



## Greenstar regular and system gas-fired condensing wall mounted boiler range

**NEW**  
**Greenstar**  
**Sense &**  
**System Filter**



## Worcester and you. Making a difference.

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



**BOSCH**  
Invented for life



The reception and main entrance at our Worcester headquarters

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

Carl Arntzen,  
Managing Director,  
Bosch Thermotechnology Ltd.

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Greenstar 27i System

# The Greenstar regular and system boiler range



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

## Higher efficiency, highly cost-effective

All Worcester Greenstar wall mounted gas-fired condensing boilers have an ErP 'A' rating for space heating which means they are over 90% efficient.

## Winner of Which? Best Buy awards in 2010 - 2015/16

For six 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.

## Gas and LPG options

Greenstar regular and system 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 and system 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 regular range at a glance

		30CDi Classic Regular	40CDi Classic Regular	12Ri	15Ri	18Ri	24Ri	27Ri	30Ri
<b>Part No.</b>	<b>NG</b>	7 738 100 245	7 738 100 232	7 733 600 074	7 733 600 072	7 733 600 070	7 733 600 068	7 733 600 064	7 733 600 066
	<b>LPG</b>	7 738 100 235	7 738 100 234	7 733 600 075	7 733 600 073	7 733 600 071	7 733 600 069	7 733 600 065	7 733 600 067
<b>Output kW to central heating (CH)</b>	<b>Min</b>	7.7kW	9.4kW	4kW	5kW	6kW	8kW	7.03kW	7.03kW
	<b>Max</b>	30kW	40.8kW	12kW	15kW	18kW	24kW	27kW	30kW
<b>CH temperature control</b>		✓	✓	✓	✓	✓	✓	✓	✓
<b>DHW temperature control</b>		-	-	-	-	-	-	✓*	✓*
<b>Modulating gas control</b>		✓	✓	✓	✓	✓	✓	✓	✓

\*When an optional Worcester Comfort control and Greenstar Wiring Centre is used.

## The Greenstar system range at a glance

		30CDi Classic System	35CDi Classic System	9i System	12i System	15i System	18i System	21i System	24i System	27i System	30i System
<b>Part No.</b>	<b>NG</b>	7 738 100 244	7 738 100 236	7 733 600 011	7 733 600 010	7 733 600 009	7 733 600 008	7 733 600 007	7 733 600 006	7 733 600 060	7 733 600 062
	<b>LPG</b>	7 738 100 233	7 738 100 237	7 733 600 033	7 733 600 034	7 733 600 035	7 733 600 036	7 733 600 037	7 733 600 038	7 733 600 061	7 733 600 063
<b>Output kW to central heating (CH)</b>	<b>Min</b>	7.7kW	7.7kW	3.1kW	3.1kW	4.6kW	4.6kW	7.2kW	7.2kW	7.03kW	7.03kW
	<b>Max</b>	30kW	34kW	9.2kW	12.2kW	15.3kW	18.4kW	21.6kW	24.6kW	27kW	30kW
<b>CH temperature control</b>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>DHW temperature control</b>		✓*	✓*	✓*	✓*	✓*	✓*	✓*	✓*	✓*	✓*
<b>Modulating gas control</b>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

\*When a Worcester optional control and internal diverter valve kit is used.

# Key features of the range



The Greenstar regular and system range

## Why choose a Worcester Greenstar regular or system boiler?

Worcester's extensive range of regular and system boilers, now with Central Heating (CH) outputs from 9kW to 40kW, deliver high energy-efficiency and lower running costs for homeowners. System variants achieve higher SAP or NHER ratings for new build properties when used in conjunction with a Greenstore unvented cylinder.

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

## Staying in control

All Greenstar system boilers are compatible with S and Y plan systems or can be used with a full range of Worcester intelligent plug-in controls when installed with an optional Worcester diverter valve kit. As well as enhancing energy efficiency, this arrangement means the boiler houses the diverter valve, reducing the need to install additional valves and cabling.

## Optional plug-in controls

A wide choice of optional controls is available with the Greenstar system series, provided the optional diverter valve accessory is installed, to enable your customers to select the type of control which best suits their individual requirements. The choice ranges from a simple-to-operate digital programmer to sophisticated wireless programmers, room thermostats and wired intelligent controls. These controls employ the latest digital technology and deliver high levels of functionality to maximise energy savings without compromising on comfort. By using low voltage power and wireless technology, the optional controls avoid the need to comply with Part P of the Building Regulations. For more information, see pages 30-33.



## ErP A+ rated system

An ErP rating of 'A+' on heating can be achieved by the Greenstar 12i - 24i System boilers when installed with either a Wave or Sense II and optional diverter valve.



## 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 system or 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 see pages 28-29.



NEW Worcester Greenstore unvented cylinder range

### Solar water heating

When used in conjunction with a Greenstore solar compatible unvented cylinder, Greenstar regular and system boilers can be fully integrated with a Greenskies solar water heating system, which has the potential to provide up to 60%+ of annual hot water requirements. 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.

### Fluing options

The Greenstar regular and system 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 90° or 45° 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 50-62.



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

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

### Energy-saving & environmental

- All models are ErP compliant
- ErP 'A' rating for heating
- SEDBUK A rating up to 89.8% (2009 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, 27Ri, 30Ri and 12Ri regular models, CDi Classic System, 27i, 30i, 12i and 9i System models 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
- Vertical pre-piping assembly available as an accessory
- Full range of Condensifit II™ flue options
- Multi-directional fluing means boiler can be sited in a wider variety of places
- Optional diverter valve accessory
- Earth bonding strip as standard with CDi Classic System boilers
- Optional wiring centre accessory on 27Ri and 30Ri models.

### End user comfort and convenience

- Full 5 year parts and labour guarantee as well as a 10 year guarantee on the primary heat exchanger\*
- Bosch renowned quality and reliability
- Built-in boiler frost protection
- Compact dimensions – Greenstar 27i and 30i System as well as Ri models
- Controls behind flap on all models (excluding 12-24Ri) minimises the risk of tampering with controls.

# Greenstar CDi Classic Regular and System

## Features and benefits

**Our top-of-the-range regular and system boilers are suitable for larger properties that demand high outputs – typically with more than three bedrooms. The Greenstar CDi Classic Regular is available with CH outputs of 30kW and 40kW whilst the Greenstar CDi Classic System is available in outputs of 30kW and 35kW.**

The Greenstar CDi Classic Regular and System range uses the proven Worcester WB5 aluminium-silicon heat exchanger which features an extra-large surface area to optimise combustion efficiency. Other energy-saving features include low electrical consumption in standby mode and anti-cycle control. The System range also benefits from a modulating pump and the ability to be paired with any of our digital and intelligent controls\*.

The Greenstar CDi Classic Regular and System range can be combined with our Greenskies solar thermal panels to provide efficient heating comfort and reducing the property's carbon footprint.



**For more information on ErP, see pages 26-27.**

### Installation benefits

- Boiler design and wall-mounting bracket allows space for pipes behind boiler
- Vertical pre-piping assembly accessory providing pre-formed copper pipe lengths allows top exit from the boiler
- Earth bonding strip supplied as standard
- Remote PRV option that can be positioned higher in the system for basement or cellar installations\*\*
- Compatible with S and Y plan systems
- A rigid 22mm compression gas connection, eliminates 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 low voltage circuits.

### Environmental benefits

- ErP 'A' rated for heating
- SEDBUK A rating of over 89% (2009 value)
- WB5 heat exchanger delivers high efficiency
- Digital and intelligent control options available, optimising boiler efficiency and fuel consumption\*
- Modulating pump uses less electricity than a fixed speed pump\*\*
- Low electrical consumption when the boiler is in standby mode
- Lead-free components
- Compatible with Worcester Greenskies solar thermal
- Electronic ignition eliminates the need for a pilot light
- Anti-cycle and modulation control
- All boilers and components are 100% recyclable.

### Features based on installer feedback

The Greenstar CDi Classic Regular and System boilers 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 Greenstar Classic range also now includes a paper wall mounting template to aid installation.

The water in the appliance can be drained using the combined appliance and condensate drain. This removes the need to connect an external hose saving the installer time on servicing and maintenance.

The pump for the System boiler range has also been upgraded to a more efficient model which meets ErP legislation. In addition, as an optional accessory, Worcester now offers a remote PRV\*\* that can be positioned higher in the system for basement or cellar installations.

### 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 100% tested and requires minimal servicing.



WB5 Heat Exchanger

On the primary heat exchanger†



### End user benefits

- Which? Best Buy award-winning boiler
- Condenses in heating modes for optimum efficiency during operation
- Highly reliable heat exchanger
- Part of the Which? Best Buy range for gas-fired condensing boilers
- Simple and intelligent control options\* for improved boiler efficiency and user comfort
- Modulation control reduces electrical consumption
- Built-in frost protection for the boiler and surrounding pipes
- All models are available in natural gas and LPG options
- Full 5 year parts and labour guarantee†
- 10 year guarantee on Worcester primary heat exchanger†
- Boiler protection plans available
- Bosch renowned quality and reliability.

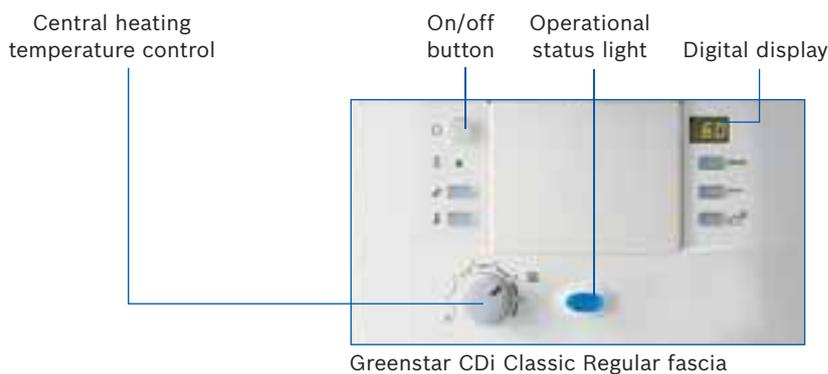
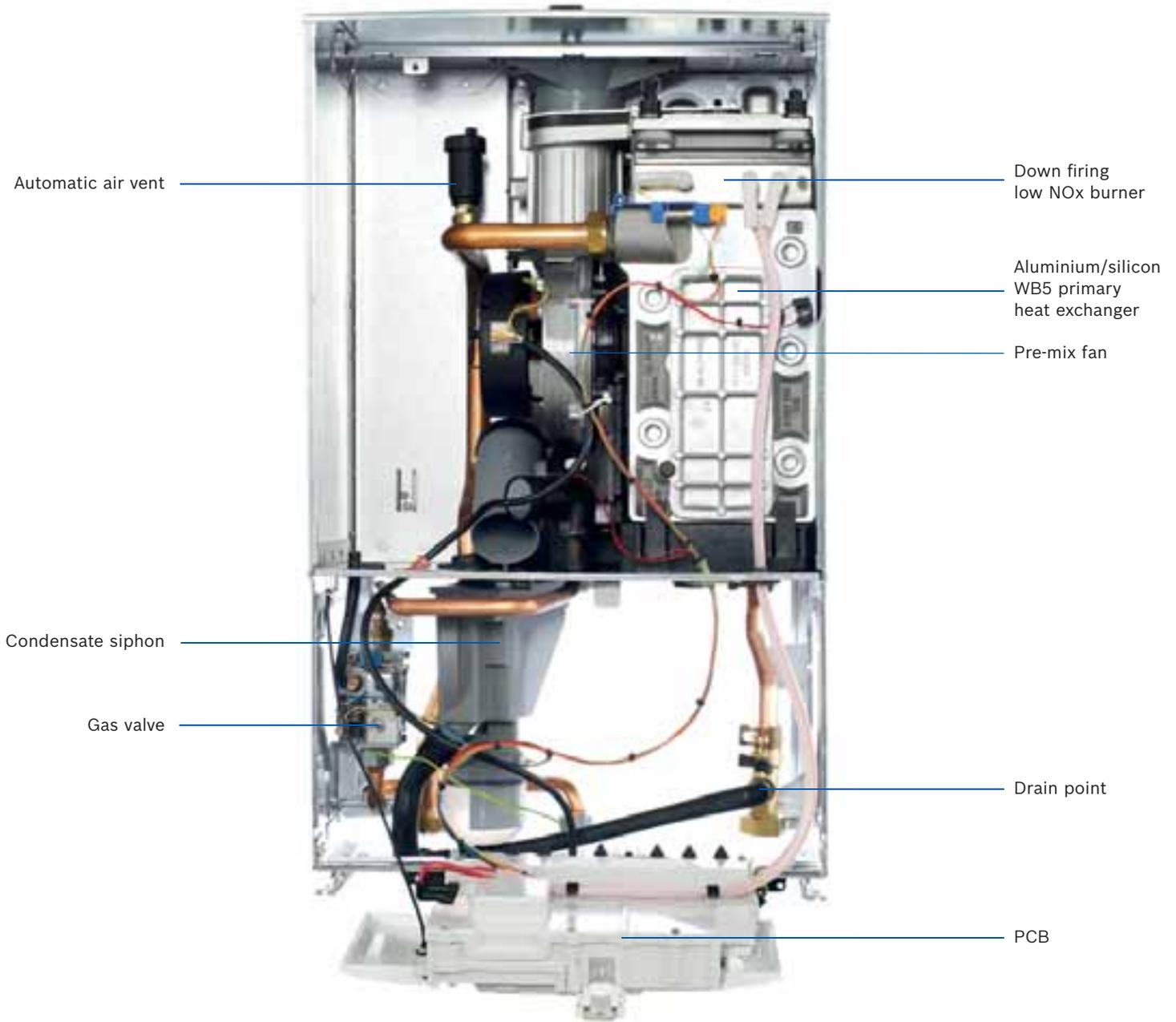


The Greenstar CDi Classic Regular and System boilers are recommended by the Energy Saving Trust (EST). The Energy Saving Trust is a non-profit organisation that provides free and impartial advice on how to save energy.



\*Terms and conditions apply. \*\*With installation of optional integral diverter valve for System variants.

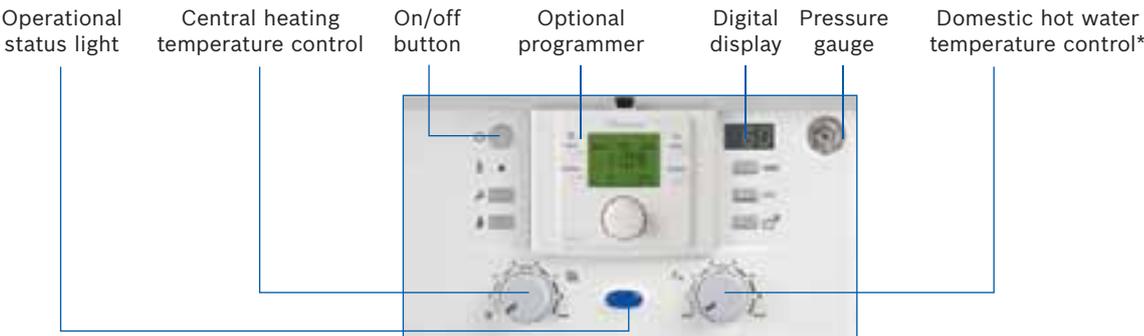
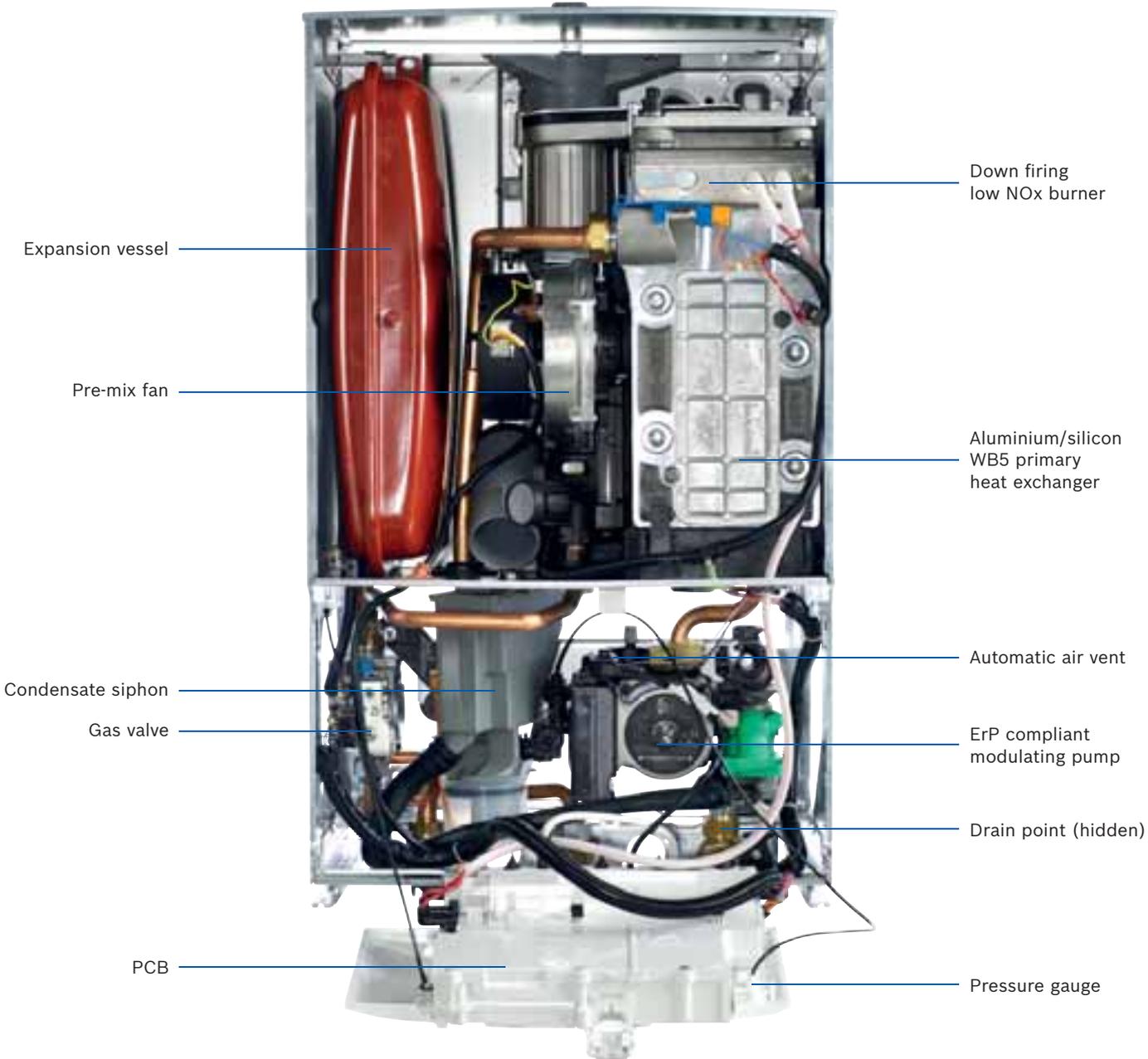
# Inside story – Greenstar CDi Classic Regular



## 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
ErP Seasonal space heating energy efficiency class	A / 92%	A / 92%
SAP efficiency – natural gas	89.2%	89.2%
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	30mg/kWh	29mg/kWh
NOx class	5	5
Noise output level	55dB(A)	60dB(A)
Ingress protection (IP)	X4D	X4D

# Inside story – Greenstar CDi Classic System



Greenstar CDi Classic System fascia with Comfort plug-in twin channel programmer fitted

\*Only used with installation of optional integral diverter valve.

## Technical data

Boiler	Greenstar 30CDi Classic System	Greenstar 35CDi Classic System
Height	760mm (max)*	760mm (max)*
Width	440mm	440mm
Depth	360mm (max)	360mm (max)
Weight – dry	46.5kg	46.5kg
ErP Seasonal space heating energy efficiency class	A / 92%	A / 92%
SAP efficiency – natural gas	89.2%	89.2%
Heating flow / return connections	22mm compression	22mm compression
Condensate connection	22mm plastic pipe	22mm plastic pipe
Gas connection	22mm compression	22mm compression
PRV connection	15mm compression	15mm compression
Primary water content	3.75 ltr	3.75 ltr
Output to central heating	7.7 - 30kW	7.7 - 34kW
Wall mounting jig	✓	✓
Diverter valve kit	✓ (optional)	✓ (optional)
Plug-in timers	✓ (optional)	✓ (optional)
Intelligent controls	✓ (optional)	✓ (optional)
Modulating pump	✓	✓
Fault diagnostic display	✓	✓
Maximum vertical flue (100mm dia.) inc. terminal	9,400mm	8,000mm
Maximum vertical flue (125mm dia.) inc. terminal	18,500mm	16,000mm
Maximum horizontal flue (100mm dia.)	7,900mm	7,000mm
Maximum horizontal flue (125mm dia.)	18,500mm	16,000mm
NOx classification – natural gas	30mg/kWh	30mg/kWh
NOx class	5	5
Ingress protection (IP)	X4D	X4D

\*Measured to the top or front of the curve height.

# 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 a wide range of households with stored hot water systems.**

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 wireless controls, for added energy savings and end-user convenience. See page 34 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.



**For more information on ErP, see pages 26-27.**

### 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

- ErP 'A' rated for heating
- SEDBUK A rating over 88.8% (2009 values) for all models
- Choice of 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 eliminates the need for the pilot light
- Anti-cycle and modulation control
- 12, 27 and 30kW models have ultra low NOx emissions – 3 credits under Code for Sustainable Homes.

### 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<sup>^</sup> manufacturing technology to create more passageways than traditional heat exchangers. As a result, the WB7 heat exchanger delivers very 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 contaminants typically 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.



The Greenstar Ri 27 and 30kW models

### End user benefits

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

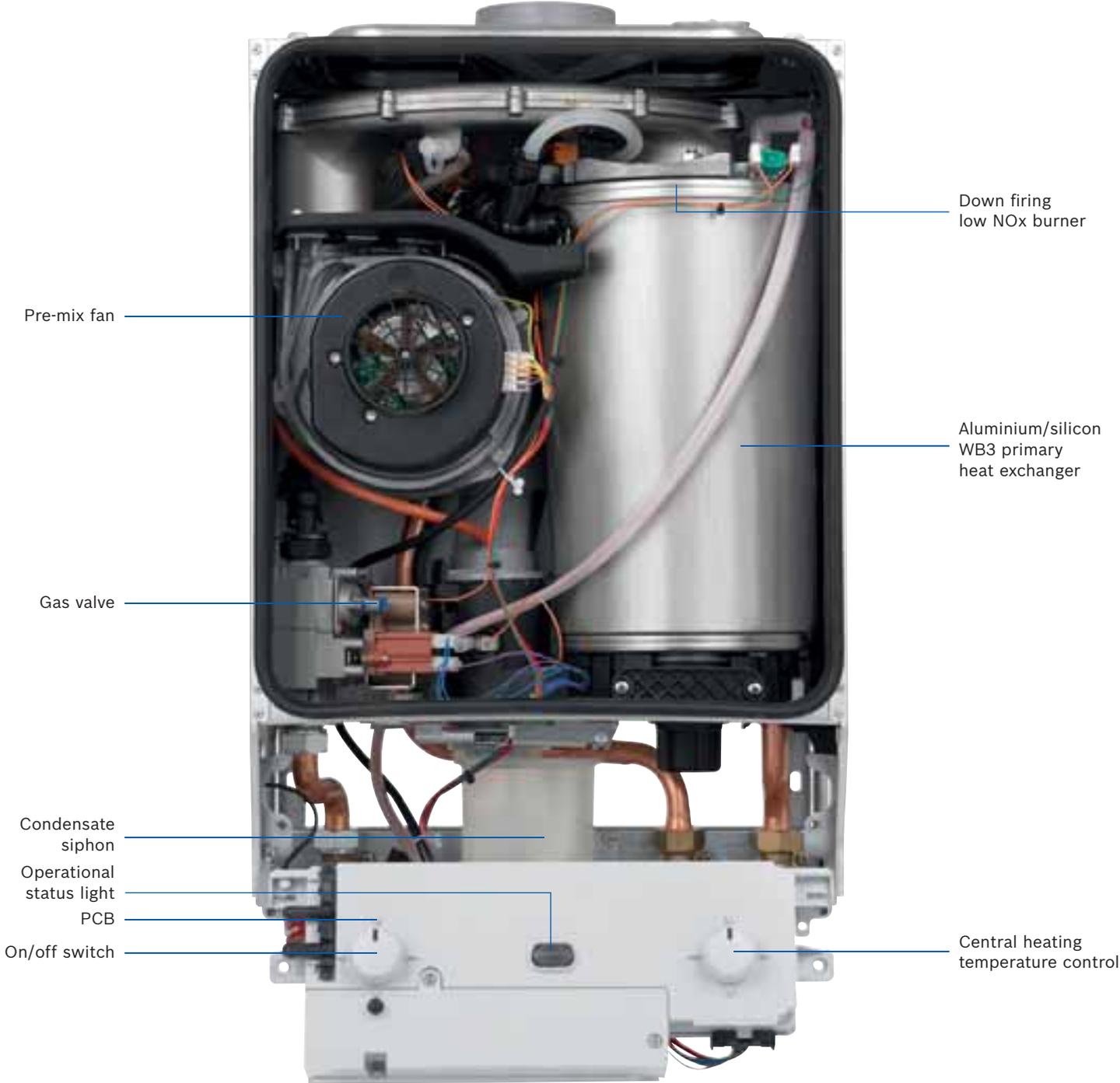


The Greenstar Ri regular boilers are recommended by the Energy Saving Trust (EST). The Energy Saving Trust is a non-profit organisation that provides free and impartial advice on how to save energy.



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

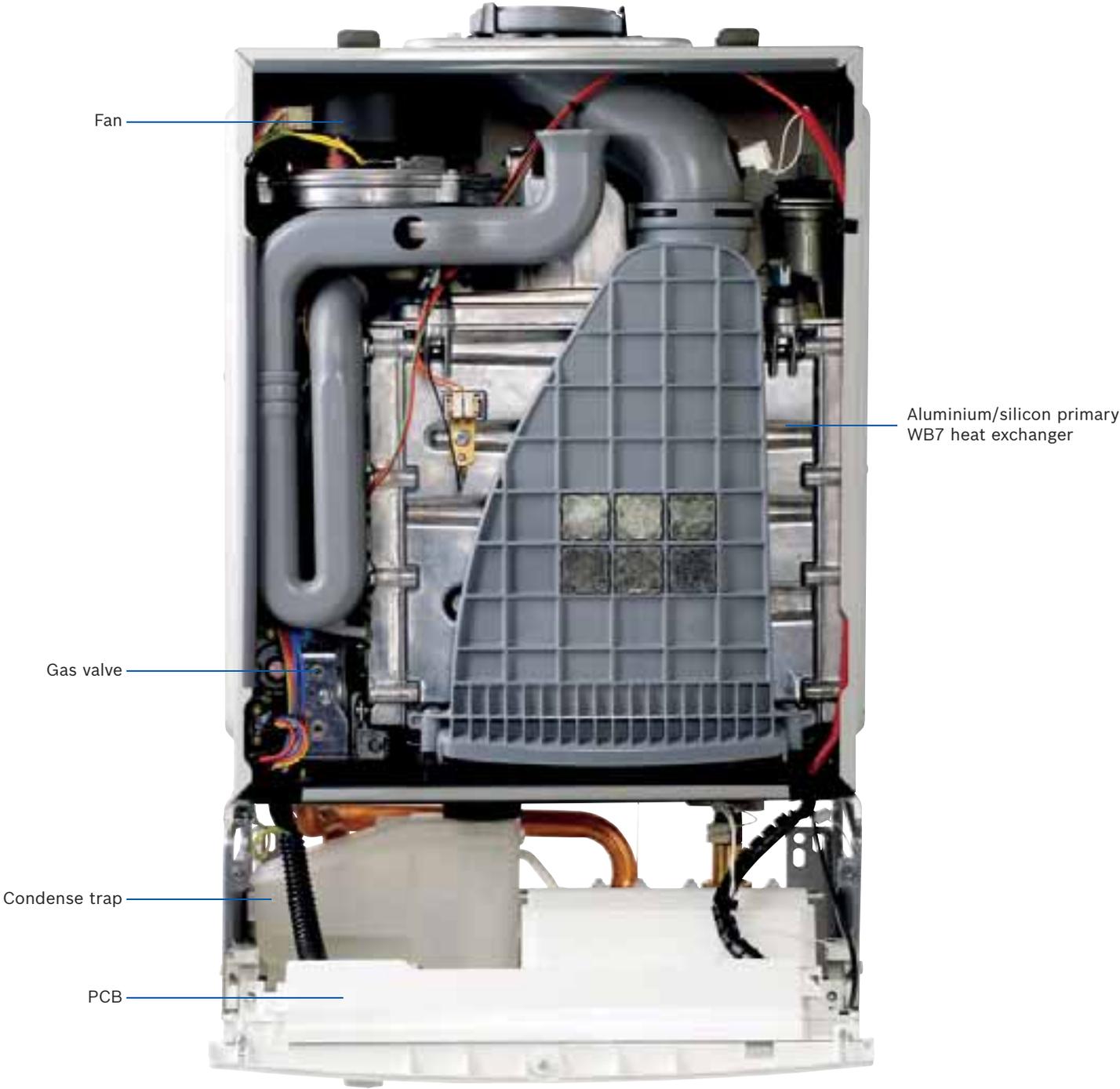
# Inside story – Greenstar 12Ri - 24Ri



## 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
ErP Seasonal space heating energy efficiency class	A / 91%	A / 91%	A / 91%	A / 92%
SAP efficiency – natural gas	88.8%	88.8%	88.8%	89.2%
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	82°C	82°C	82°C	82°C
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	35mg/kWh	54mg/kWh	76mg/kWh	59mg/kWh
NOx class	5	5	4	5
Noise output level	45dB(A)	48dB(A)	49dB(A)	49dB(A)
Ingress protection (IP)	X4D	X4D	X4D	X4D

# Inside story – Greenstar 27 & 30Ri



Central heating temperature control and reset      Operational status light      Optional programmer\*



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
ErP Seasonal space heating energy efficiency class	A / 92%	A / 93%
SAP efficiency – natural gas	89.0%	89.0%
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	82°C	82°C
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	31mg/kWh	31mg/kWh
NOx class	5	5
Noise output level	51dB(A)	53dB(A)
Ingress protection (IP)	X4D	X4D

# Greenstar i System

## Features and benefits

**The popular Greenstar i System range has been enhanced with a host of new features. This means the Greenstar i System boilers are now suitable for an even wider range of properties with the 9kW model being particularly suitable for homes with high levels of thermal insulation.**

The Greenstar i System is supplied with a pre-assembled wall frame, as well as a new angled mounting hook that makes installation over countertops even easier. The mounting points are the same as for the previous Greenstar i System models so that direct replacements are straightforward. Added to this the wall-mounting jig allows installers to quickly pre-plumb the condensate, CH flow, gas, PRV installer connection and CH return without the boiler being on the wall.

The new Heatronic i control panel features familiar 'up and down' buttons, for adjusting the flow temperature, which are similar to the simple adjustment of a TV remote control. This enables users to easily alter the flow temperature allowing heat-up times to be accelerated (higher flow temperatures) or for energy saving condensing levels (achieved with lower flow temperatures) to be increased.



Addition of two new output models – 9kW and 21kW variants.



**For more information on ErP, see pages 26-27.**

### Installation benefits

- Lift weight of just 30.9kg
- Simple switch – same dimensions as previous Greenstar i System models\*\*
- Expansion tank pre-installed in boiler
- Familiar, reliable components
- WB3 heat cell and hydraulic group – same as previous Greenstar i System models\*\*
- Smart design increases internal space for ease of access\*\*
- Front casing can be removed easily
- All items serviceable from the front
- Benchmark menu for easier completion of Benchmark logbook\*\*
- Text descriptions of error codes\*\*
- Large condensate siphon which removes the need for CondenseSure accessory\*\*.

### Environmental benefits

- ErP 'A' rated for heating
- SEDBUK A rating of over 89.0% (2009 value)
- Fully compatible with Worcester plug-in controls with the installation of an optional integral diverter valve
- Low-energy modulating pump
- Simple weather compensation sensor accessory\*\*
- Ability to programme for low NOx\*\*
- Anti-cycle and modulation control
- Low electrical consumption when in stand by mode
- All boilers and components are 100% recyclable, achieving Worcester's zero waste to landfill objective.

\*Greenstar 15i to 24i System models (NG and LPG) or Greenstar 12i System (NG only) only when installed with optional diverter valve.  
\*\*Greenstar 9i to 24i System models only.

### Information at your fingertips

The digital display includes a 'quick info' button to provide information on the boiler's status and flow temperature, as well as clear text descriptions for quick boiler diagnostic and flow detection.

### WB3 heat exchanger

Greenstar i System 9, 12, 15, 18, 21 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 i System 27 and 30kW models use the new WB7 heat exchanger which uses advanced friction stir welding<sup>^</sup> manufacturing technology to create more passageways than traditional heat exchangers. As a result, the WB7 heat exchanger delivers high outputs relative to its size.



The Greenstar i System 9 to 24kW models

### End user benefits

- Part of the Which? Best Buy range for gas-fired condensing boilers
- Simple and intelligent control options available, optimising boiler efficiency and fuel consumption<sup>†</sup>
- Excellent energy efficiency
- Larger condensate siphon to prevent risk of freezing condensate<sup>††</sup>
- 'Quick set' optimised heating temperature<sup>††</sup>
- Full 5 year guarantee on parts and labour<sup>\*</sup>
- 10 year guarantee on Worcester primary heat exchanger<sup>\*</sup>
- Boiler protection plans available.

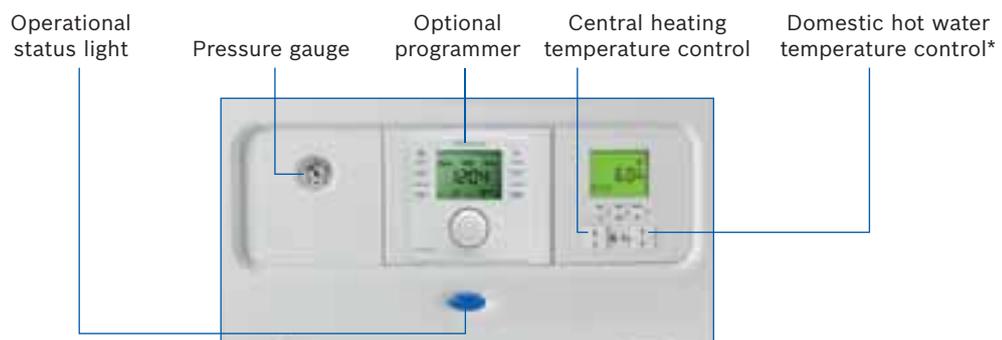


The Greenstar i System boilers are recommended by the Energy Saving Trust (EST). The Energy Saving Trust is a non-profit organisation that provides free and impartial advice on how to save energy.



<sup>^</sup>The friction stir welding process is used under license from The Welding Institute.  
<sup>\*</sup>Terms and conditions apply.  
<sup>†</sup>With installation of optional integral diverter valve.  
<sup>††</sup>Greenstar 9i to 24i System models only.  
<sup>††</sup>Provided 32mm pipework not exceeding 3 metres in length is used.

# Inside story – Greenstar 9i - 24i System



Greenstar 9i - 24i System fascia with Comfort plug-in twin channel programmer fitted

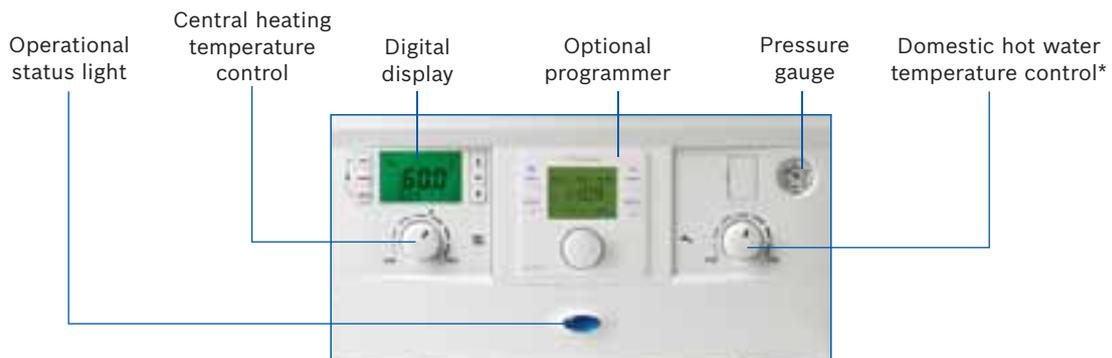
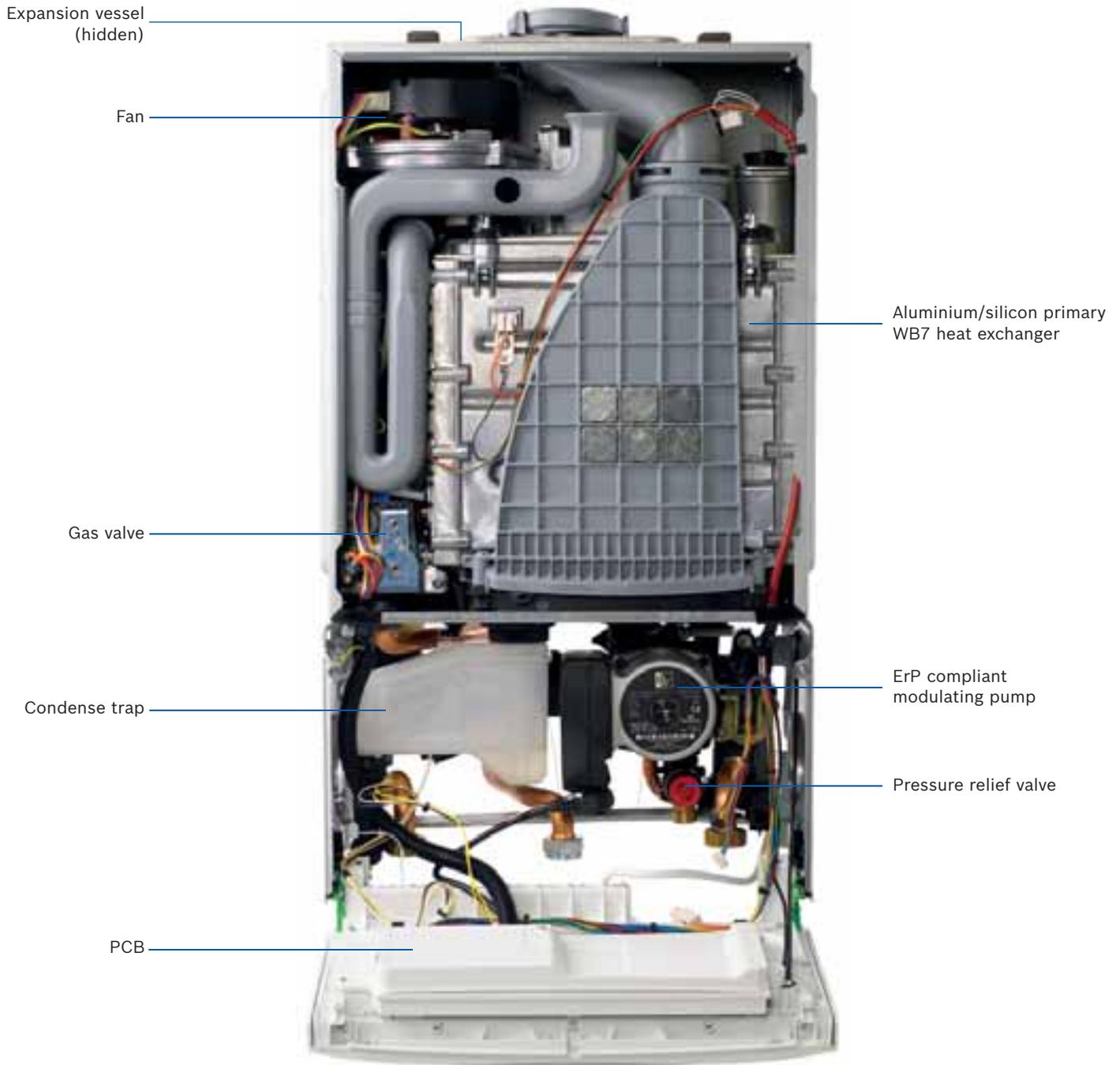
*\*Only used with installation of optional integral diverter valve.*

## Technical data

Boiler	Greenstar 9i System	Greenstar 12i System	Greenstar 15i System	Greenstar 18i System	Greenstar 21i System	Greenstar 24i System
<b>Height</b>	710mm (max)*	710mm (max)*	710mm (max)*	710mm (max)*	710mm (max)*	710mm (max)*
<b>Width</b>	400mm	400mm	400mm	400mm	400mm	400mm
<b>Depth</b>	330mm (max)*	330mm (max)*	330mm (max)*	330mm (max)*	330mm (max)*	330mm (max)*
<b>Weight – lift</b>	30.9kg	30.9kg	30.9kg	30.9kg	30.9kg	30.9kg
<b>ErP Seasonal space heating energy efficiency class</b>	A / 93%	A / 94%				
<b>SAP efficiency – natural gas</b>	89.8%	89.8%	89.7%	89.7%	89.7%	89.7%
<b>Heating flow / return connections</b>	22mm compression	22mm compression	22mm compression	22mm compression	22mm compression	22mm compression
<b>Pressure relief valve</b>	15mm dia.	15mm dia.	15mm dia.	15mm dia.	15mm dia.	15mm dia.
<b>Condensate connection</b>	22mm plastic pipe	22mm plastic pipe	22mm plastic pipe	22mm plastic pipe	22mm plastic pipe	22mm plastic pipe
<b>Gas connection</b>	22mm compression	22mm compression	22mm compression	22mm compression	22mm compression	22mm compression
<b>Primary water content</b>	3.9 ltr	3.9 ltr	3.9 ltr	3.9 ltr	3.9 ltr	3.9 ltr
<b>Output to central heating</b>	3.1 - 9.2kW	3.1 - 12.2kW	4.6 - 15.3kW	4.6 - 18.4kW	7.2 - 21.6kW	7.2 - 24.6kW
<b>Wall mounting jig</b>	✓	✓	✓	✓	✓	✓
<b>Plug-in timers</b>	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)
<b>Diverter valve kit</b>	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)
<b>Maximum vertical flue (100mm dia.) inc. terminal</b>	6,400	6,400	6,400	6,400	6,400	6,400
<b>Maximum vertical flue (125mm dia.) inc. terminal</b>	15,000	15,000	15,000	15,000	15,000	15,000
<b>Maximum horizontal flue (100mm dia.)</b>	4,600	4,600	4,600	4,600	4,600	4,600
<b>Maximum horizontal flue (125mm dia.)</b>	13,000	13,000	13,000	13,000	13,000	13,000
<b>NOx classification – natural gas</b>	36mg/kWh	45mg/kWh	42mg/kWh	50mg/kWh	49mg/kWh	49mg/kWh
<b>NOx class</b>	5	5	5	5	5	5
<b>Ingress protection (IP)</b>	X4D	X4D	X4D	X4D	X4D	X4D

\*Measured to the top or front of the curve height.

# Inside story – Greenstar 27 & 30i System



Greenstar 27i & 30i System fascia with Comfort plug-in twin channel programmer fitted

## Technical data

Boiler	Greenstar 27i System	Greenstar 30i System
Height	690mm (max)*	690mm (max)*
Width	390mm	390mm
Depth	280mm (max)	280mm (max)
Weight – lift	27.3kg	27.3kg
ErP Seasonal space heating energy efficiency class	A / 92%	A / 92%
SAP efficiency – natural gas	89.0%	89.0%
Heating flow / return connections	22mm compression	22mm compression
Condensate connection	22mm plastic pipe	22mm plastic pipe
Gas connection	22mm compression	22mm compression
PRV valve connection	15mm compression	15mm compression
Primary water content	2.1 ltr	2.1 ltr
Output to central heating	7.03 - 27kW	7.03 - 30kW
Wall mounting jig	✓	✓
Plug-in timers	✓ (optional)	✓ (optional)
Diverter valve kit	✓ (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	31mg/kWh	31mg/kWh
NOx class	5	5
Ingress protection (IP)	X4D	X4D

\*Measured to the top or front of the curve height.

# ErP easy as ABC

## What is ErP?

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



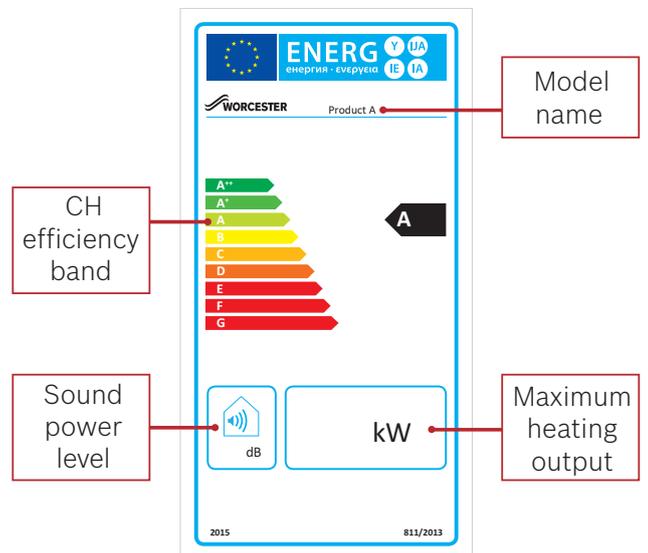
## What is Energy Labelling?

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

## How will the labelling scheme work?

The new Energy Labelling Directive will introduce new efficiency classes from A++ to G alongside the existing SEDBUK rating for boilers in the domestic and light commercial sectors.

Most condensing boilers will fall within the A band, which requires them to achieve more than 90% seasonal efficiency, while renewable technologies such as heat pumps will likely be in the A+ or A++ bands (depending on flow temperature).



### What about systems that contain different products?

In these circumstances, there is a responsibility to provide a package label when combining a heating appliance with a temperature control and/or solar device, cylinder or a supplementary heating appliance (for example, a two-boiler cascade with a combined total output of under 70kW).

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

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

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

### What about controls?

The ErP Directive covers all products that consume energy, such as boilers, heat pumps, solar thermal etc. It also includes controls, which are defined using 'classes'. These run from Class I (a simple on/off room stat) through to Class VIII (multi-sensor room control for use with modulating heating appliances).

Each control class equates to a certain percentage uplift in system efficiency e.g. a class VI weather compensating control and room thermostat will add 4% efficiency to the heating system.

This means that Greenstar 12i - 24i System boilers, which have a standard heating efficiency of 94%, will increase to 98% with the addition of the Wave\*, making an ErP 'A+' class system. Details of the controls class for each Worcester control can be found on pages 30-31.



## ErP easy as ABC with Worcester

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

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

ErP Technical Support: **0330 123 3641**

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

*\*Optional diverter valve accessory must be installed with System boilers when using Worcester controls.*





## Efficient hot water storage solutions from Worcester



Worcester is proud to offer the Greenstore range of high efficiency unvented cylinders which offer excellent hot water comfort for properties with a stored DHW supply.

### **Designed by Worcester. Developed by Bosch**

Worcester Greenstore cylinders, which are manufactured by Bosch, are available in both an unvented (SC) and solar compatible unvented (TC) option. The Greenstore unvented SC is available in seven different models ranging from SC-90 to SC-300. The Greenstore solar compatible cylinders are available in five options ranging from TC-150 to TC-300.

The Worcester Greenstore 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 cylinder is coupled with either a Greenstar high efficiency boiler or Greenskies solar panel installation.

### **Why choose an unvented cylinder?**

- High performance due to unrestricted mains pressure at hot water outlets
- A perfect replacement for low efficiency copper vented cylinder installations
- Stainless steel, delivering durability
- Siting flexibility – no need to locate the cylinder directly underneath a cold water storage cistern.





### The Greenstore unvented series

The Greenstore unvented SC 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 unvented solar compatible series

All of the models in the solar compatible Twin Coil (TC) 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 stainless steel cylinders have been specifically designed for use with solar heating installations, combined with boiler back-up.



## 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
Heat exchanger surface area	0.657m <sup>2</sup>	0.657m <sup>2</sup>	0.657m <sup>2</sup>	0.657m <sup>2</sup>	0.845m <sup>2</sup>	0.845m <sup>2</sup>	0.845m <sup>2</sup>
Volume domestic hot water	93 litres	123 litres	161 litres	191 litres	216 litres	246 litres	292 litres
Standing heat loss – 24hr	1.008kWh /24hrs	1.296kWh /24hrs	1.632kWh /24hrs	1.824kWh /24hrs	1.944kWh /24hrs	2.136kWh /24hrs	2.304kWh /24hrs
ErP energy efficiency class/ Standing heat loss	B / 42W	C / 54W	C / 68W	C / 76W	C / 81W	C / 89W	C / 96W

Solar compatible	Greenstore TC-150 Cylinder	Greenstore TC-180 Cylinder	Greenstore TC-210 Cylinder	Greenstore TC-250 Cylinder	Greenstore TC-300 Cylinder
Part no.	7716 842 040	7 716 842 041	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
Heat exchanger surface area	0.657m <sup>2</sup>	0.657m <sup>2</sup>	0.845m <sup>2</sup>	0.845m <sup>2</sup>	0.845m <sup>2</sup>
Volume domestic hot water	157 litres	187 litres	211 litres	241 litres	287 litres
Standing heat loss – 24hr	1.632kWh /24hrs	1.824kWh /24hrs	1.944kWh /24hrs	2.136kWh /24hrs	2.304kWh /24hrs
Dedicated solar volume	65 litres	65 litres	105 litres	115 litres	115 litres
ErP energy efficiency class/ Standing heat loss	C / 68W	C / 76W	C / 81W	C / 89W	C / 96W

# Controls

## System boilers – optional diverter valve required

System boilers using a Worcester control option are incompatible with Y or S plan systems and must have the optional diverter valve kit fitted.

## Regular boilers – Greenstar Wiring Centre required

Greenstar 27Ri and 30Ri boilers using a Comfort I RF or Comfort II RF control must use an optional Greenstar Wiring Centre. This total solution is compatible with both Y and S plan systems.

### NEW Greenstar Sense controls



#### **Sense I – Intelligent room thermostat – Part no. 7 738 110 054**

- ✔ Load compensation feature for increased efficiency
- ✔ Boiler output automatically adjusted to precisely meet the heat demand of the property at maximum efficiency
- ✔ Maximises the condensing boiler's operation
- ✔ Ideal when replacing an existing, less efficient wired room thermostat.



#### **Sense II – Weather compensation controller – Part no. 7 738 111 064**

- ✔ Intelligently interacts with the boiler to provide weather compensation via a wired outdoor sensor
- ✔ Solar thermal optimisation in conjunction with MS100 solar module
- ✔ Displays the amount of energy recovered from a solar system
- ✔ Service reminder function
- ✔ Enables an A+ ErP system efficiency to be achieved when installed with any Greenstar 12-24i System boilers.



### Greenstar Comfort controls



#### **Comfort plug-in twin channel programmer – Part no. 7 733 600 003**

- ✔ Simple menu navigation
- ✔ 7-day time control for heating and hot water
- ✔ Heating programme visualisation bar.



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

- ✔ All the features of Comfort PLUS...
- ✔ 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.



## NEW Intelligent Solar Module



### MS100 – Part no. 7 738 110 144

- ✔ Maximum solar control and efficiency via the Greenstar Sense II control
- ✔ Only one control to explain to the end user
- ✔ Displays the solar performance on Greenstar Sense II
- ✔ Clear colour coded plug-in connections for ease of installation
- ✔ Supplied with solar and cylinder sensors.

## Controls at a glance

### 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<sup>^</sup>.



Control option	TYPE			MOUNT		TIME CONTROL				TEMPERATURE CONTROL				CONNECTION TYPE			EFFICIENCY		MODEL				
	Digital	Intelligent	Internet	Fascia mounted	Wall mounted	Central heating	Hot water	24 hour	7 day	Auto switch – BST/GMT	Room thermostat	Programmable room thermostat	Optimum start	Boiler flow temp compensation	Plug-in	Radio frequency	Hard wired	ErP Class	Efficiency benefit	27Ri and 30Ri	CDi Classic System	9j-24i System	27i & 30i System
Comfort	✔			✔		✔	✔	✔	✔	✔					✔			-	-		✔ <sup>1</sup>	✔ <sup>2</sup>	✔
Comfort I RF		✔		✔	✔	✔	✔	✔	✔	✔			✔			✔		V	3%	✔ <sup>3</sup>	✔ <sup>1</sup>	✔ <sup>2</sup>	✔
Comfort II RF		✔		✔	✔	✔	✔	✔	✔		✔		✔		✔			V	3%	✔ <sup>3</sup>	✔ <sup>1</sup>	✔ <sup>2</sup>	✔
Sense I <sup>1</sup>		✔			✔						✔		✔				✔	V	3%			✔	✔
Sense II		✔		✔	✔	✔	✔	✔	✔		✔	✔	✔	✔			✔	VI**	4%**		✔ <sup>1</sup>	✔ <sup>2</sup>	✔
MS100		✔															✔	-	-		✔ <sup>1</sup>	✔ <sup>2</sup>	✔
Wave		✔	✔		✔	✔	✔	✔	✔		✔	✔	✔				✔	VI	4%		✔ <sup>1</sup>	✔ <sup>2</sup>	✔

<sup>1</sup> Manufactured after 16th January 2007 with software version CF12.10 onwards. <sup>2</sup> Manufactured after February 2011. <sup>3</sup> With Greenstar optional wiring centre.  
<sup>^</sup>Must be used with an external proprietary 230V timer. \*\*When the Greenstar Sense II is installed as a room thermostat.

# Worcester Wave – smart control for heating and hot water

The Wave is the first of a new generation of Worcester controls.

The Wave is a smart, internet-connected programmable control for central heating and hot water which can be operated using a smart device.

The Wave's innovative programming enables it to have an 'intelligent conversation' with the boiler and take advantage of advanced control features such as weather and load compensation.



## Enhanced energy efficiency

In the ErP Directive, smart controls like the Wave is a Class VI control, adding 4%\* to the overall system efficiency for heating, resulting in lower fuel bills. This increases the ErP rating to 'A+' for the Greenstar i, Si Compact and CDi Compact on heating.

The Wave's energy efficiency features include:

- ✔ Charts of heating and hot water usage so the homeowner can easily identify where potential savings could be made.
- ✔ When the room temperature is turned down a leaf symbol will appear to indicate additional savings are being made.
- ✔ Load and weather compensation via the Internet so no outdoor sensor is required. This allows the boiler to modulate its performance to meet the needs of the household with optimum efficiency.

## Adapting to the homeowner's needs

Each Wave unit is supplied with a pre-set programme that can then be easily modified to suit the user's requirements.

The Wave's advanced user features include:

- ✔ 'Pairing' with up to eight devices, automatically sensing when people are at home.
- ✔ Sensing to an individual device can be turned off if required.
- ✔ The Wave will remember preferred programme settings to make these easily available and features a 'holiday programme', requiring just a start and finish date.
- ✔ Unlike most other smart heating controls, the Wave can also programme the hot water settings, providing additional energy savings and comfort.
- ✔ For security and peace of mind, all of the Wave's data is owned by the user, ensuring no information is shared with other parties.

## Wave compatible devices:\*\*

Apple® devices running iOS 5.1 and higher

Android™ devices running 2.2, 2.3 or 4.0 and higher



### Quick to install

The Wave is quick and easy to install:

- ✔ Only requires a 2-core wire connection between the control and the boiler.
- ✔ All other connections are via the Wi-Fi network.
- ✔ The Wave does not need an external wired sensor unlike standard weather compensation controls.
- ✔ The Wave uses online data which significantly reduces installation time and cost to the end user.

As with all room heating controls the Wave should be sited where it can monitor the overall temperature of the property.

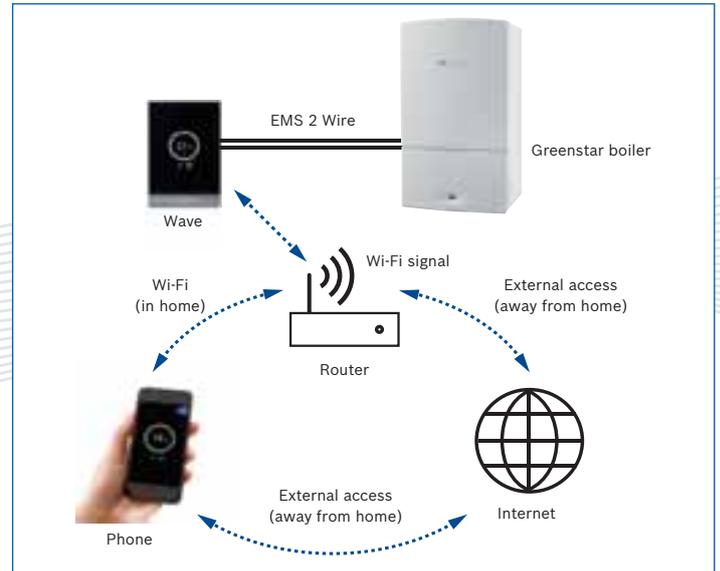


### Compatibility with Worcester Greenstar boilers

Ideal for homes and small businesses, the Wave is compatible with all current Worcester Greenstar gas-fired combination and system\* boilers. It can also be retrofitted for use with previous Worcester EMS-bus appliances.

All you need is:

- ✔ Worcester Wave control
- ✔ Worcester compatible boiler<sup>^</sup>
- ✔ Wi-Fi enabled broadband router – 802.11 b/g
- ✔ Wave app on a compatible Apple<sup>®</sup> or Android<sup>™</sup> device.



### Simple to use, providing an easy handover

The Wave's intuitive and modern design ensures it is very simple to operate using either its in-built touchscreen or via the Wave app.

- ✔ Users simply download the Wave app to their compatible device to take control of their heating system from anywhere in the world where an internet connection is available.
- ✔ There are no subscription fees or chargeable app add-ons, therefore updates to the app software are completely free of charge.
- ✔ An installation and operating manual is provided with each control and there are a number of helpful videos to provide further detail on specific functions.
- ✔ Should the Wave temporarily lose the internet connection, it will continue to operate as an intelligent heating and hot water control simply by using the last saved programme settings.



Part number	Description
7 716 192 072	Wave

# 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 Greenstar Comfort I and II, to be used on the new Greenstar 27Ri and 30Ri regular boilers. 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 allows the pump to be wired into the wiring centre, rather than going through the household between the airing cupboard and the boiler. In replacement installations, this means the existing 3-core cable between the boiler and pump can be utilised to carry communication signals (EMS-BUS) from the wiring centre to the boiler. 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.

**Please note: When used with our Greenstar Comfort controls no hot water temperature adjustment is available. To ensure Legionella protection, hot water will be stored at a pre-set temperature of 60°C. Please refer to Technical Bulletins TB 0096a & TB 0100a on our website for further guidance. If water temperatures below 60°C are required at hot water outlets, then we recommend the use of a thermostatic blending valve on the hot water outlet from the cylinder.**

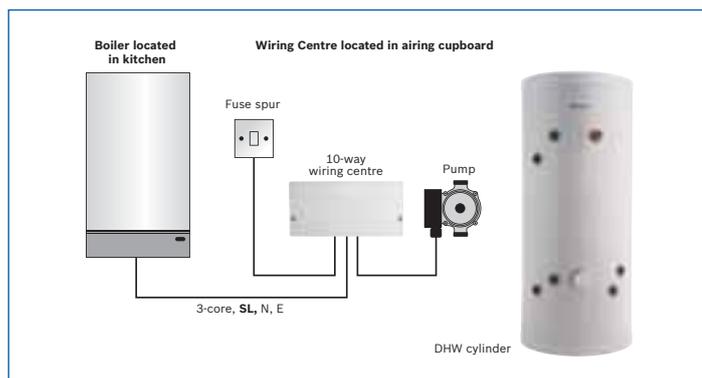


## Features and benefits

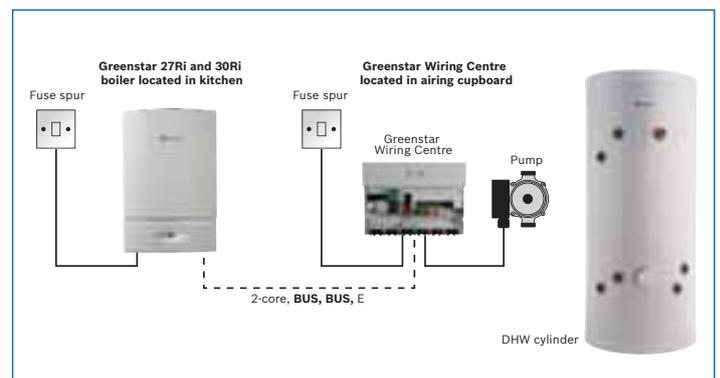
- ✔ Allows Greenstar Comfort I and II to be used with our Greenstar 27Ri and 30Ri regular boilers – controls both heating and hot water
- ✔ Enables properties to use a wireless room thermostat which allows a wider choice of controls options
- ✔ Pump is wired directly into the Wiring Centre and not to the boiler
- ✔ Simple system-type selector (S or Y plan) – simple, clear wiring connections
- ✔ Up to three Greenstar Wiring Centres can be linked together to control up to eight zones
- ✔ Supplied complete with cylinder sensor and unique retaining device
- ✔ Compatible with Worcester Greenstore unvented cylinders and third party unvented and vented cylinders\*
- ✔ IP44 safety rating increases possible installation locations.

## Product info

Part number	7 738 110 116
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Existing boiler system layout



System layout with a Greenstar Wiring Centre

# Site preparations and guidance

## Siting of appliance

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

## Mounting on a combustible surface

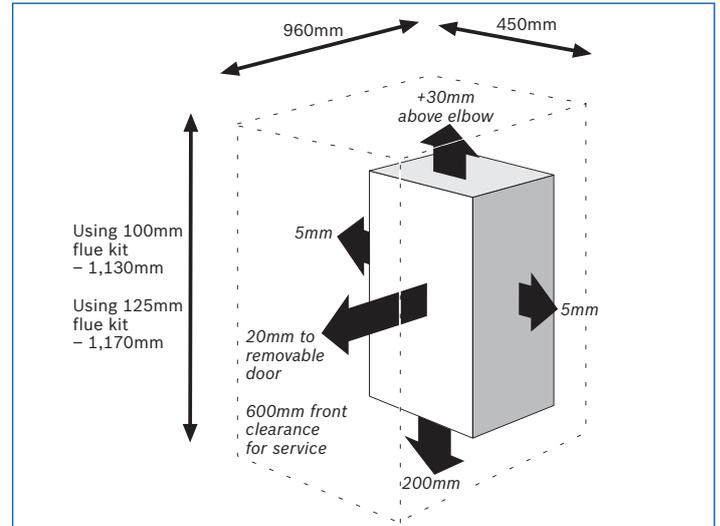
All Greenstar wall-mounted boilers can be sited on a combustible surface without the need for surface protection. EN482, Section 6.4.1.3 states no means for protection of combustible surfaces is necessary if the temperature of the wall does not exceed the room temperature by more than 60°C. Testing of Greenstar gas-fired wall-mounted boilers has shown that this temperature is not exceeded.

However, if the appliance is to be fitted in a timber frame building, the guidelines laid down in BS 5440:Part 1 and the Gas Safe publication “Gas Installations in Timber Frame Buildings” should be adhered to.

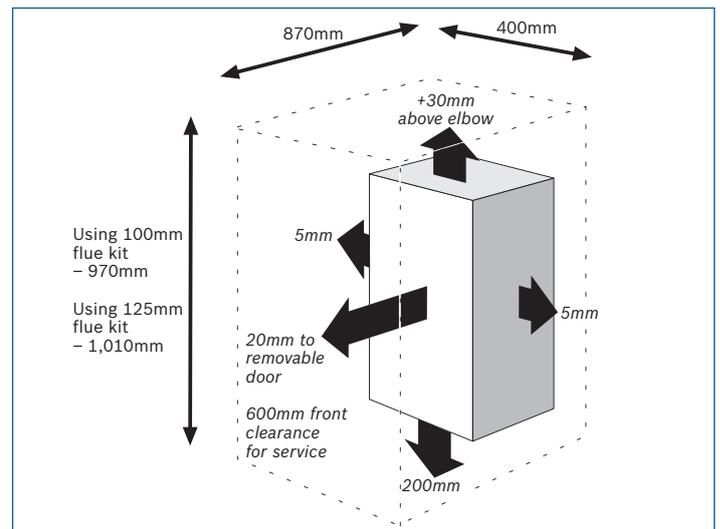
The appliances may be installed into an airing cupboard if required. However, a non-combustible perforated material (max. hole sizes of 13mm) must be used to separate the boiler from the airing space. See section “Boiler location” on page 36.

## Installation and service clearances

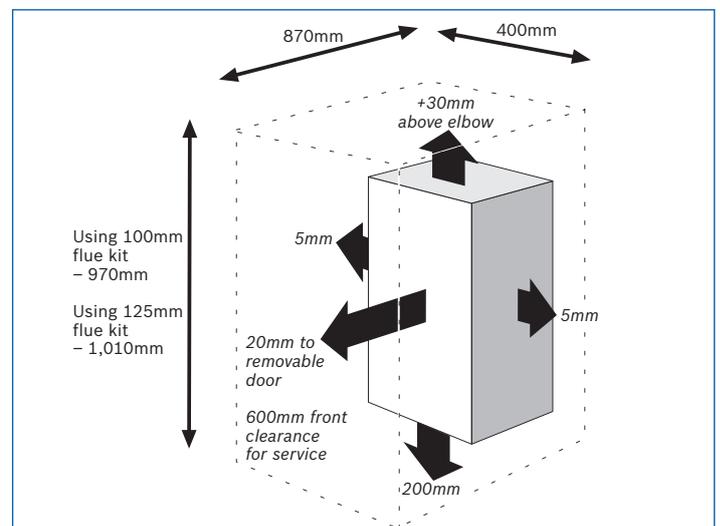
The minimum clearances shown below should be allowed for installation and servicing. **All models, with the exception of the 12Ri - 24Ri range, do not require compartment ventilation so long as minimum installation and service clearances are maintained**, see opposite.



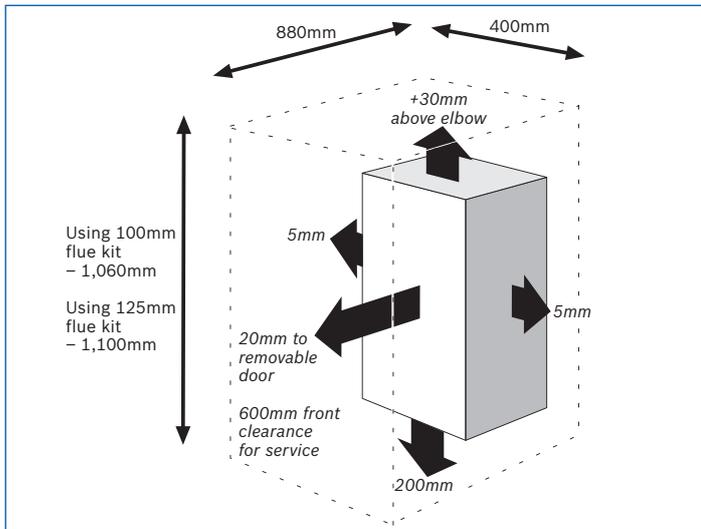
Clearances for Greenstar CDI Classic Regular and System



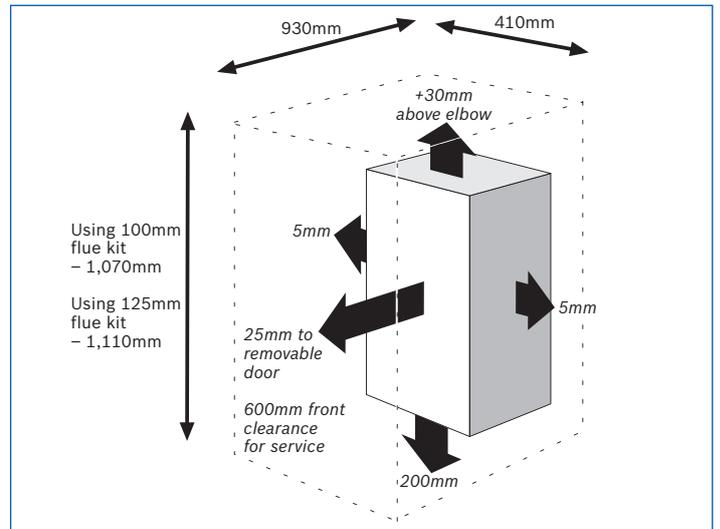
Clearances for Greenstar 27Ri & 30Ri



Clearances for Greenstar 12Ri-24Ri



Clearances for Greenstar 27i & 30i System



Clearances for Greenstar 9i-24i System

### 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.

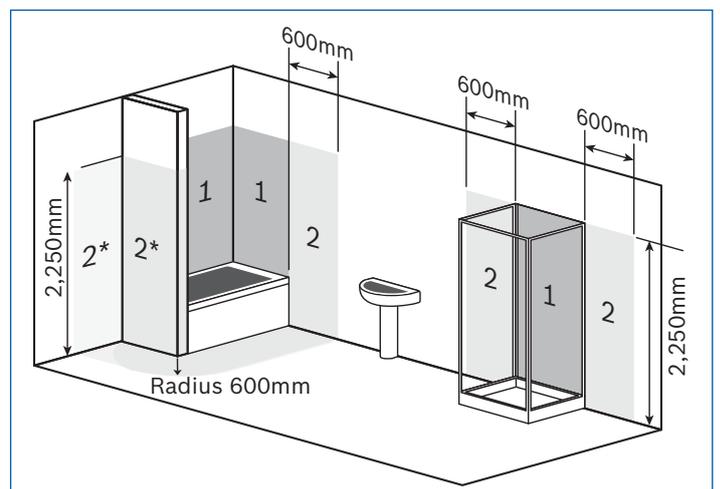
1. The room in which the appliance is installed does not require a purpose-provided air vent.
2. If the appliance is installed in a cupboard or compartment with dimensions that allow the following minimum clearances, then no ventilation is required:

Compartment installation					
Position of appliance	Min. unventilated clearance (to removable door)				
	Greenstar CDi Classic Regular & System	Greenstar 12Ri-24Ri	Greenstar 27Ri & 30Ri	Greenstar 9i-24i System	Greenstar 27i & 30i System
In front	20mm	100mm	20mm	20mm	20mm
Below	200mm	200mm	200mm	200mm	200mm
Right side	5mm	200mm*	5mm	5mm	5mm
Left side	5mm	200mm*	5mm	5mm	5mm
Above flue elbow	30mm	30mm	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 FW100 controller may only be installed in the area outside of zone 2. A boiler with any other timer fitted (or blanking panel for an optional programmer) can be installed in zone 2
- Additional Residual Current Device (RCD) protection may be required.



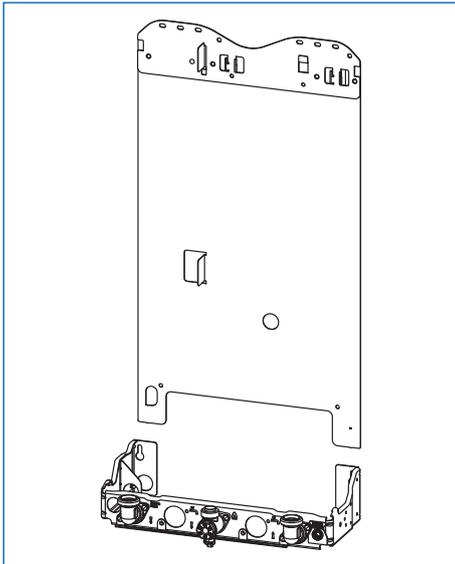
\*Without the end wall, zone 2 must extend 600mm from the bath

Refer to the latest IEE wiring regulations.

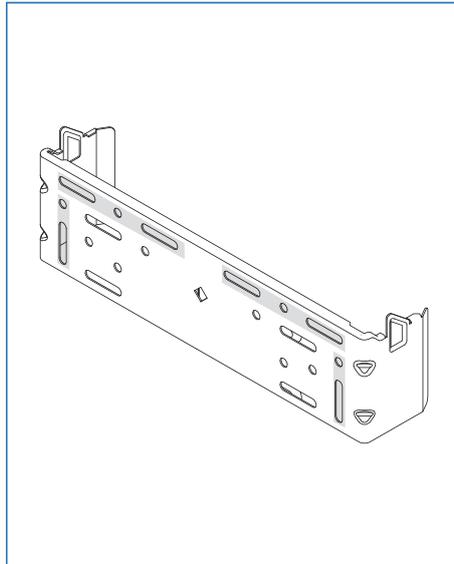
### Wall preparation

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

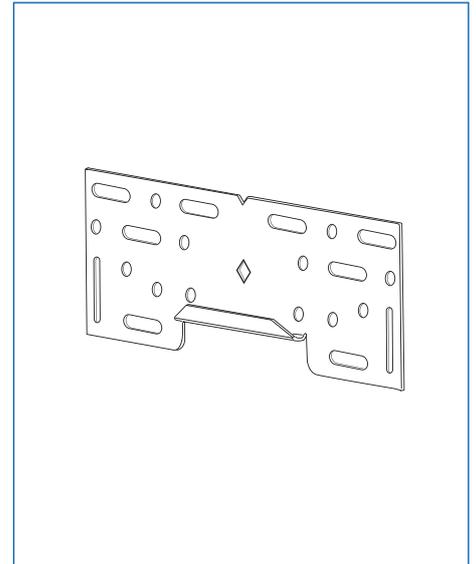
For all boilers, the pipework can be routed behind the boiler without the need for an additional wall-spacing frame.



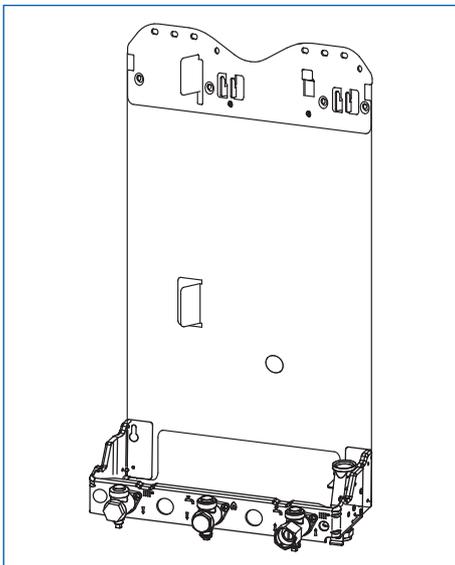
Greenstar CDi Classic Regular wall-mounting jig



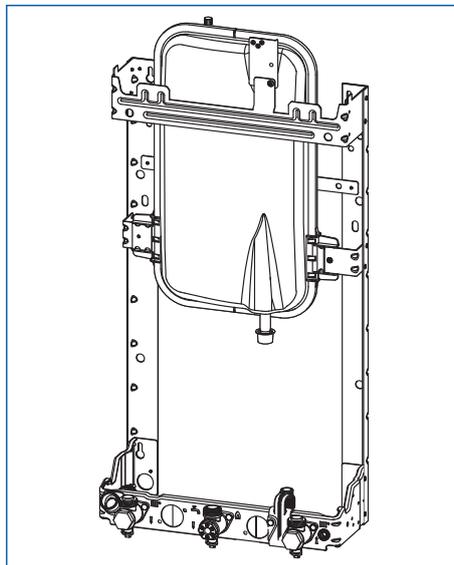
Greenstar 27Ri & 30Ri wall mounting jig



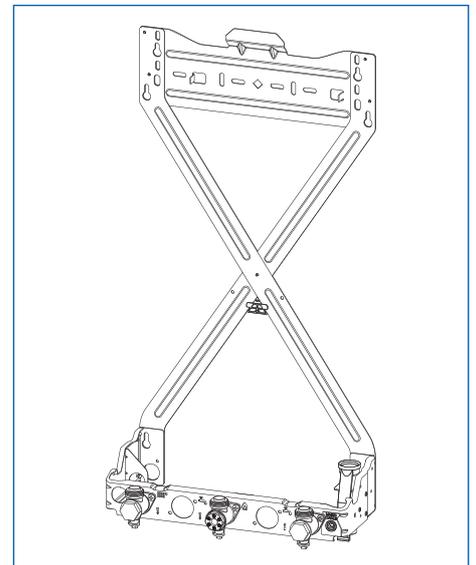
Greenstar 12Ri-24Ri wall mounting jig



Greenstar CDi Classic System boiler wall-mounting jig

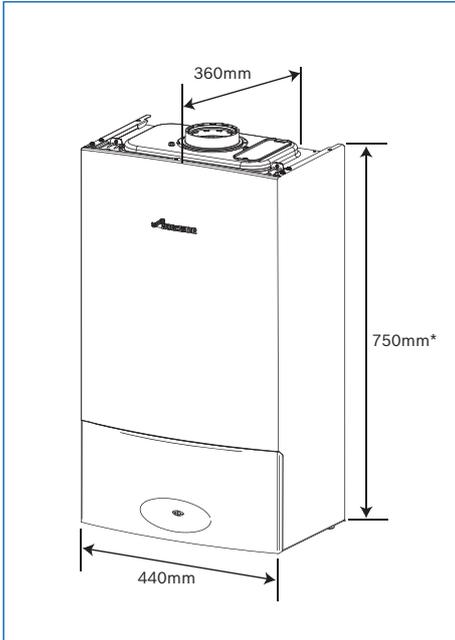


Greenstar 27i & 30i System boiler wall-mounting jig

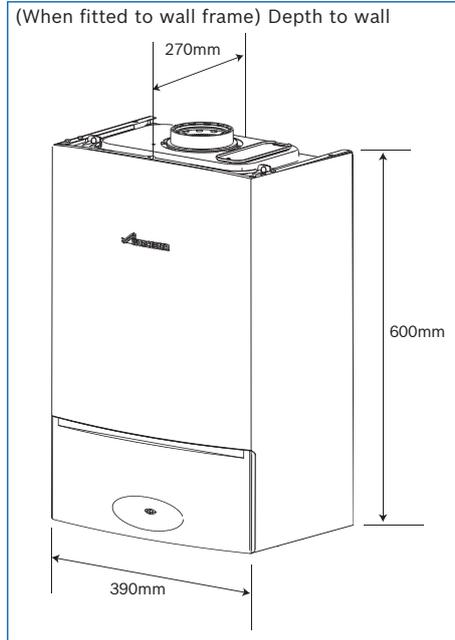


Greenstar 9i-24i System boiler wall-mounting jig

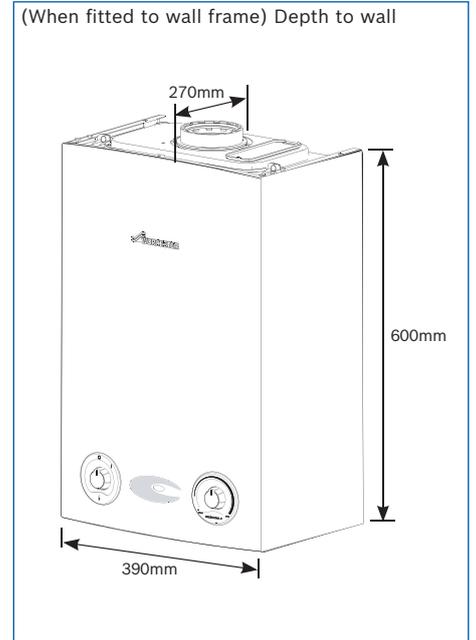
**Casing dimensions**



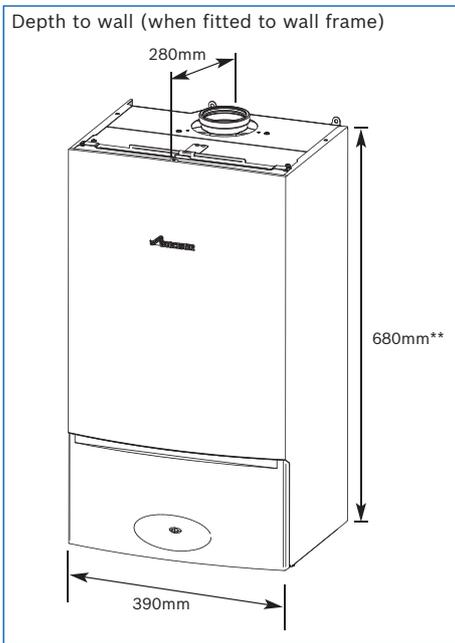
Greenstar CDi Classic Regular and System  
\*760mm to top of casing front.



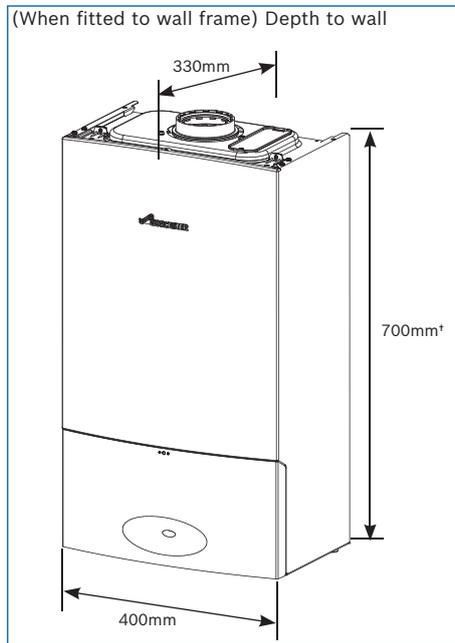
Greenstar 27Ri & 30Ri



Greenstar 12Ri-24Ri

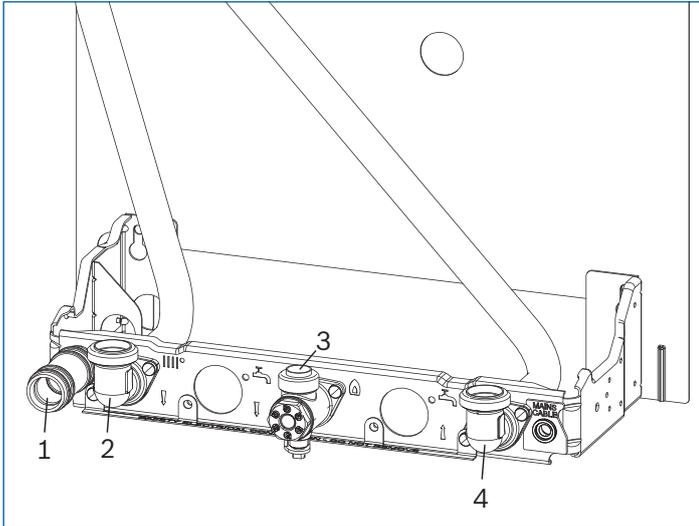


Greenstar 27i & 30i System  
\*\*690mm to top of casing front.

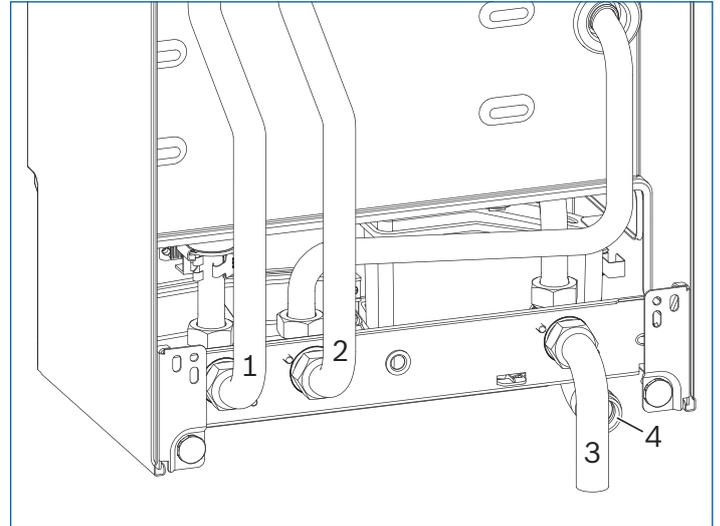


Greenstar 9i-24i System  
\*710mm to top of casing front.

### Pipework connections – regular boilers



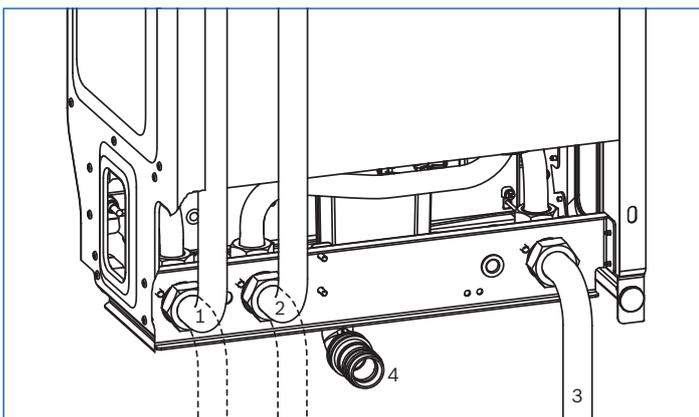
Greenstar CDi Classic Regular (front view)



Greenstar 27Ri & 30Ri (rear view)

Pipework connections – Greenstar CDi 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

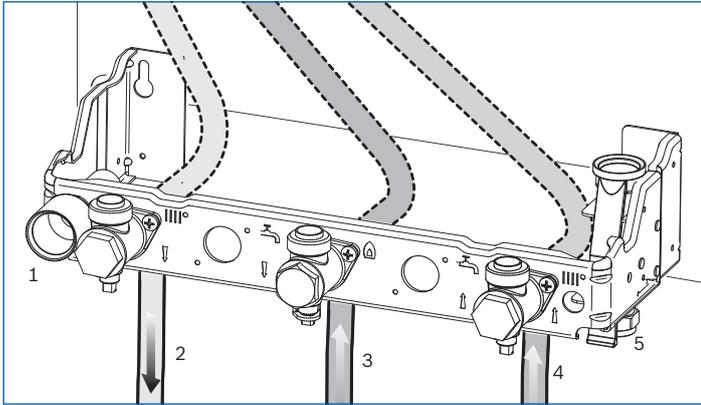
Pipework connections – Greenstar 27Ri & 30Ri			
	Function	From left case edge	Diameter of pipe
1	CH return	312mm	22mm
2	CH flow	247mm	22mm
3	Gas	65mm	22mm
4	Condensate drain	33mm	22mm



Greenstar 12Ri-24Ri (rear view)

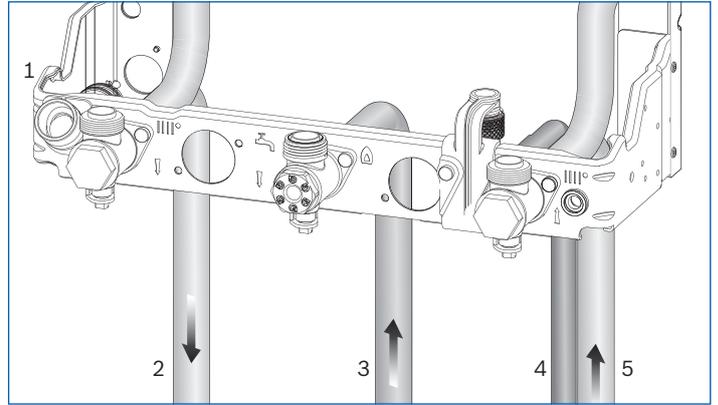
Pipework connections – Greenstar 12Ri-24Ri			
	Function	From left case edge	Diameter of pipe
1	CH return	350mm	22mm
2	CH flow	285mm	22mm
3	Gas	55mm	22mm
4	Condensate drain	210mm	22mm

## Pipework connections – system boilers



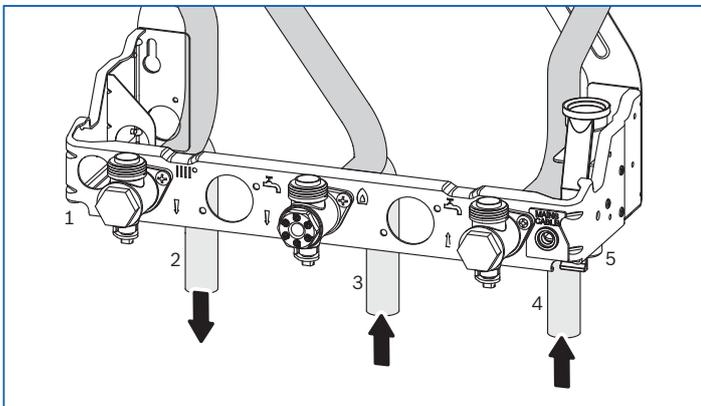
Greenstar CDi Classic System

Pipework connections – Greenstar CDi Classic System			
	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
5	Pressure relief valve	375mm	15mm



Greenstar 27i & 30i System

Pipework connections – Greenstar 27i & 30i System			
	Function	From left case edge	Diameter of pipe
1	Condensate drain	33mm	22mm
2	CH flow	65mm	22mm
3	Gas	195mm	22mm
4	Pressure relief valve	291mm	15mm
5	CH return	325mm	22mm



Greenstar 9i-24i System

Pipework connections – Greenstar 9i-24i System			
	Function	From left case edge	Diameter of pipe
1	Condensate drain	38mm	22mm
2	CH flow	70mm	22mm
3	Gas	200mm	22mm
4	CH return	330mm	22mm
5	Pressure relief valve	364mm	15mm

### Optional accessory

The vertical pre-piping assembly kit comprises a set of pre-formed copper pipes.

CDi Classic System 7 716 192 651

i System (9 to 30kW) 7 716 192 713.

# Installation requirements

Installation of the Greenstar regular and system 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 user of a suitable inhibitor will provide a resistance to this. Contact Sentinel (Tel: 0800 389 4670 or visit [www.sentinel-solutions.net](http://www.sentinel-solutions.net) ) or Fernox (Tel: 0870 601 5000 or visit [www.fernox.com](http://www.fernox.com)) for further details.

## Protecting the heating system from dirty water

It is a requirement of the building standard, BS 7593, that all heating systems should be chemically flushed and cleansed and then an inhibitor added to help prevent future corrosion taking place. It is also beneficial and best practice within the building regulations to install a system filter.



## 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

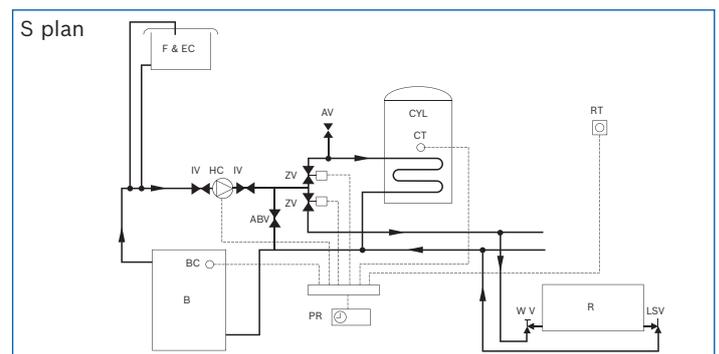
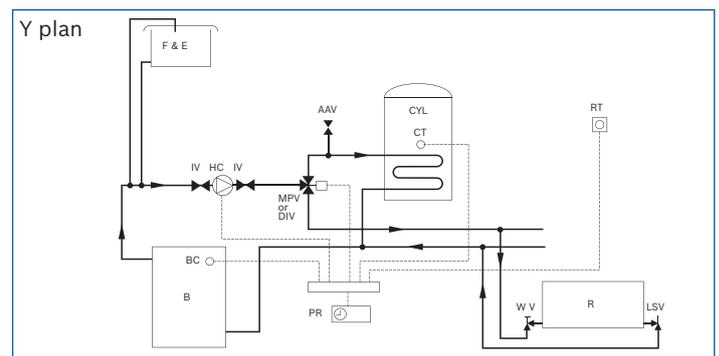
The Greenstar regular boiler range is designed for connection to an open vented fully pumped heating and hot water system.

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.



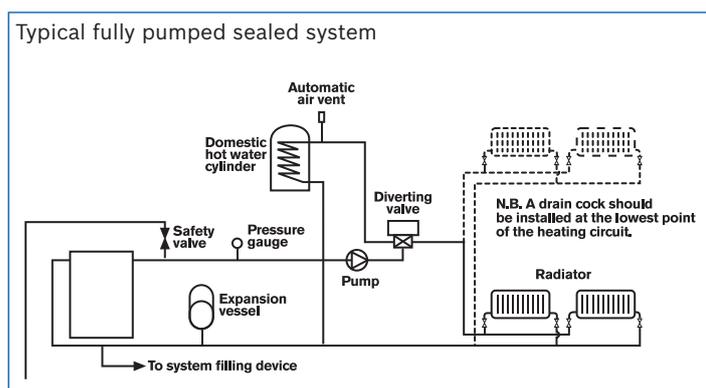
### Sealed primary systems – regular boilers

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



### Sealed primary systems – system boilers

Worcester Greenstar System boilers are supplied complete with all the necessary components to form a sealed primary system. Included are an expansion vessel, a pressure relief valve (set at 3bar), an automatic air vent and a pressure gauge.

With an initial system pressure of 0.5bar a system capacity of approximately 83 litres can be accommodated. Refer to BS 7074:Part 1 for more information.

The system should be installed in compliance with the requirements of BS 5449: Part 1.

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

### Greenstar system boiler diverter valve kit

Greenstar system boilers can be adapted to house an in-built diverter valve. The optional integral diverter valve kit allows the user to control the supply of heat to the hot water cylinder from the boiler. A choice of Worcester plug-in controls must be used.

### System filling and make-up

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.

### Air supply

Worcester Greenstar system 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
24Ri	2.6m <sup>3</sup> /hr
30Ri	3.2m <sup>3</sup> /hr
40CDi Classic Regular	4.4m <sup>3</sup> /hr
24i System	2.6m <sup>3</sup> /hr
30i System	3.24m <sup>3</sup> /hr
30CDi Classic System	3.2m <sup>3</sup> /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 - 24Ri regular & 9i - 24i System 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
24Ri	1.9kg/hr
30Ri	2.3kg/hr
40CDi Classic Regular	3.3kg/hr
24i System	1.91kg/hr
30i System	2.33kg/hr
30CDi Classic System	2.4kg/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 appliances' electrical circuits are also protected by an internal fuse. The appliance must be earthed.

**Guarantee**

Worcester Greenstar regular and system 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](http://www.worcester-bosch.co.uk/guarantee)



On all Greenstar regular and system appliances\*



On the primary heat exchanger\*

\*Subject to terms and conditions.

# The NEW Greenstar System Filter

NEW

Available in 22mm and 28mm, 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.

Inspired by installer feedback, the new filter has been designed to make installation and servicing simpler than ever before. In addition the performance has been improved resulting in a greater collection of debris from the system.

**Please note: CIBSE heating guide recommends, for a condensing boiler system, anything running continuously over 23kW is likely to require 28mm pipework and therefore a 28mm filter. However, this will be dependent on the system layout and pressure drop.**

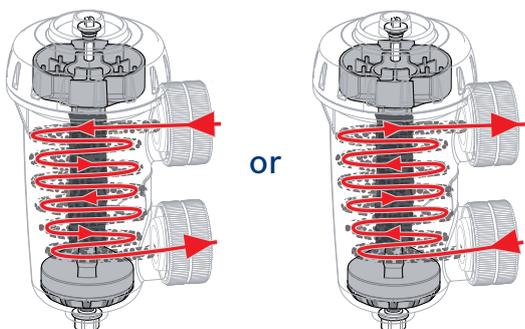


## NEW features and improvements



### ✔ Over-tightening prevention feature

The removable lid has been designed to prevent over-tightening and damage to the O-ring seal, eliminating the risk of leaks.



### ✔ Bi-directional flow

Engineered to allow a bi-directional flow, enabling it to be installed anywhere along the return circulation pipework between the last radiator and the boiler.



### ✔ Isolation valve indicators

The isolation valves can be opened using a single 90° turn, with red and green indicators showing when the filter is in operation.



### ✔ Stronger magnet

A larger powerful internal magnet safeguards the boiler and wider system components.



✔ **28mm version now available**

A larger version is now available for use in larger heating systems.



✔ **Pipe cut template**

A cutting guide is supplied with the filter for use in measuring exact lengths of pipe to cut at the point at which the filter is being installed.



✔ **Easy to fit**

Although the Greenstar System Filter shares its name with our high efficiency gas and oil-fired boilers, it can also be fitted to any typical domestic heating system.

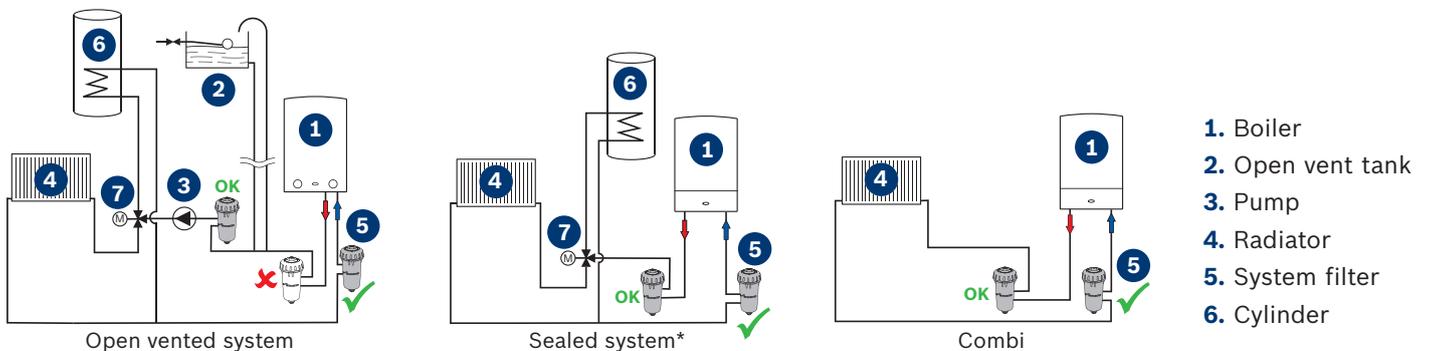


✔ **Easy to service**

The Greenstar System Filter has been designed to make servicing and maintenance simple by using the special spanners supplied and a radiator bleed key.

## Installation

The filter can be installed anywhere in a heating system, except between the boiler and on the feed and expansion pipes on an open vent system. To maximise the effectiveness it should be placed on the primary heating return before the boiler and after the last radiator.



\*When a system boiler has an internal diverter valve and two returns, the system filter should be put on the heating return and not the cylinder return.

Product info	
Part numbers	7 733 600 236 (22mm)
	7 733 600 237 (28mm)



**MAGNETIC FIELD.**  
Can be harmful to  
pacemaker wearers.

# 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)

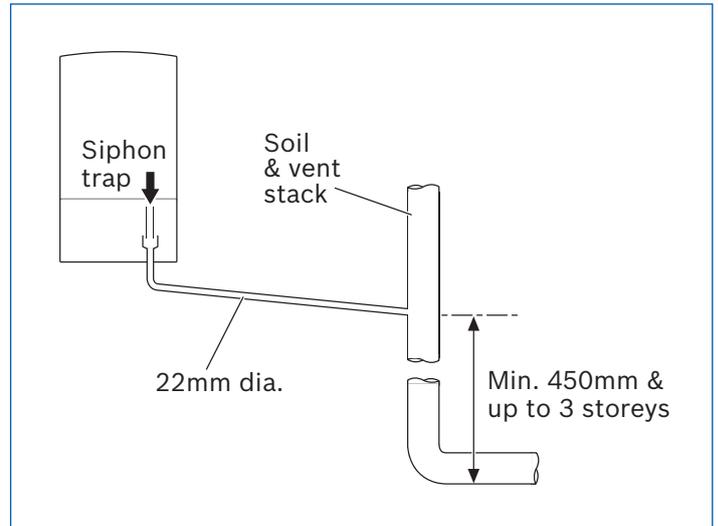


Fig. 1 Disposal to soil vent stack

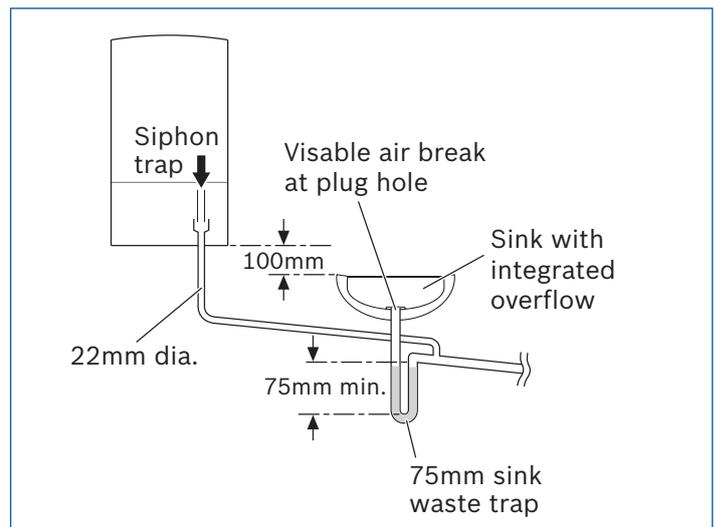


Fig. 2 Disposal to a waste pipe

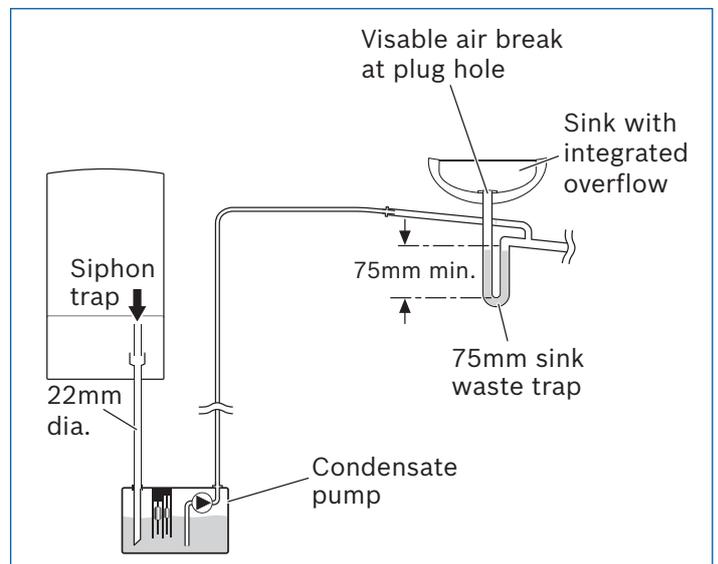


Fig. 3 Condensate pump disposal

## External connections

### Greenstar CDi Classic Regular, Greenstar CDi Classic System and Greenstar i System

The Greenstar CDi Classic and Greenstar i have a large capacity siphonic condensate trap reducing the risk of condensate discharge freezing up during periods of prolonged cold temperatures.

Like the CondenseSure siphon accessory, the expanded siphonic operation discharges 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
- Eliminated freezing potential.

For a 48 hour period at -15°C provided the installation parameters listed below are adhered to.

To maximise the effectiveness of this product the installer should:

- Keep the external pipework as short as possible. An external run pipe diameter should be increased to a minimum of 32mm and not exceed 3 metres
- Ensure a fall of at least 2.5° over horizontal sections
- Minimise the number of bends and connectors
- Remove burrs after cutting pipe
- Remove surplus solvent from the interior of the pipe.

### Greenstar Ri, Greenstar 27i and 30i System

#### 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. 5), may be considered. Please see installation and servicing instructions for more details.

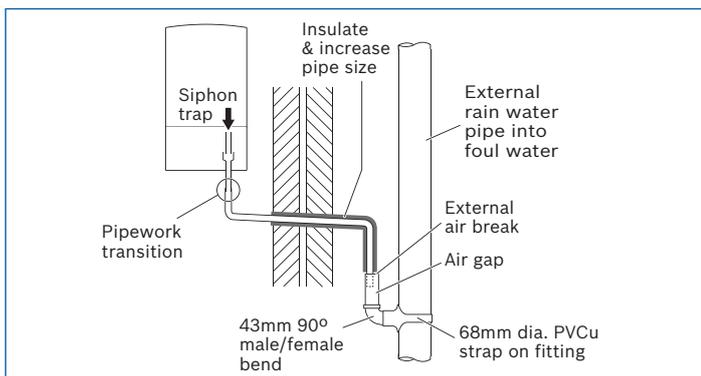


Fig. 4 Disposal into a rainwater down pipe

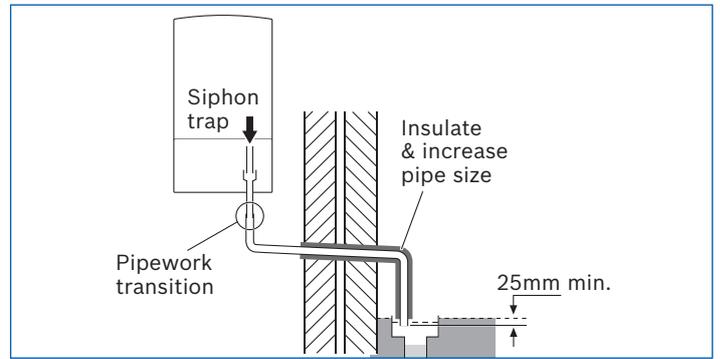


Fig. 5 External disposal

#### 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.

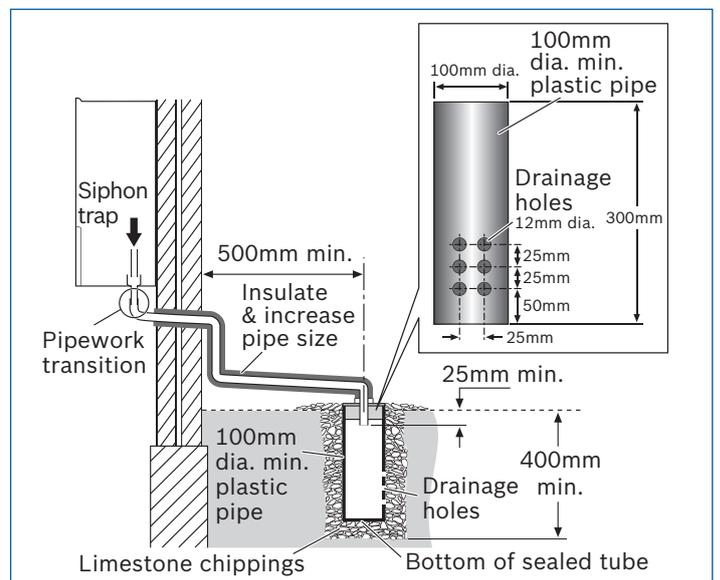


Fig. 6 Soak away

# The Worcester CondenseSure

With climate change and extreme weather variations becoming increasingly common, and very cold winters with temperatures as low as -20°C 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 -15°C 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

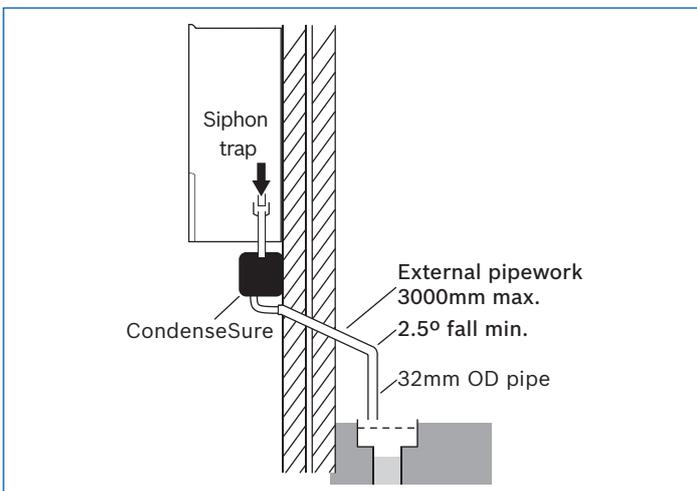
Although developed specifically for Worcester Greenstar gas- and oil-fired boilers, the Worcester CondenseSure can also be fitted to any make of condensing boiler for both new and retrofit installations. The CondenseSure can provide a simple solution which eliminates the need for re-siting both the new 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

- ✓ **No electrical supply needed**  
Zero running costs and no wiring connection, so no need for an electrician to install.
- ✓ **Compatible with all boilers**  
Can be installed on new or existing installations and is suitable for any gas- or oil-fired condensing boilers.
- ✓ **Uses 'free' energy**  
By attaching the CondenseSure to the 22mm heating flow pipework the energy from the pipe is used to heat the condensate.
- ✓ **Installation flexibility**  
Can be installed under the boiler or remotely.
- ✓ **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:

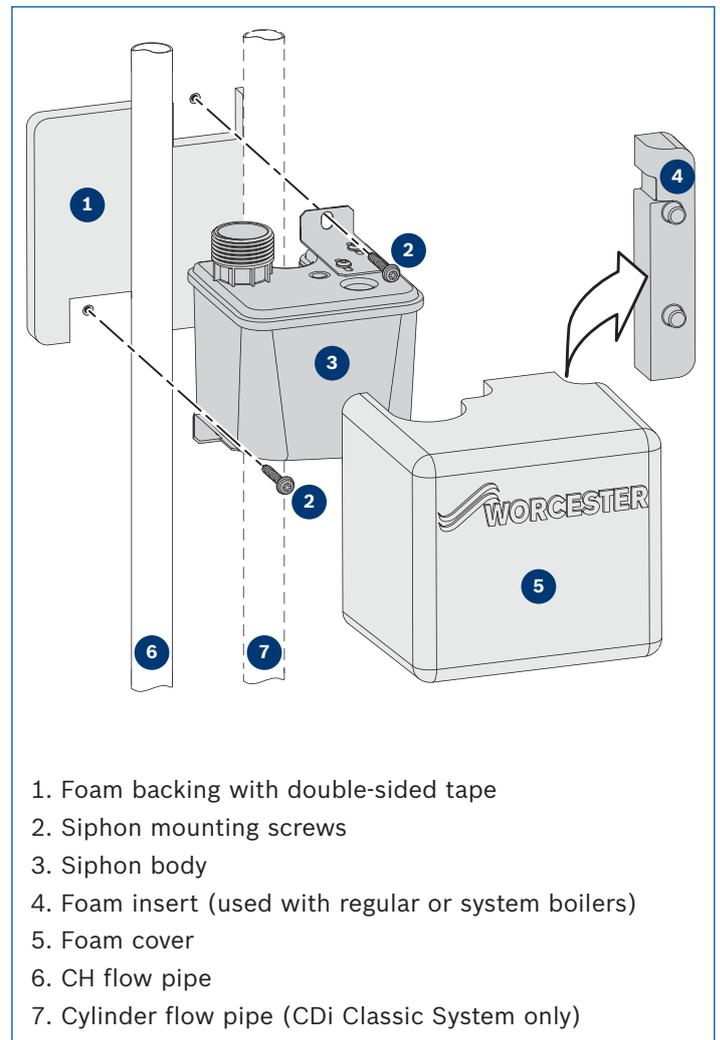
- The externally-run pipe length does not exceed 3 metres
- There is a fall on the discharge pipe of at least 2.5 degrees
- The discharge pipe diameter is not less than 32mm in diameter.

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 system 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. Cylinder flow pipe (CDi Classic System 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.

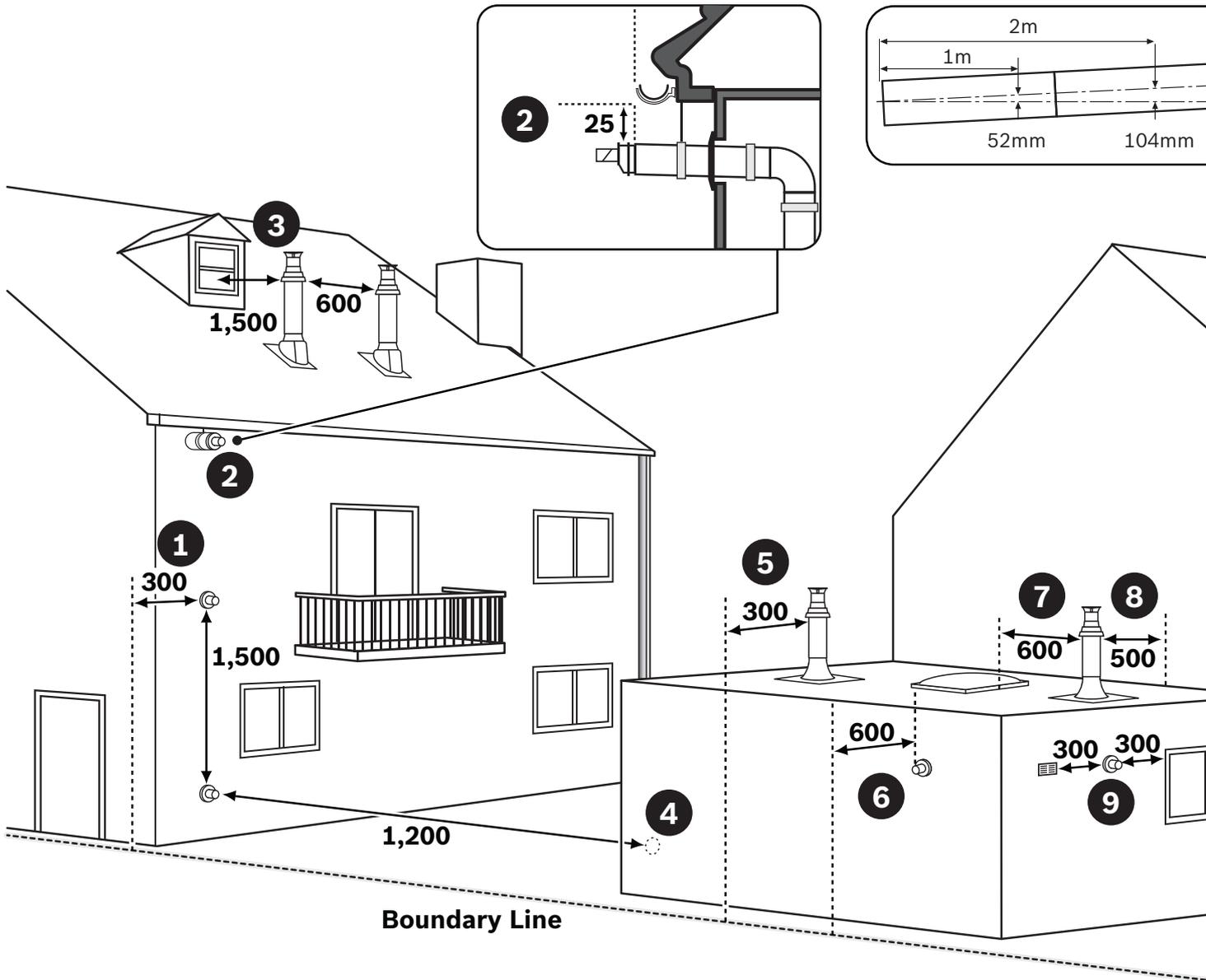
The CondenseSure has no working parts to breakdown, does not use any energy and has no electrical connections, so there is no Part P requirement.

### Product info

Part number	7 716 192 746
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# 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:

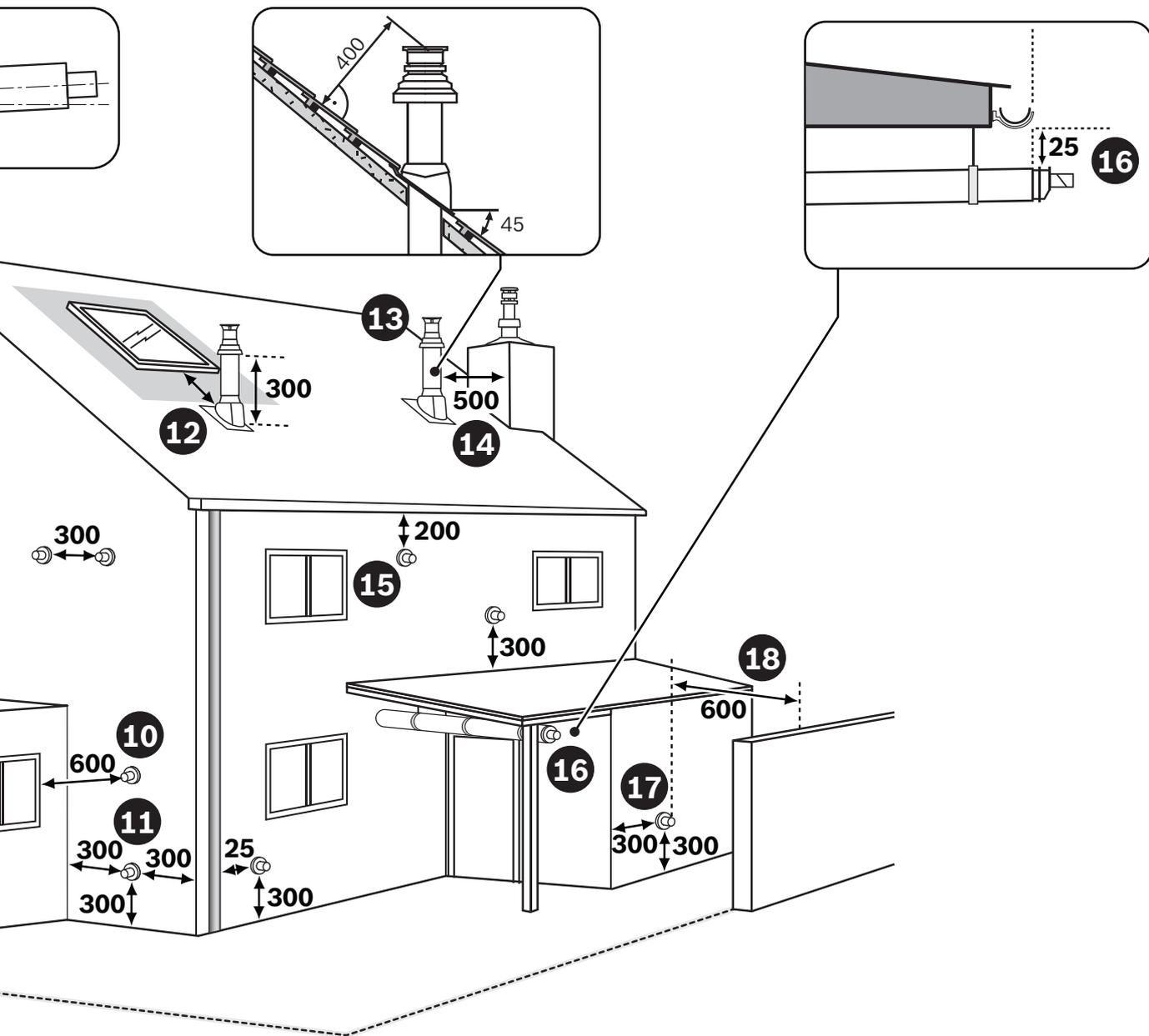
7 716 191 177 (100mm dia.)

7 716 191 178 (100mm dia. x 6)

7 716 191 179 (125mm dia.)

## 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 and system boiler range horizontal fluing options

The Greenstar regular and system 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. The following diagrams detail the permissible lengths.

## Horizontal RS flue



Flue diameter	100mm	125mm
<b>Greenstar 30CDi Classic Regular and 30CDi Classic System</b>		
Minimum flue length	350mm*	405mm
Maximum flue length	7,900mm	18,500mm
<b>Greenstar 40CDi Classic Regular</b>		
Minimum flue length	350mm*	405mm
Maximum flue length	6,000mm	12,500mm
<b>Greenstar 12Ri-24Ri and 9i-24i System models</b>		
Minimum flue length	350mm*	405mm
Maximum flue length	4,600mm	13,000mm
<b>Greenstar 27Ri &amp; 30Ri and 27i &amp; 30i System models</b>		
Minimum flue length	350mm*	405mm
Maximum flue length	6,000mm	15,000mm
<b>Greenstar 35CDi Classic System</b>		
Minimum flue length	350mm*	405mm
Maximum flue length	7,000mm	16,000mm

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

### 100mm dia. standard telescopic flue kit

- 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
<b>100mm diameter</b>		
	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	90° bend
	7 716 191 085	45° bend
	7 719 002 432	High level horizontal flue adaptor
	7 733 600 048^	High level horizontal telescopic flue kit
	7 716 191 177	Support bracket kit
	7 716 191 178	Support bracket kit (6 pack)

\*Dimensions when fitted

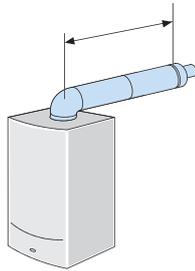
<b>125mm diameter</b>		
	7 719 003 702	Standard telescopic flue kit (405 - 600mm)
	7 719 003 666	Extension flue kit (960mm*)
	7 719 003 664	90° bend
	7 719 003 665	45° bend
	7 719 002 433	High level horizontal flue adaptor
	7 716 191 179	Support bracket kit

\*Dimensions when fitted. ^For use with high level horizontal flue adaptor.

The following criteria should be noted when planning the installation:

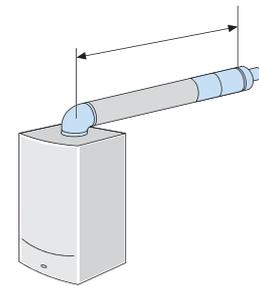
- The concentric flue system must be inclined at 3° (52mm per metre) from the appliance, to allow condensate to drain back into the boiler
- A white plume of condensation will be emitted from the terminal because the appliance operates at high efficiency. Care must be taken when selecting the flue terminal 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 30CDi Classic Regular and 30CDi Classic System		
100mm	570	1
125mm	600	1
Greenstar 40CDi Classic Regular		
100mm	570	1
125mm	600	1
Greenstar 12Ri-24Ri and 9i-24i System models		
100mm	570	1
125mm	600	1
Greenstar 27Ri & 30Ri and 27i & 30i System models		
100mm	570	1
125mm	600	1
Greenstar 35CDi Classic System		
100mm	30	1
125mm	30	1

### Option 2: Extension flue horizontal



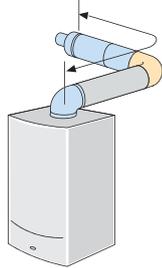
Components			
Part No. 100mm		7 716 191 082	7 716 191 083
Part No. 125mm		7 719 003 702	7 719 003 666
Maximum lengths (mm) & no. of components required			
Greenstar 30CDi Classic Regular and 30CDi Classic System			
100mm	7,900	1	up to 8
125mm	18,500	1	up to 18
Greenstar 40CDi Classic Regular			
100mm	6,000	1	up to 6
125mm	12,500	1	up to 12
Greenstar 12Ri-24Ri and 9i-24i System models			
100mm	4,600	1	up to 5
125mm	13,000	1	up to 13
Greenstar 27Ri & 30Ri and 27i & 30i System models			
100mm	6,000	1	up to 6
125mm	15,000	1	up to 15
Greenstar 35CDi Classic System			
100mm	7,000	1	up to 7
125mm	16,000	1	up to 16

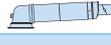
**Note:** The 100mm dia. short flue extension (Part No. 7 716 191 133) and 100mm dia. 2m flue extension (Part No. 7 716 191 172) may be used as an alternative to the standard extension as required up to the maximum flue lengths stated.

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

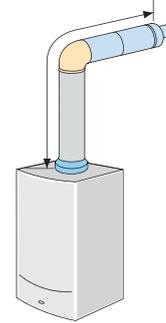
	45° bend	90° bend
Greenstar CDi Classic Regular & System 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic Regular & System 80/125mm flues	1,000mm	2,000mm
Greenstar Ri & i System – all size flues	1,000mm	2,000mm

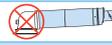
Option 3: Extension flue horizontal using a second 90° bend



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 and 30CDi Classic System				
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 and 9i-24i System models				
100mm	2,600	1	up to 3	1
125mm	11,000	1	up to 11	1
Greenstar 27Ri & 30Ri and 27i & 30i System models				
100mm	4,000	1	up to 4	1
125mm	13,000	1	up to 13	1
Greenstar 35CDi Classic System				
100mm	5,500	1	up to 6	1
125mm	14,000	1	up to 14	1

Option 4: Extension flue horizontal and upwards



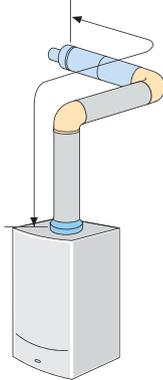
Components					
Part No. 100mm		7 716 191 082	7 716 191 083	7 716 191 084	7 719 002 432
Part No. 125mm		7 719 003 702	7 719 003 666	7 719 003 664	7 719 002 433
Maximum lengths (mm) & no. of components required					
Greenstar 30CDi Classic Regular and 30CDi Classic System					
100mm	7,900	1	up to 8	1	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 and 9i-24i System models					
100mm	4,600	1	up to 5	1	1
125mm	13,000	1	up to 13	1	1
Greenstar 27Ri & 30Ri and 27i & 30i System models					
100mm	6,000	1	up to 6	1	1
125mm	15,000	1	up to 15	1	1
Greenstar 35CDi Classic System					
100mm	7,000	1	up to 7	1	1
125mm	16,000	1	up to 16	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.

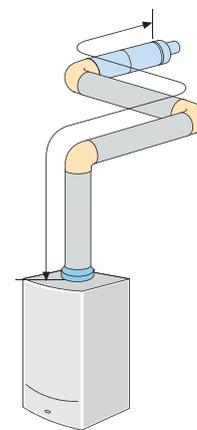
	45° bend	90° bend
Greenstar CDi Classic Regular & System 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic Regular & System 80/125mm flues	1,000mm	2,000mm
Greenstar Ri & i System – all size flues	1,000mm	2,000mm

**Option 5: Extension flue upwards and horizontal using a second 90° 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 and 30CDi Classic System					
100mm	6,400	1	up to 7	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 and 9i-24i System models					
100mm	2,600	1	up to 3	2	1
125mm	11,000	1	up to 11	2	1
Greenstar 27Ri & 30Ri and 27i & 30i System models					
100mm	4,000	1	up to 4	2	1
125mm	13,000	1	up to 13	2	1
Greenstar 35CDi Classic System					
100mm	5,500	1	up to 6	2	1
125mm	14,000	1	up to 14	2	1

**Option 6: Extension flue upwards and horizontal using a third 90° 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 and 30CDi Classic System					
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 and 9i-24i System models					
125mm	9,000	1	up to 9	3	1
Greenstar 27Ri & 30Ri and 27i & 30i System models					
100mm	2,000	1	up to 2	3	1
125mm	11,000	1	up to 11	3	1
Greenstar 35CDi Classic System					
100mm	4,000	1	up to 4	3	1
125mm	12,000	1	up to 12	3	1

45° 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.

	45° bend	90° bend
Greenstar CDi Classic Regular & System 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic Regular & System 80/125mm flues	1,000mm	2,000mm
Greenstar Ri & i System – all size flues	1,000mm	2,000mm

# Greenstar regular and system boiler range vertical fluing options

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

## Vertical RSF flue



Flue diameter	100mm	125mm
<b>Greenstar 30CDi Classic Regular, 30CDi Classic System &amp; 35CDi Classic System</b>		
Minimum flue length	1,090mm	1,365mm
Maximum flue length (inc. adaptor)	9,400mm	18,500mm
<b>Greenstar 40CDi Classic Regular</b>		
Minimum flue length	1,090mm	1,365mm
Maximum flue length (inc. adaptor)	7,500mm	16,000mm
<b>Greenstar 12Ri-24Ri and 9i-24i System models</b>		
Minimum flue length	1,090mm	1,365mm
Maximum flue length (inc. adaptor)	6,400mm	15,000mm
<b>Greenstar 27Ri &amp; 30Ri and 27i &amp; 30i System models</b>		
Minimum flue length	1,090mm	1,365mm
Maximum flue length (inc. adaptor)	6,000mm	15,000mm

### 100mm dia. vertical balanced flue kit

- 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**

### 125mm dia. vertical balanced flue kit

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

**Part No. 7 719 002 431**

## Accessories



Components	Part No.	Description
<b>100mm diameter</b>		
	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	90° bend
	7 716 191 085	45° bend
	7 716 191 090	Flashing – flat roof
	7 716 191 091	Flashing – pitched roof

\*Dimensions when fitted

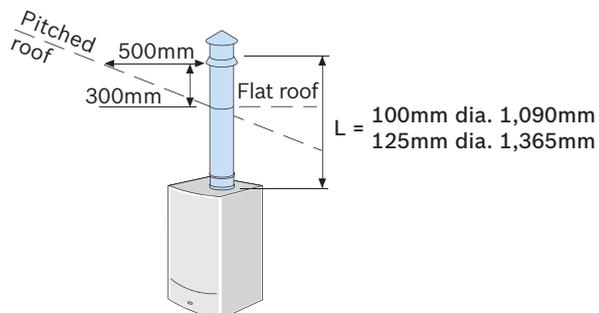
<b>125mm diameter</b>		
	7 719 002 431	Vertical 1,365mm balanced flue kit (inc. adaptor)
	7 719 003 666	Extension flue kit (960mm*)
	7 719 003 664	90° bend
	7 719 003 665	45° bend
	7 716 191 090	Flashing – flat roof
	7 716 191 091	Flashing – pitched roof

\*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.

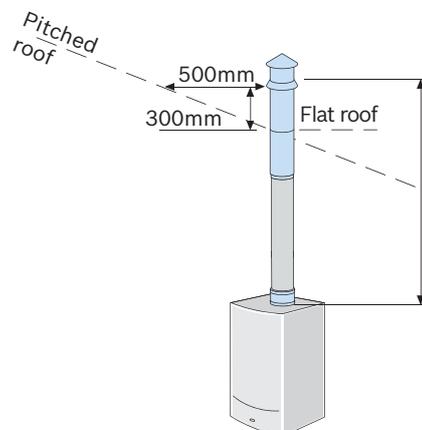
### Option 1: Minimum height



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 and 30CDi Classic System		
100mm	1,090	1
125mm	1,365	1
Greenstar 40CDi Classic Regular		
100mm	1,090	1
125mm	1,365	1
Greenstar 12Ri-24Ri and 9i-24i System models		
100mm	1,090	1
125mm	1,365	1
Greenstar 27Ri & 30Ri and 27i & 30i System models		
100mm	1,090	1
125mm	1,365	1
Greenstar 35CDi Classic System		
100mm	1,090	1
125mm	1,365	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.

### Option 2: Vertical balanced flue system maximum height

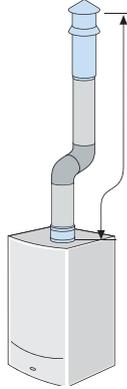


Components			
Part No. 100mm		7 719 002 430	7 716 191 083
Part No. 125mm		7 719 002 431	7 719 003 666
Maximum lengths (mm) & no. of components required			
Greenstar 30CDi Classic Regular and 30CDi Classic System			
100mm	9,400	1	up to 9
125mm	18,500	1	up to 18
Greenstar 40CDi Classic Regular			
100mm	7,500	1	up to 7
125mm	16,000	1	up to 15
Greenstar 12Ri-24Ri and 9i-24i System models			
100mm	6,400	1	up to 6
125mm	15,000	1	up to 14
Greenstar 27Ri & 30Ri and 27i & 30i System models			
100mm	6,000	1	up to 5
125mm	15,000	1	up to 14
Greenstar 35CDi Classic System			
100mm	8,000	1	up to 8
125mm	16,000	1	up to 16

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

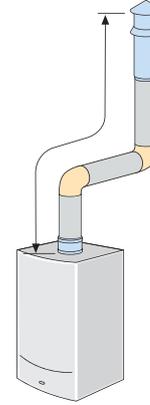
	45° bend	90° bend
Greenstar CDi Classic Regular & System 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic Regular & System 80/125mm flues	1,000mm	2,000mm
Greenstar Ri & i System – all size flues	1,000mm	2,000mm

**Option 3: Vertical balanced flue system with two 45° 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 and 30CDi Classic System			
100mm	7,900	1	up to 7
125mm	16,500	1	up to 16
Greenstar 40CDi Classic Regular			
100mm	6,000	1	up to 5
125mm	14,000	1	up to 13
Greenstar 12Ri-24Ri and 9i-24i System models			
100mm	4,400	1	up to 4
125mm	13,000	1	up to 12
Greenstar 27Ri & 30Ri and 27i & 30i System models			
100mm	4,000	1	up to 3
125mm	13,000	1	up to 12
Greenstar 35CDi Classic System			
100mm	6,500	1	up to 6
125mm	14,000	1	up to 14

**Option 4: Vertical balanced flue system with two 90° bends**



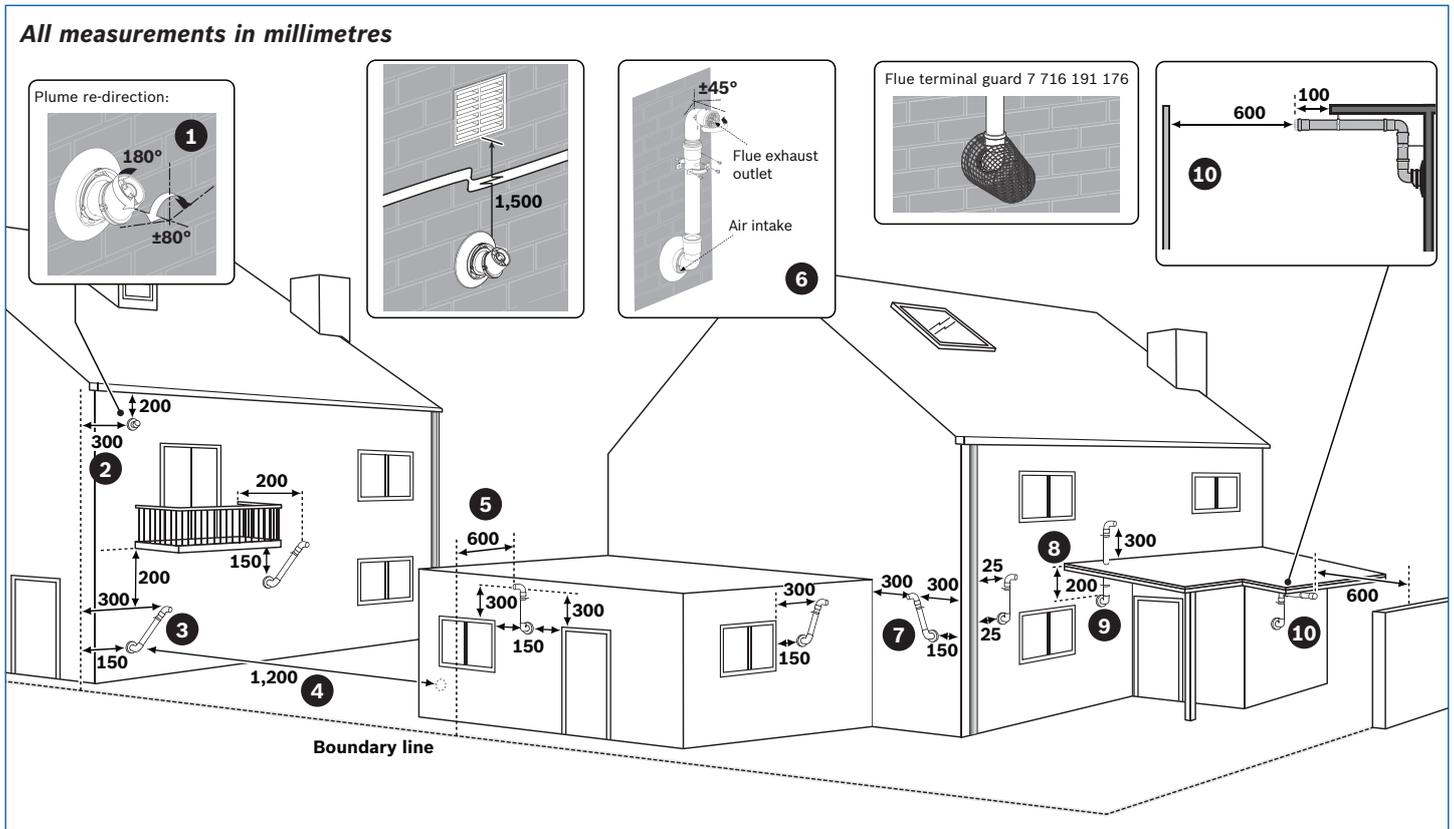
Components			
Part No. 100mm	7 719 002 430	7 716 191 083	7 716 191 084
Part No. 125mm	7 719 002 431	7 719 003 666	7 719 003 664
Maximum lengths (mm) & no. of components required			
Greenstar 30CDi Classic Regular and 30CDi Classic System			
100mm	6,400	1	up to 6
125mm	14,500	1	up to 14
Greenstar 40CDi Classic Regular			
100mm	4,500	1	up to 4
125mm	12,000	1	up to 13
Greenstar 12Ri-24Ri and 9i-24i System models			
100mm	2,400	1	up to 2
125mm	11,000	1	up to 10
Greenstar 27Ri & 30Ri and 27i & 30i System models			
100mm	2,000	1	1
125mm	11,000	1	up to 10
Greenstar 35CDi Classic System			
100mm	5,000	1	up to 5
125mm	12,000	1	up to 12

**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.

	45° bend	90° bend
<b>Greenstar CDi Classic Regular &amp; System 60/100mm flues</b>	750mm	1,500mm
<b>Greenstar CDi Classic Regular &amp; System 80/125mm flues</b>	1,000mm	2,000mm
<b>Greenstar Ri &amp; i System – all size flues</b>	1,000mm	2,000mm

# Plume management terminal positioning



## Note

- All measurements are the minimum clearances required
- Refer to pages 50-51 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 an 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**

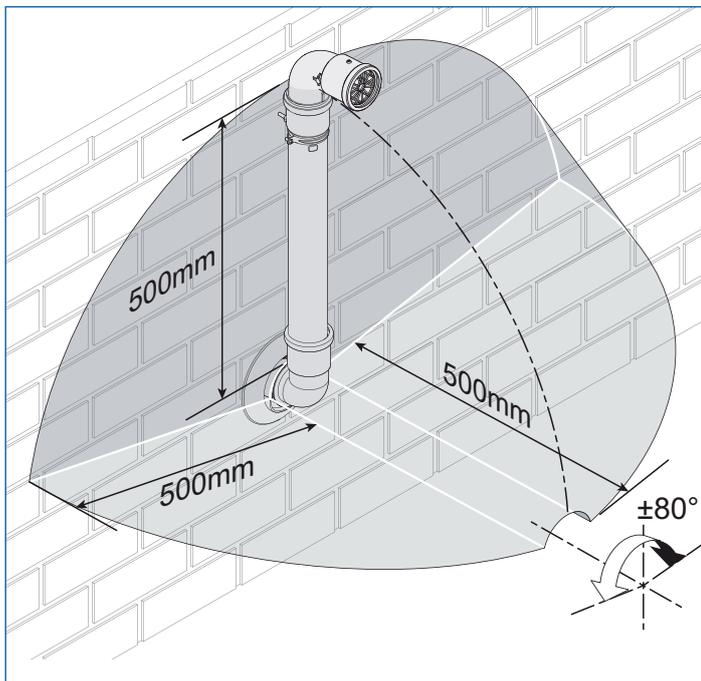
## Accessories



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

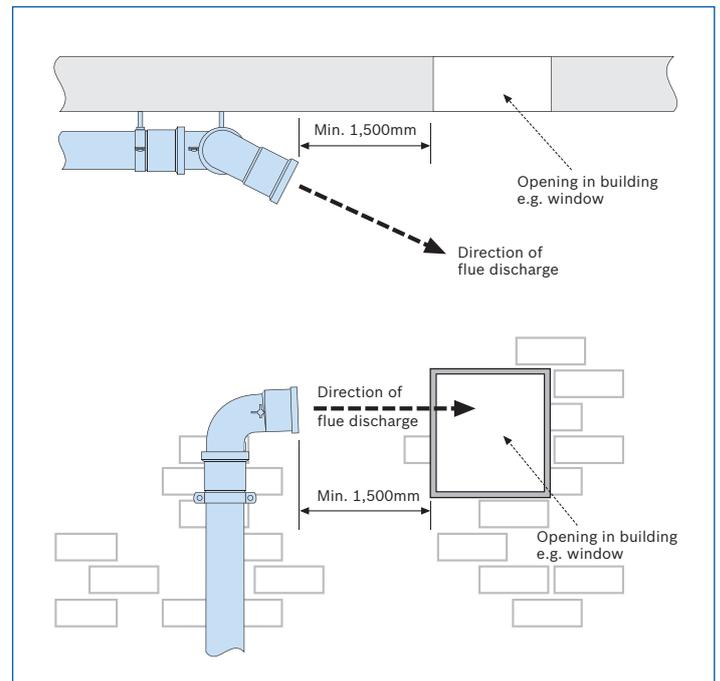
### Standard plume management system

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.



Terminal exclusion zone

Any plume management extensions as far as the first elbow must rise by at least 173mm per metre (10°). Further subsequent extensions must rise by 52mm (3°) to ensure that condensate flows back to the boiler.



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

For Greenstar CDi Classic System and Regular boilers, the 100mm dia. internal flue length is immediately reduced by 2,000mm when the minimum plume management of 500mm is used.

For the Greenstar 27i & 30i System and 27Ri & 30Ri boilers, the 100mm dia. internal flue is immediately reduced by 1,000mm when the minimum plume management of 500mm is used.

Greenstar 9i-24i System and 9-24Ri 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. For more information, see below.

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

**60mm dia. plume management system**

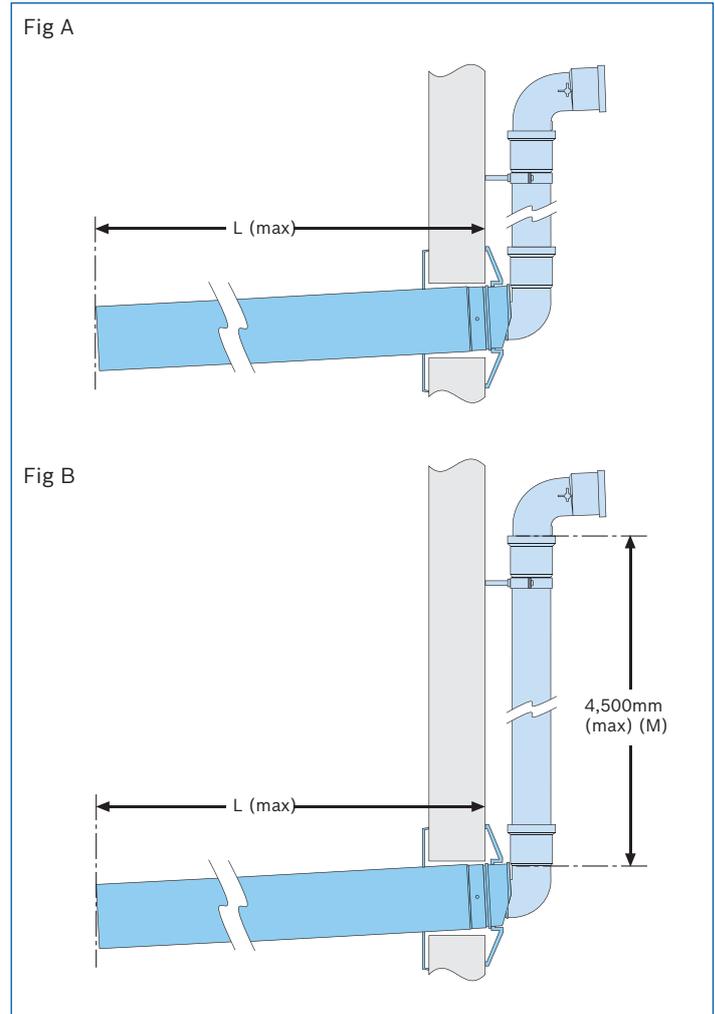
To ensure that the maximum total straight flue length along the plume management route is not exceeded, the following should be added to dimension (M):

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

For plume management options with 60mm dia. extensions, please refer to page 62.

The effective 100mm dia. internal flue length can be determined by adding together all the straight flue lengths and the effective lengths of the bends used. Allowances for 90° and 45° bends are detailed on pages 53-55.

**Condensfit II™ telescopic flue and plume management system measuring**



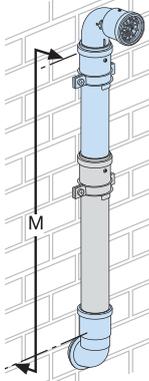
Effective straight flue lengths for telescopic flue with plume management		
Boiler	Fig. A Maximum straight flue length (L) with minimum plume management length 500mm (M)	Fig. B Maximum straight flue length (L) with maximum plume management length 4,500mm (M)
30CDi Classic Regular & System	5,900mm	3,100mm
35CDi Classic System	5,000mm	2,200mm
40CDi Classic Regular	4,000mm	1,200mm
12Ri-24Ri models	4,600mm	4,600mm
9i-24i System models	4,600mm	4,600mm
27Ri & 30Ri, 27i & 30i System models	5,000mm	2,200mm

### Plume management system

See terminal exclusion zone diagram on page 60

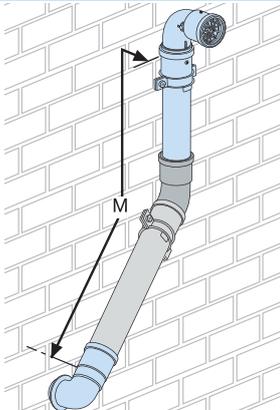
Components			
Part No. 60mm		7 716 191 086	
Maximum lengths (mm) & no. of components required			
Greenstar CDi Classic Regular & System, Ri & i System series*			
60mm	500	1	

### Plume management system with extensions



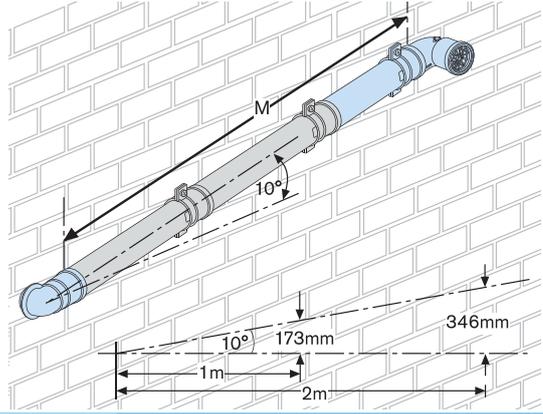
Components			
Part No. 60mm		7 716 191 086	7 716 191 087
Maximum lengths (mm) & no. of components required			
Greenstar CDi Classic Regular & System, Ri & i System series*			
60mm	4,500	1	up to 4

### Plume management system with extensions and 45° bend



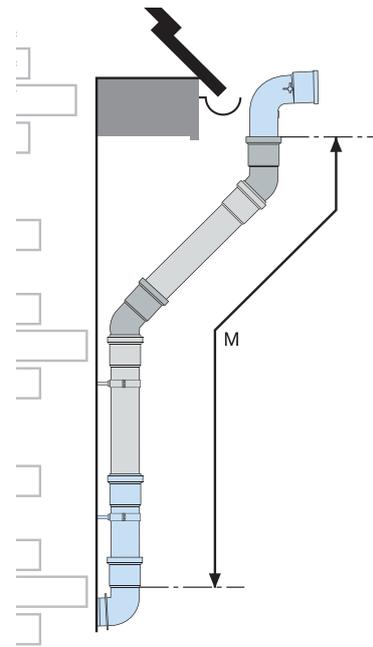
Components				
Part No. 60mm		7 716 191 086	7 716 191 087	7 716 191 089
Maximum lengths (mm) & no. of components required				
Greenstar CDi Classic Regular & System, Ri & i System series*				
60mm	3,750	1	up to 4	1

### 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 & System, Ri & i System series*				
60mm	4,500	1		up to 4

### Plume management system with extensions and 45° 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 & System, Ri & i System series*					
60mm	3,000	1	up to 3		2

\*NOTE: You must refer to the table on page 61 to calculate your horizontal flue lengths and plume management lengths.

# Greenstar regular and system boiler range accessories

<p><b>Comfort plug-in twin channel programmer*</b></p>  <p><b>Worcester Part No. 7 733 600 003</b></p>	<p><b>Comfort I RF wireless room thermostat and plug-in twin channel programmer**</b></p>  <p><b>Worcester Part No. 7 733 600 001</b></p>	<p><b>Comfort II RF wireless programmable room thermostat and plug-in RF receiver**</b></p>  <p><b>Worcester Part No. 7 733 600 002</b></p>	<p><b>Comfort wall mounting plate kit</b></p>  <p><b>Worcester Part No. 7 733 600 039</b></p>
<p><b>Sense I intelligent room thermostat^^</b></p>  <p><b>Worcester Part No. 7 738 110 054</b></p>	<p><b>Sense II weather compensation controller</b></p>  <p><b>Worcester Part No. 7 738 111 064</b></p>	<p><b>MS100 Solar Module*</b></p>  <p><b>Worcester Part No. 7 738 110 144</b></p>	<p><b>Wave*</b></p>  <p><b>Worcester Part No. 7 716 192 072</b></p>
<p><b>Greenstar Wiring Centre^</b></p>  <p><b>Worcester Part No. 7 738 110 116</b></p>	<p><b>RS telescopic flue kit (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 082</b></p>	<p><b>Long telescopic flue kit (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 171</b></p>	<p><b>Standard telescopic horizontal flue kit (125mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 003 702</b></p>
<p><b>Vertical BF kit (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 002 430</b></p>	<p><b>Vertical BF kit (125mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 002 431</b></p>	<p><b>1,000mm extension kit (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 083</b></p>	<p><b>2m flue extension (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 172</b></p>

\*Greenstar system boilers only. \*\*27Ri and 30Ri, CDi Classic System, 9i-24i System and 27i & 30i System.  
^27i & 30i System. ^^27Ri and 30Ri only. ^^For use with external proprietary 230V programmer.

# Greenstar regular and system boiler range accessories

<p><b>Short flue extension 220mm (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 133</b></p>	<p><b>1,000mm extension (125mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 003 666</b></p>	<p><b>45° bend (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 085</b></p>	<p><b>45° bend (125mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 003 665</b></p>
<p><b>90° bend (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 084</b></p>	<p><b>90° bend (125mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 003 664</b></p>	<p><b>High level horizontal flue adaptor (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 002 432</b></p>	<p><b>High level horizontal flue adaptor (125mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 002 433</b></p>
<p><b>Security fixing</b></p>  <p><b>Worcester Part No. 7 716 192 261</b></p>	<p><b>Support bracket kit (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 177</b></p>	<p><b>Support bracket kit 6 pack (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 178</b></p>	<p><b>Support bracket kit (125mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 179</b></p>
<p><b>Optional 30kW CDi Classic System diverter valve kit</b></p>  <p><b>Worcester Part No. 7 719 002 746</b></p>	<p><b>Optional 9-24kW i System diverter valve kit</b></p>  <p><b>Worcester Part No. 7 733 600 089</b></p>	<p><b>Optional 27kW i System diverter valve kit</b></p>  <p><b>Worcester Part No. 7 733 600 220</b></p>	<p><b>Optional 30kW i System diverter valve kit</b></p>  <p><b>Worcester Part No. 7 733 600 221</b></p>

**Optional 35kW CDi Classic System diverter valve kit**



**Worcester Part No.**  
**7 738 112 011**

**Vertical pre-piping assembly for CDi Classic System**



**Worcester Part No.**  
**7 716 192 651**

**Vertical pre-piping assembly for 9i to 30i System\***



**Worcester Part No.**  
**7 716 192 713**

**Earth bonding strip#**



**Worcester Part No.**  
**7 716 192 686**

**Plume management kit (60mm dia.)**



**Worcester Part No.**  
**7 716 191 086**

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



**Worcester Part No.**  
**7 716 191 087**

**90° bend (60mm dia.)**



**Worcester Part No.**  
**7 716 191 088**

**45° 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**

# Greenstar regular and system boiler range accessories

**Greenstar System Filter (22mm)**

**Worchester Part No.  
7 733 600 236**

**Greenstar System Filter (28mm)**

**Worchester Part No.  
7 733 600 237**

**Remote PRV kit\*\***

**Worchester Part No.  
7 716 161 071**

**Worchester CondenseSure siphon**

**Worchester Part No.  
7 716 192 746**

**WB3 cleaning tool**

**Worchester Part No.  
7 733 600 091**

**WB5 cleaning tool**

**Worchester Part No.  
7 719 001 996**

**Greenstore Unvented Cylinders**

Worchester 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 Solar Compatible Unvented Cylinders**

Worchester Part No.	
TC-150	7 716 842 040
TC-180	7 716 842 041
TC-210	7 716 842 042
TC-250	7 716 842 043
TC-300	7 716 842 044

**WB7 cleaning tool**

**Worchester Part No.  
7 746 901 479**

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

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

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

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

## Training centres throughout the UK

### **Worcester**

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

### **Wakefield**

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

### **West Thurrock and Clay Cross**

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

## College-linked Learning

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

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

## Mobile training

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

**Call now for more information 0330 123 0166.**



# 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<sub>2</sub> 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 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, Greenstar Comfort range, Wave internet connected room thermostat, NEW Greenstar Sense range and solar controls).

	Greenstar Overview	CDi Classic	CDi Compact & Si Compact	Greenstar i	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*
<b>Training course covers</b>							
Specification	✓	✓	✓	✓	✓	✓	Guide to the varied range of control options that are available
Installation	✓	✓	✓	✓	✓	✓	
Commissioning	✓	✓	✓	✓	✓	✓	
Servicing	✓	✓	✓	✓	✓	✓	
Maintenance	✓	✓	✓	✓	✓	✓	
<b>Course locations</b>							
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](http://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 ground source heat pumps.
- Greensource air to air 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.
- LPG Changeover.
- WRAS Water Regulations.



# A complete after-sales service

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

## Worcester Contact Centre

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

**Tel: 0330 123 9559**

## Opening times

Monday – Friday: 7.00am – 8.00pm

Saturday: 8.00am – 5.00pm

Sunday: 9.00am – 12 noon

Bank Holidays: 8.00am – 4.30pm



## Spares

Genuine replacement parts for all supported Worcester products are readily available from stock, or on a next day delivery basis. Visit [www.worcester-bosch.co.uk/spares](http://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](mailto:technical-advice@uk.bosch.com)**

## Opening times

Monday – Friday: 7.00am – 8.00pm

Saturday: 8.30am – 4.00pm

Bank Holidays: 8.00am – 4.30pm

## ErP Technical Helpline

**Tel: 0330 123 3641**

**Email: [ErP-advice@uk.bosch.com](mailto:ErP-advice@uk.bosch.com)**





# 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

## ErP Technical Helpline

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

## Training

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

## Literature

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

# Customer Service

## Service Enquiries

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

## Guarantee Registration

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



Guarantee  
app

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Tag your installations with: **#WarmAtHeart**

We are also on:

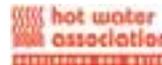


Calls to and from Bosch Thermotechnology Ltd may be recorded for training and quality assurance purposes.

# worcester-bosch.co.uk



In partnership with



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