcester primary heat exchanger†
- Boiler protection plans available
- Which? Best Buy award-winning quality.

The Greenstar Ri regular boilers are recommended by the Energy Saving Trust (EST). The Energy Saving Trust is a non-profit organisation that provides free and impartial advice on how to save energy.

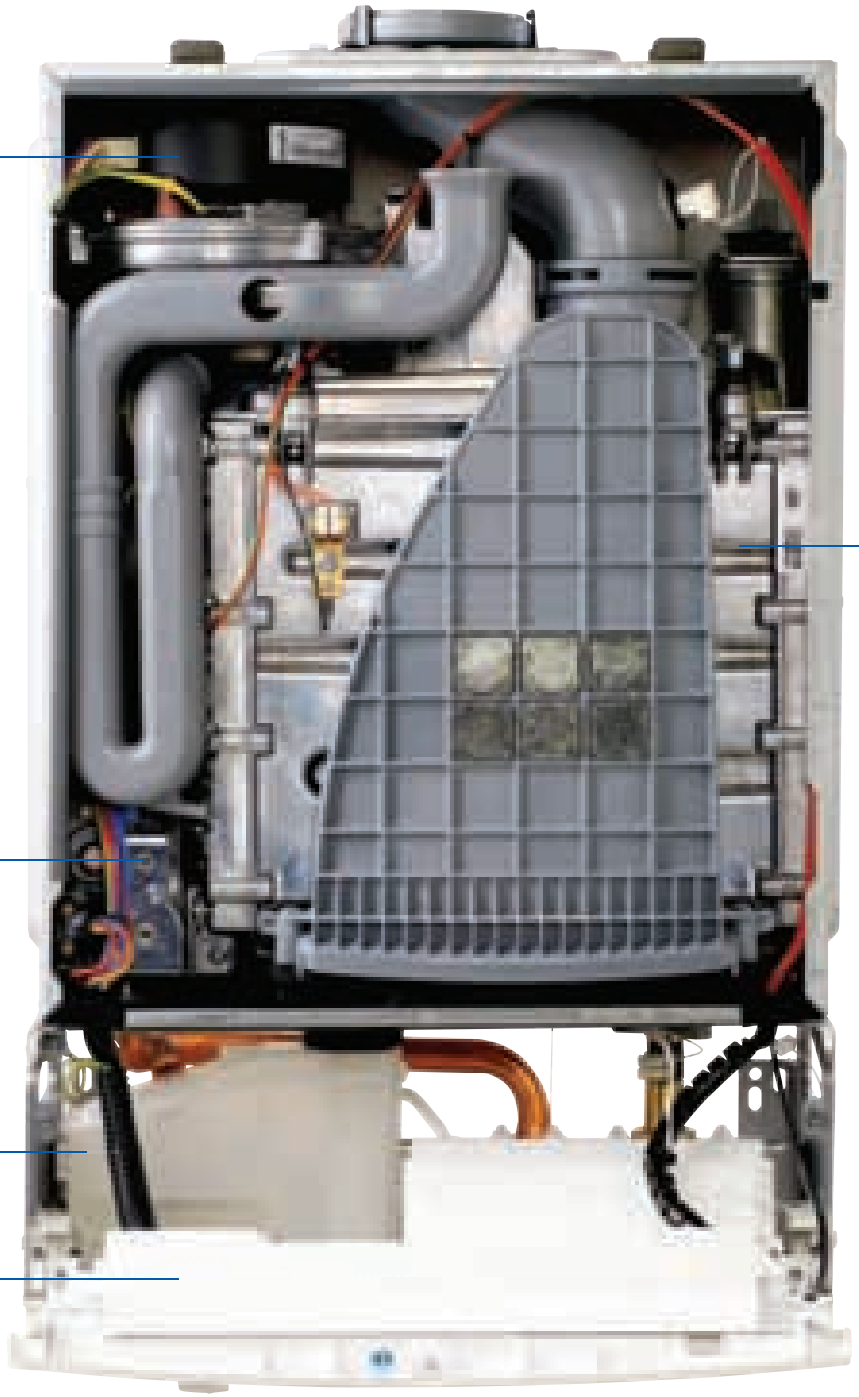
†Terms and conditions apply. ^The friction stir welding process is used under license from The Welding Institute.

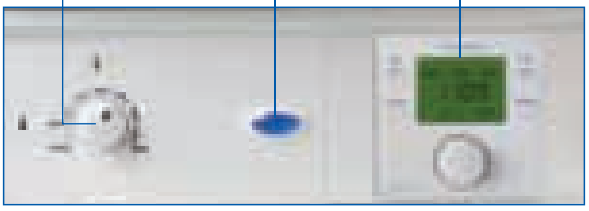
Inside story – Greenstar 12Ri - 24Ri

Technical data

Boiler	Greenstar 12Ri	Greenstar 15Ri	Greenstar 18Ri	Greenstar 24Ri
Height	600mm	600mm	600mm	600mm
Width	390mm	390mm	390mm	390mm
Depth	270mm	270mm	270mm	270mm
Weight – dry	22.6kg	22.6kg	22.6kg	22.6kg
2005 SEDBUK value – natural gas	90.1% / A rated	90.1% / A rated	90.1% / A rated	90.2% / A rated
2005 SEDBUK value – LPG	91.4% / A rated	91.4% / A rated	91.4% / A rated	92.0% / A rated
2009 SEDBUK value – natural gas	88.8%	88.8%	88.8%	89.2%
2009 SEDBUK value – LPG	89.8%	89.8%	89.8%	90.2%
Heating flow / return connections	22mm compression	22mm compression	22mm compression	22mm compression
Gas connection	22mm compression	22mm compression	22mm compression	22mm compression
Primary water content	1.1 litres	1.1 litres	1.1 litres	1.1 litres
Maximum flow temperature	82ºC	82ºC	82ºC	82ºC
Output to central heating	4 - 12kW	5 - 15kW	6 - 18kW	8 - 24kW
Maximum vertical flue (100mm dia.) inc. terminal	6,400mm	6,400mm	6,400mm	6,400mm
Maximum vertical flue (125mm dia.) inc. terminal	15,000mm	15,000mm	15,000mm	15,000mm
Maximum horizontal flue (100mm dia.)	4,600mm	4,600mm	4,600mm	4,600mm
Maximum horizontal flue (125mm dia.)	13,000mm	13,000mm	13,000mm	13,000mm
NOx classification – natural gas	39mg/kWh	60mg/kWh	84mg/kWh	66mg/kWh
NOx class	5	5	4	5
Noise output level	39dB(A)	42.7dB(A)	43.7dB(A)	41dB(A)
Ingress protection (IP)	X4D	X4D	X4D	X4D

Inside story – Greenstar 27 & 30Ri





Greenstar 27Ri & 30Ri fascia with optional Comfort I RF wireless room thermostat and plug-in twin channel programmer*

*When an optional Worcester Greenstar Wiring Centre is used.

Technical data

Boiler	Greenstar 27Ri	Greenstar 30Ri
Height	600mm	600mm
Width	390mm	390mm
Depth	270mm	270mm
Weight – dry	22.7kg	22.7kg
2005 SEDBUK value – natural gas	90.3% / A rated	90.3% / A rated
2005 SEDBUK value – LPG	91.8% / A rated	91.8% / A rated
2009 SEDBUK value – natural gas	89.0%	89.0%
2009 SEDBUK value – LPG	90.0%	90.0%
Heating flow / return connections	22mm compression	22mm compression
Gas connection	22mm compression	22mm compression
Primary water content	1.83 litres	1.83 litres
Maximum flow temperature	82ºC	82ºC
Output to central heating	7.03 - 27kW	7.03 - 30kW
Wall mounting jig	✓	✓
Plug-in timers	✓ (optional)	✓ (optional)
Maximum vertical flue (100mm dia.) inc. terminal	6,000mm	6,000mm
Maximum vertical flue (125mm dia.) inc. terminal	15,000mm	15,000mm
Maximum horizontal flue (100mm dia.)	6,000mm	6,000mm
Maximum horizontal flue (125mm dia.)	15,000mm	15,000mm
NOx classification – natural gas	35mg/kWh	35mg/kWh
NOx class	5	5
Noise output level	45.5dB(A)	45.5dB(A)
Ingress protection (IP)	X4D	X4D

The Greenstore unvented cylinder series

Developed by Worcester. Built by Bosch.

BOSCH
Invented for life

Worcester offers a range of Greenstore high-efficiency unvented cylinders which provide excellent hot water comfort for properties with a stored DHW supply. They are available in both an unvented and solar compatible unvented option. The Greenstore unvented cylinder is available in seven different models ranging from 93L to 292L. The Greenstore solar compatible unvented cylinders are available in five options ranging from 158L to 287L.

The Worcester Greenstore unvented cylinder series is fully compatible with a wide range of non-Worcester boilers and solar panels, although to achieve the optimum system solution, it is recommended that a Greenstore unvented cylinder is coupled with either a Greenstar high-efficiency boiler or Greenskies solar panel installation.

The Greenstore unvented series

The Greenstore unvented cylinder benefits consumers who do not require solar compatibility, but are looking for a cylinder which offers high levels of insulation, excellent flow rate and outstanding re-heat performance. The Greenstore unvented range is also ideal for consumers who require a smaller capacity of hot water storage, with the unvented series being available in SC-90 and SC-120 variants.

The Greenstore solar compatible unvented series

All of the models in the solar compatible unvented cylinder series feature high levels of insulation and dedicated solar volumes in compliance with current Building Regulations, SAP 2012 and the Microgeneration Certification Scheme (MCS). Worcester's Greenstore solar compatible unvented stainless steel cylinders have been specifically designed for use with solar heating installations, combined with boiler back-up.

*Terms and conditions apply.

Features and benefits

Energy efficiency – high levels of heat retention

A critical factor that affects the performance and the overall efficiency of any hot water storage cylinder is the level of insulation that it can provide. Greenstore unvented cylinders feature extremely high heat retention levels, made possible by the 65mm of factory-fitted EPS (Expanded Polystyrene) insulation.

As well as satisfying the new-build requirements of SAP, the benefits could include lower energy consumption and heating bills for the end user.

Outstanding re-heat performance

When supplying large volumes of hot water to multiple outlets simultaneously, a cylinder's re-heat performance is crucial to providing a continuous flow.

Worcester Greenstore unvented cylinders feature high-quality heat exchange coils maximising heat transfer and providing quick hot water replenishment.

Cost-effective hot water solution

Everything you need with Greenstore unvented cylinder models can be ordered via a single part number. You will receive a full G3 accessory kit including:

- Tundish (15/22mm)
- Inlet control group
- 2-port motorised valve
- Expansion vessel
- Dual thermostat
- Connection set
- Solar high limit thermostat (solar compatible series only).

All of the G3 accessories are pre-adjusted. These high quality controls have been specifically selected to ensure a high flow rate performance with a minimum pressure drop, allowing the Greenstore unvented cylinders to perform well even in low pressure areas.

Greenstore unvented cylinder series at a glance

Unvented	Greenstore SC-90 Cylinder	Greenstore SC-120 Cylinder	Greenstore SC-150 Cylinder	Greenstore SC-180 Cylinder	Greenstore SC-210 Cylinder	Greenstore SC-250 Cylinder	Greenstore SC-300 Cylinder
Part no.	7 716 842 027	7 716 842 028	7 716 842 029	7 716 842 030	7 716 842 031	7 716 842 032	7 716 842 033
Height	835mm	1,035mm	1,285mm	1,490mm	1,665mm	1,860mm	2,155mm
Diameter	570mm	570mm	570mm	570mm	570mm	570mm	570mm
Weight – dry	26kg	31kg	36kg	40kg	44kg	48kg	54kg
Volume domestic hot water	93 litres	123 litres	161 litres	191 litres	216 litres	246 litres	292 litres
Standing heat loss – 24hr	0.72kWh/24hrs	1.06kWh/24hrs	1.35kWh/24hrs	1.54kWh/24hrs	1.67kWh/24hrs	1.93kWh/24hrs	2.17kWh/24hrs

Solar compatible	Greenstore TC-150 Cylinder	Greenstore TC-180 Cylinder	Greenstore TC-210 Cylinder	Greenstore TC-250 Cylinder	Greenstore TC-300 Cylinder
Part no.	7 716 800 542	7 716 800 543	7 716 842 042	7 716 842 043	7 716 842 044
Height	1,285mm	1,490mm	1,665mm	1,860mm	2,155mm
Diameter	570mm	570mm	570mm	570mm	570mm
Weight – dry	41kg	45kg	50kg	54kg	60kg
Volume domestic hot water	158 litres	187 litres	211 litres	241 litres	287 litres
Standing heat loss – 24hr	1.27kWh/24hrs	1.31kWh/24hrs	1.42kWh/24hrs	1.52kWh/24hrs	1.93kWh/24hrs
Dedicated solar volume	65 litres	65 litres	105 litres	115 litres	115 litres

Greenstar Wiring Centre

Enabling plug-in, fascia mounted digital timers and programmers for Greenstar 27Ri and 30Ri regular boilers

The Greenstar Wiring Centre is a major benefit for installers and end users, allowing the use of Worcester's plug-in controls, including wireless models, with the new Greenstar 27Ri and 30Ri regular boiler. This enables digital timers and programmers to control the heating and hot water for regular boilers systems. The wiring centre clearly distinguishes whether the cylinder needs hot water or if the home needs heating and, to maximise comfort and efficiency, responds by operating the boiler at different temperatures for each.

Simple, time-saving installation

An innovative feature of the Greenstar Wiring Centre is that it only requires a low voltage EMS connection between the boiler and the Wiring Centre. Existing wiring can be used for this purpose and a separate local power supply used for the appliance. The Wiring Centre will control external valves and circulating pump via the EMS connection. Experience shows this can save as much as half a day of installation time.

The Greenstar Wiring Centre uses simple, clear, colour-coded connections and is supplied with a cylinder sensor and unique retaining device as standard. Up to three Wiring Centres can be linked together to control up to eight zones. It also provides a selection for S plan, Y plan or multiple zones.

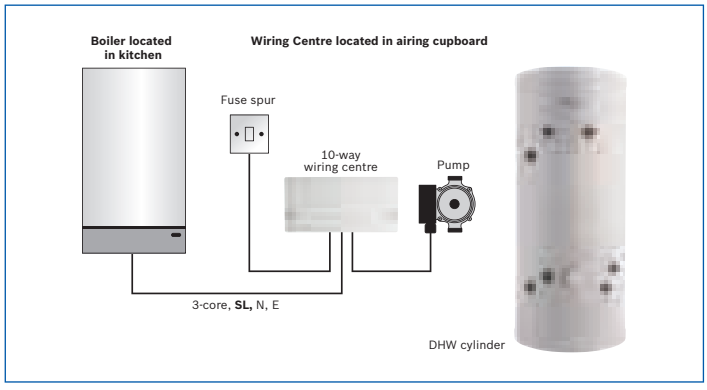
Control options

The Greenstar Wiring Centre is compatible with the following Worcester plug-in controls:

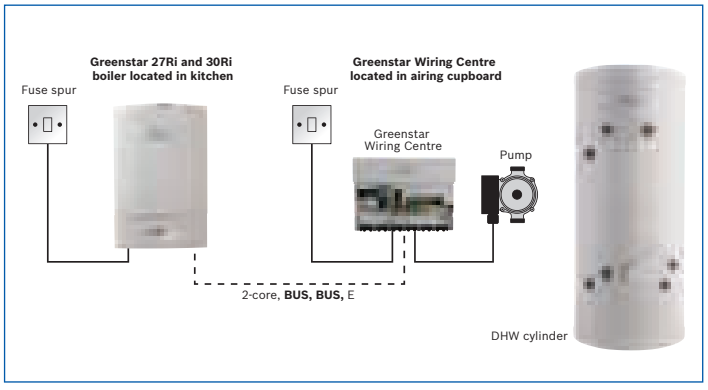
- Comfort I RF wireless room thermostat and plug-in twin channel programmer
- Comfort II RF wireless programmable room thermostat and plug-in RF receiver.

Features	Benefits
Allows digital timers and programmers to be used with a regular boiler	Controls both heating and hot water
Enables properties to use a wireless room thermostat	Allows a wider choice of controls options
Pump is wired directly into the Wiring Centre and not to the boiler	Can reduce installation time by up to half a day
Simple system-type selector (S or Y plan)	Simple, clear wiring connections
Supplied complete with cylinder sensor and unique retaining device	Can be used with any vented cylinder
Compatible with Worcester Greenstore and third party unvented cylinders, please check with the manufacturer	Makes replacement boiler installation much easier
IP44 safety rating	Increases possible installation locations

Product info	
Part number	7 738 110 116



Existing boiler system layout



System layout with a Greenstar Wiring Centre

Controls

5 year guarantee

When purchased and installed at the same time, the guarantee period for a Worcester control will match that of a Greenstar gas-fired boiler†.

NEW Greenstar Comfort controls

The Greenstar 27Ri and 30Ri models, when used with a Greenstar Wiring Centre, are compatible with the new Greenstar Comfort controls. Developed by Worcester with the help of feedback from installers and end-users, the Greenstar Comfort controls are our most advanced and simple to use controls yet – being easier to install and simpler to use, while producing a wider choice of programming options.

Comfort I RF wireless room thermostat and plug-in twin channel programmer – Part no. 7 733 600 001

- Simple menu navigation
- 7-day time control for heating and hot water
- Heating programme visualisation bar
- Enhanced load compensation for increased efficiency
- No wiring required
- Extremely reliable RF signal.

Comfort II RF wireless programmable room thermostat and plug-in RF receiver – Part no. 7 733 600 002

- All the features of Comfort and Comfort I **PLUS**...
- 6 adjustable heating temperatures per day
- Set programme at the room thermostat
- Remote access to boiler diagnostic codes
- Back lit display.

Controls at a glance

	TYPE		MOUNT		TIME CONTROL					TEMPERATURE CONTROL		CONNECTION TYPE		MODEL
Control option	Digital	Intelligent	Fascia mounted	Wall mounted	Central heating	Hot water	24 hour	7 day	Auto switch – BST/GMT	Room thermostat	Programmable room thermostat	Plug-in	Radio frequency	27Ri and 30Ri
Comfort I RF		✓	✓	✓	✓	✓		✓	✓	✓			✓	✓*
Comfort II RF		✓		✓	✓	✓		✓	✓		✓		✓	✓*

*†Terms and conditions apply. *With Greenstar optional wiring centre.*

Site preparations and guidance

The Greenstar regular boilers are designed for connection to a traditional heating and hot water system and are compatible with S and Y plan systems.

Greenstar regular boilers are exceptional for their number of additional time-saving installation features:

- Built-in frost protection
- Built-in fault finding diagnostics
- Automatic gas pressure adjustment
- Highly versatile multi-directional fluing system
- Combined ignition and control board means fewer connections
- A rigid 22mm compression gas connection, eliminating the need for pre-fabricating the gas pipe onto the isolating valve
- A syphonic condensate trap is pre-plumbed within the boiler
- Pre-fabricated pipes allowing top exit from the boiler.

Siting of appliance

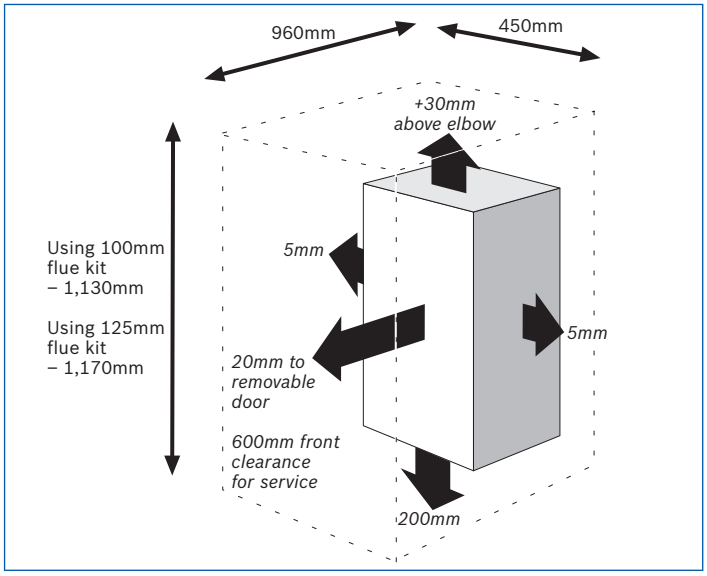
The appliances are only suitable for installing internally within a property at a suitable location onto a fixed, rigid surface at least the same size as the appliance and capable of supporting its weight.

No surface protection is required against heat transfer from the boiler. However, if the appliance is to be fitted in a timber frame building, the guidelines laid down in BS 5440:Part 1 and the CORGI publication “Gas Installations in Timber Frame Buildings” should be adhered to.

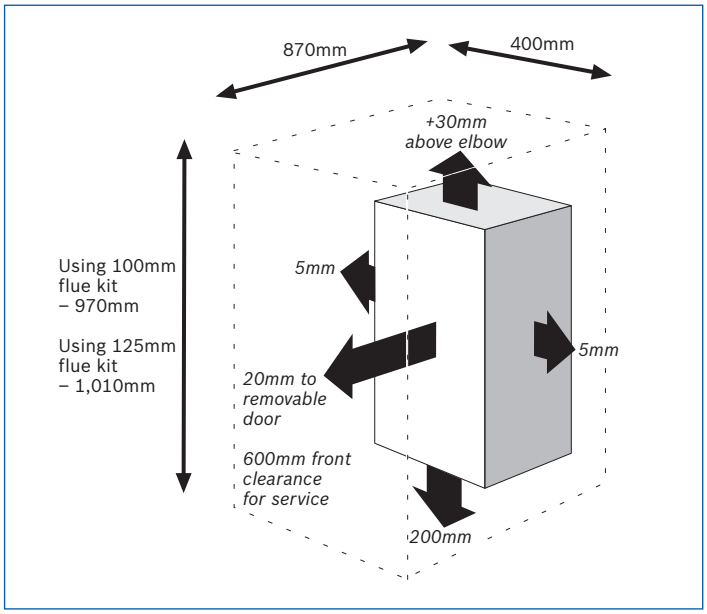
The appliances may be installed into an airing cupboard if required. Use a non-combustible perforated material (max. hole sizes of 13mm) to separate the boiler from the airing space. See section “Boiler location” on page 23.

Installation and service clearances

The minimum clearances shown below should be allowed for installation and servicing. Compartment ventilation would only be required at these clearances for the Greenstar 12Ri-24Ri range. The **Greenstar CDi Classic Regular, 27Ri and 30Ri models do not require compartment ventilation so long as minimum installation and service clearances are maintained**, see below.

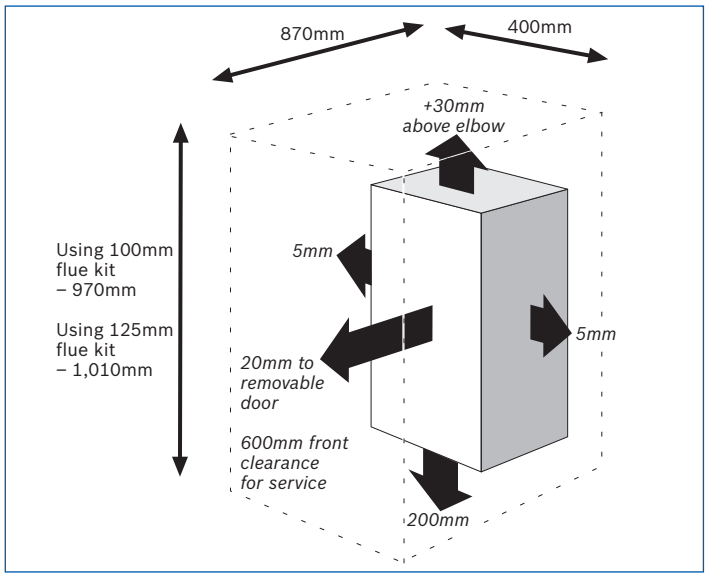


Clearances for Greenstar 30CDi & 40CDi Classic Regular



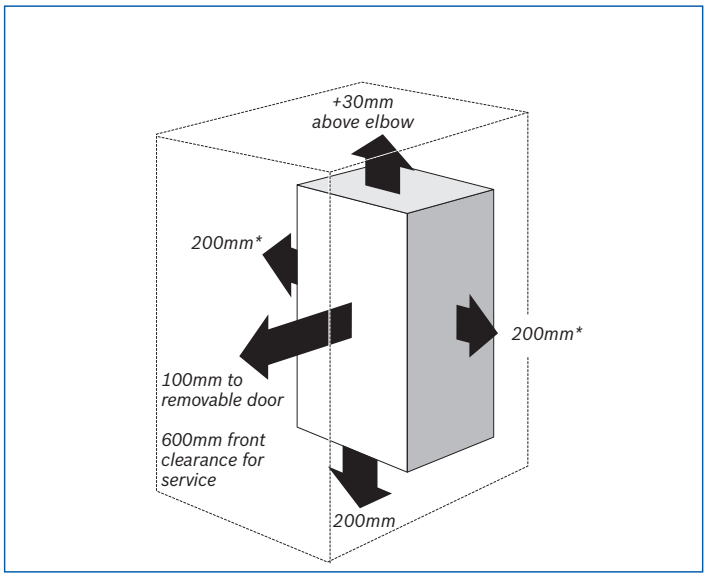
Clearances for Greenstar 27Ri & 30Ri

Ventilated compartment installation – minimum clearances



Clearances for Greenstar 12Ri-24Ri

Ventilation-free compartment installation – minimum clearances



Greenstar 12Ri-24Ri

**This can be reduced to 50mm for one side, provided that the total side clearances add up to 400mm or more.*

Boiler location

The appliance may be installed in any room, although particular attention is drawn to the requirements of the IEE regulations applicable and in Scotland the electrical provisions with respect to installation in a room containing a bath or shower.

1. The room in which the appliance is installed does not require a purpose-provided air vent.
2. If the appliance is installed in a cupboard or compartment with dimensions that allow the following minimum clearances, then no ventilation is required:

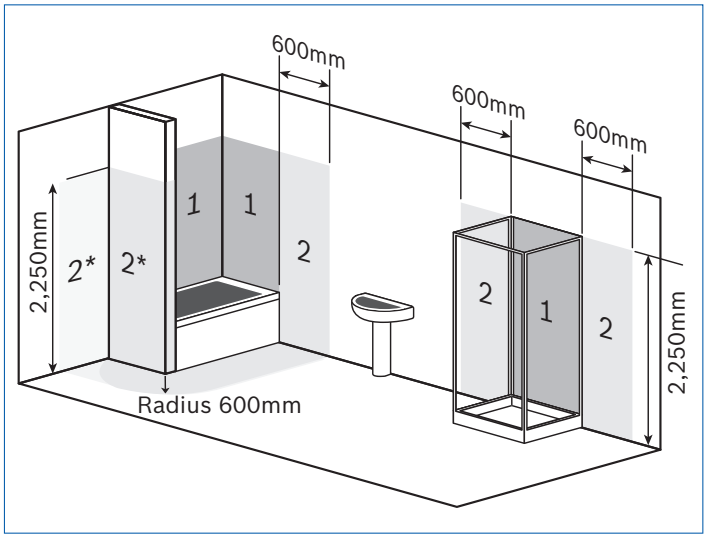
Compartment installation			
Position of appliance	Min. unventilated clearance (to removable door)		
	Greenstar CDi Classic Regular	Greenstar 12Ri-24Ri	Greenstar 27Ri & 30Ri
In front	20mm	100mm	20mm
Below	200mm	200mm	200mm
Right side	5mm	200mm*	5mm
Left side	5mm	200mm*	5mm
Above flue elbow	30mm	30mm	30mm

**This can be reduced to 50mm for one side, provided that the total side clearances add up to 400mm or more.*

Important: bathroom locations and clearances

- The boiler must not be installed in Zone 1
- Any switch or appliance control using mains electricity must not be within reach of a person using the bath or shower
- Electrical switches (other than pull cords), fused spurs and socket outlets must not be situated in the bathroom
- A boiler fitted with an optional digital programmer (or blanking panel for an optional programmer) can be installed in zone 2
- Additional Residual Current Device (RCD) protection may be required.

Refer to the latest IEE wiring regulations.

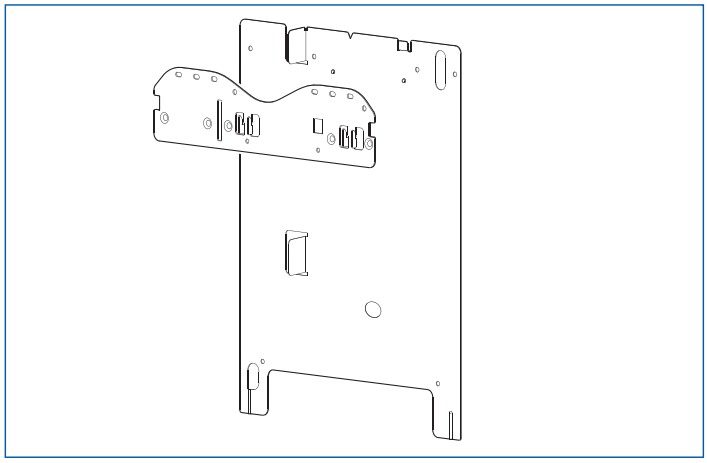


**Without the end wall, zone 2 must extend 600mm from the bath*

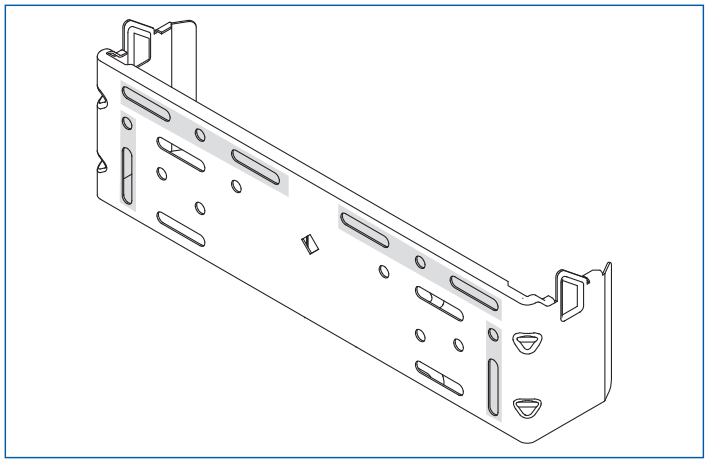
Wall preparation

The following diagrams show the wall-mounting jigs which enable a simple and straightforward method of attaching the boiler to the wall surface.

The wall-mounting jig for the Greenstar CDi Classic Regular has additional optional fixing points and provides improved engagement. After fixing the jig to the wall, the appliance can be lifted onto the jig and the union connections tightened. The pipework can be routed behind the boiler without the need for an additional wall spacing frame.



Greenstar CDi Classic Regular wall-mounting jig



Greenstar 27Ri & 30Ri wall mounting jig

All Greenstar wall-mounting jigs have pre-drilled fixing points and options that make hanging a Worcester Greenstar quick and easy.

After fixing the jig to the wall, the appliance can be lifted onto the jig and the union connections tightened. The pipework can be routed behind the boiler without the need for an additional wall spacing frame.

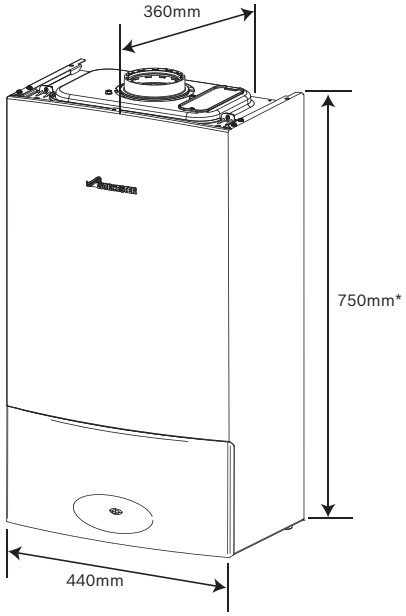
Greenstar Ri boilers come complete with a wall-mounting bracket which provides a quick and easy approach of attaching the boiler to the wall surface. After fixing to the wall, the flow, return and gas supply can be connected. The boiler also features levelling screws which allow the alignment to the wall to be adjusted in line with the wall finish. This is particularly useful on uneven walls and tiled surfaces.

Greenstar 12Ri-24Ri wall mounting bracket

Greenstar Ri pipe re-orientation

The flow and return pipework can be orientated to exit out of the bottom of the appliance if desired. The pipework tails are simply removed from the compression fittings and are directed downwards behind the chassis.

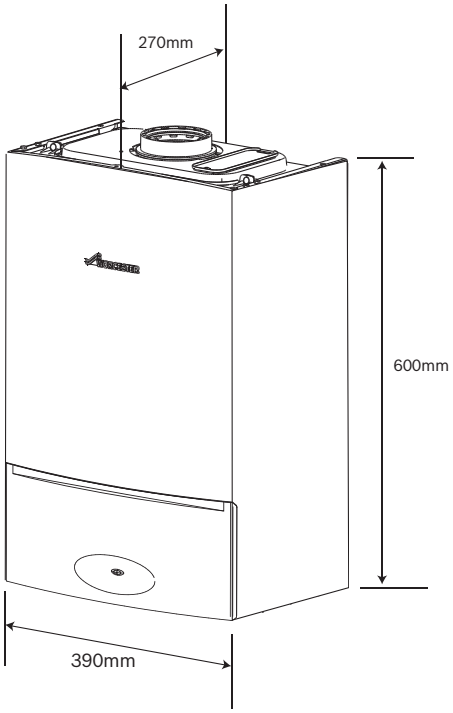
Casing dimensions



Greenstar CDi Classic Regular

**760mm to top of casing front.*

(When fitted to wall frame) Depth to wall

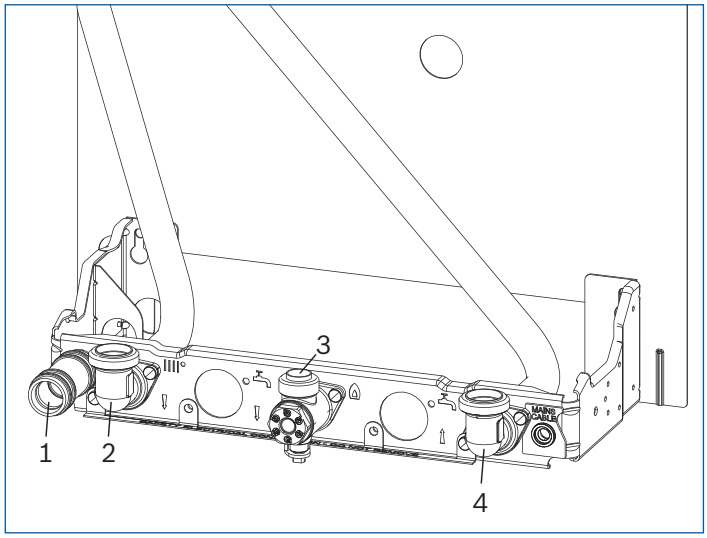


Greenstar 27Ri & 30Ri

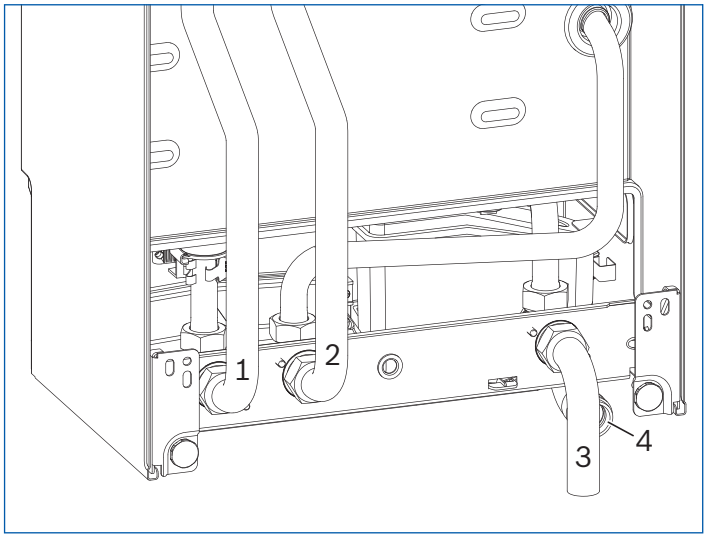
(When fitted to wall frame) Depth to wall

Greenstar 12Ri-24Ri

Pipework connections



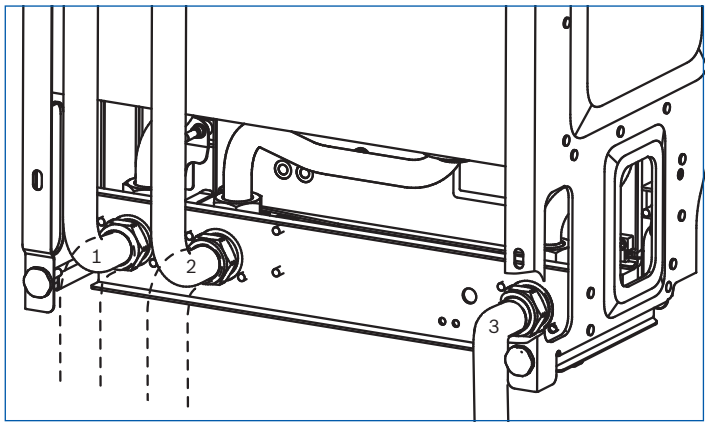
Greenstar CDi Classic Regular (front view)



Greenstar 27Ri & 30Ri (rear view)

Pipework connections – Greenstar Classic Regular			
	Function	From left case edge	Diameter of pipe
1	Condensate drain	55mm	22mm
2	CH flow	85mm	22mm
3	Gas	212mm	22mm
4	CH return	343mm	22mm

Pipework connections – Greenstar 27Ri & 30Ri			
	Function	From left case edge	Diameter of pipe
1	CH return	312mm	22mm
2	CH flow	247mm	22mm
3	Gas	65mm	22mm
4	Condensate drain	33mm	22mm



Greenstar 12Ri-24Ri (rear view)

Pipework connections – Greenstar 12Ri-24Ri			
	Function	From left case edge	Diameter of pipe
1	CH return	350mm	22mm
2	CH flow	285mm	22mm
3	Gas	55mm	22mm

Installation requirements

Installation of the Greenstar regular boiler range must be in accordance with the relevant requirements of the Gas Safety (Installation Use) Regulations (as amended), current IEE Wiring Regulations, local Building Regulations, Building Standards (Scotland) regulations and bylaws of the local Water company and Health and Safety Document No. 635 (Electricity at Work Regulations 1989). It should be in accordance with the relevant recommendations of the following British Standards:

BS 6798; BS 5449; BS 5546:1; BS 5440:1; BS 5440:2; BS 6891.

Gas Safety (Installation and Use) Regulations. All gas appliances must be installed by a Gas Safe registered person in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution.

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

It is important, with an aluminium heat exchanger, that the pH level of the water does not exceed 8. Levels in excess of this could be detrimental to the heat exchanger.

The use of a suitable inhibitor will provide a resistance to this. Contact Sentinel (Tel: 0800 389 4670 or visit www.sentinel-solutions.net) or Fernox (Tel: 0870 601 5000 or visit www.fernox.com) for further details.

The use of circulating pumps

From the 1st January 2013, it has been a requirement under the ERP Directive for all stand-alone circulating pumps (i.e. those not plumbed into the boiler) to be of a low energy type with an energy efficiency index rating of no more than 0.27 – basically an 'A' Rated circulating pump. Typically this would apply to the installation of regular boilers such as a Greenstar Ri and CDi Classic Regular.

As the Greenstar Ri and CDi Classic Regular circulating pump operation is conducted via the boiler PCB, the requirements for a low energy, stand-alone circulating pump does not officially apply to these appliances. It is therefore permissible to install a non-low energy circulating pump with a Greenstar Ri boiler as the pump will not be stand-alone in terms of its operation. Whilst the installation of low energy circulating pumps should be encouraged wherever possible, there are some cost-conscious installation situations where a non-low energy pump may be considered.

Sealed primary systems

The appliance is suitable for use with a sealed primary system.

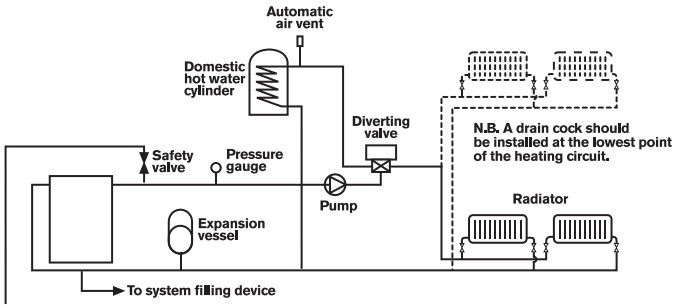
The system should be installed in compliance with the requirements of BS 5449: Part1. The system must be fitted with a spring loaded safety valve set to operate at 3bar (45 psi) and the pipe connections made through the system must be capable of sustaining a pressure of up to 3bar.

Manual air vents should be fitted at any high points in the system.

The following is a list of major items which must be fitted to the system:

1. Safety valve – 3bar
2. Pressure gauge – 0 - 4bar
3. Expansion vessel
4. Automatic air vent

Typical fully pumped sealed system



To comply with the Water Authority requirements, the system should be filled via a temporary hose connection to the mains cold water supply, with a double check valve assembly and test point fitted to the mains water side of a temporary circuit.

Valves and joints

It is very important that all valves and joints are able to sustain a working pressure of up to 3bar (45psi). Particular care should be exercised when fitting radiator valves and only those of high quality to BS 2767:10 should be used. All other valves and fittings should comply with BS 1010.

Loss of water pressure from a sealed system will require continuous recharging with fresh water and consequential introduction of air. Air is highly corrosive and will considerably reduce life expectancy of radiators, pumps etc.

Plastic pipework

The use of plastic pipework is acceptable. However, some plastics are permeable to oxygen and must be avoided. Only pipework with a polymeric barrier should be used. Please note that the first 600mm of pipework connected to the boiler must be of copper or steel.

Open vented primary systems

The Greenstar regular boiler range is designed for connection to an open vented fully pumped heating and hot water system.

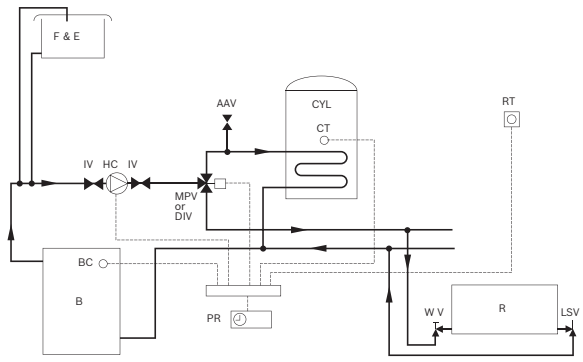
The following points are for guidance only. The system installation should be carried out in accordance with BS 5449:Part 1.

The cistern must be arranged to provide a minimum static head of 0.25 metres above the top of the highest point in the heating circuit.

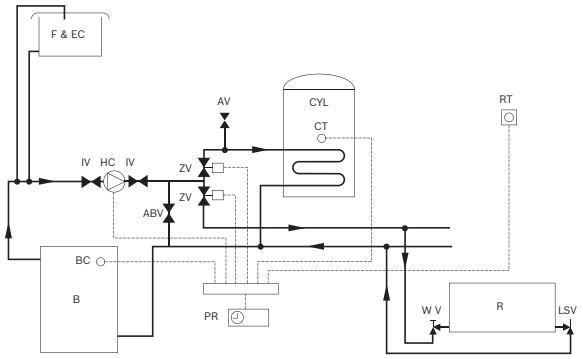
Air in the appliance is expelled through the vent pipe or dissipated into the system. Manual air vents should be fitted at any high points in the system.

The boilers can be used on a sealed system but a third party sealed system installation kit must be utilised.

Y plan



S plan



Air supply

Worcester Greenstar regular boilers are room-sealed appliances; the room in which it is installed does not therefore require a purpose provided combustion air vent.

Natural gas supply

Gas supply pipework must be sized to ensure a maximum 1mbar pressure drop between the meter and appliance inlet, + 1.5mbar across the appliance to the gas valve test point.

Listed below is a representative example. Figures for other appliances can be found in the relevant installation manuals.

Model	Gas rate
40CDi Classic Regular	4.4m^3/hr
30Ri	3.2m^3/hr
24Ri	2.6m^3/hr

The gas meter and supply pipes must be capable of supplying this quantity of gas in addition to the demand from any other appliance being served. Particular consideration should be given to the resistance to gas flow created by elbows, bends etc.

Greenstar 12Ri, 15Ri, 18Ri and 24Ri models

Provided that the correct gas supply working pressure and gas rate can be achieved (refer to BS 6891) then it may be possible to reduce the gas supply pipe diameter to 15mm.

Generally speaking, the appliance would need to be within 3 to 4 metres of the gas meter. However, this will depend on the distribution pipe size and route.

Liquid Petroleum Gas (LPG) supply

Listed below is a representative example. Figures for other appliances can be found in the relevant installation manuals.

Model	Gas rate
40CDi Classic Regular	3.3kg/hr
30Ri	2.3kg/hr
24Ri	1.9kg/hr

The gas tank or bottles must be capable of supplying this quantity of gas at a nominal pressure of 37mbar (14.8in wg) at the appliance.

Electricity supply

A 3amp fused three pin plug and unswitched shuttered socket outlet (both complying with BS 1362), or preferably a double pole isolator with a contact separation of 3mm in all poles supplying the appliance, should be used.

The appliance electrical circuits are also protected by an internal 2amp fuse. The appliance must be earthed.

Guarantee

Worcester Greenstar regular appliances are offered with a full 5 year guarantee* on parts and labour and a 10 year guarantee* on the primary heat exchanger*. Ongoing service and maintenance contracts can be arranged through the Worcester Customer Service Department.

Please contact our guarantee registration advisors on 0330 123 2552 or visit **www.worcester-bosch.co.uk/guarantee**

On all Greenstar regular appliances*

On the primary heat exchanger*

*Subject to terms and conditions.

The Worcester Greenstar System Filter

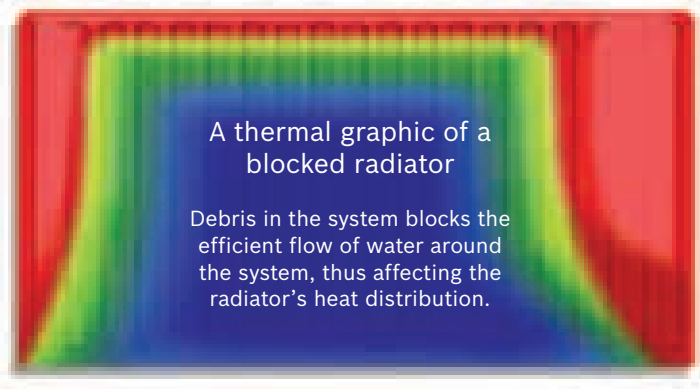
Modern condensing boilers are precision-engineered and designed to run with a clean water heating system. Over time, dirty system water will damage a boiler and its components, causing failures and shortening the life of the overall system.

Damaged boiler and system components

- Blockages in primary heat exchanger
- Increased wear on pumps
- Blocked valves.

Reduced efficiency

- Energy efficiency loss equivalent to a boiler being reduced from A rated efficiency to D rated, resulting in fuel wastage
- Blocked radiators can reduce efficiency and heating comfort.



A thermal graphic of a blocked radiator

Debris in the system blocks the efficient flow of water around the system, thus affecting the radiator's heat distribution.

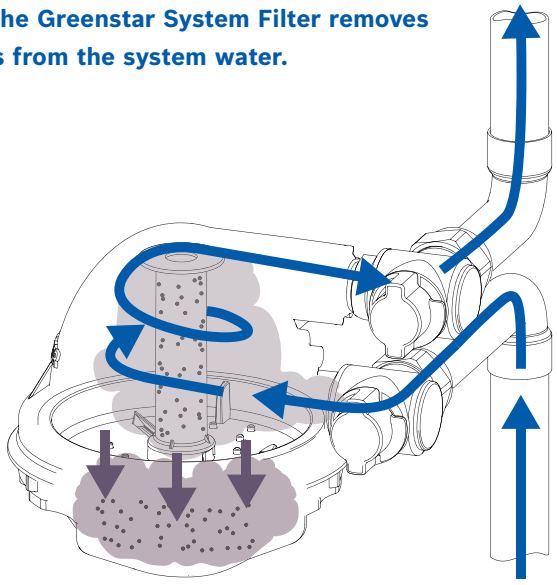
A highly effective solution from the brand you can trust

The Worcester Greenstar System Filter has been specifically designed to combat the damaging effects of system debris and pollutants, allowing homeowners to protect their boiler or heat pump for a fraction of its cost. The filter is suitable for 22mm piped heating systems.

At the centre of this innovative design is a highly powerful magnet that removes the magnetic debris (magnetite) that is present in the heating system water. The central location of the magnet ensures that magnetite is collected quickly and retained, maximising the overall protection. Any non-magnetic debris is caught by the twin-action cyclonic trap, a proven technology that offers a capacity to collect up to 200g of magnetite a year.

The Greenstar System Filter has been extensively tested in simulated systems, proving its effectiveness in removing iron oxide, magnetite, limescale particles, casting sand, welding debris, non-magnetic metal flakes, paint particles and other system pollutants.

How the Greenstar System Filter removes debris from the system water.



Installation

The filter can be installed almost anywhere in a heating system, however to maximise the effectiveness, it should be placed before the boiler and after the last radiator on the return pipework.

Features	Benefits
Highly effective filter	Safeguards the boiler against damage and protects the efficiency of the system. Saves up to 6% a year on energy bills*
Prevent blockages in radiators	A warmer home and quieter system
High powered internal magnet	Proven technology that can capture up to 200g of magnetite
Cylindrical design	Increased performance – better installation options
Twin-action – magnetic and non-magnetic filtration	Instantly effective against a wide range of system debris
No power consumption or moving parts	No electrical wiring connection or supply needed. Zero running costs and no failure of components
Can be installed under the boiler or away from the appliance	Flexibility
One-way valve for adding system chemicals	Removes the need to isolate a section of the system when carrying out servicing and maintenance
Worcester, Bosch Group specification and design	Reliability of components and filter

**Independent research carried out by GASTEC at CRE*

Product info	
Part number	7 716 192 609

Condensate pipework

Important points to consider when siting a condensate drainage pipe:

- **Where a new or replacement boiler is being installed, access to an internal "gravity discharge" point should be one of the factors considered in determining boiler location**
- **The condensate pipe must be a minimum of 22mm dia. plastic pipe**
- **The condensate pipework must fall at least 52mm per metre towards the outlet and should take the shortest practicable route**
- **Ensure there are no blockages in the pipe run.**

Internal connections

In order to minimise the risk of freezing during prolonged cold spells, the following methods of installing a condensate drainage pipe should be adopted, **in order of priority**.

Wherever possible, the condensate drainage pipe should be routed and terminated so that the condensate drains away from the boiler, under gravity, to a suitable internal foul water discharge point, such as an internal soil and vent stack. A suitable permanent connection to the foul waste pipe should be used. (see fig. 1)

Alternatively, if the first option is not possible, an internal kitchen, bathroom or washing machine waste pipe etc. can be used. (see fig. 2)

Condensate pump

Where "gravity discharge" to an internal termination is not physically possible, or where very long internal runs would be required to reach a suitable discharge point, condensate should be removed using a proprietary condensate pump of a specification recommended by the boiler or condensate pump manufacturer.

The pump outlet pipe should discharge to a suitable internal foul water discharge point such as an internal soil and vent stack, internal kitchen, bathroom or washing machine waste pipe etc. A suitable permanent connection to the foul waste pipe should be used. (see fig. 3)

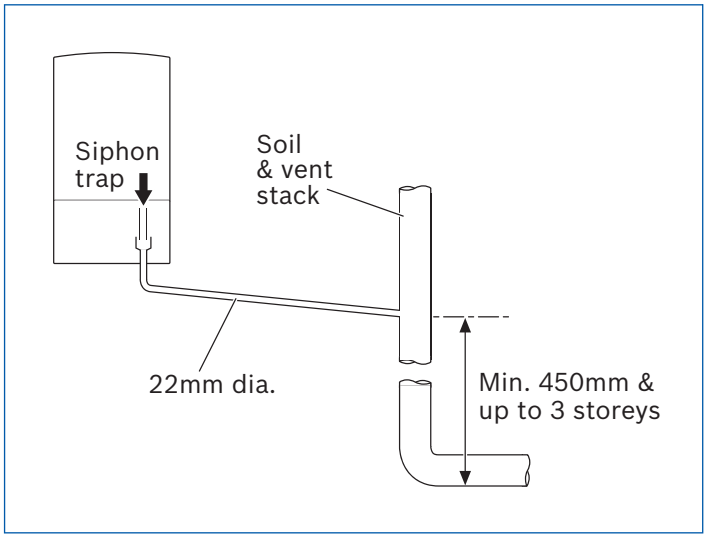


Fig. 1 Disposal to soil vent stack

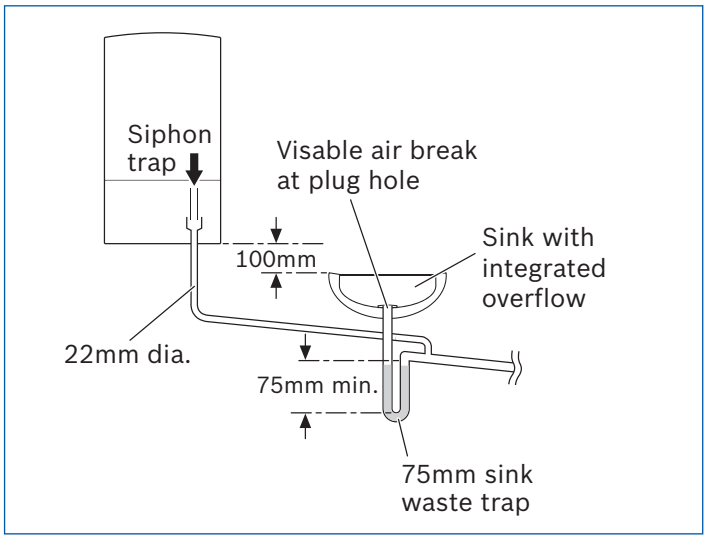


Fig. 2 Disposal to a waste pipe

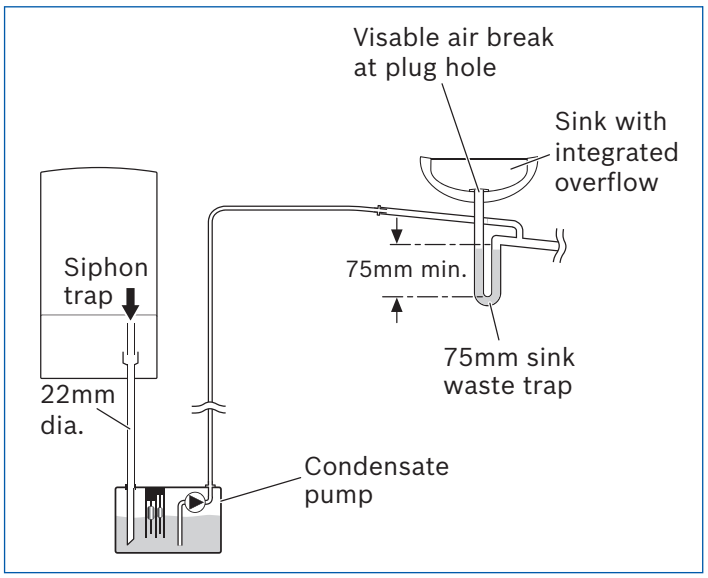


Fig. 3 Condensate pump disposal

External connections

Freezing conditions

- **When the position of the boiler prevents internal routing, we recommend installing a Worcester CondenseSure siphon to minimise the risk of freezing**
- **Pipework length should be kept to a minimum and the route as vertical as possible**
- **Weather-proofing insulation must be sized when not using a CondenseSure siphon.**

Condensate waste

- **Care should be taken when siting a soak away to avoid obstructing existing services.**

If no other discharge method is possible, then the use of an externally-run condensate drainage pipe terminating at a suitable foul water discharge point (fig. 4), or purpose-designed soak away (fig. 6), may be considered. Please see installation and servicing instructions for more details.

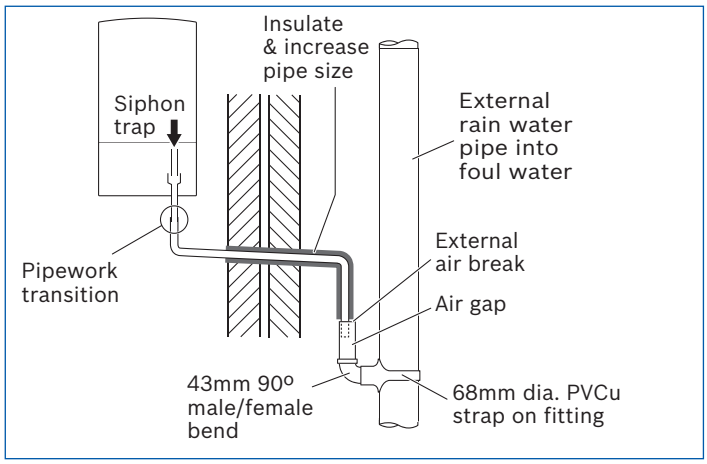


Fig. 4 Disposal into a rainwater down pipe

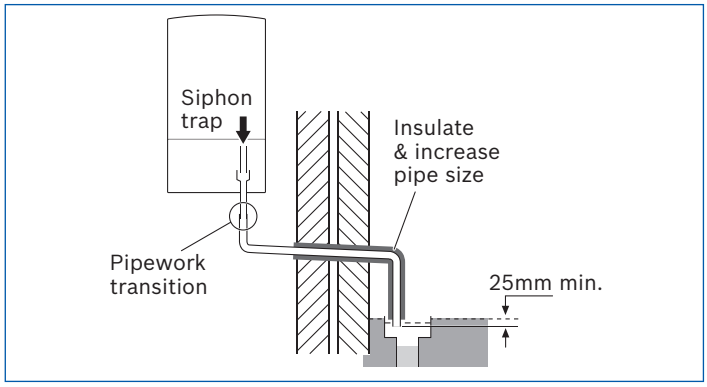


Fig. 5 External disposal

For full technical information on pipe size, insulation and different condensate pipework methods please see Installation, Commissioning and Servicing Instruction Manual.

Condensate soak away (see fig. 6)

- The condensate drainage pipe may be run above or below the ground to the soak away
- The examples shown run above ground
- The soak away must use a 100mm dia. plastic tube with two rows of three 12mm holes on 25mm centres and 50mm from the bottom of the tube. The holes must face away from the house
- The tube must be surrounded by at least 100mm of limestone chippings to a depth of 400mm
- Minimum hole size for the condensate soak away must be 400mm deep by 300mm dia.

In situations where there are likely to be extremes of temperature or exposure, the use of a proprietary trace heating system for external pipework (that incorporates an external frost thermostat) should be considered. If such a system is used, the requirement to use 32mm pipe does not apply, however all other guidance above, and the instructions for the trace heating system, should be closely followed.

Unheated internal areas

Internal pipe runs in unheated areas such as lofts, basements and garages should be treated as external runs, with consideration given to using a CondenseSure siphon.

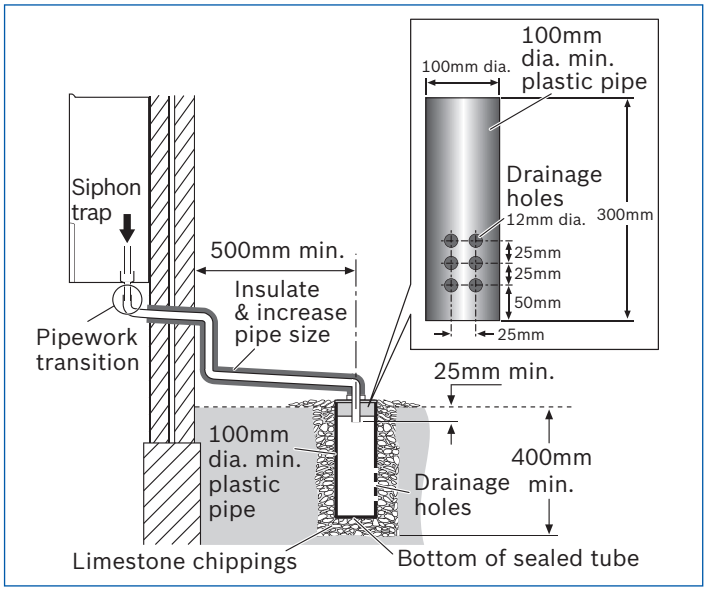


Fig. 6 Soak away

In addition to the condensate discharge options illustrated on these pages and in the Installation, Commissioning and Servicing Instruction Manual, the new Worcester CondenseSure auxiliary siphon provides an innovative alternative for the prevention of freezing for externally-run discharge condensate (see over for details).

The Worcester CondenseSure

With climate change and extreme weather variations becoming increasingly common, and very cold winters with temperatures as low as -20ºC being experienced, practices such as externally run condensate discharge pipework are now being questioned.

The CondenseSure auxiliary siphon has been designed to allow a more flexible approach to boiler siting.

Tested to extreme temperatures

The CondenseSure has been extensively tested under simulated extreme weather conditions and proved its effectiveness in preventing frozen condensate at -15ºC for a sustained period of 48 hours.

CondenseSure principle of operation

Within most condensing boilers there is an internal siphon which holds around 100ml of condensate before being released down the condensate discharge pipe. A typical high-efficiency condensing boiler will generate up to 2 litres of condensate an hour (dependant on output and temperature) and this will result in the in-built siphon discharging approximately every 3 minutes. With this frequency of discharge, it is unlikely that the condensate pipework is ever empty of condensate, consequently increasing the potential for freezing of the pipework in prolonged sub-zero temperatures.

The CondenseSure siphon connects to the boiler condensate discharge outlet and collects the condensate into a larger volume before releasing it into the discharge pipe.

With this expanded siphonic operation, the discharge from the CondenseSure is every 15 to 20 minutes, resulting in:

- Increased velocity and flow rate
- With only 3 to 4 siphonic actions per hour, the condensate pipework is empty for longer
- Significantly decreased or even eliminated freezing potential.

The CondenseSure insulating jacket helps to retain the temperature of the condensate.

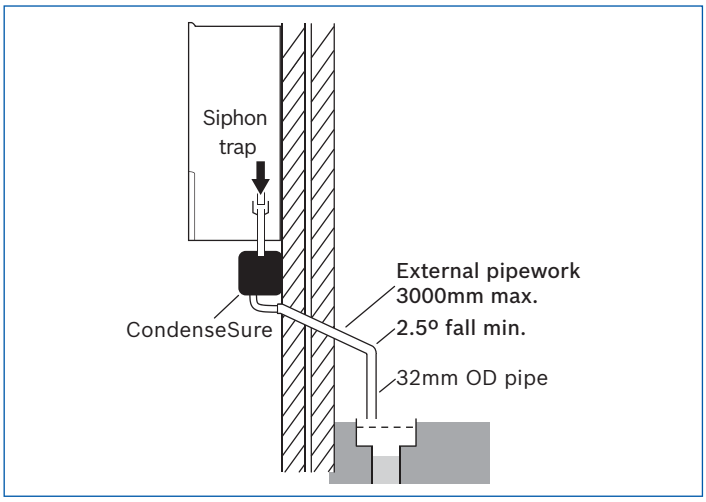
A universal fitting for new and existing installations

Although developed specifically for Worcester Greenstar gas- and oil-fired boilers, the Worcester CondenseSure can also be fitted to any make of condensing boiler for both new and retrofit installations. The CondenseSure can provide a simple solution which eliminates the need for re-siting both the new boiler and the system pipework when replacing an existing non-condensing appliance. The CondenseSure can easily be fitted to existing installations to provide peace of mind in extreme weather conditions.

Features	Benefits
No power consumption	No electrical wiring connection or supply needed, meaning zero running costs
No moving parts	No failure of components
Can be installed on new or existing installations	Suitable for any gas- or oil-fired condensing boilers
Can be attached to 22mm heating flow pipework	Uses ‘free’ energy from the pipe to heat the condensate
Under boiler or remote installation	Flexibility
No electrical connections	No electrician needed
No pipe insulation needed	Cost-saving and aesthetically pleasing

Ease of installation

The CondenseSure has been designed with ease of installation in mind and is suitable for most boiler applications. For maximum effectiveness, it should be installed immediately beneath the boiler where it is clipped on to the boiler's heating flow pipe and connected to its siphonic trap. If this is not practical, the CondenseSure can be wall-mounted away from the boiler and connected to a 32mm condensate discharge pipe. However, this will sacrifice the benefit of warming the condensate prior to discharge and therefore slightly reduce its performance.



A typical installation using CondenseSure

The CondenseSure installation parameters

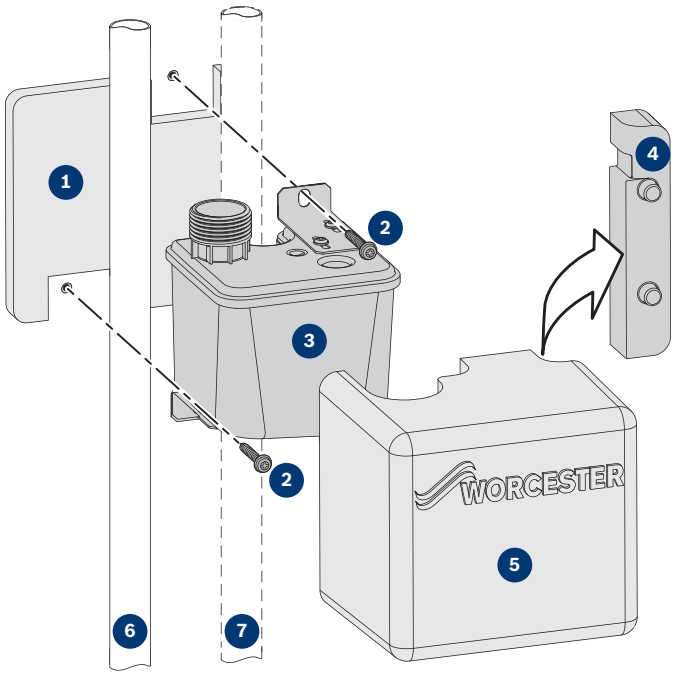
The CondenseSure will protect an externally-run condensate discharge pipe from freezing for 48 hours at -15°C providing the following installation parameters are met:

- The externally-run pipe length does not exceed 3 metres
- There is a fall on the discharge pipe of at least 2.5 degrees
- The discharge pipe diameter is not less than 32mm in diameter.

Whilst it is not necessary to insulate the pipework, it may be a consideration if longer lengths or if lower external temperatures are expected.

The CondenseSure clips onto the 22mm heating flow pipe using the 'free' heat to raise the condensate temperature.

Fitting to a regular boiler



1. Foam backing with double-sided tape
2. Siphon mounting screws
3. Siphon body
4. Foam insert (used with regular or system boilers)
5. Foam cover
6. CH flow pipe
7. CH return pipe Greenstar Ri only

Additional installation considerations include:

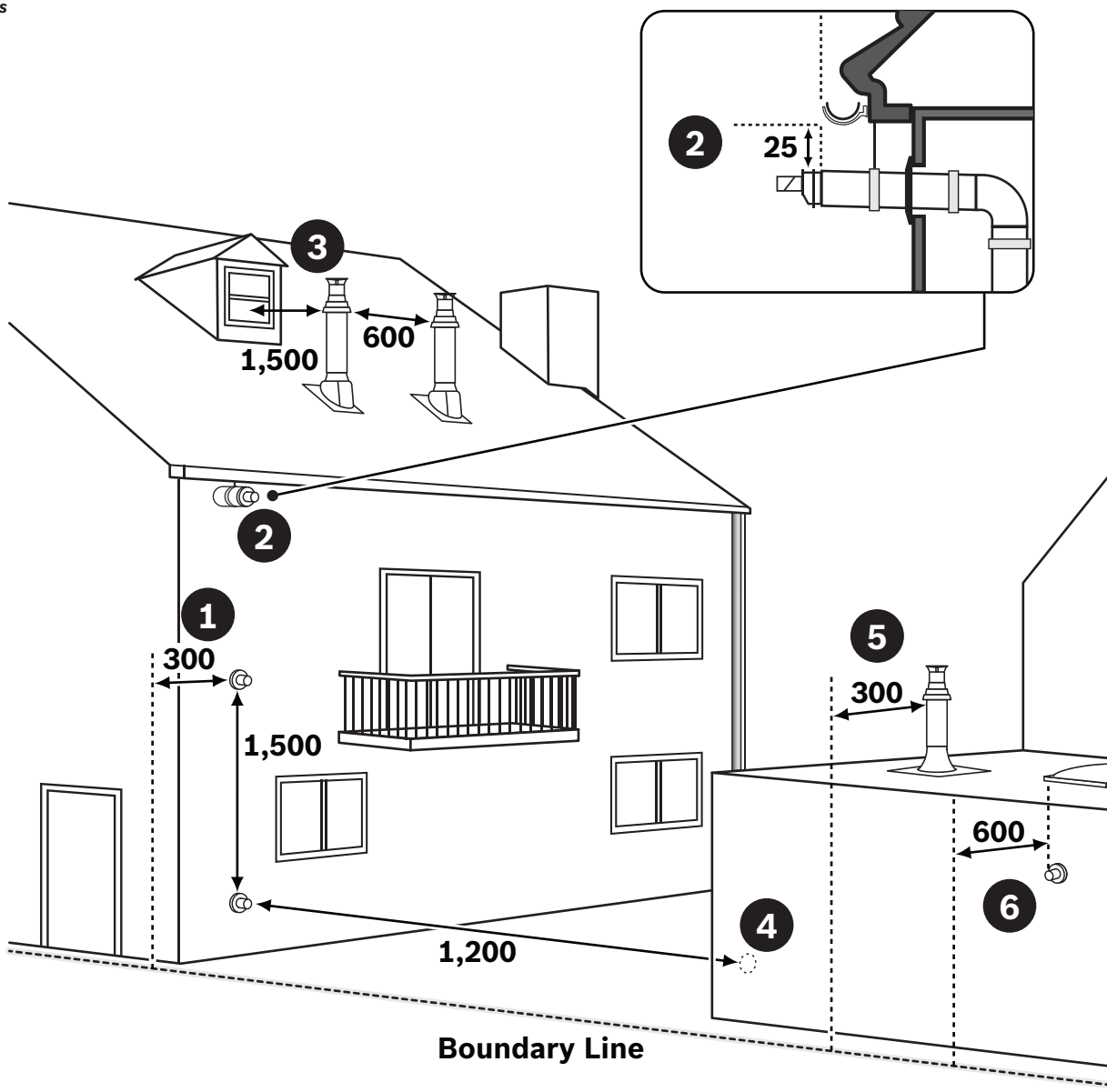
- Keeping any external pipework as short as possible
- Minimising the number of bends and connections
- Removal of burrs after cutting pipe
- Removal of surplus solvent from the interior of the pipe.

The CondenseSure has no working parts to breakdown, does not use any energy and has no electrical connections, so there is no Part P requirement.

Product info	
Part number	7 716 192 746

Horizontal and vertical flue terminal positioning

All measurements in millimetres



Note

- **All measurements are the minimum clearances required**
- **Terminals must be positioned so as to avoid combustion products entering the building**
- **Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fittings.**

Flue bracket part numbers:

7 716 191 092 (100mm dia.)

7 716 191 173 (100mm dia. x 6)

7 716 191 174 (125mm dia.)

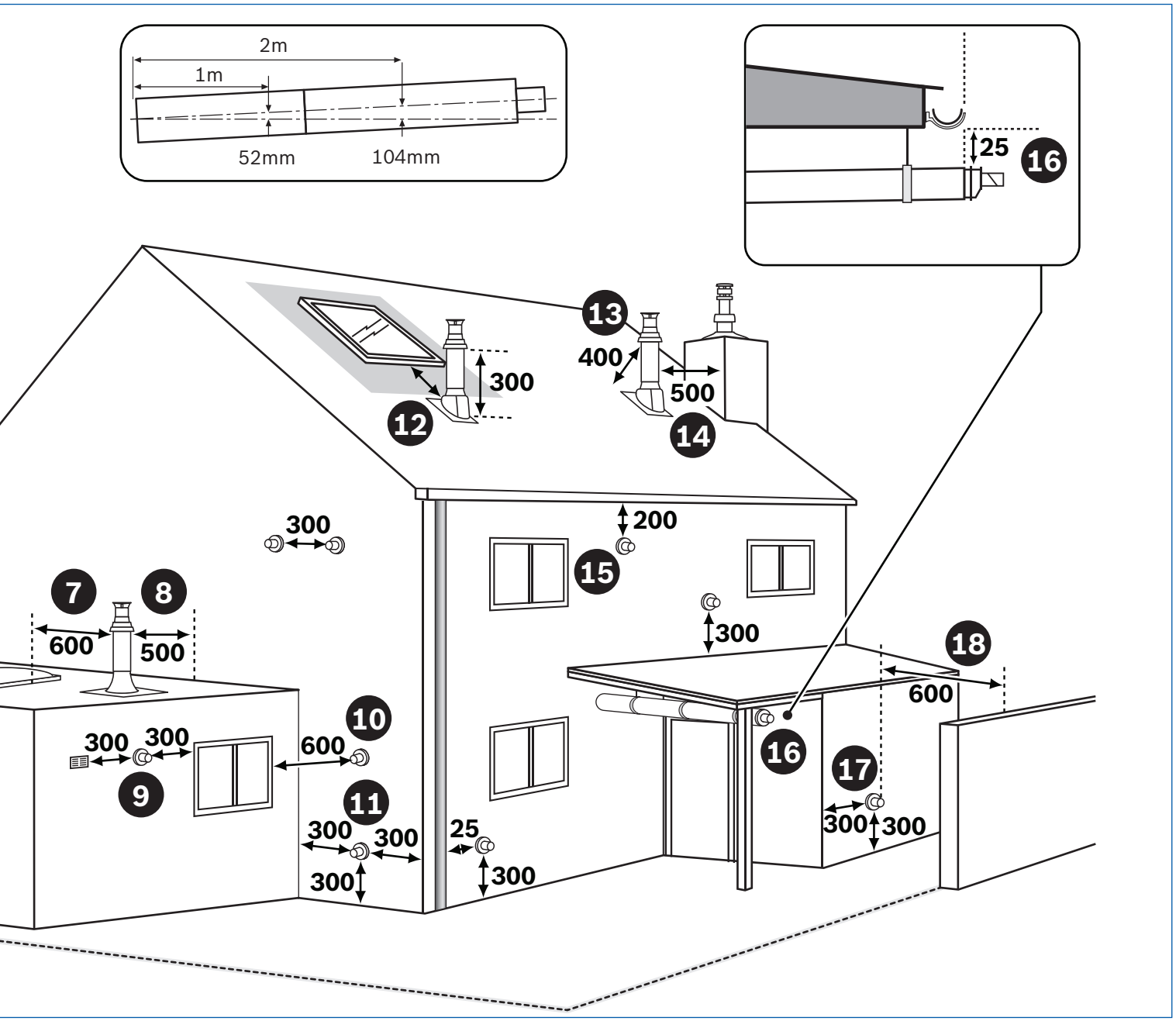
7 716 191 177 (100mm dia.) – 27Ri and 30Ri only

7 716 191 178 (100mm dia. x 6) – 27Ri and 30Ri only

7 716 191 179 (125mm dia.) – 27Ri and 30Ri only

Key to illustration

1. 300mm adjacent to a boundary line.
2. The dimension below eaves, balconies and car ports can be reduced to 25mm, as long as the flue terminal is extended to clear any overhang. External flue joints must be sealed with suitable silicon sealant.
3. 1,500mm between a vertical flue terminal and a window or dormer window.
4. 1,200mm between terminals facing each other.
5. Vertical flue clearance, 300mm adjacent to a boundary line.
6. 600mm distance to a boundary line, unless it will cause a nuisance. BS 5440:Part 1 recommends that care is taken when siting terminal in relation to boundary lines.
7. 600mm minimum clearance from a skylight to a vertical flue.
8. Vertical flue clearance, 500mm to non-combustible building material, and 1,500mm clearance to combustible building material.



9. 300mm above, below and either side of an opening door, air vent or opening window.
10. 600mm diagonally to an opening door, air vent or opening window.
11. 300mm to an internal or external corner.
12. 2,000mm below a Velux window, 600mm above or to either side of the Velux window.
13. 400mm from a pitched roof or 500mm in regions with heavy snowfall.
14. 500mm clearance to any vertical structure on a roof, 600mm to room sealed flue or 1,500 to an open flue.
15. 200mm below eaves and 75mm below gutters, pipe and drains.
16. The dimension below eaves, balconies and car ports can be reduced to 25mm, as long as the flue terminal is extended to clear any overhang. External flue joints must be sealed with suitable silicon sealant.
17. Flue clearance must be at least 300mm from the ground. Terminal guards must be fitted if the flue is less than 2 metres from the ground or if a person could come into contact with the flue terminal.
18. 600mm distance to a surface facing a terminal, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to surfaces facing a terminal.

- **Installations in car ports are not recommended**
- **The flue cannot be lower than 1,000mm from the top of a light well due to the build-up of combustion products**
- **Dimensions from a flue terminal to a fanned air inlet to be determined by the ventilation equipment manufacturer.**

Greenstar regular boiler range horizontal fluing options

The Greenstar regular boiler range offers the choice of 2 differently sized horizontal RSF flue systems, a 100mm diameter telescopic flue kit including a plume management kit and a 125mm diameter telescopic flue kit. Both systems have different maximum lengths. Options 1 to 6 detail the permissible lengths.

Horizontal RS flue

Flue diameter	100mm	125mm
Greenstar CDi Classic Regular series		
Minimum flue length	350mm*	405mm
Maximum flue length 30CDi Classic Regular	7,900mm	18,500mm
40CDi Classic Regular	6,000mm	12,500mm
Greenstar 12Ri-24Ri series		
Minimum flue length	350mm*	405mm
Maximum flue length	4,600mm	13,000mm
Greenstar 27Ri & 30Ri		
Minimum flue length	350mm*	405mm
Maximum flue length	6,000mm	15,000mm

**Can be cut to 130mm. Please refer to instructions.*

100mm dia. standard telescopic flue kit

Comprises:

1 x flue turret elbow

570mm (100mm dia.) of flue duct

1 x weather sealing ring

1 x internal collar

Part No. 7 716 191 082

125mm dia. standard telescopic flue kit

1 x flue turret elbow

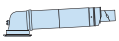
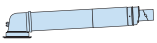
600mm (125mm dia.) of flue duct including terminal (as measured from centre of flue outlet)

1 x weather sealing plate

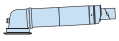
1 x internal plate

Part No. 7 719 003 702

Accessories

Components	Part No.	Description
100mm diameter		
	7 716 191 082	Standard telescopic flue kit (350 - 570mm)
	7 716 191 171	Long telescopic flue kit (570 - 790mm)
	7 716 191 083	Extension flue kit (960mm*)
	7 716 191 172	2m flue extension*
	7 716 191 133	Short flue extension (220mm*)
	7 716 191 084	90º bend
	7 716 191 085	45º bend
	7 719 002 432	High level horizontal flue adaptor
	7 716 191 092	Support bracket kit
	7 716 191 173	Support bracket kit (6 pack)

**Dimensions when fitted*

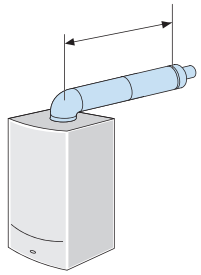
125mm diameter		
	7 719 003 702	Standard telescopic flue kit (405 - 600mm)
	7 719 003 666	Extension flue kit (960mm*)
	7 719 003 664	90º bend
	7 719 003 665	45º bend
	7 719 002 433	High level horizontal flue adaptor
	7 716 191 174	Support bracket kit

**Dimensions when fitted*

The following criteria should be noted when planning the installation:

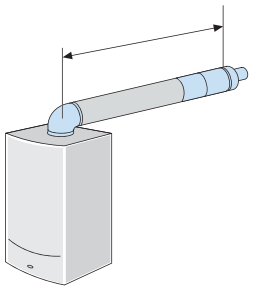
- The concentric flue system must be inclined at 3º (52mm per metre) from the appliance, to allow condensate to drain back into the boiler
- A white plume of condensation will be emitted from the terminal because the appliance operates at high efficiency. Care must be taken when selecting the flue terminal position
- To achieve a maximum flue length, one of the extension flue kits will need to be cut so that the permitted maximum flue length is not exceeded
- Horizontal flue options 1-6 illustrate common flue installations. Other configurations of the flue system are possible up to, and not exceeding, the stated maximum flue lengths.

Option 1: Standard horizontal flue assembly



Components	
Part No. 100mm	7 716 191 082
Part No. 125mm	7 719 003 702
Maximum lengths (mm) & no. of components required	
Greenstar CDi Classic Regular series	
100mm	570	1
125mm	600	1
Greenstar 12Ri-24Ri series	
100mm	570	1
125mm	600	1
Greenstar 27Ri & 30Ri	
100mm	570	1
125mm	600	1

Option 2: Extension flue horizontal



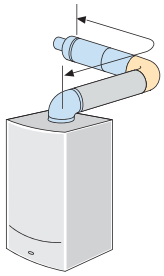
Components			
Part No. 100mm		7 716 191 082	7 716 191 083
Part No. 125mm		7 719 003 702	7 719 003 666
Maximum lengths (mm) & no. of components required			
Greenstar 30CDi Classic Regular			
100mm	7,900	1	up to 8
125mm	18,500	1	up to 18
Greenstar 40CDi Classic Regular			
100mm	6,000	1	up to 6
125mm	12,500	1	up to 12
Greenstar 12Ri-24Ri series			
100mm	4,600	1	up to 5
125mm	13,000	1	up to 13
Greenstar 27Ri & 30Ri			
100mm	6,000	1	up to 6
125mm	15,000	1	up to 15

Note: The 100mm dia. short flue extension (Part No. 7 716 191 133) and 100mm dia. 2m flue extension (Part No. 7 716 191 172) may be used as an alternative to the standard extension as required up to the maximum flue lengths stated.

Note: The maximum flue length must be reduced by the following amounts for each bend used.

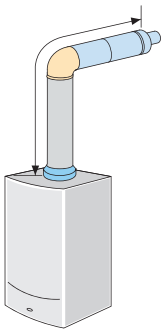
	45º bend	90º bend
Greenstar CDi Classic Regular 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic Regular 80/125mm flues	1,000mm	2,000mm
Greenstar Ri series – all flue sizes	1,000mm	2,000mm

Option 3: Extension flue horizontal using a second 90º bend



Components				
Part No. 100mm		7 716 191 082	7 716 191 083	7 716 191 084
Part No. 125mm		7 719 003 702	7 719 003 666	7 719 003 664
Maximum lengths (mm) & no. of components required				
Greenstar 30CDi Classic Regular				
100mm	6,400	1	up to 6	1
125mm	16,500	1	up to 16	1
Greenstar 40CDi Classic Regular				
100mm	4,500	1	up to 4	1
125mm	10,500	1	up to 10	1
Greenstar 12Ri-24Ri series				
100mm	2,600	1	up to 3	1
125mm	11,000	1	up to 10	1
Greenstar 27Ri & 30Ri				
100mm	4,000	1	up to 4	1
125mm	13,000	1	up to 13	1

Option 4: Extension flue horizontal and upwards



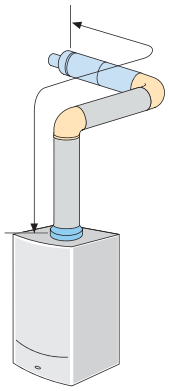
Components					
Part No. 100mm		7 716 191 082	7 716 191 083	7 716 191 084	7 719 002 432
Part No. 125mm		7 719 003 702	7 719 003 666	7 719 003 664	7 719 002 433
Maximum lengths (mm) & no. of components required					
Greenstar 30CDi Classic Regular					
100mm	7,900	1	up to 8	1	1
125mm	18,500	1	up to 18	1	1
Greenstar 40CDi Classic Regular					
100mm	6,000	1	up to 6	1	1
125mm	12,500	1	up to 12	1	1
Greenstar 12Ri-24Ri series					
100mm	4,600	1	up to 5	1	1
125mm	13,000	1	up to 13	1	1
Greenstar 27Ri & 30Ri					
100mm	6,000	1	up to 6	1	1
125mm	15,000	1	up to 15	1	1

Note: The 100mm dia. short flue extension (Part No. 7 716 191 133) and 100mm dia. 2m flue extension (Part No. 7 716 191 172) may be used as an alternative to the standard extension as required up to the maximum flue lengths stated.

Note: The maximum flue length must be reduced by the following amounts for each bend used.

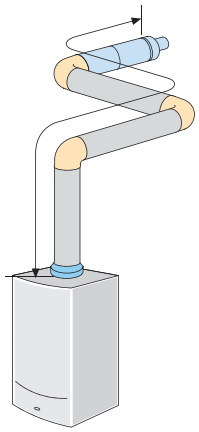
	45º bend	90º bend
Greenstar CDi Classic Regular 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic Regular 80/125mm flues	1,000mm	2,000mm
Greenstar Ri series – all flue sizes	1,000mm	2,000mm

Option 5: Extension flue upwards and horizontal using a second 90º bend



Components					
Part No. 100mm		7 716 191 082	7 716 191 083	7 716 191 084	7 719 002 432
Part No. 125mm		7 719 003 702	7 719 003 666	7 719 003 664	7 719 002 433
Maximum lengths (mm) & no. of components required					
Greenstar 30CDi Classic Regular					
100mm	6,400	1	up to 6	2	1
125mm	16,500	1	up to 16	2	1
Greenstar 40CDi Classic Regular					
100mm	4,500	1	up to 4	2	1
125mm	10,500	1	up to 10	2	1
Greenstar 12Ri-24Ri series					
100mm	2,600	1	up to 3	2	1
125mm	11,000	1	up to 11	2	1
Greenstar 27Ri & 30Ri					
100mm	4,000	1	up to 4	2	1
125mm	13,000	1	up to 13	2	1

Option 6: Extension flue upwards and horizontal using a third 90º bend



Components					
Part No. 100mm		7 716 191 082	7 716 191 083	7 716 191 084	7 719 002 432
Part No. 125mm		7 719 003 702	7 719 003 666	7 719 003 664	7 719 002 433
Maximum lengths (mm) & no. of components required					
Greenstar 30CDi Classic Regular					
100mm	4,900	1	up to 5	3	1
125mm	14,500	1	up to 14	3	1
Greenstar 40CDi Classic Regular					
100mm	3,000	1	up to 2	3	1
125mm	8,500	1	up to 8	3	1
Greenstar 12Ri-24Ri series					
125mm	9,000	1	up to 9	3	1
Greenstar 27Ri & 30Ri					
100mm	2,000	1	up to 2	3	1
125mm	11,000	1	up to 11	3	1

45º options available

Note: The 100mm dia. short flue extension (Part No. 7 716 191 133) and 100mm dia. 2m flue extension (Part No. 7 716 191 172) may be used as an alternative to the standard extension as required up to the maximum flue lengths stated.

Note: The maximum flue length must be reduced by the following amounts for each bend used.

	45º bend	90º bend
Greenstar CDi Classic Regular 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic Regular 80/125mm flues	1,000mm	2,000mm
Greenstar Ri series – all flue sizes	1,000mm	2,000mm

Greenstar regular boiler range vertical fluing options

The Greenstar regular boiler range offers the choice of 2 differently sized vertical RSF flue systems, 100mm and 125mm. Both systems have different maximum lengths. Options 1 to 4 detail the permissible lengths.

Vertical RSF flue

Flue diameter	100mm	125mm
Greenstar CDi Classic Regular series		
Minimum flue length	1,140mm	1,365mm
Maximum flue length (inc. adaptor) 30CDi Classic Regular	9,400mm	18,500mm
40CDi Classic Regular	7,500mm	16,000mm
Greenstar 12Ri-24Ri series		
Minimum flue length	1,090mm	1,365mm
Maximum flue length (inc. adaptor)	6,400mm	15,000mm
Greenstar 27Ri & 30Ri		
Minimum flue length	1,090mm	1,365mm
Maximum flue length (inc. adaptor)	6,000mm	15,000mm

Vertical balanced flue kit

Comprises:

1 x flue terminal assembly
1 x weather sealing collar
1 x fire stop spacer
1 x vertical adaptor

Part No. 7 719 002 430 (100mm dia.)

Part No. 7 719 002 431 (125mm dia.)

Accessories

Components	Part No.	Description
100mm diameter		
	7 719 002 430	Vertical 1,090mm balanced flue kit (inc. adaptor)
	7 716 191 083	Extension flue kit (960mm*)
	7 716 191 172	2m flue extension*
	7 716 191 133	Short flue extension (220mm*)
	7 716 191 084	90º bend
	7 716 191 085	45º bend
	7 716 191 090	Flashing – flat roof
	7 716 191 091	Flashing – pitched roof

**Dimensions when fitted*

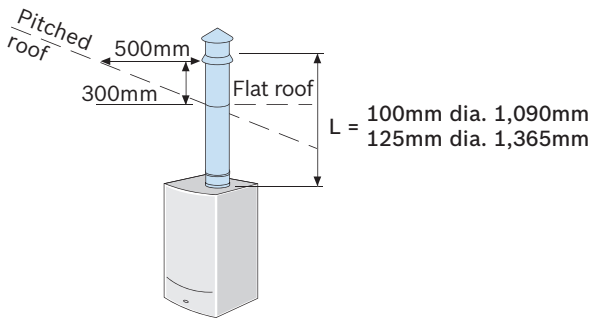
125mm diameter		
	7 719 002 431	Vertical 1,365mm balanced flue kit (inc. adaptor)
	7 719 003 666	Extension flue kit (960mm*)
	7 719 003 664	90º bend
	7 719 003 665	45º bend
	7 716 191 090	Flashing – flat roof
	7 716 191 091	Flashing – pitched roof

**Dimensions when fitted*

The following criteria should be noted when planning the installation:

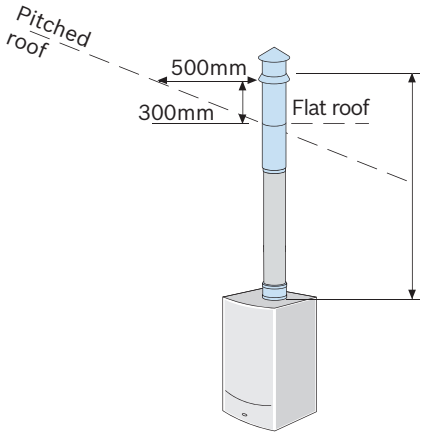
- Because the appliance operates at high efficiency, a white plume of condensation will be emitted from the terminal. Care must be taken when selecting the flue terminal position
- To achieve a maximum flue length, one of the extension flue kits will need to be cut so that the permitted maximum flue length is not exceeded
- Vertical flue options 1-4 illustrate common flue installations. Other configurations of the flue system are possible up to, and not exceeding, the stated maximum flue lengths.

Option 1: Minimum height



Components		
Part No. 100mm		7 719 002 430
Part No. 125mm		7 719 002 431
Maximum lengths (mm) & no. of components required		
Greenstar 30CDi Classic Regular		
100mm	1,090	1
125mm	1,365	1
Greenstar 40CDi Classic Regular		
100mm	1,090	1
125mm	1,365	1
Greenstar 12Ri-24Ri series		
100mm	1,090	1
125mm	1,365	1
Greenstar 27Ri & 30Ri		
100mm	1,090	1
125mm	1,365	1

Option 2: Vertical balanced flue system maximum height



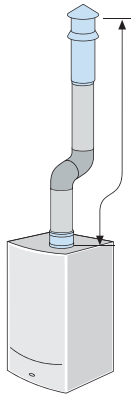
Components			
Part No. 100mm		7 719 002 430	7 716 191 083
Part No. 125mm		7 719 002 431	7 719 003 666
Maximum lengths (mm) & no. of components required			
Greenstar 30CDi Classic Regular			
100mm	9,400	1	up to 9
125mm	18,500	1	up to 18
Greenstar 40CDi Classic Regular			
100mm	7,500	1	up to 7
125mm	16,000	1	up to 15
Greenstar 12Ri-24Ri series			
100mm	6,400	1	up to 6
125mm	15,000	1	up to 14
Greenstar 27Ri & 30Ri			
100mm	6,000	1	up to 5
125mm	15,000	1	up to 14

Note: The 100mm dia. short flue extension (Part No. 7 716 191 133) and 100mm dia. 2m flue extension (Part No. 7 716 191 172) may be used as an alternative to the standard extension as required up to the maximum flue lengths stated.

Note: The maximum flue length must be reduced by the following amounts for each bend used.

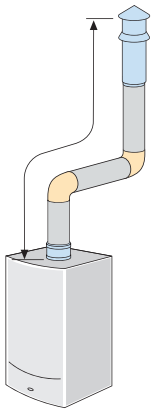
	45º bend	90º bend
Greenstar CDi Classic Regular 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic Regular 80/125mm flues	1,000mm	2,000mm
Greenstar Ri series – all flue sizes	1,000mm	2,000mm

Option 3: Vertical balanced flue system with two 45º bends



Components				
Part No. 100mm		7 719 002 430	7 716 191 083	7 716 191 085
Part No. 125mm		7 719 002 431	7 719 003 666	7 719 003 665
Maximum lengths (mm) & no. of components required				
Greenstar 30CDi Classic Regular				
100mm	7,900	1	up to 7	2
125mm	16,500	1	up to 16	2
Greenstar 40CDi Classic Regular				
100mm	6,000	1	up to 5	2
125mm	14,000	1	up to 13	2
Greenstar 12Ri-24Ri series				
100mm	4,400	1	up to 4	2
125mm	13,000	1	up to 12	2
Greenstar 27Ri & 30Ri				
100mm	4,000	1	up to 3	2
125mm	13,000	1	up to 12	2

Option 4: Vertical balanced flue system with two 90º bends



Components				
Part No. 100mm		7 719 002 430	7 716 191 083	7 716 191 084
Part No. 125mm		7 719 002 431	7 719 003 666	7 719 003 664
Maximum lengths (mm) & no. of components required				
Greenstar 30CDi Classic Regular				
100mm	6,400	1	up to 7	2
125mm	14,500	1	up to 16	2
Greenstar 40CDi Classic Regular				
100mm	4,500	1	up to 4	2
125mm	12,000	1	up to 13	2
Greenstar 12Ri-24Ri series				
100mm	2,400	1	up to 2	2
125mm	11,000	1	up to 10	2
Greenstar 27Ri & 30Ri				
100mm	2,000	1	up to 1	2
125mm	11,000	1	up to 10	2

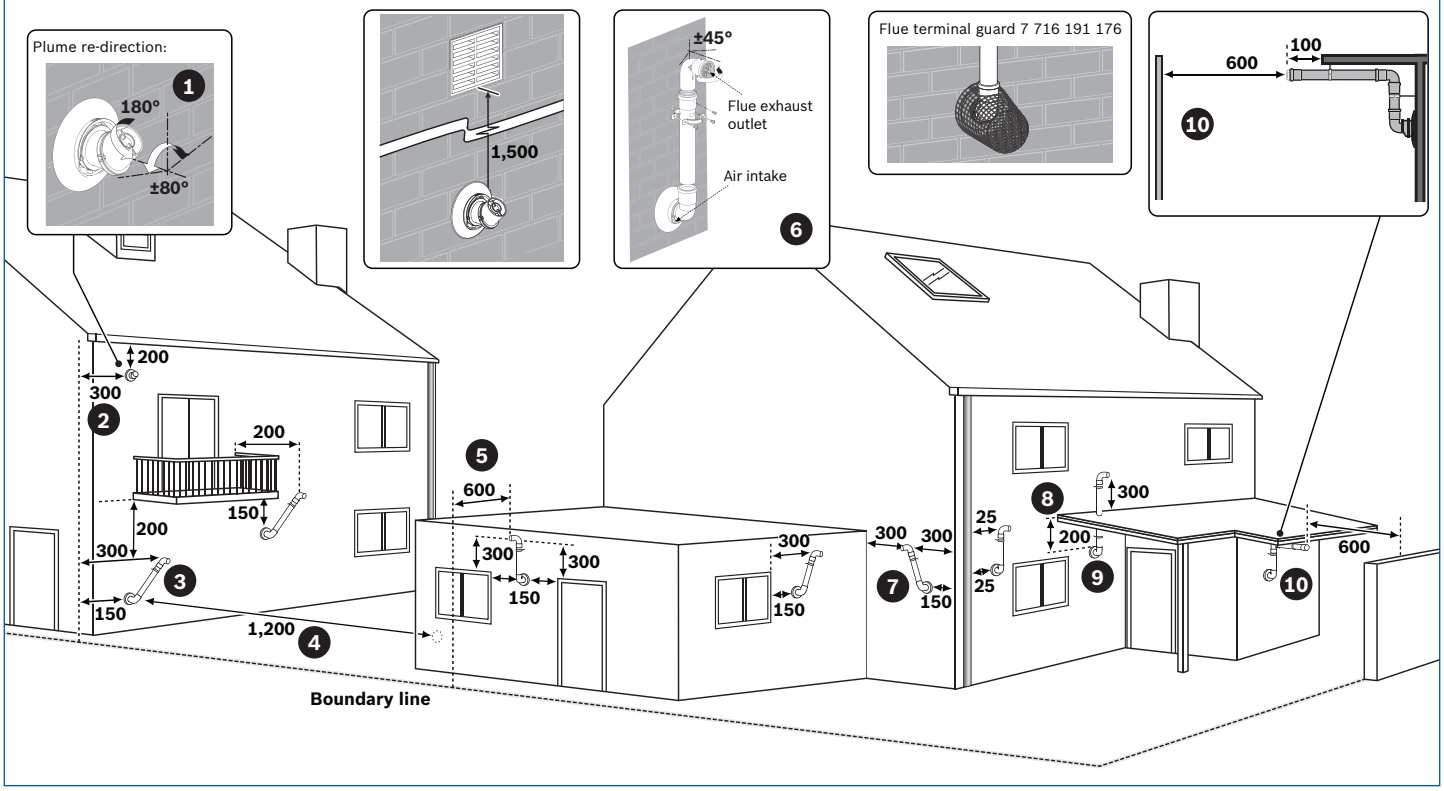
Note: The 100mm dia. short flue extension (Part No. 7 716 191 133) and 100mm dia. 2m flue extension (Part No. 7 716 191 172) may be used as an alternative to the standard extension as required up to the maximum flue lengths stated.

Note: The maximum flue length must be reduced by the following amounts for each bend used.

	45º bend	90º bend
Greenstar CDi Classic Regular 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic Regular 80/125mm flues	1,000mm	2,000mm
Greenstar Ri series – all flue sizes	1,000mm	2,000mm

Plume management terminal positioning

All measurements in millimetres



Note

- **All measurements are the minimum clearances required**
- **Refer to pages 36-37 for all concentric flue terminal positions unless the flue position is specified on the figure above "Plume terminal positions"**
- **Terminals must be positioned so as to avoid combustion products entering the building**
- **Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fittings.**

Key to illustration

1. This feature allows some basic plume re-direction options on a standard telescopic horizontal flue terminal. 300mm minimum clearances to a opening, e.g. window. However the minimum clearances to an opening in the direction that the plume management is facing, must be increased to 1,500mm. Where the flue is less than 150mm to a drainpipe, and plume re-direction is used, the deflector should not be directed towards the drainpipe.
2. 300mm adjacent to a boundary line.
3. Plume Management Kit air intake can be reduced to 150mm providing the flue exhaust outlet is no less than 300mm adjacent to a boundary line.
4. 1,200mm between terminals facing each other.
5. 600mm distance to a boundary line, unless it will cause a nuisance. BS 5440:Part 1 recommends that care is taken when siting terminal in relation to boundary lines.
6. Using a Plume Management Kit, the air intake measurement can be reduced to 150mm providing the flue exhaust outlet has a 300mm clearance. Plume kits running horizontally must have a 10° fall back to the boiler for proper disposal of condensate. For details on specific lengths see relevant boiler Technical & Specification information.
7. Internal/external corners. The air intake clearance can be reduced to 150mm providing the flue exhaust outlet has a 300mm clearance.
8. Clearances no less than 200mm from the lowest point of the balcony or overhang.
9. 1,200mm from an opening in a car port on the same wall e.g. door or window leading into the dwelling.
10. 600mm distance to a surface facing a terminal, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to surfaces facing a terminal.

- **Installations in car ports are not recommended**
- **The flue cannot be lower than 1,000mm from the top of a light well due to the build up of combustion products**
- **Dimensions from a flue terminal to a fanned air inlet to be determined by the ventilation equipment manufacturer.**

Plume management system options

Plume management system

60mm dia. plume management kit

1 x terminal bend
1 x extension 500mm
1 x outlet assembly
1 x clamp pack

Part No. 7 716 191 086

Accessories

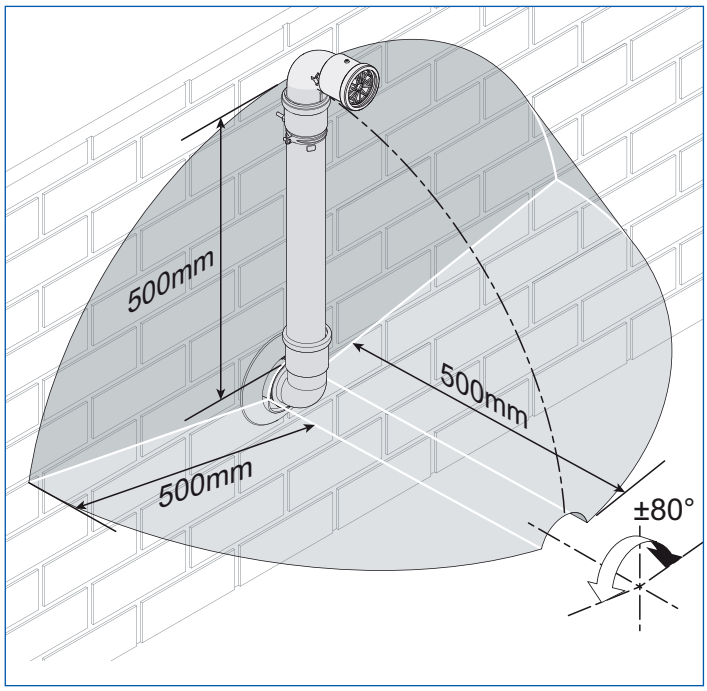
Condensfit II™

Components	Part No.	Description
60mm diameter		
	7 716 191 086	Plume management kit
	7 716 191 087	Extension (1,000mm)
	7 716 191 088	90º bend
	7 716 191 089	45º bend (pair)
	7 716 191 176	Plume management terminal guard round

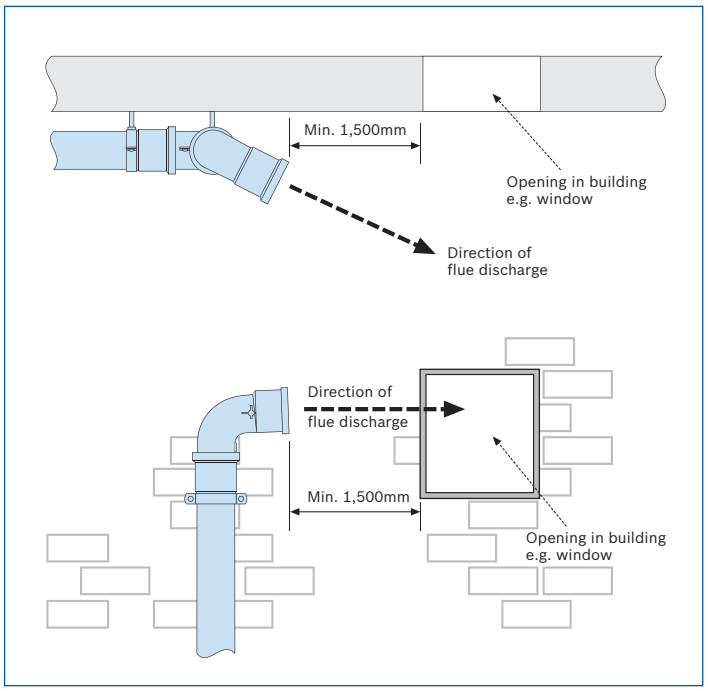
Standard plume management system

The flue terminal outlet has built-in stops which limits the rotation for horizontal fluing, allowing the condensate to run back into the boiler for safe disposal. Do not attempt to force beyond the limit stops.

All plume management sections must rise by at least 173mm per metre (10º) from the terminal to ensure that condensate flows back into the boiler.



Terminal exclusion zone



Re-directing flue discharge from a 60mm dia. plume management outlet

For Greenstar CDi Classic Regular and Greenstar 27 and 30Ri boilers, the 100mm dia. internal flue length must be reduced by 700mm for every additional 1,000mm of plume management; refer to table and graph below.

Greenstar 12-24Ri regular boilers are able to use the maximum 100mm dia. internal flue length of 4,600mm regardless of the amount of plume management selected.

External plume management bends still need to be allowed for. See below.

60mm dia. plume management system

To ensure that the maximum total straight flue length along the plume management route is not exceeded, the following should be added to dimension (M):

- 1,500mm for each extra 90º bend
- 750mm for each extra 45º bend

For plume management options with 60mm dia. extensions, refer to page 48.

Use the graph below to determine the permissible plume management length that can be used with your effective flue length 'L'.

The effective flue length can be determined by adding together all the straight flue lengths and the effective lengths of the bends used, 2,000mm for each 90º bend and 1,000mm for each 45º bend.

Condensfit II™ telescopic flue and plume management system measuring

Fig A

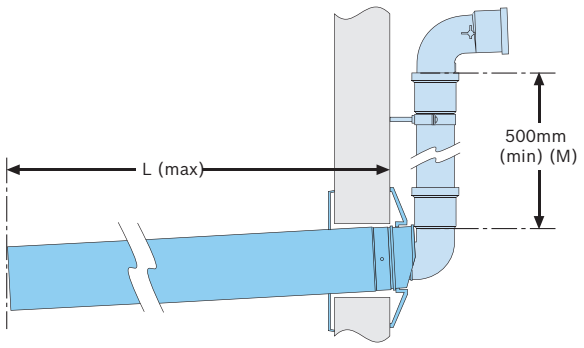
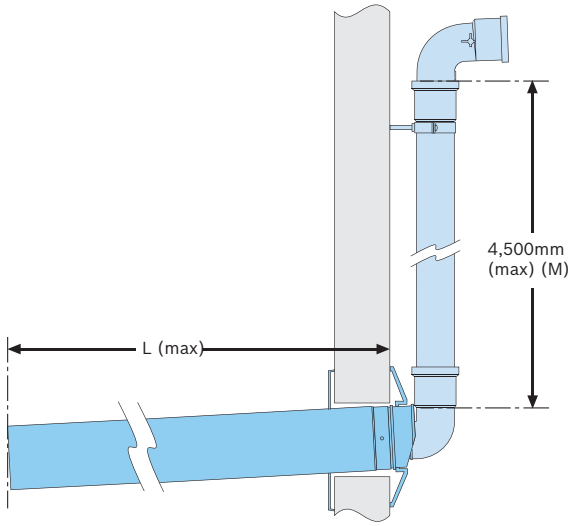
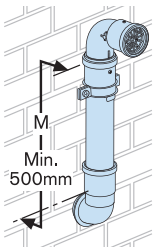


Fig B



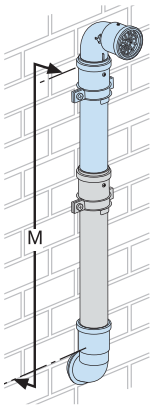
Effective straight flue lengths for telescopic flue with plume management		
Boiler	**Fig. A** **Maximum straight flue length (L) with minimum plume management length 500mm (M)**	**Fig. B** **Maximum straight flue length (L) with maximum plume management length 4,500mm (M)**
30CDi Classic Regular	5,900mm	3,100mm
40CDi Classic Regular	4,000mm	1,200mm
12Ri-24Ri series	4,600mm	4,600mm
27Ri & 30Ri	5,000mm	2,200mm

Plume management system



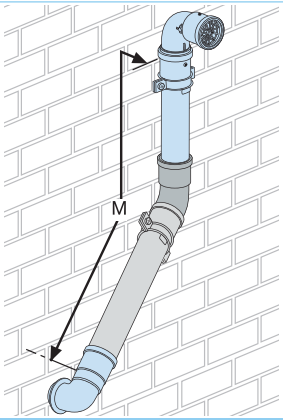
Components	
Part No. 60mm	7 716 191 086
Maximum lengths (mm) & no. of components required	
Greenstar CDi Classic Regular and Ri series*	
60mm 500	1

Plume management system with extensions



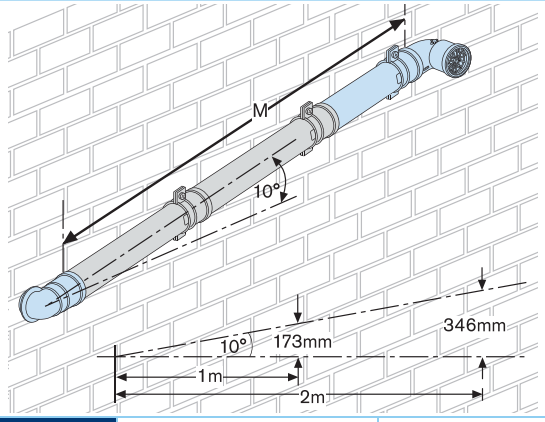
Components		
Part No. 60mm	7 716 191 086	7 716 191 087
Maximum lengths (mm) & no. of components required		
Greenstar CDi Classic Regular and Ri series*		
60mm 4,500	1	up to 4

Plume management system with extensions and 45º bend



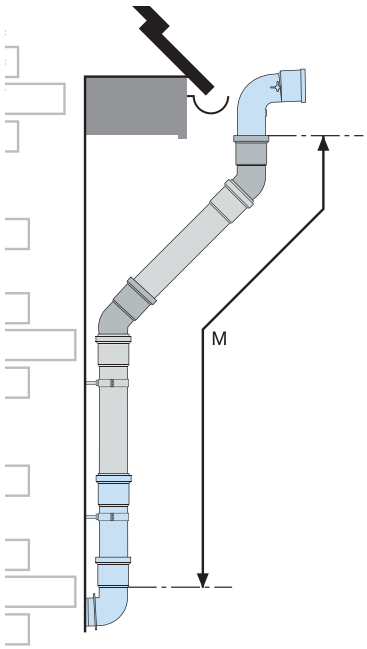
Components			
Part No. 60mm	7 716 191 086	7 716 191 087	7 716 191 089
Maximum lengths (mm) & no. of components required			
Greenstar CDi Classic Regular and Ri series*			
60mm 3,750	1	up to 4	1

Plume management system with angled termination



Components		
Part No. 60mm	7 716 191 086	7 716 191 087
Maximum lengths (mm) & no. of components required		
Greenstar CDi Classic Regular and Ri series*		
60mm 4,500	1	up to 4

Plume management system with extensions and 45º bends



Components			
Part No. 60mm	7 716 191 086	7 716 191 087	7 716 191 089
Maximum lengths (mm) & no. of components required			
Greenstar CDi Classic Regular and Ri series*			
60mm 3,000	1	up to 3	2

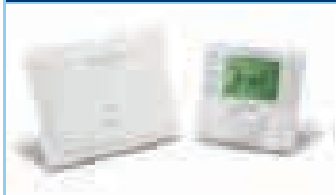
***NOTE: For the CDi Classic Regular and Ri series you must refer to the table on page 47 to calculate your horizontal flue lengths and plume management lengths.**

Greenstar regular boiler range accessories

Comfort I RF wireless room thermostat and plug-in twin channel programmer*

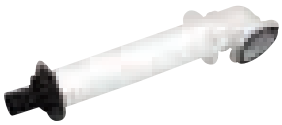
Worcester Part No.
7 733 600 001

Comfort II RF wireless programmable room thermostat and plug-in RF receiver*



Worcester Part No.
7 733 600 002

RS telescopic flue kit (100mm dia.)



Worcester Part No.
7 716 191 082

Long telescopic flue kit (100mm dia.)

Worcester Part No.
7 716 191 171

Standard telescopic horizontal flue kit (125mm dia.)

Worcester Part No.
7 719 003 702

Vertical BF kit (100mm dia.)

Worcester Part No.
7 719 002 430

Vertical BF kit (125mm dia.)

Worcester Part No.
7 719 002 431

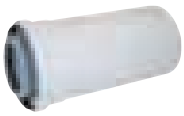
1,000mm extension kit (100mm dia.)

Worcester Part No.
7 716 191 083

2m flue extension (100mm dia.)

Worcester Part No.
7 716 191 172

Short flue extension 220mm (100mm dia.)

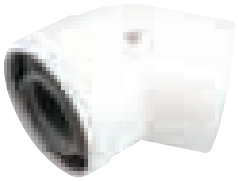


Worcester Part No.
7 716 191 133

1,000mm extension (125mm dia.)

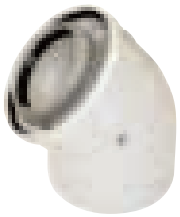
Worcester Part No.
7 719 003 666

45º bend (100mm dia.)



Worcester Part No.
7 716 191 085

45º bend (125mm dia.)



Worcester Part No.
7 719 003 665

90º bend (100mm dia.)

Worcester Part No.
7 716 191 084

90º bend (125mm dia.)

Worcester Part No.
7 719 003 664

High level horizontal flue adaptor (100mm dia.)

Worcester Part No.
7 719 002 432

*When an optional Worcester Greenstar Wiring Centre is used.

Greenstar regular boiler range accessories

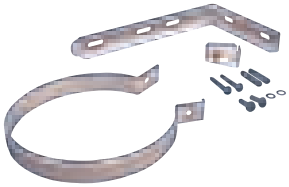
High level horizontal flue adaptor (125mm dia.)

Worcester Part No.
7 719 002 433

Security fixing

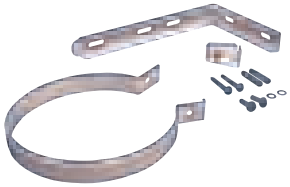
Worcester Part No.
7 716 192 261

Support bracket kit (100mm dia.)



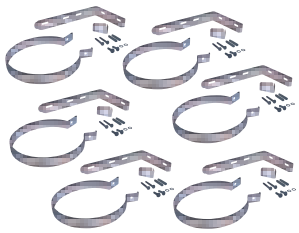
Worcester Part No.
7 716 191 092

Support bracket kit (125mm dia.)



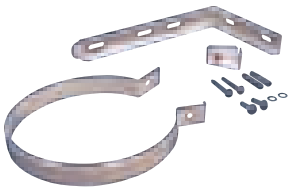
Worcester Part No.
7 716 191 174

Support bracket kit 6 pack (100mm dia.)



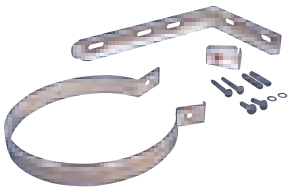
Worcester Part No.
7 716 191 173

Support bracket kit– 27Ri & 30Ri only (100mm dia.)



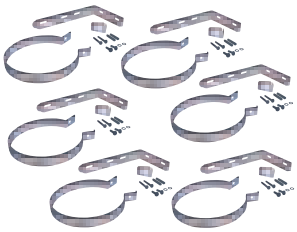
Worcester Part No.
7 716 191 177

Support bracket kit– 27Ri & 30Ri only (125mm dia.)



Worcester Part No.
7 716 191 179

Support bracket kit 6 pack – 27Ri & 30Ri only (100mm dia.)



Worcester Part No.
7 716 191 178

Below boiler pipe cover

Worcester Part No.
7 716 192 608

Plume management kit (60mm dia.)

Worcester Part No.
7 716 191 086

Extension (60mm dia., 1,000mm)

Worcester Part No.
7 716 191 087

90º bend (60mm dia.)

Worcester Part No.
7 716 191 088

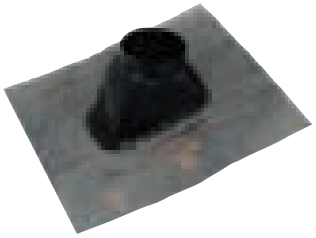
45º bend (60mm dia.)

Worcester Part No.
7 716 191 089

Flat roof flashing kit (100mm & 125mm dia.)

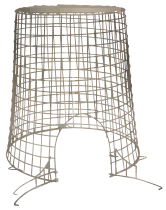
Worcester Part No.
7 716 191 090

Pitched roof flashing kit (100mm & 125mm dia.)



Worcester Part No.
7 716 191 091

Plume management terminal guard round (60mm dia.)



Worcester Part No.
7 716 191 176

WB3 cleaning tool

Worcester Part No.
7 716 192 312

WB5 cleaning tool

Worcester Part No.
7 719 001 996

WB7 cleaning tool

Worcester Part No.
7 746 901 479

Greenstar System Filter

Worcester Part No.
7 716 192 609

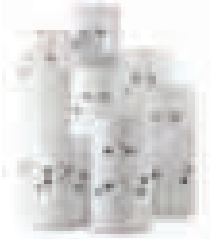
Worcester CondenseSure siphon†

Worcester Part No.
7 716 192 746

Greenstar Wiring Centre

Worcester Part No.
7 738 110 116

Greenstore SC Cylinders



Worcester Part No.	
SC-90	7 716 842 027
SC-120	7 716 842 028
SC-150	7 716 842 029
SC-180	7 716 842 030
SC-210	7 716 842 031
SC-250	7 716 842 032
SC-300	7 716 842 033

Greenstore TC Cylinders

Worcester Part No.	
TC-150	7 716 800 542
TC-180	7 716 800 543
TC-210	7 716 842 042
TC-250	7 716 842 043
TC-300	7 716 842 044

†The CondenseSure is built into the CDi Classic Regular range.

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. It also contains a heat pump room with a full range of Greenstore ground source, Greensource air source and Greenstar Plus hybrid heat pumps with a courtyard for all external components. 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.

Gas-fired product courses

As a market leader in gas-fired condensing boilers, we aim to ensure the highest levels of competence and expertise in the installation of all Worcester Greenstar gas-fired products. We run intensive training courses for installers, commissioning engineers and operatives involved with servicing and fault finding.

Our comprehensive gas-fired condensing boiler training courses include product overview, inspection and cleaning of components, CO and CO_2 analysis of flue gas, removal of compact hydraulics, service mode functions and fault finding on 'live and demo' appliances.

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 Junior 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 ISM1).

	Greenstar Overview	CDi Classic	CDi Compact & Si Compact	i Junior	System & Regular	Highflow CDi & FS CDi Regular	Controls
Duration	1 Day	1 Day	1 Day	1 Day	1 Day	1 Day	1 Day
Cost	Free*	Free*	Free*	Free*	Free*	Free*	Free*
Training course covers							
Specification	✔	✔	✔	✔	✔	✔	Guide to the varied range of control options that are available
Installation	✔	✔	✔	✔	✔	✔	
Commissioning	✔	✔	✔	✔	✔	✔	
Servicing	✔	✔	✔	✔	✔	✔	
Maintenance	✔	✔	✔	✔	✔	✔	
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.

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**

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.**

Renewable product courses

- **Renewables overview.**
- **Greenskies solar.**
- **Greenskies advanced solar.**
- **Introduction to heat pumps.**
- **Greenstore LECP ground source heat pumps.**
- **Greensource air to air heat pumps.**
- **Greensource air to water heat pumps.**
- **Greensource split air to water heat pumps.**

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.**
- **Green Deal.**
- **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

TOP 50 2011

2014 OFTEC Awards for Excellence

Spares

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

Customer Technical Support

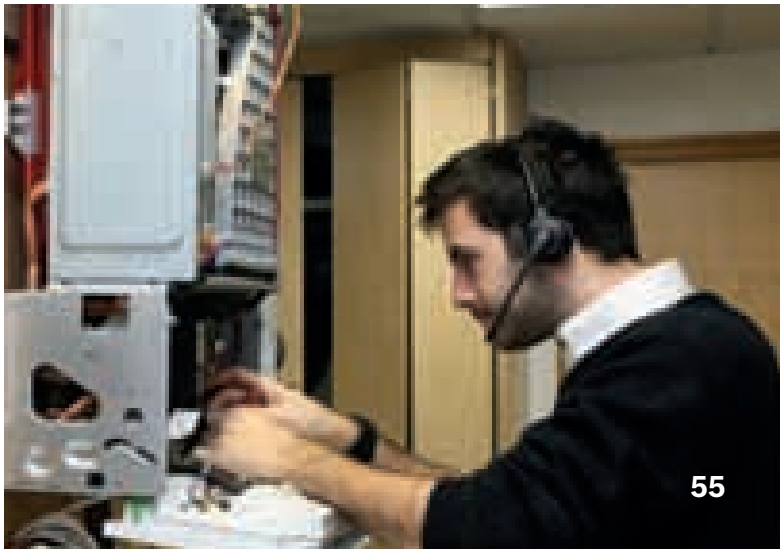
The Worcester Technical Helpline is a dedicated phone line – committed to providing a comprehensive service to complement the brand name and quality of our products. Our experienced team of technical experts provides answers to queries of a technical nature across the entire Worcester range.

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



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

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
or telephone 0330 123 2552

Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls. These rules apply to calls from any type of line, including mobile, BT, other fixed phone line or payphone. Calls from mobiles and some other networks may vary. Calls to and from Bosch Thermotechnology Ltd may be recorded for training and quality assurance purposes.

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