



Greenstar combi gas-fired condensing wall mounted boiler range

NEW

Greenstar
CDi Classic &
CDi Compact

 **WORCESTER**
Bosch Group



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

ference.

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

Carl Arntzen,
Managing Director,
Bosch Thermotechnology Ltd.

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The Greenstar combi gas-fired wall



Greenstar Si



Greenstar CDi Classic



The Greenstar combi range is part of a market-leading range of energy-saving gas-fired boilers. Renowned for their energy efficiency, reliability, ease of installation and servicing, more than 2 million Greenstar combi boilers have been installed in homes across the UK.

mounted condensing boiler range



Greenstar CDi Compact

NEW



Greenstar i Junior

Now part of the range is the all-new, revolutionary Greenstar CDi Compact series, which has an innovative heat exchanger designed to combine high outputs with compact dimensions.

Also, the new and improved Greenstar CDi Classic, has recently undergone a number of enhancements including

increased domestic hot water performance, a new magnetic flap and reduced standby electrical consumption.

For lower hot water output applications, the Greenstar range also offers the Si and i Junior series, which are ideal for apartments and other small properties with one bathroom.

Key features of the range

Winner of 23 Which? Best Buy awards in 2011 and 2012.

For the second year running, in a survey of Which? members, the Worcester Greenstar gas-fired condensing boiler range scooped 23 Best Buy awards.* In the latest survey, no other manufacturer scored higher on reliability and customer satisfaction.

Highly efficient, highly cost effective

Greenstar condensing combi boilers have an annual A rated efficiency (SEDBUK 2005 value) of over 90%, efficiently producing heating and hot water for the home. Non-condensing boilers achieve around 78% efficiency.

Keep hot facility

All Greenstar combi models have an in-built 'keep hot' facility which will keep the primary water within the heat exchanger hot – approximately 2.5 litres volume. This will ensure that hot water is delivered almost instantly to the opened outlet.

ECO mode

With the ECO mode button activated, the 'keep hot' facility is de-energised and the hot water will be heated from cold. A slight delay should be expected before the hot water is at full temperature when in ECO mode. By selecting Eco mode, less gas will be used as energy is used only on demand.



The Greenstar CDI Compact fascia with the intuitive in-built display

Low NOx options

Worcester's commitment to reduce emissions from gas-fired condensing boilers sees all Greenstar combi boilers achieve NOx values <40mg/kWh. This enables the appliances to achieve 3 credits under the Code for Sustainable Homes. With Si and i Junior models this is achieved using the Low NOx Code Plug supplied with the appliance. When fitted, the central heating output is reduced to 13kW.

Hot water mode

Whenever a hot water tap is turned on, the incoming mains water will activate a flow turbine which, via the electronic control system, ignites the pre-mix burner. Boiler output is automatically boosted to maximum in order to heat the incoming cold water as it passes through the heat exchanger. Electronic controls modulate the boiler output to ensure an accurate hot water temperature.

Central heating mode

On a central heating demand, the boiler will initially fire at minimum output before modulating upwards to meet the system's actual requirement. Electronic controls within the boiler continually monitor the heating flow and return temperature and increase or decrease the output on demand.

Fluing options

The Greenstar combi range has a full range of Condensfit II™ flue options in both 60/100mm and 80/125mm diameters and includes a plume deflector as standard. This versatile flue system can be run horizontally or vertically.

The Greenstar combi range at a glance

Boiler		29CDi Classic	34CDi Classic	38CDi Classic	42CDi Classic	28CDi Compact	32CDi Compact	36CDi Compact	25Si	30Si	24i Junior	28i Junior
Part No.	NG	7 738 100 216	7 738 100 218	7 738 100 222	7 713 331 019	7 716 130 234	7 716 130 235	7 716 130 236	7 716 130 139	7 716 130 140	7 716 130 141	7 716 130 142
	LPG	7 738 100 217	7 738 100 219	7 738 100 223	7 713 331 020	7 716 130 237	7 716 130 238	7 716 130 239	7 716 130 146	7 716 130 145	7 716 130 148	7 716 130 147
Output kW to DHW	Min	7.7kW	7.7kW	9.4kW	9.4kW	7.03kW	7.03kW	7.03kW	7.2kW	7.2kW	7.2kW	7.2kW
	Max	30.9kW	35kW	40kW	42kW	28kW	32kW	36kW	25kW	30kW	24kW	28kW
Flow rate at 35°C ΔT (± 15%)		12.3l/min	14.3l/min	16.4l/min	17.2l/min	11.4l/min	13.1l/min	14.7l/min	10.2l/min	12.3l/min	9.8l/min	11.4l/min
Flow rate at 40°C ΔT (± 15%)		11l/min	12l/min	14l/min	15l/min	10l/min	11.5l/min	12.9l/min	8.9l/min	10.7l/min	8.6l/min	10l/min
Output kW to central heating (CH)	Min	7.7kW	7.7kW	9.4kW	9.4kW	7.03kW	7.03kW	7.03kW	7.2kW	7.2kW	7.2kW	7.2kW
	Max	30kW	30kW	30kW	30kW	24kW	24kW	24kW	24kW	24kW	24kW	24kW
Maximum output kW to central heating (CH) with low NOx code plug		-	-	-	-	-	-	-	13kW	13kW	13kW	13kW
CH temperature control		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DHW temperature control		✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
Modulating control		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Electronic ignition		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
In-built filling link		✓	✓	✓	✓	✓	✓	✓	(optional)	(optional)	(optional)	(optional)
Condensing in DHW		✓	✓	✓	✓	✓	✓	✓	-	-	-	-

Energy-saving & environmental

- SEDBUK A rating of 90.1% and above (2005 value)
- Simple and intelligent control options are available to optimise boiler efficiency
- Low electrical consumption in standby mode
- Aluminium-silicon heat exchangers deliver high efficiency and reliability
- Greenstar CDi Classic and CDi Compact condense in DHW mode
- Modulating pump which uses less electricity than a fixed speed pump – Greenstar CDi Classic and CDi Compact only
- Anti-cycle control.

Time & labour-saving installation

- Wall frame allows space for pipes behind the boiler as standard
- Vertical pre-piping assembly available as an accessory
- Full range of Condensfit II™ flue options
- Multi-directional fluing means boiler can be sited in a wider variety of places
- The boiler comes pre-wired and pre-plumbed
- There is no need to install a hot water cylinder
- There is no need to install a storage tank in the roof space
- There is less pipework in the heating system.

End user comfort and convenience

- 10 year guarantee on Worcester primary heat exchanger*
- Boiler protection plans available for both new and out of guarantee Worcester Greenstar boilers
- Bosch renowned quality and reliability
- Built-in boiler frost protection
- Compact dimensions – Greenstar CDi Compact, Si and i Junior models
- ECO mode for energy saving fuel consumption
- Controls behind flap – aesthetically pleasing and minimises the risk of tampering with controls.

Greenstar CDi Classic

Features and benefits

The top-of-the-range award-winning Greenstar CDi Classic is a high performance boiler that is suitable for small, medium and large-sized properties with one or two bathrooms. It has set the benchmark within the industry for efficiency, reliability and ease of installation, while achieving a market leading output of up to 42kW.

The Greenstar CDi Classic offers the opportunity to range-rate the central heating output to perfectly match the properties requirements which reduces cycling and improves efficiency further.

As well as being the flagship boiler in our Greenstar combi range, the upgraded CDi Classic now benefits from a number of new improvements including higher **domestic hot water flow rates of 12.3, 14.3 and 16.4 to compliment the already class-leading 17.2 l/min performance.**

The improvements to the control box now includes lead-free components for environmental benefits, a clearer display for temperatures and commissioning settings, and a new short-circuit proof PCB design that removes the need for fuses on the low voltage circuits. The control box casing is more water resistant due to the removal of the transformer, while the lift weight of the appliance has also been reduced to 47.5kg.

The Greenstar CDi Classic achieves 3 credit points within the Code for Sustainable Homes and has an A rated annual efficiency of up to 90.2% (SEDBUK 2005 value).



Greenstar CDi Classic is available with DHW flow rates of 12.3, 14.3, 16.4 and 17.2 l/min

Installation benefits

- Standard wall frame allows space for pipes behind the boiler
- Can be serviced entirely from the front with easy access to parts and components
- All models available as natural gas and LPG for a range of properties
- Split wall mounting jig provided as standard for pre-plumbing of all 7 connections - gas, water, PRV & condensate connections for ease and speed of installation
- Full range of Condensfit II™ horizontal and vertical flue options with optional plume management kit available
- Multi-directional fluing means boiler can be sited in a wider variety of places.

Environmental benefits

- SEDBUK A rating of up to 90.2% (2005 value)
- WB5 heat exchanger delivers high efficiency and reliability
- Low electrical consumption when in standby mode
- Achieves 3 credits under the Code for Sustainable Homes
- All boilers and components are 100% recyclable.

WB5 heat exchanger

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

2 million installed and still going strong

With more than 2 million Greenstar Combi boilers installed in the UK, the ever popular Worcester Greenstar CDi Classic, with its advanced features and future-proof technology, still sets the standard for premium quality, high efficiency combi boilers.



WB5
Heat Exchanger

On the primary
heat exchanger*



End user benefits

- Heat exchanger delivers high efficiency and reliability
- Energy-saving anti-cycle and modulation control
- Condenses in DHW mode, resulting in greater efficiency and fuel savings
- Low electrical consumption when in standby mode
- 5 year guarantee on plate heat exchanger*
- 10 year guarantee on Worcester primary heat exchanger*
- Boiler protection plans available
- Part of the Which? Best Buy range for gas-fired condensing boilers
- Fully modulating pump for reduced electricity consumption and quieter operation.

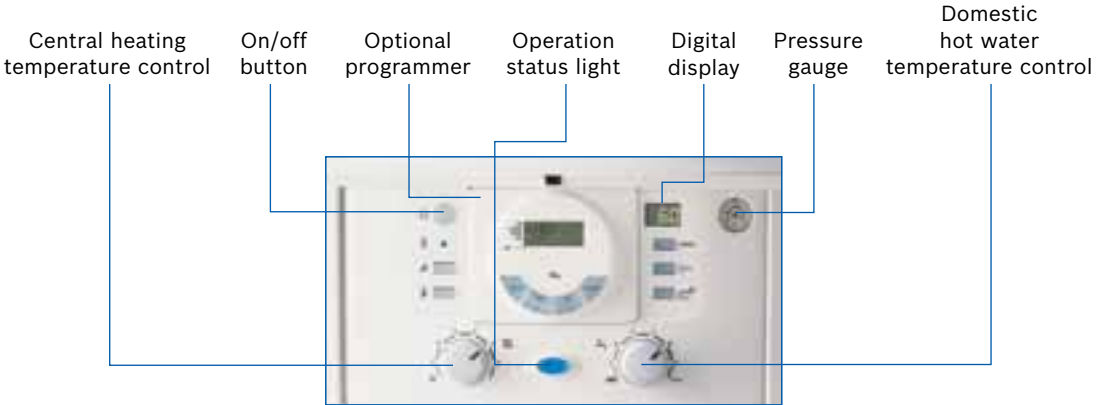
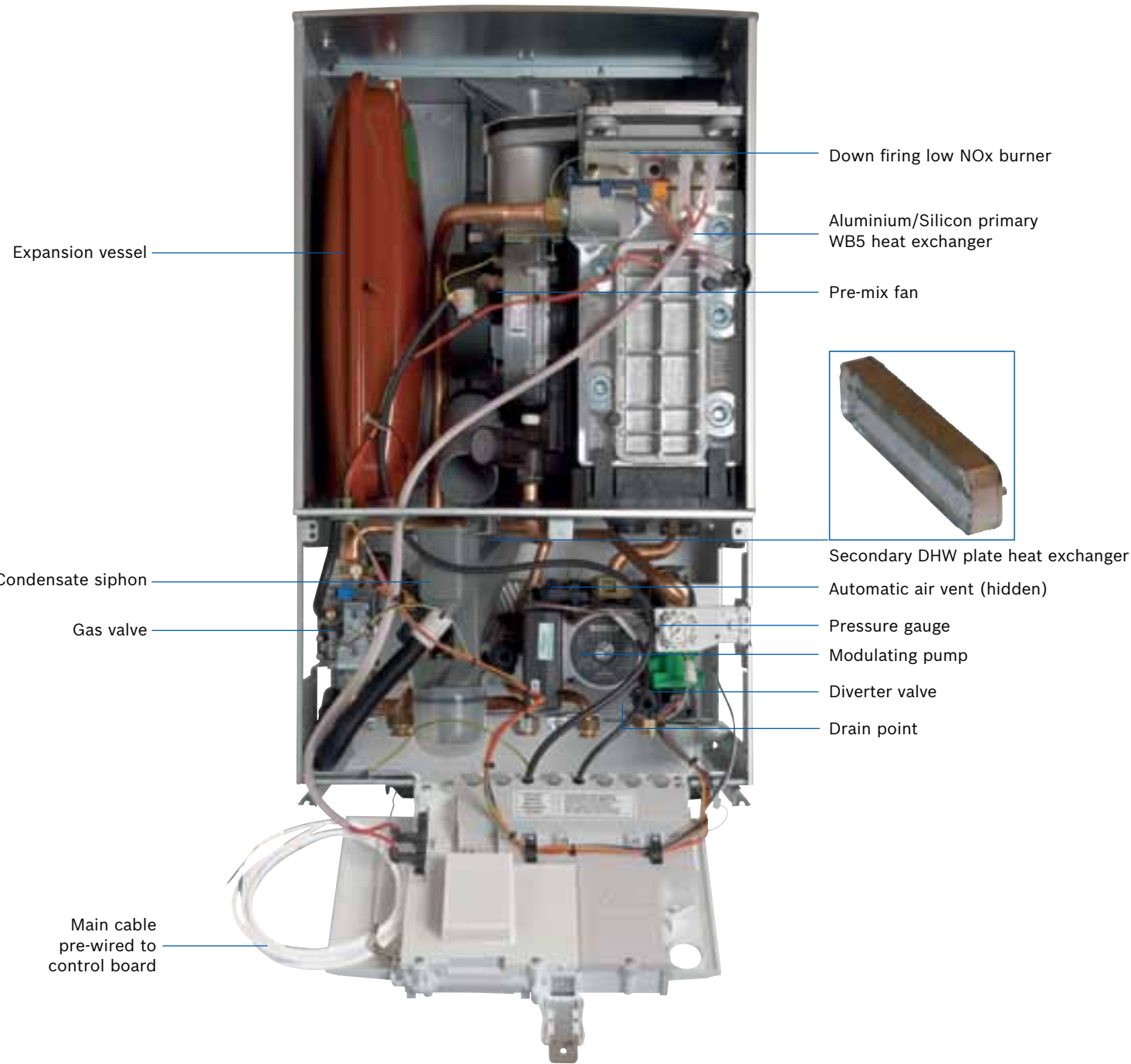


The Greenstar CDi Classic boiler is recommended by the Energy Saving Trust (EST). The Energy Saving Trust is a non-profit organisation that provides free and impartial advice on how to save energy.



*Terms and conditions apply.

Inside story – Greenstar CDi Classic



Greenstar CDi Classic fascia with optional DT10RF fitted

Technical data

Boiler	Greenstar 29CDi Classic	Greenstar 34CDi Classic	Greenstar 38CDi Classic	Greenstar 42CDi Classic
Height	760mm (max)	760mm (max)	760mm (max)	760mm (max)
Width	440mm	440mm	440mm	440mm
Depth	360mm (max)	360mm (max)	360mm (max)	360mm (max)
Weight – lift	47.5kg	47.5kg	47.5kg	47.5kg
2005 SEDBUK value – natural gas	90.1% / A rated	90.1% / A rated	90.2% / A rated	90.2% / A rated
2005 SEDBUK value – LPG	92% / A rated	92% / A rated	91.9% / A rated	92.2% / A rated
2009 SEDBUK value – natural gas	89.1%	89.1%	89.0%	89.4%
2009 SEDBUK value – LPG	90.1%	90.1%	90.0%	90.4%
Heating flow / return connections (compression)	22mm	22mm	22mm	22mm
Hot / cold water connections (compression)	15mm	15mm	15mm	15mm
Pressure relief valve (compression)	15mm	15mm	15mm	15mm
Condensate connection (plastic pipe)	22mm	22mm	22mm	22mm
Gas connection (compression)	22mm	22mm	22mm	22mm
Primary water content	3.75 ltr	3.75 ltr	3.75 ltr	3.75 ltr
Minimum domestic inlet pressure for maximum DHW flow rate	1.4bar	1.5bar	1.7bar	1.9bar
Minimum domestic inlet pressure to operate the appliance	0.2bar	0.2bar	0.2bar	0.2bar
Maximum domestic inlet pressure	10bar	10bar	10bar	10bar
Minimum flow rate to operate the appliance	1.9 ltr/min	1.9 ltr/min	1.9 ltr/min	1.9 ltr/min
DHW flow rate @ 35°CΔT*	12.3 ltr/min	14.3 ltr/min	16.4 ltr/min	17.2 ltr/min
DHW flow rate @ 40°CΔT**	11 ltr/min	12 ltr/min	14 ltr/min	15 ltr/min
Output to central heating (natural gas)	7.7 - 30kW	7.7 - 30kW	9.4 - 30kW	9.4 - 30kW
Wall mounting jig	✓	✓	✓	✓
Filling link	✓	✓	✓	✓
Plug-in timers	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)
Optimising room temperature controller	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)
Intelligent controls	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)
Condensing in DHW mode	✓	✓	✓	✓
Maximum vertical flue (100mm dia.) inc. terminal	9,400mm	8,000mm	7,500mm	7,500mm
Maximum vertical flue (125mm dia.) inc. terminal	18,500mm	16,000mm	16,000mm	16,000mm
Maximum horizontal flue (100mm dia.)	7,900mm	7,000mm	6,000mm	6,000mm
Maximum horizontal flue (125mm dia.)	18,500mm	16,000mm	12,500mm	12,000mm
NOx classification	33.3mg/kWh	33.3mg/kWh	21.8mg/kWh	21.8mg/kWh
NOx class	5	5	5	5
Ingress protection (IP)	X4D	X4D	X4D	X4D

*Values for industry comparisons. **Designed operational flow rate.

Greenstar CDi Compact

Features and benefits

The revolutionary Worcester Greenstar CDi Compact is the newest addition to our top-of-the-range CDi boiler series and is part of our next generation of wall-mounted combi boilers. Suitable for small, medium and large-sized properties with one or two bathrooms, the CDi Compact, with hot water outputs of up to 36kW, is best suited to properties that demand high outputs from an appliance that can fit within a standard kitchen cupboard.

Available with DHW flow rates of **11.4, 13.1 and 14.7 l/min**, the CDi Compact is the smallest and most efficient condensing combi boiler Worcester has produced and comes with a host of design features for ease of installation, use and servicing.

Its ease of installation and cupboard size dimensions are thanks to the new ultra-compact WB7 heat exchanger, easy access hydraulics and colour coded wiring connectors. The boiler comes supplied with an innovative wall mounting jig that allows installers to easily pre-plumb the condensate, CH flow, DHW outlet, gas, DCW inlet, PRV installer connection & CH return.

The Greenstar CDi Compact achieves an A rated annual efficiency of 90.5% (SEDBUK 2005 value) and, along with its low NOx emissions, obtains 3 credit points within the Code for Sustainable Homes standard.



Greenstar CDi Compact is available with DHW flow rates of 11.4, 13.1 and 14.7 l/min

Installation benefits

- Robust metal wall mounting jig for safe, secure, hassle-free fixing
- Split jig design for optimum lift weight. The expansion vessel has a simple drop lock mechanism that connects directly onto the hydraulic unit
- Boiler display for operation status, commissioning features and diagnostics data
- Double seal siphon located at the front of the boiler for easy maintenance
- Electrical connections accessible from the front of the boiler
- Colour-coded wiring connectors for error free connection and removal
- Maximum flue lengths of 6m horizontal and 15m vertical
- Pre-set combustion settings for fast commissioning and with Benchmark Commissioning Checklist data available on the boiler display
- Full range of Condensfit II™ horizontal and vertical flue options with optional plume management kit available.

Environmental benefits

- SEDBUK A rating of 90.5% (2005 value)
- Ability to fix a maximum heating temperature – meaning no matter how much you turn the dial, the temperature will not exceed maximum setting
- Precision engineered WB7 heat exchanger reduces raw material usage during manufacturing
- All boilers and components are 100% recyclable
- Low electrical standby consumption
- Achieves 3 credits under the Code for Sustainable Homes
- Coming soon: hot water pre-heat feature allows it to be used in conjunction with other heat sources, such as Greenskies solar thermal (additional accessory is required).

WB7 heat exchanger

At the heart of the Greenstar CDi Compact is the ground-breaking WB7 heat exchanger, which uses advanced friction stir welding* to create more passageways than traditional heat exchangers. These channels provide more efficient circulation, resulting in a more effective heat transfer and quieter operation.

Designed, tested and manufactured within Bosch Thermotechnology Ltd., the WB7 heat exchanger delivers high output despite its compact size.

Friction stir welding

Friction stir welding is a solid state machining process where the metal is softened rather than melted, giving improved quality, reliability and performance.

Widely used for demanding applications in the aviation, marine and automotive sectors, it has enabled Worcester to manufacture a more compact heat exchanger, reducing the overall size of the boiler while delivering a high power ratio of up to maximum 36kW.

To view a video of the friction stir welding process, please visit www.worcester-bosch.co.uk/stir-welding-video



WB7
Heat Exchanger

On the primary
heat exchanger*



End user benefits

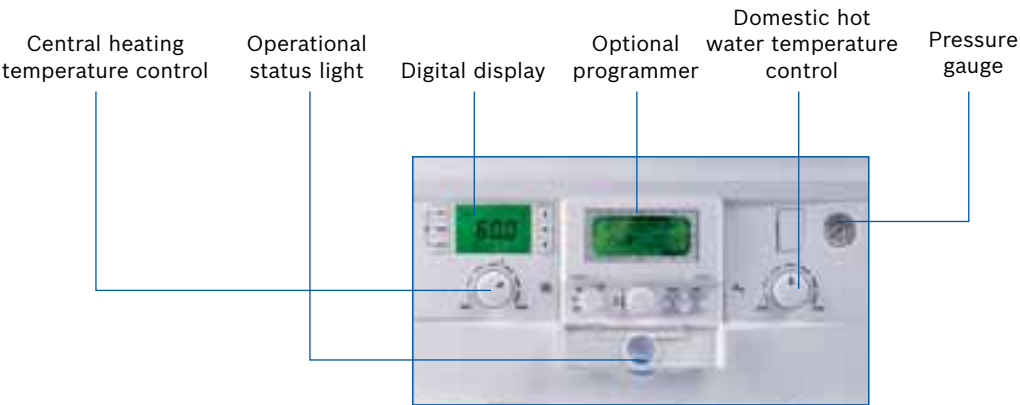
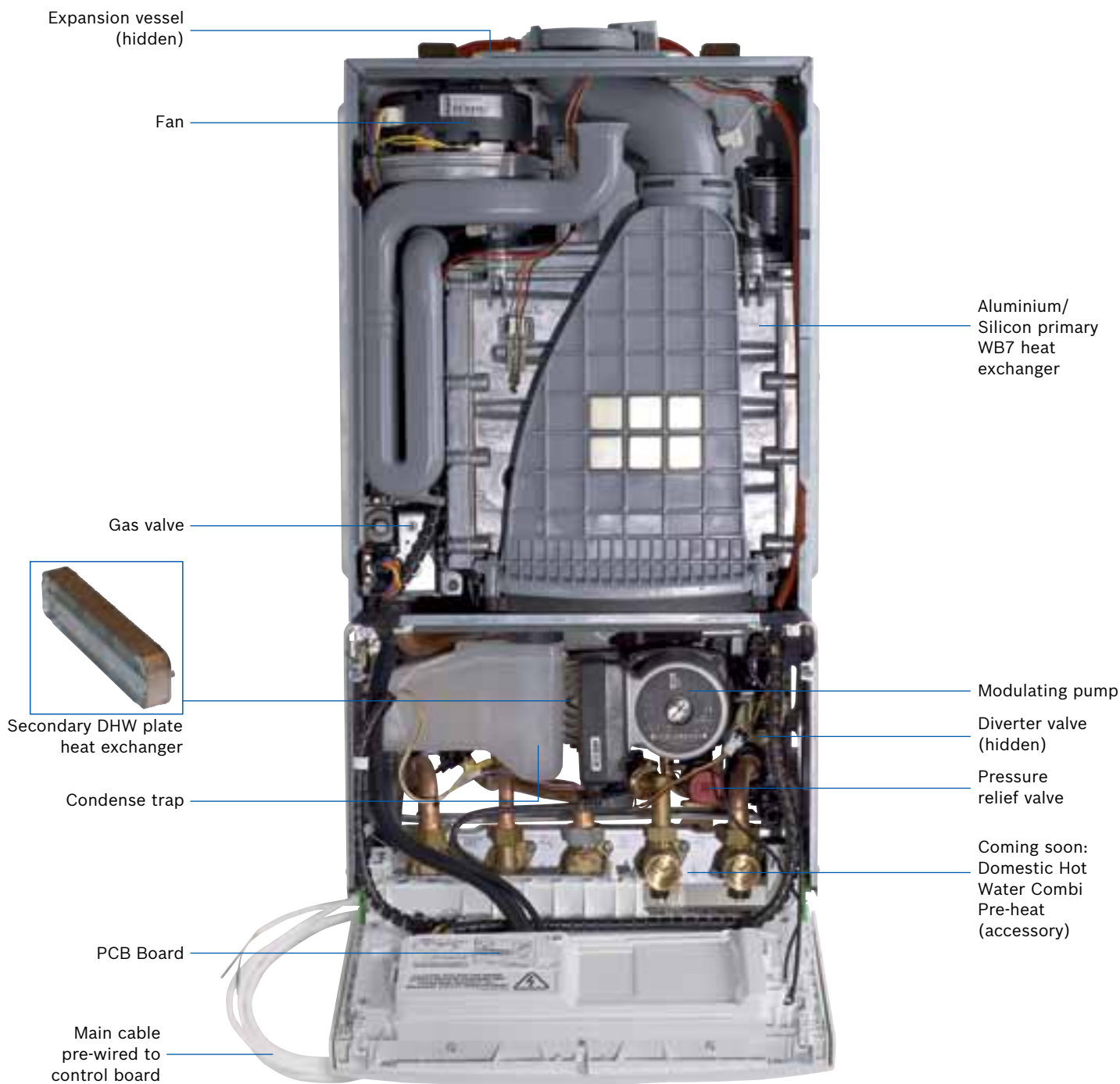
- Simple and intelligent control options available, optimising boiler efficiency and fuel consumption
- Condenses in central heating and domestic hot water modes for optimum efficiency during operation
- Comfort and ECO modes to suit hot water delivery needs
- Fully modulating pump for reduced electricity consumption and quieter operation
- Built-in frost protection of the boiler and the surrounding pipes
- 5 year guarantee on plate heat exchanger*
- 10 year guarantee on Worcester primary heat exchanger*
- Boiler protection plans available.



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

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

Inside story – Greenstar CDi Compact



Greenstar CDi Compact fascia with optional FW100 weather compensating controller fitted

Technical data

Boiler	Greenstar 28CDi Compact	Greenstar 32CDi Compact	Greenstar 36CDi Compact
Height	680mm*	680mm*	680mm*
Width	390mm	390mm	390mm
Depth	280mm	280mm	280mm
Weight – lift	32.9kg	32.9kg	32.9kg
2005 SEDBUK value – natural gas	90.5% / A rated	90.5% / A rated	90.5% / A rated
2005 SEDBUK value – LPG	92.6% / A rated	92.6% / A rated	92.6% / A rated
2009 SEDBUK value – natural gas	89.8%	89.8%	89.8%
2009 SEDBUK value – LPG	90.9%	90.9%	90.9%
Heating flow / return connections (compression)	22mm	22mm	22mm
Hot / cold water connections (compression)	15mm	15mm	15mm
Pressure relief valve (compression)	15mm	15mm	15mm
Condensate connection (compression)	22mm	22mm	22mm
Gas connection (compression)	22mm	22mm	22mm
Primary water content	2.2 ltr	2.2 ltr	2.2 ltr
Minimum domestic inlet pressure for maximum DHW flow rate	1.6bar	1.6bar	1.6bar
Minimum domestic inlet pressure to operate the appliance	0.2bar	0.2bar	0.2bar
Maximum domestic inlet pressure	10.0bar	10.0bar	10.0bar
DHW flow rate @ 35°CΔT*	11.4 ltr/min	13.1 ltr/min	14.7 ltr/min
DHW flow rate @ 40°CΔT**	10.0 ltr/min	11.5 ltr/min	12.9 ltr/min
Output to central heating	7.03 - 24kW	7.03 - 24kW	7.03 - 24kW
Wall mounting jig	✓	✓	✓
Filling link	✓	✓	✓
Plug-in timers	✓ (optional)	✓ (optional)	✓ (optional)
Optimising room temperature controller	✓ (optional)	✓ (optional)	✓ (optional)
Intelligent controls	✓ (optional)	✓ (optional)	✓ (optional)
Condensing in DHW mode	✓	✓	✓
Maximum vertical flue (100mm dia.) inc. terminal	6,000mm	6,000mm	6,000mm
Maximum vertical flue (125mm dia.) inc. terminal	15,000mm	15,000mm	15,000mm
Maximum horizontal flue (100mm dia.)	6,000mm	6,000mm	6,000mm
Maximum horizontal flue (125mm dia.)	15,000mm	15,000mm	15,000mm
NOx classification	35mg/kWh	35mg/kWh	35mg/kWh
NOx class	5	5	5
Ingress protection (IP)	X4D	X4D	X4D

*690mm to top of casing curve. *Values for industry comparisons. **Designed operational flow rate

Greenstar Si and i Junior

Features and benefits

Providing efficient heating and hot water performance, the well-established award-winning Worcester Si and i Junior condensing boiler series, with outputs of up to 30kW and 28kW respectively, are ideal for apartments and small to medium-sized properties with one bathroom.

The Greenstar Si combi boilers with DHW flow rates of **10.2 and 12.3l/min**, give slightly higher flow rates than an i Junior range. They also feature hot water temperature and central heating controls for improved boiler performance. Si combi boilers can be installed in a variety of locations, including kitchens, utility rooms, bathrooms, airing cupboards, lofts or garages. Greenstar Si combi boilers are compatible with the full range of Worcester mechanical, digital and intelligent controls.

The Greenstar i Junior has DHW flow rates of **9.8 and 11.4 l/min**, features a central heating temperature control and can be used with Worcester's mechanical and digital and wireless controls.

Both ranges come supplied with a pre-assembled light weight wall frame, that have pre-drilled fixing points and options that make hanging the appliance quick and easy. The wall mounting jig allows installers to quickly pre-plumb the condensate, CH flow, DHW outlet, gas, DCW inlet, PRV installer connection & CH return. Both ranges offer an A rated annual efficiency of up to 90.1% (SEDBUK 2005 value).



Greenstar Si is available with DHW flow rates of 10.2 and 12.3 l/min and the Greenstar i Junior has DHW flow rates of 9.8 and 11.4 l/min

Installation benefits

- Small dimensions
- Class-leading lift weight 27kg
- Split wall mounting jig design for a simple installation
- Wall mounting jig provided as standard for pre-plumbing of all 7 connections - gas, water, PRV & condensate connections for ease and speed of installation
- Robust metal wall frame provided as standard allows space for pipes behind the boiler
- Vertical pre-piping assembly is available as an accessory
- Full range of Condensfit II™ horizontal and vertical flue options with optional plume management kit available.

Environmental benefits

- SEDBUK A rating of 90.1% (2005 value)
- Heat exchanger delivers high efficiency and reliability
- Anti-cycle and modulation control
- Simple and intelligent (Greenstar Si only) control options available
- Low electrical consumption when in standby mode
- Both achieve 3 credits under the Code for Sustainable Homes when the Low NOx Code Plug is fitted.

WB3 heat exchanger

Greenstar Si and i Junior boilers use the WB3 heat exchanger which is manufactured by Bosch Thermotechnology Ltd. and is guaranteed for 10 years.

The aluminium-silicon heat exchanger has an extra-large surface area for enhanced heat exchange efficiency. As a result they deliver efficiencies of up 90.1% (SEDBUK 2005 rating).

Quality guaranteed

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



WB3
Heat Exchanger

On the primary
heat exchanger*



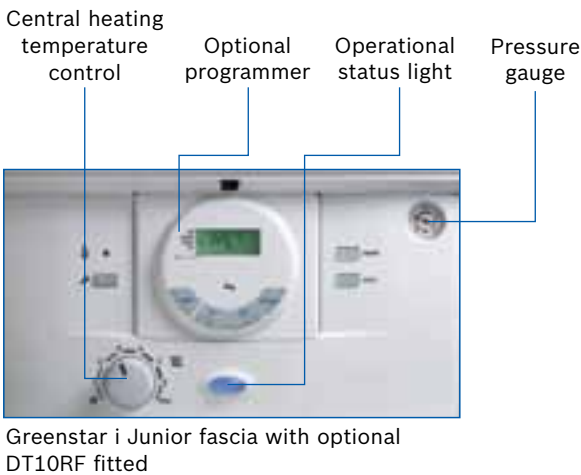
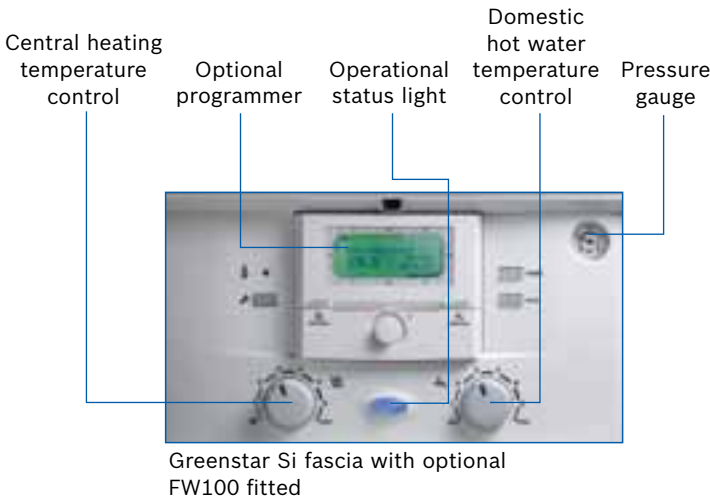
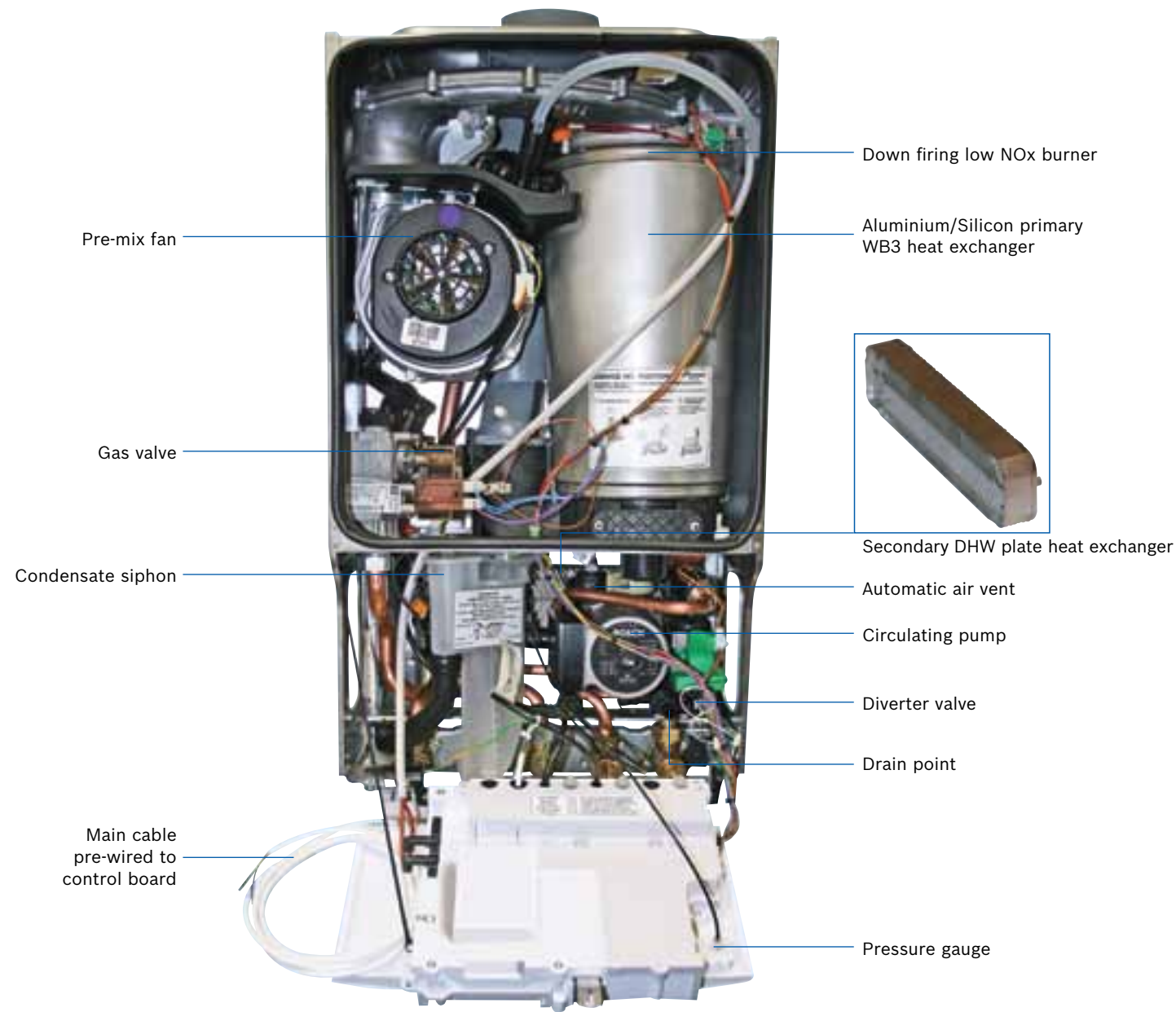
The Greenstar Si and i Junior boilers are recommended by the Energy Saving Trust (EST). The Energy Saving Trust is a non-profit organisation that provides free and impartial advice on how to save energy.

End user benefits

- Highly reliable and efficient heat exchanger
- Energy saving anti-cycle and modulation control
- Simple and intelligent control options available, optimising boiler efficiency and fuel consumption
- 5 year guarantee on plate heat exchanger*
- 10 year guarantee on Worcester primary heat exchanger*
- Boiler protection plans available
- Part of the Which? Best Buy range for gas-fired condensing boilers.



Inside story – Greenstar Si and i Junior



Technical data

Boiler	Greenstar 25Si	Greenstar 30Si	Greenstar 24i Junior	Greenstar 28i Junior
Height	710mm (max)*	710mm (max)*	710mm (max)*	710mm (max)*
Width	400mm	400mm	400mm	400mm
Depth	330mm (max)	330mm (max)	330mm (max)*	330mm (max)*
Weight – lift	27.1kg	27.1kg	27.1kg	27.1kg
2005 SEDBUK value – natural gas	90.1% / A rated	90.1% / A rated	90.1% / A rated	90.1% / A rated
2005 SEDBUK value – LPG	91.8% / A rated	91.8% / A rated	91.8% / A rated	91.8% / A rated
2009 SEDBUK value – natural gas	89.1%	89.1%	89.1%	89.1%
2009 SEDBUK value – LPG	90.1%	90.1%	90.1%	90.1%
Heating flow / return connections (compression)	22mm	22mm	22mm	22mm
Hot / cold water connections (compression)	15mm	15mm	15mm	15mm
Pressure relief valve (compression)	15mm	15mm	15mm	15mm
Condensate connection (plastic pipe)	22mm	22mm	22mm	22mm
Gas connection (compression)	22mm	22mm	22mm	22mm
Primary water content	3.9 ltr	3.9 ltr	3.9 ltr	3.9 ltr
Minimum domestic inlet pressure for maximum DHW flow rate	1.3bar	2bar	1.3bar	1.3bar
Minimum domestic inlet pressure to operate the appliance	0.2bar	0.2bar	0.2bar	0.2bar
Maximum domestic inlet pressure	10bar	10bar	10bar	10bar
Minimum flow rate to operate the appliance	1.9 ltr/min	1.9 ltr/min	1.9 ltr/min	1.9 ltr/min
DHW flow rate @ 35°CΔT*	10.2 ltr/min	12.3ltr/min	9.8 ltr/min	11.4 ltr/min
DHW flow rate @ 40°CΔT**	8.9 ltr/min	10.7 ltr/min	8.6 ltr/min	10 ltr/min
Output to central heating (natural gas)	7.2 - 24kW**	7.2 - 24kW**	7.2 - 24kW**	7.2 - 24kW**
Wall mounting jig	✓	✓	✓	✓
Filling link	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)
Plug-in timers	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)
Optimising room temperature controller	✓ (optional)	✓ (optional)	✓ (optional)	✓ (optional)
Intelligent controls	✓	✓	–	–
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	66mg/kWh	66mg/kWh	66mg/kWh	66mg/kWh
NOx classification with low NOx code plug	38mg/kWh	38mg/kWh	38mg/kWh	38mg/kWh
NOx class	5	5	5	5
Ingress protection (IP)	X4D	X4D	X4D	X4D

*Measured to the top or front of the curve height. **13kW with low NOx code plug fitted. *Values for industry comparisons. **Designed operational flow rate.

Optional plug-in controls

Increased SAP ratings

As well as all Greenstar combi models achieving very high SAP ratings for dwellings, the addition of an intelligent flow temperature 'compensating' controller can further increase these ratings, as well as being part of the recommended best practice, as covered by the CHES design standard. Load or weather compensation offers around 5% energy savings compared to standard on/off controls.

Intelligent controls

(for use with CDi Classic, CDi Compact and Si models only)



FW100 – Weather compensation controller – Part no. 7 716 192 067

- Boiler output automatically adjusts to precisely meet the heat demands of the property according to outside temperature conditions at maximum efficiency
- Programmable unit with six switching points a day for control of both central heating and hot water pre-heat
- Choice of six selectable weekly programmes
- Can be integral to the boiler or wall mounted
- Has factory set heatcurves for various different heating systems (radiators, underfloor etc.)
- Manual override that can boost or reduce heating if required.



FR110 – Programmable room thermostat – Part no. 7 716 192 066

- Intelligent programmable room thermostat
- Load compensation
- Choice of six selectable weekly programmes
- Six switching points a day for central heating and hot water pre-heat
- Boiler output automatically adjusted to precisely meet the heat demand of the property at maximum efficiency
- Maximises the condensing boiler's operation.



FR10 – Intelligent room thermostat – Part no. 7 716 192 065

- Load compensation
- Boiler output automatically adjusted to precisely meet the heat demand of the property at maximum efficiency
- Maximises the condensing boiler's operation
- Compatible with Worcester time controls.

Digital and wireless programmers and room thermostats



DT20 Twin channel digital programmer (for use with all models) – Part no. 7 716 192 038

- Three separate time periods per day for both central heating and hot water (for DHW pre-heat)
- Plugs into fascia and is pre-set to current time, day and date.



DT20RF – similar to the DT20 but with the following features (for use with all models) – Part no. 7 716 192 054

- Three separate time periods per day for both central heating and hot water (for DHW pre-heat)
- Room thermostat provides room temperature control
- No wiring
- Adjusts automatically to British summertime mode.



DT10RF Digistat (for use with all models) – Part no. 7 716 192 052

- 24hr programmable room thermostat offering different room temperatures over six switching periods a day
- No wiring
- Fascia mounted receiver includes timer for HW pre-heat.



DT10RF Optimiser – similar to the DT10RF Digistat but with the following additional features (for use with Si, CDi Classic and CDi Compact only) – Part no. 7 716 192 067

- Sophisticated seven day programmable room thermostat
- Optimum start (feature that switches the boiler on at precisely the right time to achieve the desired room temperature at the desired time).

Mechanical timers



MT10 mechanical timer (for use with all models) – Part no. 7 716 192 036

- The simplest Worcester device
- Analogue clock for setting on and off times for heating.



MT10RF mechanical timer (for use with all models) – Part no. 7 716 192 037

- Simple installation
- Analogue display has comfort and economy time and temperature periods
- No need for separate room thermostat
- No wiring.

Optional plug-in controls at a glance

Control option	TYPE			MOUNT		TIME CONTROL					TEMPERATURE CONTROL				CONNECTION TYPE			MODEL			
	Mechanical	Digital	Intelligent	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	CDi Classic	CDi Compact	Si	i Junior
	✓			✓		✓		✓							✓			✓	✓	✓	✓
	✓				✓	✓		✓				✓				✓		✓	✓	✓	✓
		✓		✓		✓	✓		✓	✓					✓			✓	✓	✓	✓
		✓			✓	✓	✓		✓	✓	✓				✓	✓		✓	✓	✓	✓
		✓			✓	✓	✓	✓		✓		✓				✓		✓	✓	✓	✓
			✓		✓						✓				✓		✓	✓	✓	✓	
			✓		✓	✓	✓		✓	✓		✓	✓	✓			✓	✓	✓	✓	
			✓	✓	✓	✓	✓		✓	✓		✓		✓	✓		✓	✓	✓	✓	

Site preparations and guidance

All combi boilers require less installation time than a conventional boiler, for these reasons:

- One-man lift (Greenstar Si and Greenstar i Junior)
- The boiler comes supplied with a wall mounting bracket (Greenstar CDi Classic) or a wall mounting jig (Greenstar CDi Compact, Greenstar Si and Greenstar i Junior)
- Zero pressure governor gas valve with fully modulating fan
- Highly versatile multi-directional fluing system
- Combined ignition and control board means less connections
- Plug-in filling link provided with the Greenstar CDi Classic and CDi Compact (also available as an optional extra on both the Greenstar Si and Greenstar i Junior)
- Optional plug-in timers
- Built-in boiler frost protection
- Vertical pre-piping assembly accessory providing pre-formed copper pipe lengths.

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.

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

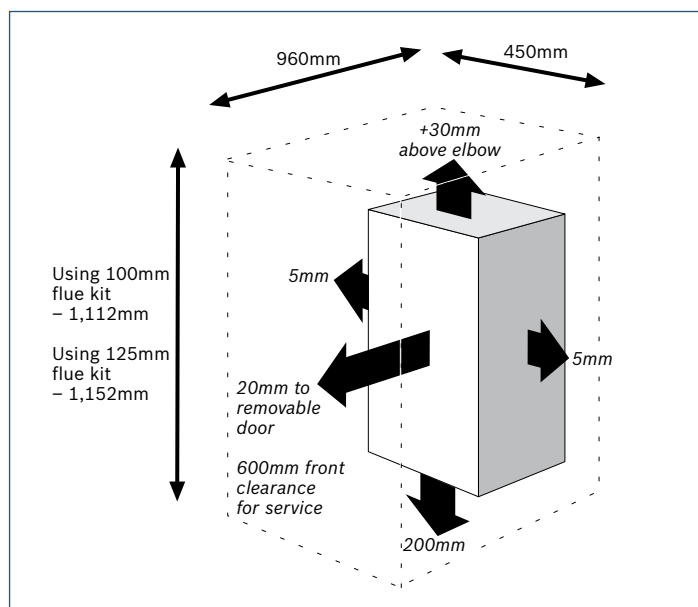
The appliances may be installed into an airing cupboard if required. Use a non-combustible perforated material (max. hole sizes of 13mm) to separate the boiler from the airing space. See section "Boiler location" on page 23.

Mounting on a combustible surface

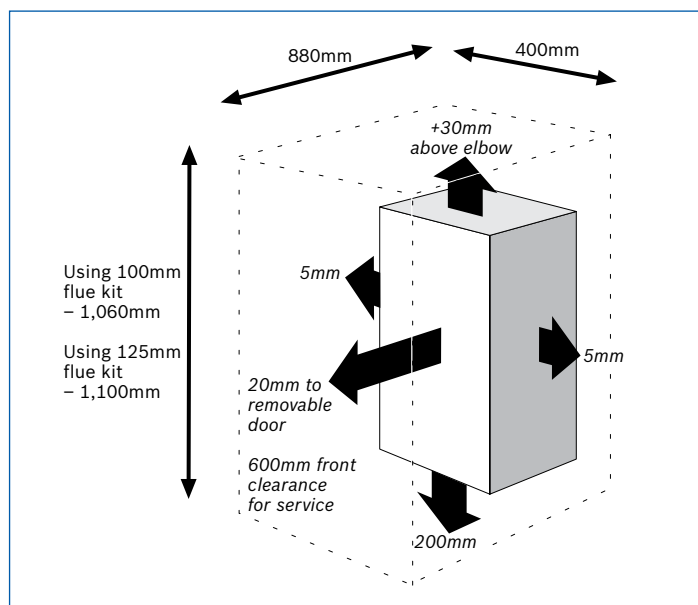
All Greenstar wall mounted boilers can be sited on a combustible surface. EN482, Section 6.4.1.3 states no means for protection of combustible surfaces are necessary if the temperature of the wall does not exceed the room temperature by more than 60°C. Testing of Greenstar gas-fired wall mounted boilers has shown that this temperature is not exceeded.

Installation and service clearances

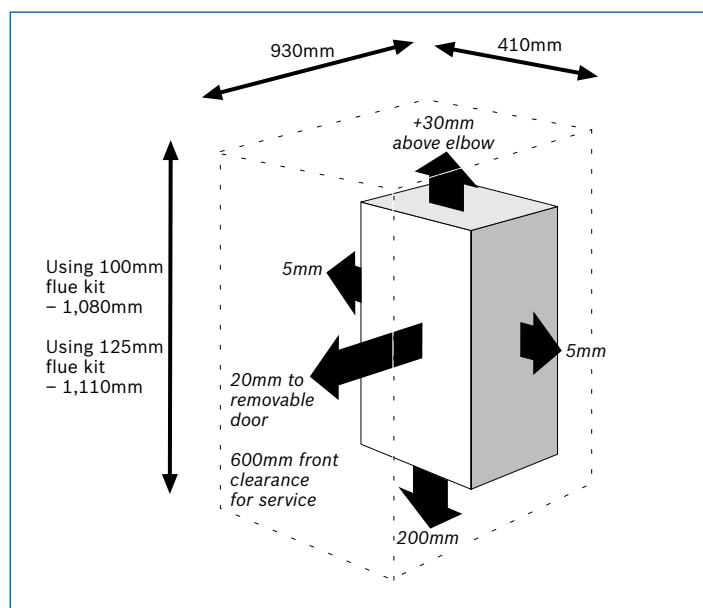
The minimum clearances shown below should be allowed for installation and servicing. Compartment ventilation would be required at these clearances.



Clearances for Greenstar CDi Classic



Clearances for Greenstar CDi Compact



Clearances for Greenstar Si and Greenstar i Junior

Boiler location

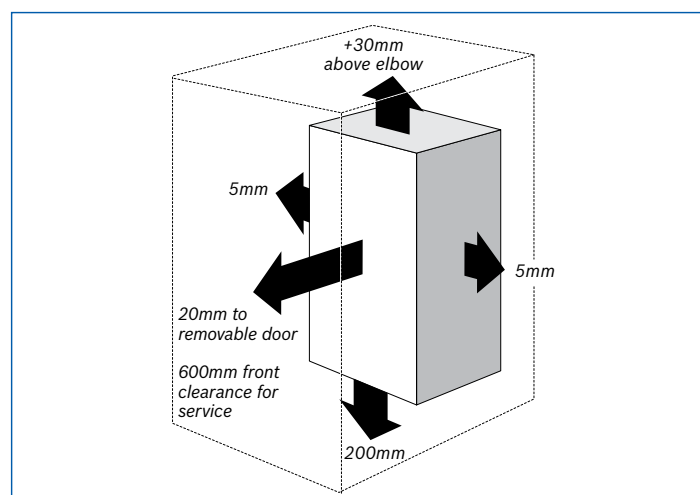
The appliance may be installed in any room, although particular attention is drawn to the requirements of the IEE regulations applicable, and in Scotland the electrical provisions with respect to installation in a room containing a bath or shower.

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:

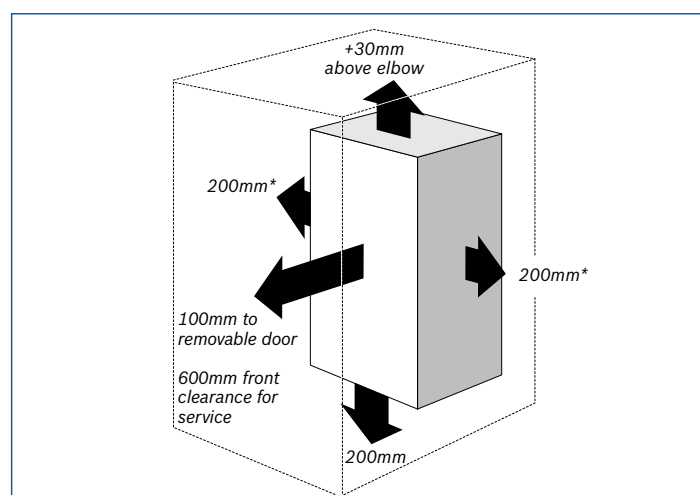
Compartment installation			
Position of appliance	Minimum unventilated clearance (to removable door)		
	Greenstar CDi Classic	Greenstar CDi Compact	Greenstar i Junior & Si
In front	20mm	20mm	100mm
Below	200mm	200mm	200mm
Right side	5mm	5mm	200mm*
Left side	5mm	5mm	200mm*
Above flue elbow	30mm	30mm	30mm

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

Ventilation free compartment installation – minimum clearances



Greenstar CDi Classic and Greenstar CDi Compact



Greenstar Si and Greenstar i Junior

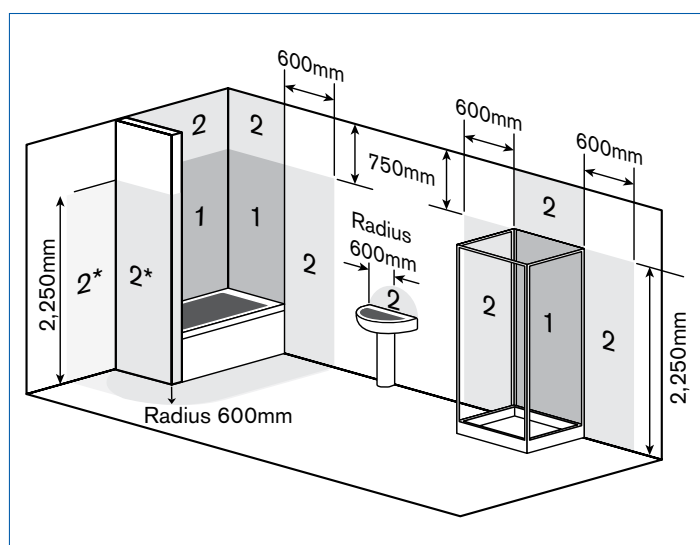
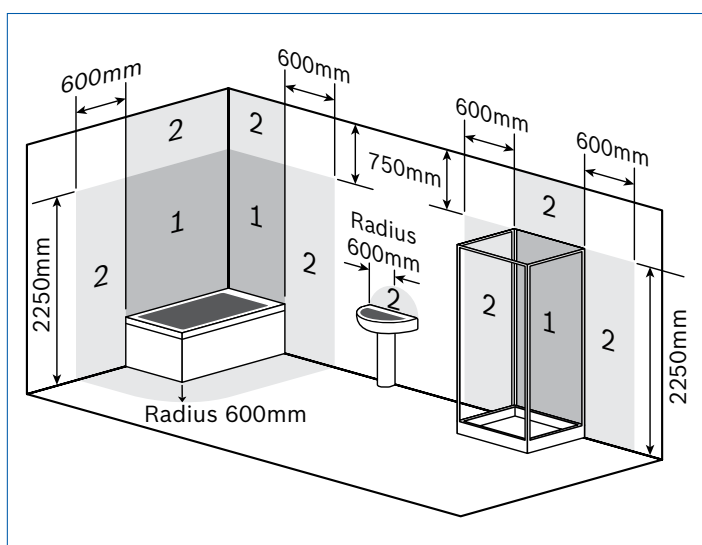
*This can be reduced to 50mm for one side, provided that the total side clearances add up to 400mm or more.

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 a non-mechanical timer or with no timer in the boiler, can be installed in Zone 2 or outside the shaded area

- A boiler with a mechanical timer or RF mechanical timer with a room thermostat must only be installed outside the shaded area
- Additional Residual Current Device (RCD) protection may be required.

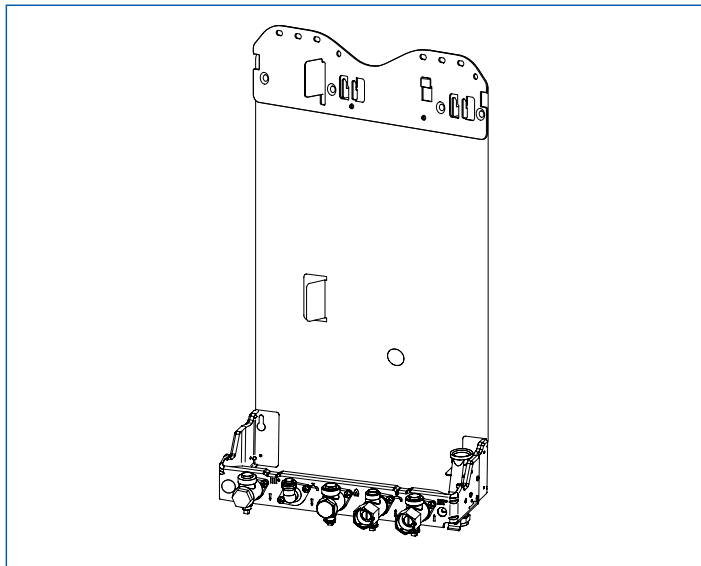
Refer to the latest IEE wiring regulations.



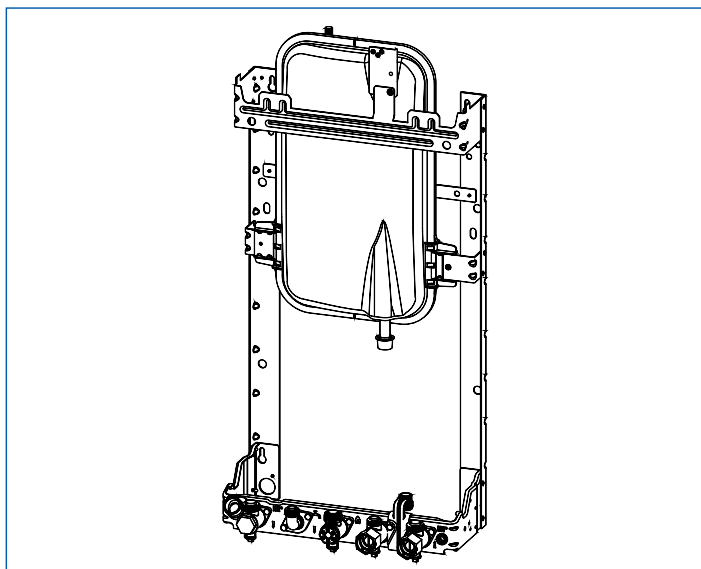
**Without the end wall, zone 2 must extend 600mm from the bath*

Wall preparation

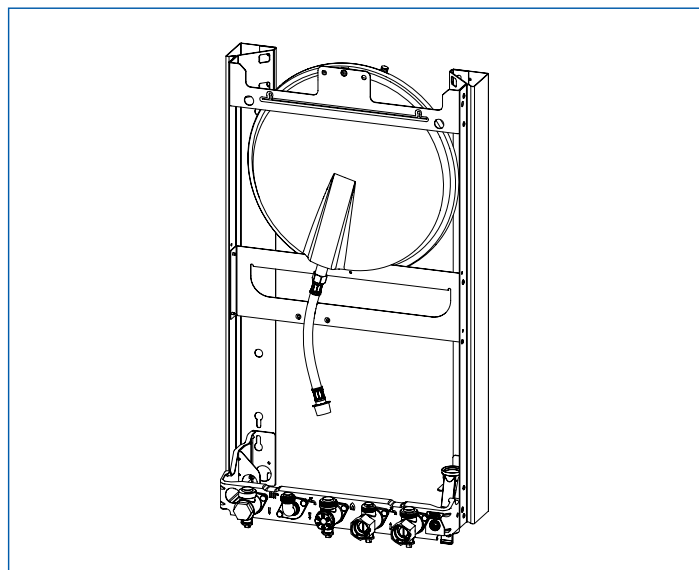
The following diagrams show the wall mounting jigs which enable a simple and straightforward method of attaching the boiler to the wall surface.



Greenstar CDi Classic wall mounting jig



Greenstar CDi Compact wall mounting jig

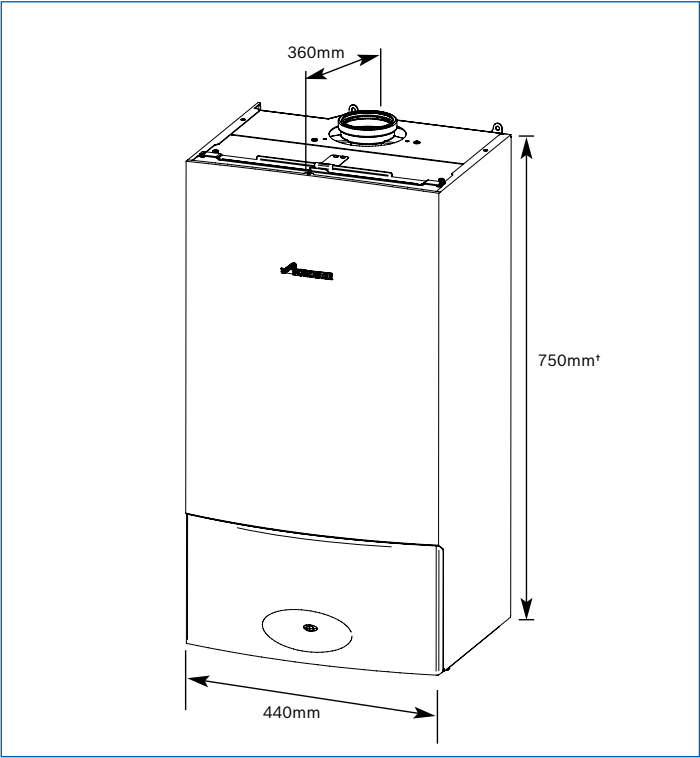


Greenstar Si and Greenstar i Junior wall mounting jig

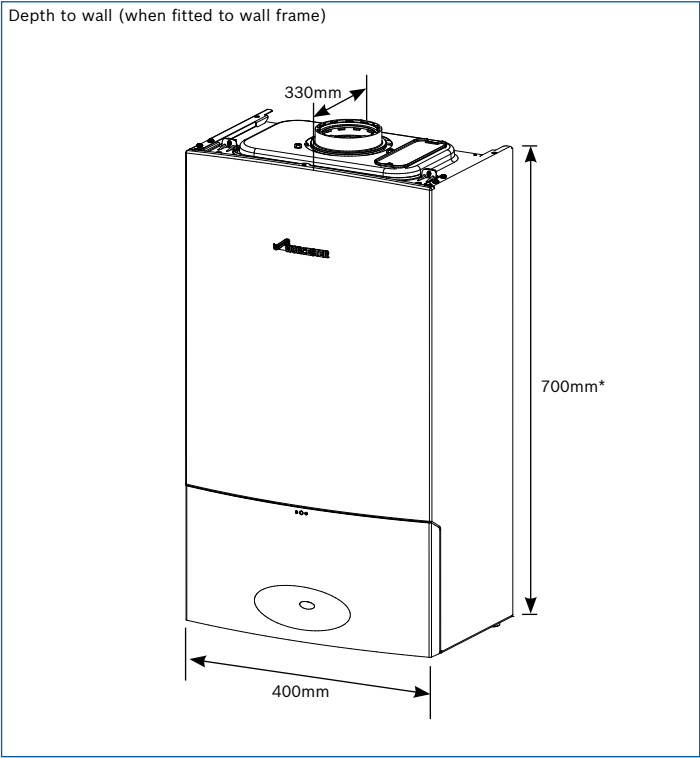
All Greenstar wall mounting jigs have pre-drilled fixing points and options that make hanging a Worcester Greenstar quick and easy.

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

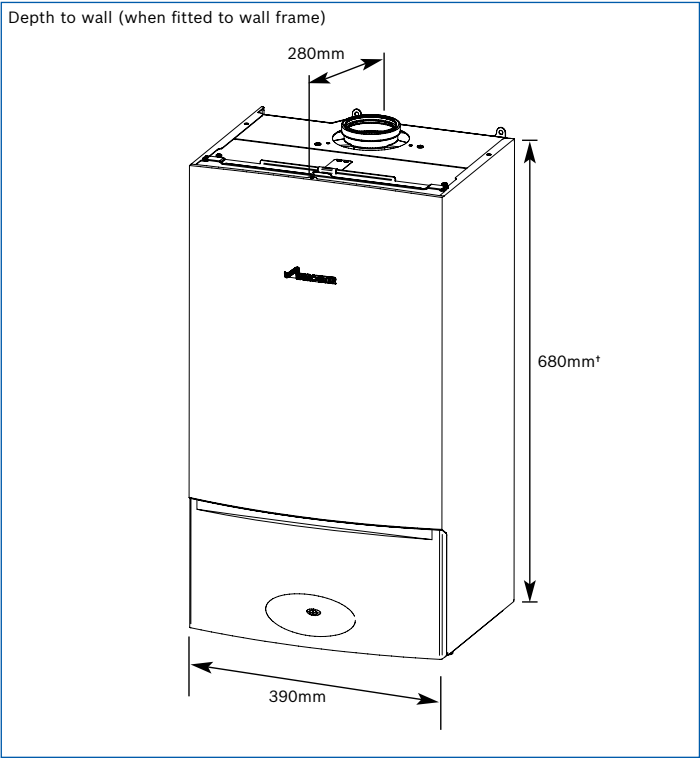
Casing dimensions



Greenstar CDi Classic
*760mm to top of casing front.

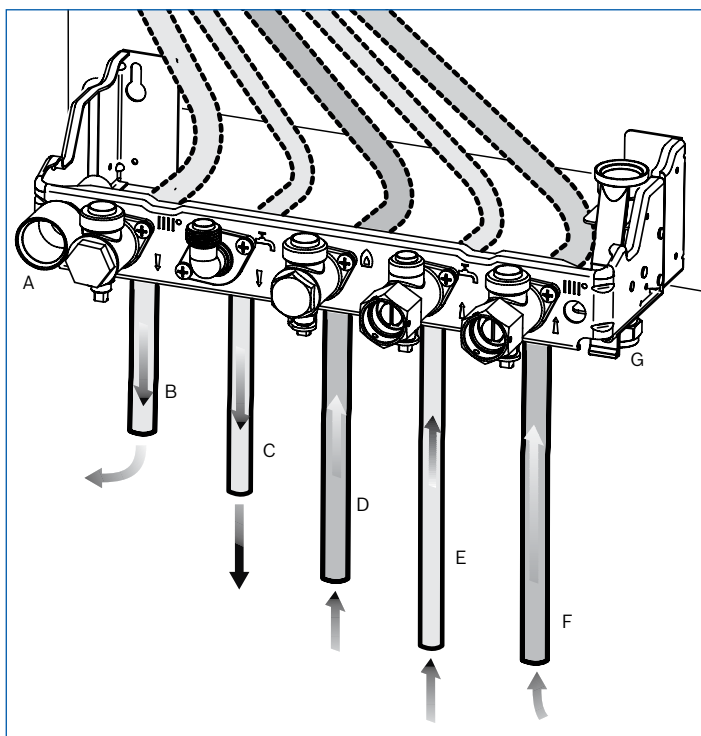


Greenstar Si and Greenstar i Junior
*710mm to top of casing front.

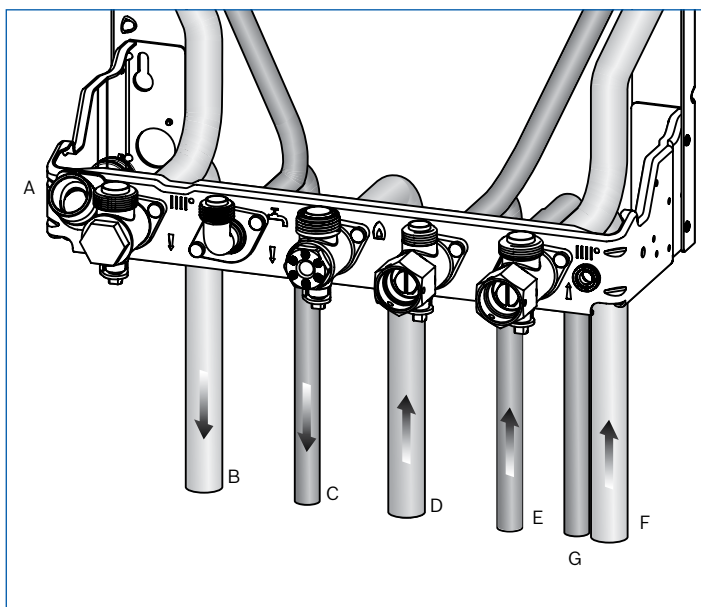


Greenstar CDi Compact
*690mm to top of casing front.

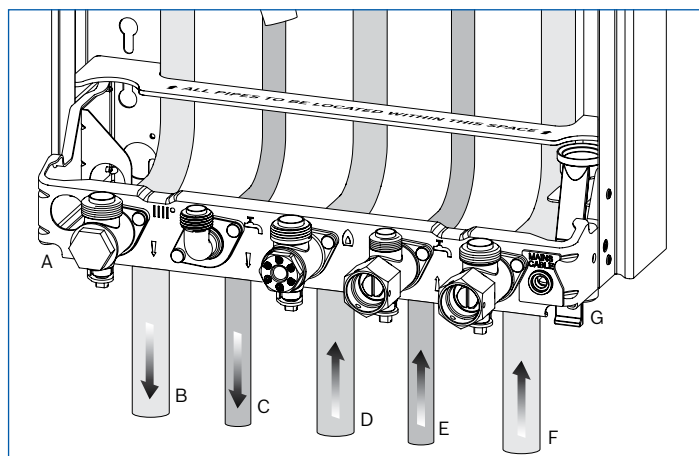
Pipework connections



Greenstar CDi Classic



Greenstar CDi Compact



Greenstar Si and Greenstar i Junior

Pipework connections		
A	Condensate drain	22mm
B	CH flow	22mm
C	DHW outlet	15mm
D	Gas inlet	22mm
E	Mains water inlet	15mm
F	CH return	22mm
G	PRV drain	15mm

Optional pre-piping assembly kit

The vertical pre-piping assembly kits comprises a set of pre-formed copper pipes. More information on this and other time saving accessories can be found on page 52.

Greenstar combi installation requirements

Installation of the Greenstar combi 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 also be in accordance with the relevant recommendations of the following British Standards:

BS 6798; EN 12828; BS 5546:1; BS 5440:1; BS 5440:2; BS 6891; BS 7074; BS 7593.

Gas Safety (Installation and Use) Regulations state 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.

Sealed primary systems

The Worcester Greenstar combi 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.

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

The use of a suitable inhibitor will provide a resistance to this. Contact Sentinel (Tel: 0800 3894670 or visit www.sentinel-solutions.net) or Fernox (Tel: 0870 601 5000 or visit www.fernox.com) for further details.

System filling and re-pressurising

Worcester Greenstar combi boilers are fitted to a sealed heating system which is pressurised. To maintain optimum system pressure, two options may be used: an optional Worcester integral filling link or external filling loop.

Optional Worcester integral filling link

The Worcester integral filling link simply connects between the cold main connection and the heating return circuit on the wall mounting jig.

This feature is supplied as standard with the Greenstar CDi Classic and CDi Compact and is available as an accessory for the Greenstar Si and i Junior (part no. 7 716 192 281).



Valves and joints

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

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

Plastic pipework

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

Natural gas supply

For the Greenstar CDi Classic 42kW appliance when on a hot water or full output demand will require up to 4.4m³/hr of gas.

For the Greenstar CDi Compact 36kW appliance when on a hot water or full output demand will require up to 3.93m³/hr of gas.

For the Greenstar Si when on a hot water or full output demand will require up to 3.24m³/hr of gas (depending on the model).

For the Greenstar i Junior when on a hot water or full output demand will require up to 3.02m³/hr of gas (depending on the model).

Figures for other appliances can be found in the relevant installation manuals.

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. It is important that a gas supply pipe of at least 22mm diameter is used. Under no circumstances should the size of the gas supply pipe be less than that of the appliance inlet connection. The meter outlet governor should be capable of ensuring a dynamic pressure of 20mbar (8in wg) at the appliance. Particular consideration should be given to the resistance to gas flow created by elbows, bends etc. Pipework should be sized to overcome this resistance.

Liquid Petroleum Gas (LPG) supply

All Greenstar combi appliances are available in natural gas and LPG variants. The appliance when on a hot water or full output demand will require up to 2.22 kg/h of gas (depending on the model). The Greenstar Si models will require up to 2.38 kg/h of gas (depending on the model) at maximum demand.

The Greenstar CDi Classic 42kW appliance when on a hot water or full output demand will require up to 3.3 kg/h of gas (figures for other appliances can be found in the relevant installation manual).

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. The table below shows the LPG gas discharge through varying lengths of pipe and the resistance to flow created by elbows, bends etc. Pipework should be sized to overcome this resistance.

Electricity supply

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

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

Mains cold water supply

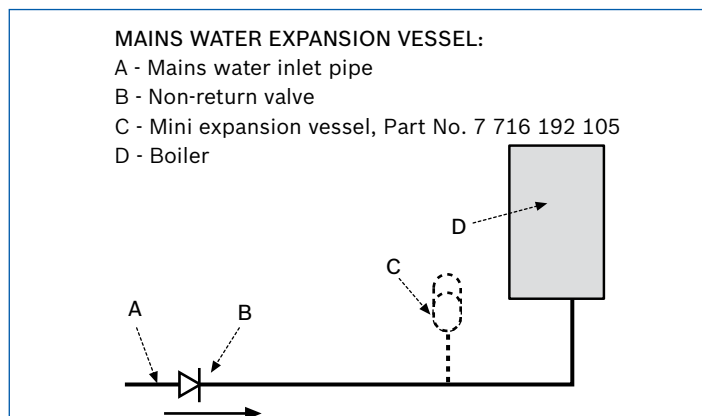
Water Authority requirement

A direct mains cold water connection is permitted by Water Authorities. However, it is recommended that reference be made to local requirements. In the event of difficulty please contact Worcester Technical Support Department.

Cold water connection

Connection should be made as shown in the pipework detail and the appliance installed generally in accordance with the layout shown on page 27.

Wherever possible the cold supply to the appliance should be the first connection off the mains supply, in order to minimise hot water flow reduction when cold water services are operated. The final 600mm of piping to the appliance should be of copper only.



Cold water pressure

To achieve the stipulated flow rate a working cold water mains pressure of 1.3bar is required.

However, for the Greenstar CDi Classic range to achieve the stipulated flow rate a working cold water mains pressure of between 1.2 and 2.3bar is required (dependent on model).

The appliance will operate at a minimum working pressure of only 0.2bar (3psi); however a reduced hot water flow rate should be expected. Back-flow prevention devices, including water meters, can prevent the expansion of hot water into the cold water main. However, this can result in a pressure build-up that may cause damage to the boiler and household devices such as showers, washing machines etc. In these cases we recommend that a mini-expansion vessel (Part No. 7 716 192 105) be fitted adjacent to the boiler in the cold water main.

Hot water supply

All Worcester Greenstar boilers are fitted with a flow regulator set to achieve a 40°C temperature rise. This ensures comfortable bathing during the colder winter months.

For the Greenstar CDi Classic range, a domestic hot water flow regulator, set to give an optimum flow rate of between 9 and 15l/min $\pm 15\%$ (dependent on model) is fitted to the cold supply of the hot water heat exchanger.

The Greenstar CDi Compact flow regulators are sized between 10l and 13l.

A domestic hot water flow regulator, set to give an optimum flow rate of between 8 and 11l/min $\pm 15\%$ (dependent on model) is fitted to the cold supply of the hot water heat exchanger in the Greenstar Si and i Junior combis.

As with all mains fed systems, the flow rate of water obtainable from individual taps will vary in relation to the number of taps operating simultaneously, and will depend upon the cold mains supply available to the property.

Therefore, in order to avoid excessive starvation of flow to individual taps, flow balancing may be required by the use of proprietary constant volume flow regulators or Ball-o-Fix valves.

Hot water systems

Taps and valves

Hot and cold taps and mixing valves used with the Greenstar combi appliances must be suitable for operating at a mains pressure and temperatures of 65°C (150°F).

Use in hard water areas

As the maximum temperature of the domestic hot water heat exchanger is limited by the electronic control circuit, there is normally no need for water treatment to prevent scale accumulation.

In areas where exceptional water conditions prevail, consideration may need to be given to the fitting of a device capable of preventing scale. In such circumstances the advice of the local water authority should be sought.

Guarantee

Worcester Greenstar combi appliances are offered with a full 2 year guarantee* on parts and labour, a 10 year guarantee* on the primary heat exchanger and a 5 year guarantee* on the plate heat exchanger. Ongoing service and maintenance contracts can be arranged through the Worcester Customer Service Department.

Please contact our guarantee registration advisors on 0844 892 2552 or visit www.worcester-bosch.co.uk/guarantee

The Worcester Greenstar System Filter

NEW

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

Damaged boiler and system components

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



Heat exchanger damaged by system debris and pollutants

Reduced efficiency

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

A highly effective solution from the brand you can trust

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



The Greenstar System Filter is easy to install and service

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

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



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

**Independent research carried out by GASTEC at CRE*

Installation

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

Product info

Part number	7 716 192 609
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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 risk of freezing during prolonged cold spells, the following methods of installing a condensate drainage pipe should be adopted, **in order of priority**.

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

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

Condensate pump

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

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

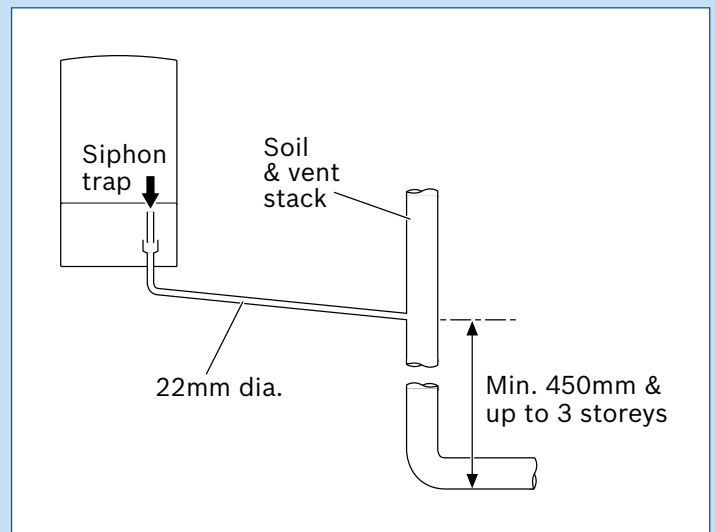


Fig. 1 Disposal to soil vent stack

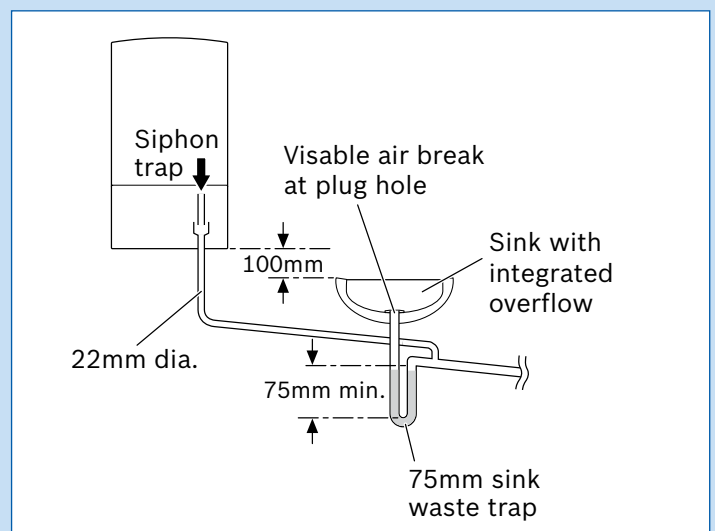


Fig. 2 Disposal to a waste pipe

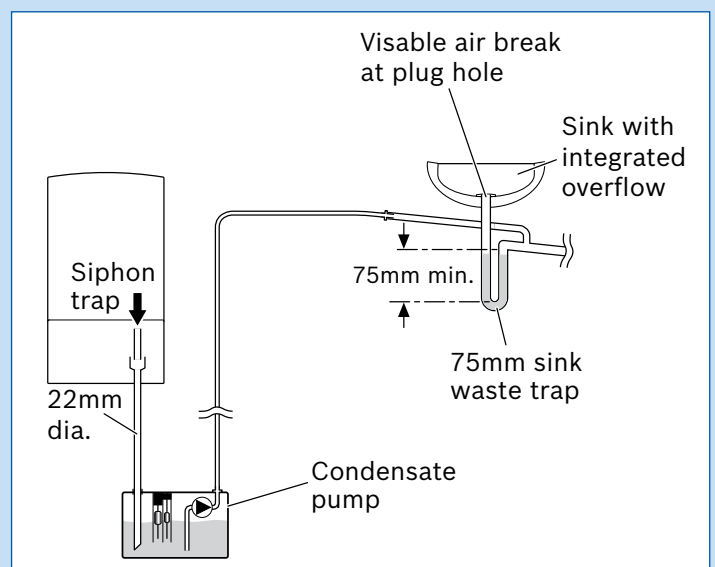


Fig. 3 Condensate pump disposal

External connections

Freezing conditions

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

Condensate waste

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

If no other discharge method is possible, then the use of an externally run condensate drainage pipe terminating at a suitable foul water discharge point (fig. 4), or purpose-designed soak away (fig. 5), may be considered. Please see installation and servicing instructions for more details.

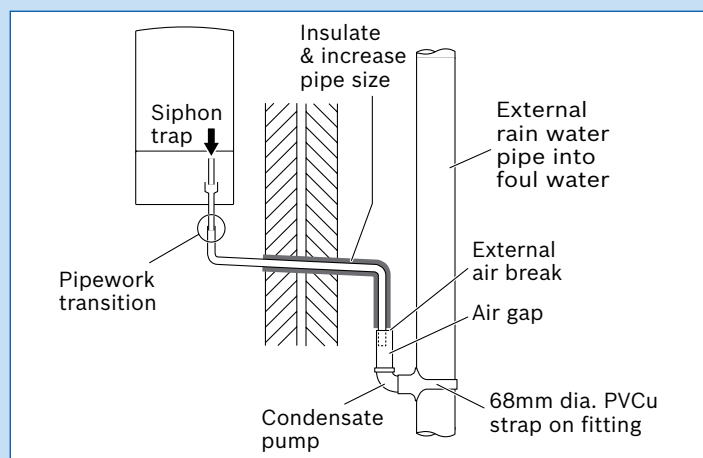


Fig. 4 Disposal into a rainwater down pipe

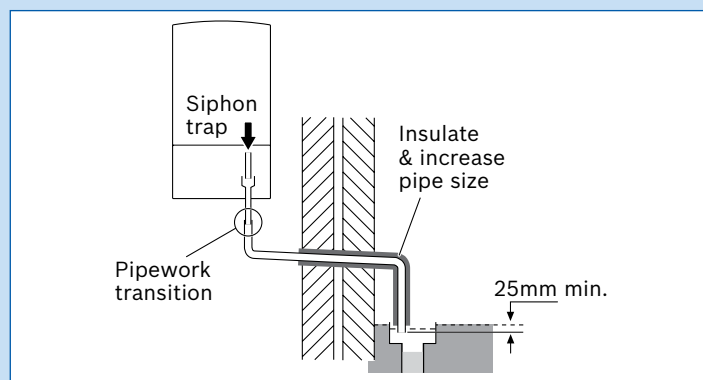


Fig. 5 External disposal

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.

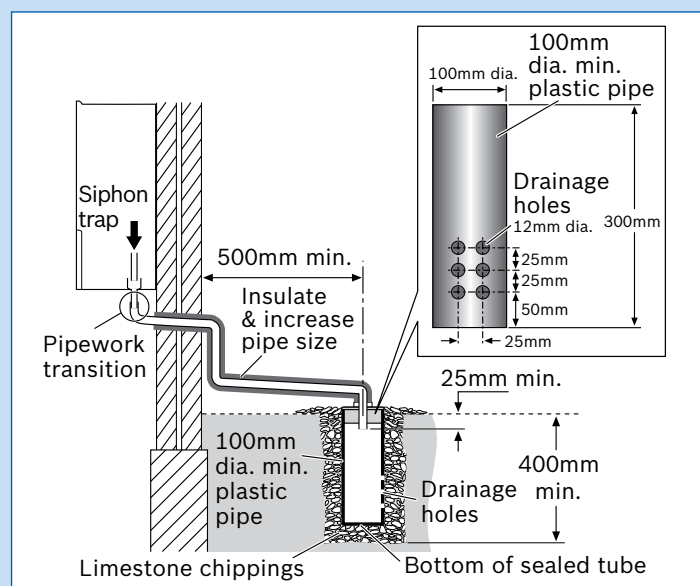


Fig. 6 Soak away

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

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

The Worcester CondenseSure auxiliary siphon



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.

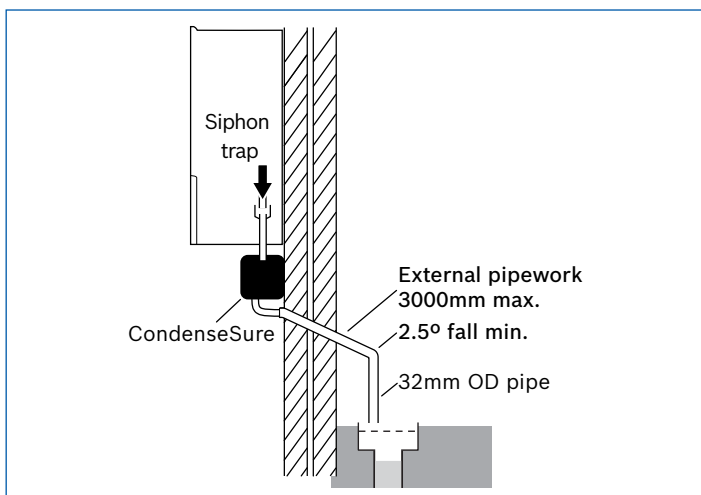
A universal fitting for new and existing installations

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

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

Ease of installation

The CondenseSure has been designed for 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:

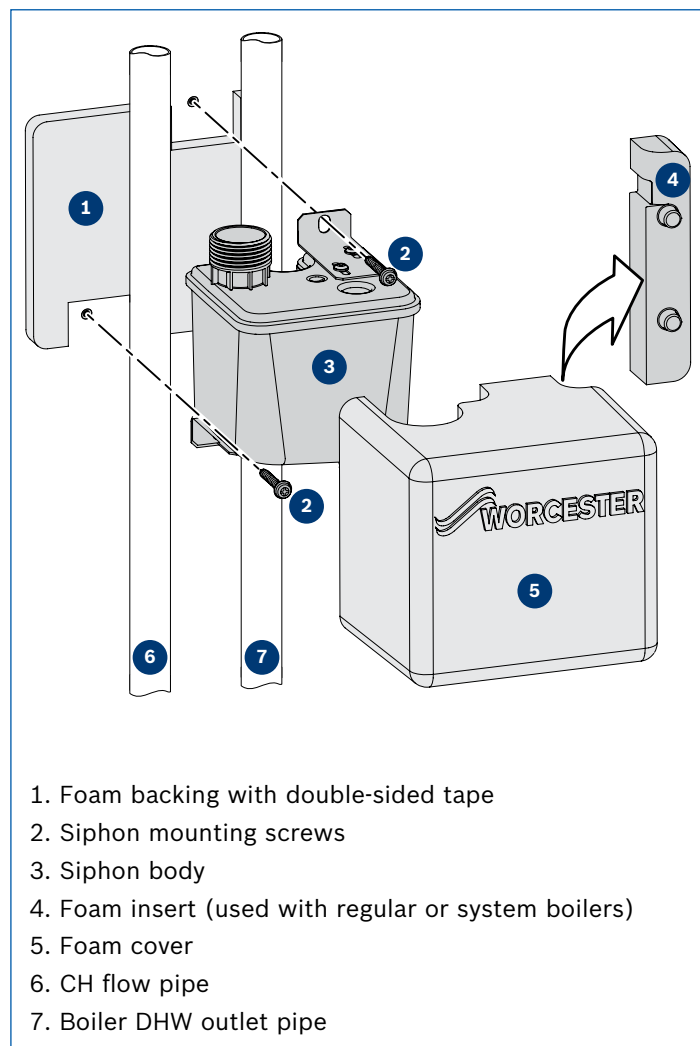
- The externally run pipe length does not exceed 3 metres
- There is a fall on the discharge pipe of at least 2.5 degrees
- The discharge pipe diameter is not less than 32mm in diameter.

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 combi 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. Boiler DHW outlet pipe

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.

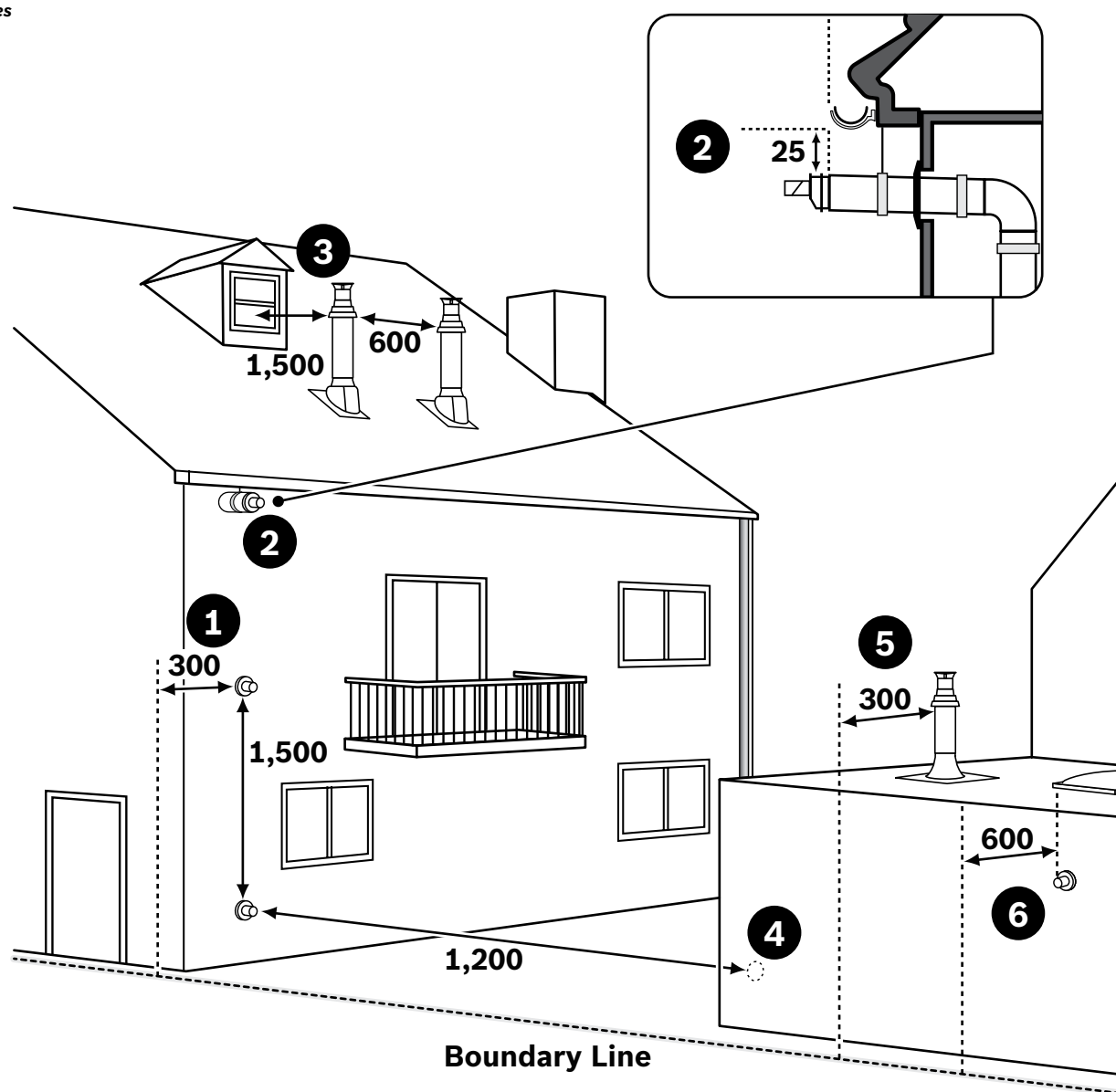
The CondenseSure has no working parts to breakdown, does not use any energy and has no electrical connections, so there is no Part P requirement.

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 to avoid combustion products entering the building
- Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fittings.

Flue bracket part numbers:

7 716 191 092 (100mm dia.)

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

7 716 191 174 (125mm dia.)

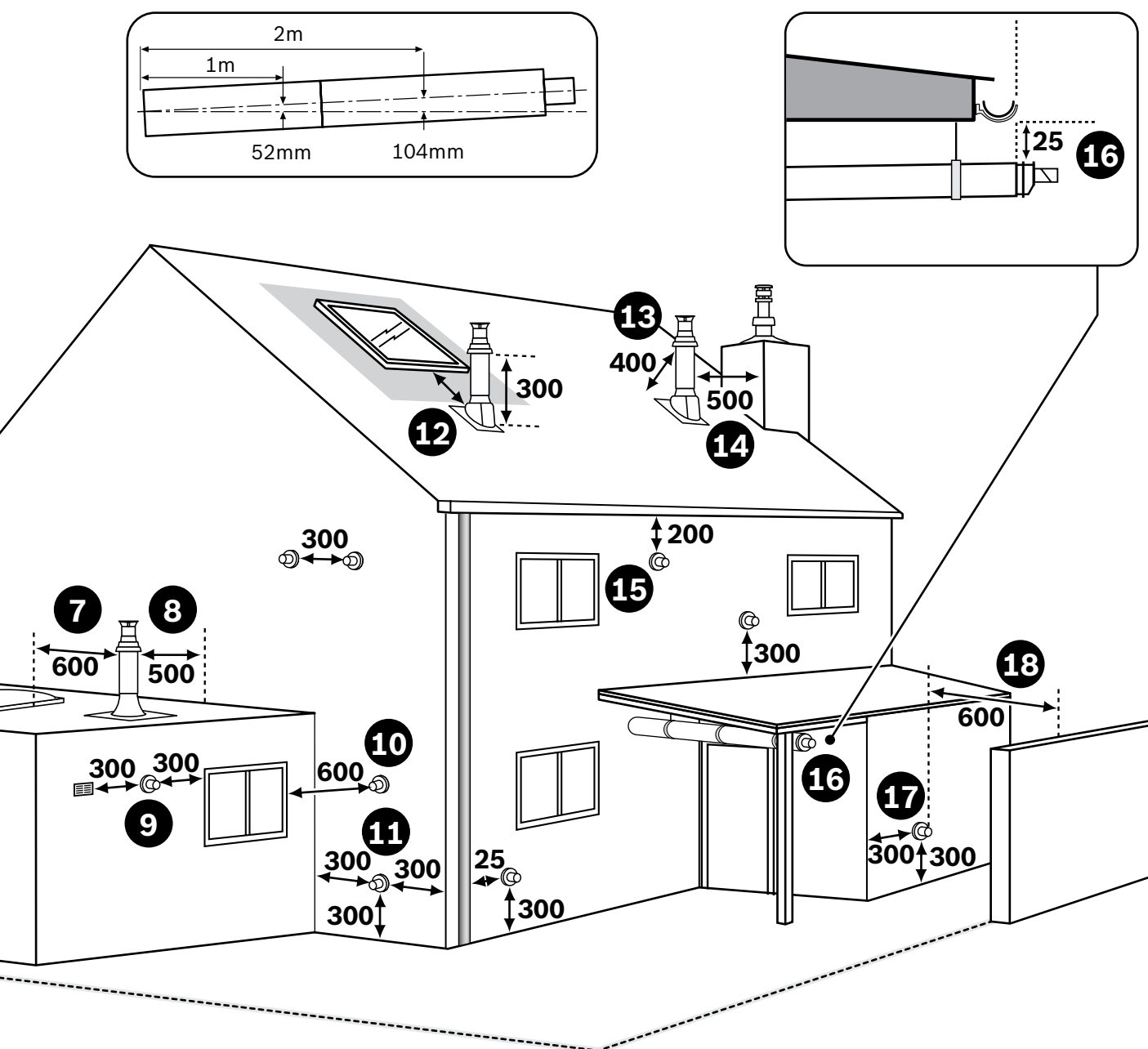
7 716 191 177 (100mm dia.) – CDi Compact only

7 716 191 178 (100mm dia. x 6) – CDi Compact only

7 716 191 179 (125mm dia.) – CDi Compact only

Key to illustration

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



9. 300mm above, below and either side of an opening door, air vent or opening window.
10. 600mm diagonally to an opening door, air vent or opening window.
11. 300mm to an internal or external corner.
12. 2,000mm below a Velux window, 600mm above or to either side of the Velux window.
13. 400mm from a pitched roof or 500mm in regions with heavy snowfall.
14. 500mm clearance to any vertical structure on a roof, 600mm to room sealed flue or 1,500 to an open flue.
15. 200mm below eaves and 75mm below gutters, pipe and drains.
16. The dimension below eaves, balconies and car ports can be reduced to 25mm, as long as the flue terminal is extended to clear any overhang. External flue joints must be sealed with suitable silicon sealant.

17. Flue clearance must be at least 300mm from the ground. Terminal guards must be fitted if the flue is less than 2 metres from the ground or if a person could come into contact with the flue terminal.
18. 600mm distance to a surface facing a terminal, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to surfaces facing a terminal.

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

Greenstar combi boiler range horizontal fluing options

The Greenstar combi boiler range have 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
Greenstar CDi Classic series		
Minimum flue length	350mm*	405mm
Maximum flue length		
29CDi Classic	7,900mm	18,500mm
34CDi Classic	7,000mm	16,000mm
38CDi Classic	6,000mm	12,500mm
42CDi Classic	6,000mm	12,000mm
Greenstar CDi Compact series		
Minimum flue length	350mm*	405mm
Maximum flue length	6,000mm	15,000mm
Greenstar Si and Greenstar i Junior series		
Minimum flue length	350mm*	405mm
Maximum flue length	4,600mm	13,000mm

*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
100mm diameter		
	7 716 191 082	Standard telescopic flue kit (350 - 570mm)
	7 716 191 171	Long telescopic flue kit (570 - 790mm)
	7 716 191 083	Extension flue kit (960mm*)
	7 716 191 172	2m flue extension
	7 716 191 133	Short flue extension (220mm*)
	7 716 191 084	90° bend
	7 716 191 085	45° bend
	7 719 002 432	High level horizontal flue adaptor
	7 716 191 092	Support bracket kit
	7 716 191 173	Support bracket kit (6 pack)

*Dimensions when fitted

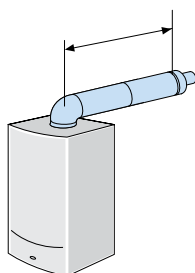
125mm diameter		
	7 719 003 702	Standard telescopic flue kit
	7 719 003 666	Extension flue kit (960mm*)
	7 719 003 664	90° bend
	7 719 003 665	45° bend
	7 719 002 433	High level horizontal flue adaptor
	7 716 191 174	Support bracket kit


*Dimensions when fitted

The following criteria should be noted when planning the installation:

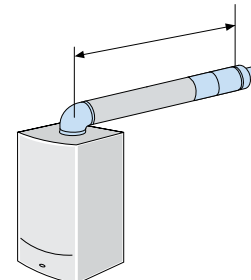
- The concentric flue system must be inclined at 3° (52mm per metre) from the appliance, to allow condensate to drain back into the boiler
- A white plume of condensation will be emitted from the terminal because the appliance operates at high efficiency. Care must be taken when selecting the flue terminal 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 CDi Classic series		
100mm	570	1
125mm	600	1
Greenstar CDi Compact series		
100mm	570	1
125mm	600	1
Greenstar Si and Greenstar i Junior series		
100mm	570	1
125mm	600	1

Option 2: Extension flue horizontal



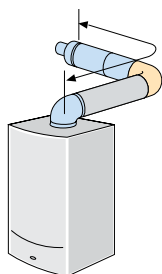
Components			
Part No. 100mm		7 716 191 082	7 716 191 083
Part No. 125mm		7 719 003 702	7 719 003 666
Maximum lengths (mm) & no. of components required			
Greenstar 29CDi Classic			
100mm	7,900	1	up to 8
125mm	18,500	1	up to 19
Greenstar 34CDi Classic			
100mm	7,000	1	up to 7
125mm	16,000	1	up to 16
Greenstar 38CDi Classic			
100mm	6,000	1	up to 6
125mm	12,500	1	up to 13
Greenstar 42CDi Classic			
100mm	6,000	1	up to 6
125mm	12,000	1	up to 12
Greenstar Compact series			
100mm	6,000	1	up to 6
125mm	15,000	1	up to 15
Greenstar Si and Greenstar i Junior series			
100mm	4,600	1	up to 4
125mm	13,000	1	up to 13

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

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

	45° bend	90° bend
Greenstar CDi Classic 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic 80/125mm flues	1,000mm	2,000mm
Greenstar CDi Compact – all flue sizes	1,000mm	2,000mm
Greenstar Si & i Junior – all flue sizes	1,000mm	2,000mm

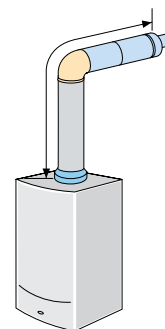
Option 3: Extension flue horizontal
using a second 90° bend



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 29CDi Classic				
100mm	6,400	1	up to 6	1
125mm	16,500	1	up to 17	1
Greenstar 34CDi Classic				
100mm	5,500	1	up to 6	1
125mm	14,000	1	up to 14	1
Greenstar 38CDi Classic				
100mm	4,500	1	up to 4	1
125mm	10,500	1	up to 11	1
Greenstar 42CDi Classic				
100mm	4,500	1	up to 4	1
125mm	10,000	1	up to 10	1
Greenstar CDi Compact series				
100mm	4,000	1	up to 4	1
125mm	13,000	1	up to 13	1
Greenstar Si and Greenstar i Junior series				
100mm	2,600	1	up to 3	1
125mm	11,000	1	up to 11	1

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

Option 4: Extension flue horizontal and upwards

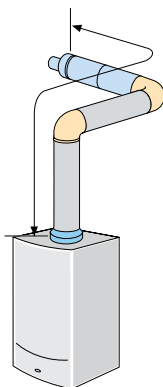


Components				
Part No. 100mm	7 716 191 082	7 716 191 083	7 716 191 084	7 719 002 432
Part No. 125mm	7 719 003 702	7 719 003 666	7 719 003 664	7 719 002 433
Maximum lengths (mm) & no. of components required				
Greenstar 29CDi Classic				
100mm	7,900	1	up to 8	1
125mm	18,500	1	up to 19	1
Greenstar 34CDi Classic				
100mm	7,000	1	up to 7	1
125mm	16,000	1	up to 16	1
Greenstar 38CDi Classic				
100mm	6,000	1	up to 6	1
125mm	12,500	1	up to 13	1
Greenstar 42CDi Classic				
100mm	6,000	1	up to 6	1
125mm	12,000	1	up to 12	1
Greenstar CDi Compact series				
100mm	6,000	1	up to 6	1
125mm	15,000	1	up to 15	1
Greenstar Si and Greenstar i Junior series				
100mm	4,600	1	up to 4	1
125mm	13,000	1	up to 13	1

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

	45° bend	90° bend
Greenstar CDi Classic 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic 80/125mm flues	1,000mm	2,000mm
Greenstar CDi Compact – all flue sizes	1,000mm	2,000mm
Greenstar Si & i Junior – all flue sizes	1,000mm	2,000mm

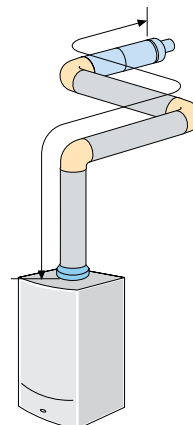
Option 5: Extension flue upwards and horizontal using a second 90° bend







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 29CDi Classic					
100mm	6,400	1	up to 6	2	1
125mm	16,500	1	up to 17	2	1
Greenstar 34CDi Classic					
100mm	5,500	1	up to 6	2	1
125mm	14,000	1	up to 14	2	1
Greenstar 38CDi Classic					
100mm	4,500	1	up to 4	2	1
125mm	10,500	1	up to 11	2	1
Greenstar 42CDi Classic					
100mm	4,500	1	up to 4	2	1
125mm	10,000	1	up to 10	2	1
Greenstar CDi Compact series					
100mm	4,000	1	up to 4	2	1
125mm	13,000	1	up to 13	2	1
Greenstar Si and Greenstar i Junior series					
100mm	2,600	1	up to 3	2	1
125mm	11,000	1	up to 11	2	1

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

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 29CDi Classic					
100mm	4,900	1	up to 5	3	1
125mm	14,500	1	up to 15	3	1
Greenstar 34CDi Classic					
100mm	4,000	1	up to 4	3	1
125mm	12,000	1	up to 12	3	1
Greenstar 38CDi Classic					
100mm	3,000	1	up to 3	3	1
125mm	8,500	1	up to 9	3	1
Greenstar 42CDi Classic					
100mm	3,000	1	up to 3	3	1
125mm	8,000	1	up to 8	3	1
Greenstar CDi Compact series					
100mm	2,000	1	up to 2	3	1
125mm	11,000	1	up to 11	3	1
Greenstar Si and Greenstar i Junior series					
125mm	9,000	1	up to 9	3	1

45° options available

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

	45° bend	90° bend
Greenstar CDi Classic 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic 80/125mm flues	1,000mm	2,000mm
Greenstar CDi Compact – all flue sizes	1,000mm	2,000mm
Greenstar Si & i Junior – all flue sizes	1,000mm	2,000mm

Greenstar combi boiler range

vertical fluing options

The Greenstar combi boiler range have 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
Greenstar CDi Classic series		
Minimum flue length	1,090mm	1,365mm
Maximum flue length (inc. adaptor)		
29CDi Classic	9,400mm	18,500mm
34CDi Classic	8,000mm	16,000mm
38CDi Classic	7,500mm	16,000mm
42CDi Classic	7,500mm	16,000mm
Greenstar CDi Compact series		
Minimum flue length	1,090mm	1,365mm
Maximum flue length (inc. adaptor)	6,000mm	15,000mm
Greenstar Si and Greenstar i Junior series		
Minimum flue length	1,090mm	1,365mm
Maximum flue length (inc. adaptor)	6,400mm	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
100mm diameter		
	7 719 002 430	Vertical 1,090mm balanced flue kit (inc. adaptor)
	7 716 191 083	Extension flue kit (960mm*)
	7 716 191 172	2m flue extension
	7 716 191 133	Short flue extension (220mm*)
	7 716 191 084	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*

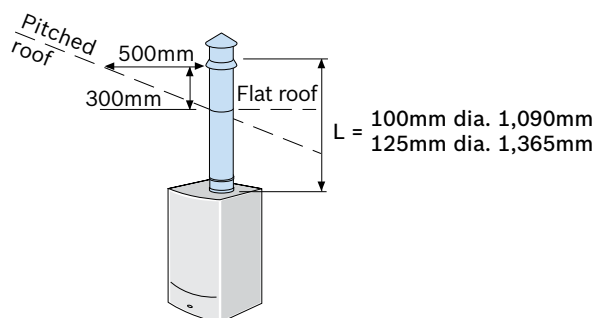
125mm diameter		
	7 719 002 431	Vertical 1,365mm balanced flue kit (inc. adaptor)
	7 719 003 666	Extension flue kit (960mm*)
	7 719 003 664	90° bend
	7 719 003 665	45° bend
	7 716 191 090	Flashing – flat roof
	7 716 191 091	Flashing – pitched roof

**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.

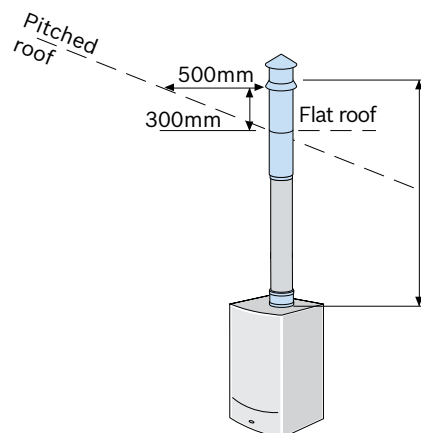
Option 1: Minimum height



Components		
Part No. 100mm		7 719 002 430
Part No. 125mm		7 719 002 431
Maximum lengths (mm) & no. of components required		
Greenstar 29CDi Classic		
100mm	1,090	1
125mm	1,365	1
Greenstar 34CDi Classic		
100mm	1,090	1
125mm	1,365	1
Greenstar 38CDi Classic		
100mm	1,090	1
125mm	1,365	1
Greenstar 42CDi Classic		
100mm	1,090	1
125mm	1,365	1
Greenstar CDi Compact series		
100mm	1,090	1
125mm	1,365	1
Greenstar Si and Greenstar i Junior series		
100mm	1,090	1
125mm	1,365	1

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

Option 2: Vertical balanced flue system maximum height

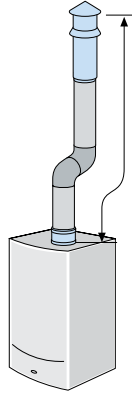


Components			
Part No. 100mm	7 719 002 430		7 716 191 083
Part No. 125mm	7 719 002 431		7 719 003 666
Maximum lengths (mm) & no. of components required			
Greenstar 29CDi Classic			
100mm	9,400	1	up to 9
125mm	18,500	1	up to 18
Greenstar 34CDi Classic			
100mm	8,000	1	up to 8
125mm	16,000	1	up to 16
Greenstar 38CDi Classic			
100mm	7,500	1	up to 7
125mm	16,000	1	up to 16
Greenstar 42CDi Classic			
100mm	7,500	1	up to 7
125mm	16,000	1	up to 16
Greenstar CDi Compact series			
100mm	6,000	1	up to 5
125mm	15,000	1	up to 14
Greenstar Si and Greenstar i Junior series			
100mm	6,400	1	up to 6
125mm	15,000	1	up to 14

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

	45° bend	90° bend
Greenstar CDi Classic 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic 80/125mm flues	1,000mm	2,000mm
Greenstar CDi Compact – all flue sizes	1,000mm	2,000mm
Greenstar Si & i Junior – all flue sizes	1,000mm	2,000mm

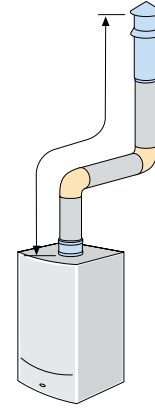
Option 3: Vertical balanced flue system with two 45° bends



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 29CDi Classic				
100mm	7,900	1	up to 7	2
125mm	16,500	1	up to 16	2
Greenstar 34CDi Classic				
100mm	6,500	1	up to 6	2
125mm	14,000	1	up to 14	2
Greenstar 38CDi Classic				
100mm	6,000	1	up to 6	2
125mm	14,000	1	up to 14	2
Greenstar 42CDi Classic				
100mm	6,000	1	up to 6	2
125mm	14,000	1	up to 14	2
Greenstar CDi Compact series				
100mm	4,000	1	up to 3	1
125mm	13,000	1	up to 12	1
Greenstar Si and Greenstar i Junior series				
100mm	4,400	1	up to 4	2
125mm	13,000	1	up to 13	2

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

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



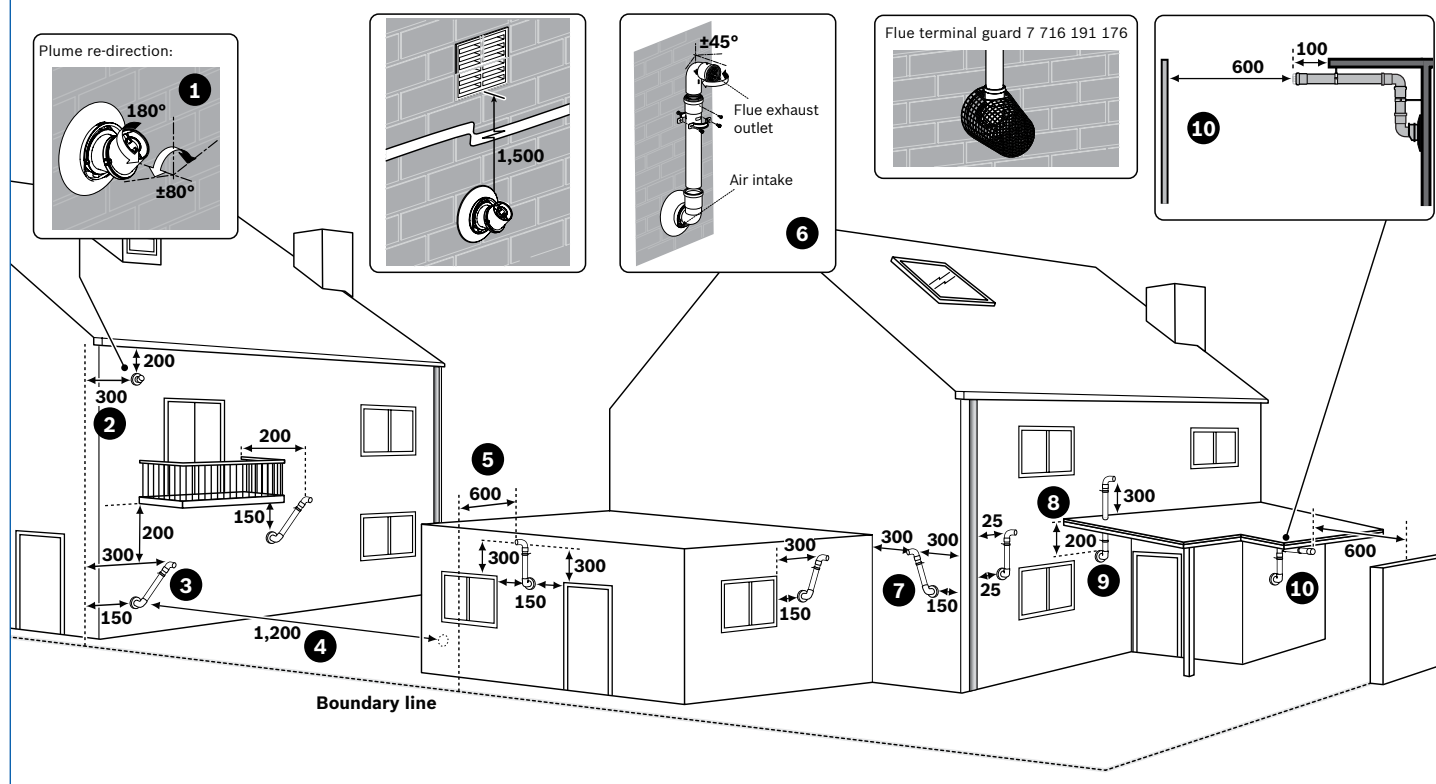
Components				
Part No. 100mm		7 719 002 430	7 716 191 083	7 716 191 084
Part No. 125mm		7 719 002 431	7 719 003 666	7 719 003 664
Maximum lengths (mm) & no. of components required				
Greenstar 29CDi Classic				
100mm	6,400	1	up to 6	2
125mm	14,500	1	up to 14	2
Greenstar 34CDi Classic				
100mm	5,000	1	up to 4	2
125mm	12,000	1	up to 11	2
Greenstar 38CDi Classic				
100mm	4,500	1	up to 4	2
125mm	12,000	1	up to 11	2
Greenstar 42CDi Classic				
100mm	4,500	1	up to 4	2
125mm	12,000	1	up to 11	2
Greenstar CDi Compact series				
100mm	2,000	1	up to 1	2
125mm	11,000	1	up to 10	2
Greenstar Si and Greenstar i Junior series				
100mm	2,400	1	up to 2	2
125mm	11,000	1	up to 10	2

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

	45° bend	90° bend
Greenstar CDi Classic 60/100mm flues	750mm	1,500mm
Greenstar CDi Classic 80/125mm flues	1,000mm	2,000mm
Greenstar CDi Compact – all flue sizes	1,000mm	2,000mm
Greenstar Si & i Junior – all flue sizes	1,000mm	2,000mm

Plume management terminal positioning

All measurements in millimetres



Note

- All measurements are the minimum clearances required
- Refer to pages 36-37 for all concentric flue terminal positions unless the flue position is specified on the figure above "Plume terminal positions"
- Terminals must be positioned so 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.

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

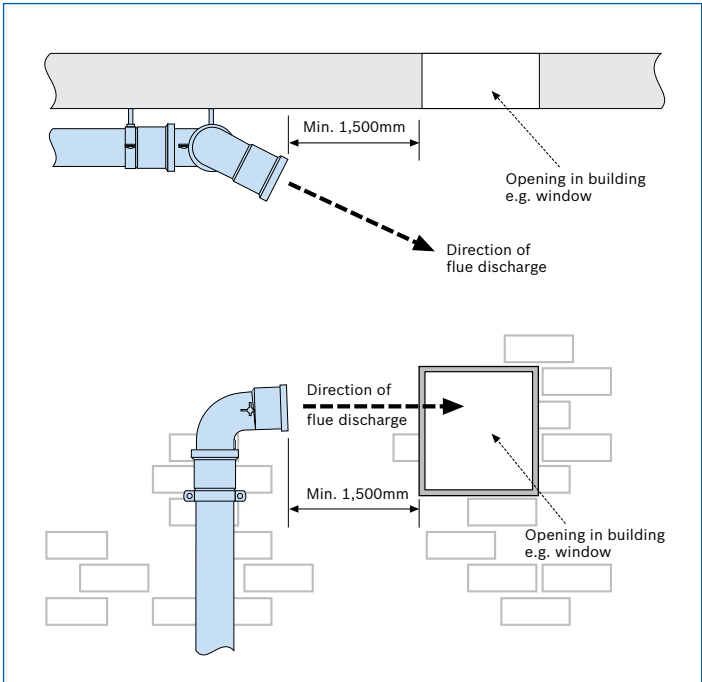
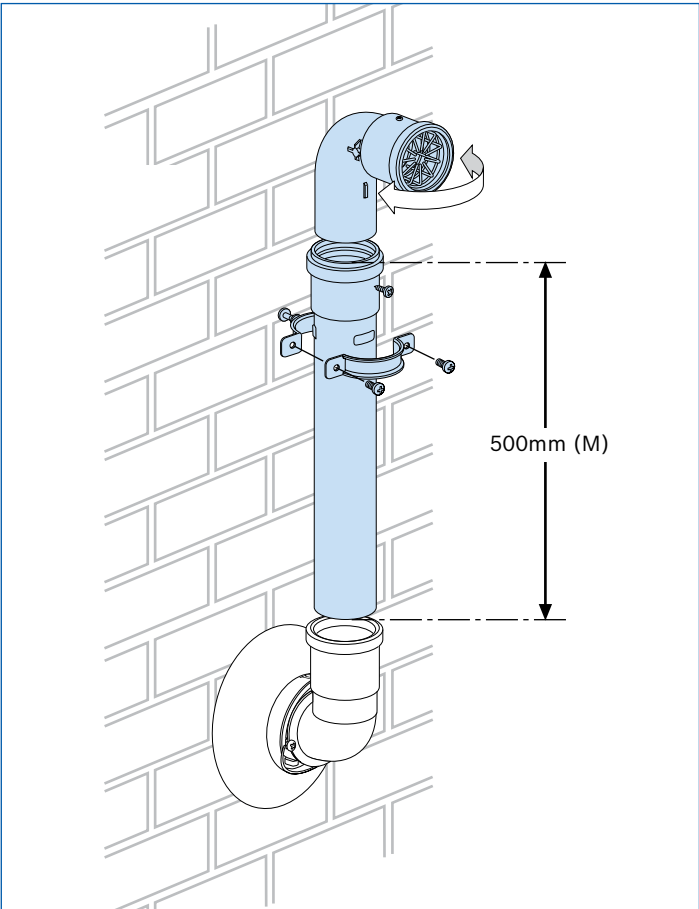


Components	Part No.	Description
60mm diameter		
	7 716 191 086	Plume management kit
	7 716 191 087	Extension (1,000mm)
	7 716 191 088	90° bend
	7 716 191 089	45° bend (pair)
	7 716 191 176	Plume management terminal guard round

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.

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



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

For Greenstar CDi Classic 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 CDi Compact boilers the 100mm dia. internal flue is immediately reduced by 1,000mm when the minimum plume management of 500mm is used.

Greenstar Si and Greenstar i Junior 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 both the Greenstar CDi Classic and CDi Compact, 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 48.

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 39-44.

Condensfit II™ telescopic flue and plume management system measuring

Fig A

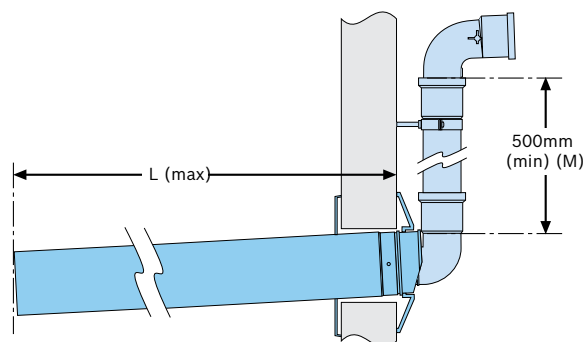
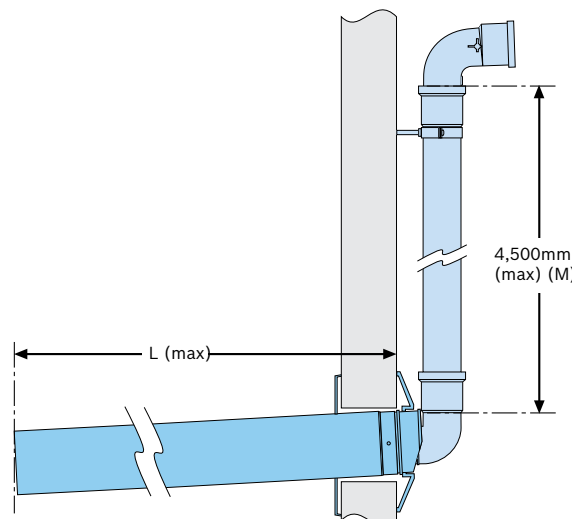


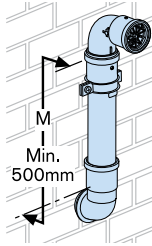
Fig B




Effective straight flue lengths for telescopic flue with plume management

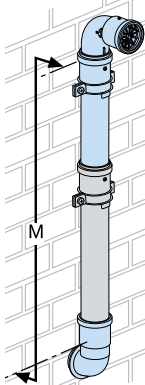
Boiler	Fig. A	Fig. B
	Maximum straight flue length (L) with minimum plume management length 500mm (M)	Maximum straight flue length (L) with maximum plume management length 4,500mm (M)
29CDi Classic	5,900mm	3,100mm
34CDi Classic	5,000mm	2,200mm
38CDi Classic	4,000mm	1,200mm
42CDi Classic	4,000mm	1,200mm
CDi Compact series	5,000mm	2,200mm
Si & i Junior series	4,600mm	4,600mm

Plume management system



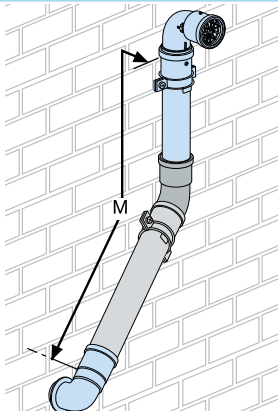
Components		
Part No. 60mm		7 716 191 086
Maximum lengths (mm) & no. of components required		
Greenstar CDi Classic & CDi Compact*, Si and i Junior series		
60mm	500	1

Plume management system with extensions



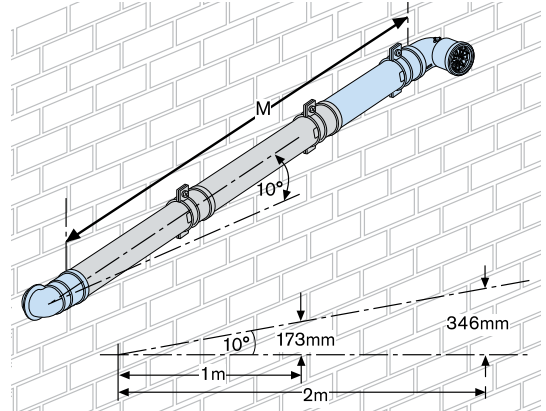
Components		
Part No. 60mm	7 716 191 086	7 716 191 087
Maximum lengths (mm) & no. of components required		
Greenstar CDi Classic & CDi Compact*, Si and i Junior series		
60mm	4,500	1 up to 4

Plume management system with extensions and 45° bend



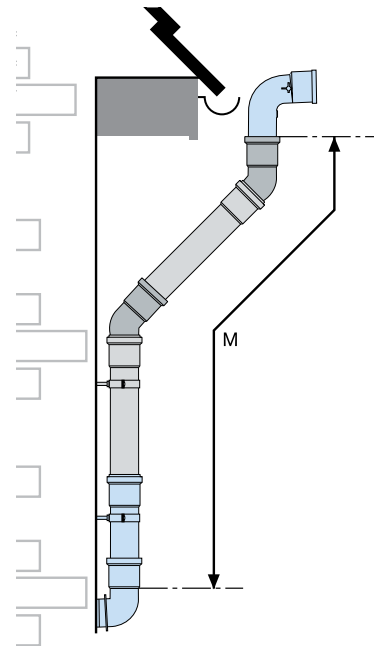
Components			
Part No. 60mm	7 716 191 086	7 716 191 087	7 716 191 089
Maximum lengths (mm) & no. of components required			
Greenstar CDi Classic & CDi Compact*, Si and i Junior series			
60mm	3,750	1	up to 4 1

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 & CDi Compact*, Si and i Junior 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 & CDi Compact*, Si and i Junior series			
60mm	3,000	1	up to 3 2

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

Greenstar combi boiler range accessories

Greenstar combi boiler controls

MT10 mechanical timer



**Worcester Part No.
7 716 192 036**

**MT10RF mechanical
RF thermostat**



**Worcester Part No.
7 716 192 037**

**DT20 twin channel
digital programmer**



**Worcester Part No.
7 716 192 038**

**DT20RF digital RF
thermostat with twin
channel programmer**



**Worcester Part No.
7 716 192 054**

DT10RF digistat



**Worcester Part No.
7 716 192 052**

DT10RF optimiser†



**Worcester Part No.
7 716 192 053**

**FR10 intelligent
room thermostat^†**



**Worcester Part No.
7 716 192 065**

**FR110 programmable
room thermostat†**



**Worcester Part No.
7 716 192 066**

**FW100 weather
compensation controller†**



**Worcester Part No.
7 716 192 067**

Greenstar combi boiler range accessories

Condensfit II™ 60/100mm & 80/125mm horizontal & vertical flue accessories

**Standard telescopic
flue kit (100mm dia.)**



**Worchester Part No.
7 716 191 082**

**Standard telescopic
horizontal flue kit
(125mm dia.)**



**Worchester Part No.
7 719 003 702**

**Long telescopic flue kit
(100mm dia.)**



**Worchester Part No.
7 716 191 171**

**Vertical BF kit
(100mm dia.)**



**Worchester Part No.
7 719 002 430**

**Vertical BF kit
(125mm dia.)**



**Worchester Part No.
7 719 002 431**

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



**Worchester Part No.
7 716 191 083**

**1,000mm extension
(125mm dia.)**



**Worchester Part No.
7 719 003 666**

**2m flue extension
(100mm dia.)**



**Worchester Part No.
7 716 191 172**

**Short flue extension
220mm (100mm dia.)**



**Worchester Part No.
7 716 191 133**

**45° bend
(100mm dia.)**



**Worchester Part No.
7 716 191 085**

**45° bend
(125mm dia.)**



**Worchester Part No.
7 719 003 665**

**90° bend
(100mm dia.)**



**Worchester Part No.
7 716 191 084**

**90° bend
(125mm dia.)**



**Worcester Part No.
7 719 003 664**

**High level horizontal
flue adaptor (100mm dia.)**



**Worcester Part No.
7 719 002 432**

**High level horizontal
flue adaptor (125mm dia.)**



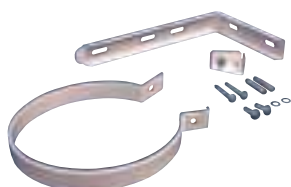
**Worcester Part No.
7 719 002 433**

**Support bracket kit
(100mm dia.)**



**Worcester Part No.
7 716 191 092**

**Support bracket kit
(125mm dia.)**



**Worcester Part No.
7 716 191 174**

**Support bracket kit
6 pack (100mm dia.)**



**Worcester Part No.
7 716 191 173**

**Support bracket kit-
CDi Compact only
(100mm dia.)**



**Worcester Part No.
7 716 191 177**

**Support bracket kit -
CDi Compact only
(125mm dia.)**



**Worcester Part No.
7 716 191 179**

**Support bracket kit
6 pack - CDi Compact
only (100mm dia.)**



**Worcester Part No.
7 716 191 178**

Greenstar combi boiler range accessories

Additional accessories

Filling link†



Worchester Part No.
7 716 192 281

Vertical pre-piping assembly for CDi Classic



Worchester Part No.
7 716 192 607

Vertical pre-piping assembly for CDi Compact



Worchester Part No.
7 716 192 713

Vertical pre-piping assembly for Si & i Junior



Worchester Part No.
7 716 192 733

Earth bonding strip



Worchester Part No.
7 716 192 686

Domestic hot water combi pre-heat accessory for CDi Compact



Worchester Part No.
7 716 192 735

Below boiler pipe cover



Worchester Part No.
7 716 192 608

Plume management kit (60mm dia.)



Worchester Part No.
7 716 191 086

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



Worchester Part No.
7 716 191 087

45° bend (60mm dia.)



Worchester Part No.
7 716 191 089

90° bend (60mm dia.)



Worchester Part No.
7 716 191 088

CondenseSure auxiliary siphon



Worchester Part No.
7 716 192 746

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



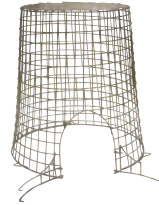
**Worcester Part No.
7 716 191 090**

**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 System Filter



**Worcester Part No.
7 716 192 609**

A Greenstar combi with Greenfloor heating – a great combination

Whether you are upgrading an existing system or installing a new system, Worcester Greenfloor heating can provide an ideal alternative to traditional radiators. Worcester's Greenfloor heating system uses a water-filled pipe system that turns the floor into a large surface area radiator. The pipe system gently warms the space above it through a combination of radiant energy and heat conduction.

In a modern, well-insulated space where heat loss factors have been taken into consideration, underfloor heating can act as the primary heating source and, in most cases, no other space heating methods will be required.

Underfloor heating operates with lower water temperatures than traditional radiator systems. This makes it suitable for use with Worcester condensing boilers, ensuring they remain at their optimum efficiency, with significant energy savings.

As there are no radiators to take up space, Worcester Greenfloor systems also provide maximum flexibility within the property. They can also be used with a wide range of floor coverings, including parquet, carpeting, marble or tiles.

Underfloor heating is a system where every component is important to the overall performance. Worcester Greenfloor systems provide a comprehensive selection of high quality system components, while offering considerable flexibility to meet all project needs.



System components

Greenfloor heating systems comprise a number of elements:

- PE-Xc system pipe
- Stainless steel manifolds
- Manifold cabinets
- Pump and mixing stations
- Pipe fixing methods
- Controls.

Features	Benefits
PE-Xc Pipe, protected against thermal ageing and stress fracture	Flexible and durable
Pre-insulated pipe positioning panels	Quick and easy installation
Stainless steel manifolds	Robust and durable
Full suite of wireless and wired control systems	Suits any type of installation
Uses radiant heat	Less circulation of dust than with radiators, cleaner air for home
Requires lower working temperatures	Maximises the efficiency of condensing boilers and heat pumps
Eliminates the need for radiators	Creates space on walls and allows unrestricted layout within a room
Complements Worcester gas- and oil-fired boilers, ground source and air to water heat pumps	Complete heating and hot water solutions from one source

All Greenfloor systems are supplied complete with all components and connections. Any specialist tools that are necessary are also available from Worcester.

Greenfloor PE-Xc system pipe

System pipe is available in coils, with a reel available to ease unwinding, reduce waste and avoid the need for couplings.

Pipe and pipe fixing method compatibility		
Pipe positioning panel	14 x 2mm	16 x 2mm
Stapler panel systems	14 x 2mm	16 x 2mm
Dry construction system	14 x 2mm	–
Timber suspended floor	14 x 2mm	16 x 2mm

Pipe	14 x 2mm	16 x 2mm
PE-Xc	Yes	Yes
Coil length (standard)	200m	200m
Coil length (long)	750m	650m
Maximum operating pressure	6bar	6bar
Maximum operating temperature	90°C	90°C
Minimum bend radius	70mm	80mm

The total **training** experience

Worcester expertise that will build your skills

Worcester has always placed great emphasis on technical support and training for installers and service engineers. Advances in heating technology, including the increasing use of renewables, make the need for training greater than ever.

To ensure the highest levels of competence and expertise in the installation of all Worcester products, we run intensive training courses for installers, commissioning engineers and operatives involved with servicing and fault finding.

Courses available

Our training facilities offer a number of courses suitable for the installer and commissioning engineers, and more in-depth courses for the servicing and fault finding engineers.

Training centres throughout the UK

To enable us to meet the growing demand for training we have invested in additional facilities at the award-winning training academy at our Worcester headquarters. In addition to the original academy there is now a new 400m² unit, 25% of which is devoted to an open-plan domestic training area with life-size single-storey brick buildings. These feature working Greenskies solar thermal systems which enable installers to get up onto the roof of the building to get more realistic training. There are bays full of all Greenstar gas-fired appliances, so installers can really get to grips with the importance of system design. The additional space also contains dedicated training areas for our renewable and future products. The training centre also runs certified domestic and commercial ACS training and assessment.

Further academies are located at West Thurrock in Essex, Wakefield and Clay Cross in Derbyshire, all offering our full suite of courses. Please phone 01905 752526 for more information about a course near you. Each course is run by specialist trainers and is superbly equipped to deliver a combination of classroom theory and practical hands-on experience that's second to none.

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. Call us on 01905 752526 to find out when we will be running the course of your choice at a college in your area.

Mobile training

To complement our training venues across the country, 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, ensuring that quality training in a comfortable environment can be achieved on your doorstep!

If it's oil training you require, our 7.5 tonne mobile oil vehicle is available throughout the country for hands-on product training and OFTEC assessments.

Distance learning/web based learning

Worcester has produced a selection of Distance Learning CD ROMs/DVDs which are packed with information.

Call 0844 892 9800 for your copies, or visit **www.worcester-bosch.co.uk** for information on Web Based Learning.

Get on course for a more profitable future now.



Call now for more information 01905 752526

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 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 CO₂ analysis of flue gas, removal of compact hydraulic, 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 gas-fired condensing combi boilers.

Greenstar Si & i Junior gas-fired condensing combi boilers.

Greenstar system & regular gas-fired condensing boilers

(covers Greenstar Ri, Greenstar CDi Classic Regular, Greenstar FS CDi Regular, Greenstar 30CDi Classic System and Greenstar i System boilers).

Greenstar Highflow CDi & FS CDi regular floor standing gas-fired condensing combi and regular boilers.

	CDi Classic	CDi Compact	Si & i Junior	System & Regular	Highflow CDi & FS CDi Regular
Duration	1 Day	1 Day	1 Day	1 Day	1 Day
Cost	£65	£65	£65	£65	£65
Training course covers					
Specification	✓	✓	✓	✓	✓
Installation	✓	✓	✓	✓	✓
Commissioning	✓	✓	✓	✓	✓
Servicing	✓	✓	✓	✓	✓
Maintenance	✓	✓	✓	✓	✓
Course locations					
Worcester	✓	✓	✓	✓	✓
Clay Cross	✗	✗	✗	✗	✗
Wakefield	✓	✓	✓	✓	✓
West Thurrock	✓	✓	✓	✓	✓
College Links*	✓	✓	✓	✓	✗
Mobile*	✓	✓	✓	✗	✗

*Please contact Worcester Training for specific colleges and mobiles dates

To complement the above courses, Worcester also runs **domestic ACS, unvented, underfloor, water treatment** and **IDHEE domestic heating design courses.**



Additional product and industry training courses

The diversity of products in today's heating industry gives you the opportunity to expand your expertise, whilst offering more choice to your customers. Worcester provides comprehensive training from all its academies on its entire range of technologies.

Oil-fired product courses

Greenstar oil-fired products.

Oil advanced fault finding.

OFTEC 101, 105e and 600a.

Renewable product courses

Renewables overview.

Greenskies solar.

Greenskies advanced solar.

Introduction to heat pumps.

Greenstore LECP ground source heat pumps.

Greensource air to air heat pumps.

Greensource air to water heat pumps.

Greensource split air to water heat pumps.

Greenstar Plus hybrid heat pumps.

Accessories training courses

Greenfloor heating.

Worcester controls.

We are here to provide you with training and assistance for all areas of your business, not just product training. Call us on **01905 752526** 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**

Commercial product courses

Greenspring CWi47 water heater.

GB162 overview.

GB162 domestic.

GB162 commercial.

Commercial ACS training and assessment – CODNCO1.

Industry focused courses

BPEC underfloor heating installation.

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.

MCS Made Easy.



A complete after-sales service

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

In addition to the no-nonsense parts and labour guarantee applicable to all Worcester products, you and your customers have the assurance that every Worcester product is manufactured to both the appropriate British and European standards.

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: 0844 892 9900

Opening times

Monday – Friday: 7.00am – 8.00pm

Saturday: 8.00am – 5.00pm

Sunday: 9.00am – 12 noon

Bank Holidays: 8.00am – 4.30pm



All the technical advice you need

Spares

Genuine replacement parts for all supported Worcester products are readily available from stock, or on a next day delivery basis. Visit our website at 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.

Worcester also has a pre-sales department, which provides assistance in selecting a heating system to suit a particular application, along with full guidance on installation. For more information please contact the Technical Helpline or alternatively visit our website where literature can be downloaded at **www.worcester-bosch.co.uk**.

Technical

Tel: 0844 892 3366

Fax: 01905 752 741

technical.enquiries@uk.bosch.com

Opening times

Monday – Friday: 7.00am – 8.00pm

Saturday: 8.30am – 4.00pm

Bank Holidays: 8.00am – 4.30pm



Useful numbers

Sales

Tel: 01905 752640
Fax: 01905 456445

Spare Parts

Tel: 01905 752576
Fax: 01905 754620

Technical Helpline (Pre & Post Sales)

Tel: 0844 892 3366
Fax: 01905 752741
technical.enquiries@uk.bosch.com

Renewables Technical Helpline

Email: renewable.energy@uk.bosch.com
or telephone 0844 892 4010

Training

Tel: 01905 752526
Fax: 01905 752535

Literature

Email: literature@uk.bosch.com
or download instantly from our website
or telephone 0844 892 9800

Calls to the listed 0844 numbers are charged at up to 3 pence per minute from BT land lines.
Calls from mobiles and some other networks may vary. Calls to and from Bosch Thermotechnology Ltd
may be recorded for training and quality assurance purposes.

Customer Service

Engineer Appointments

Email: appointment.worcester@uk.bosch.com
or telephone 0844 892 3000

Enquiries

Email: service.mailbox@uk.bosch.com
or telephone 0844 892 3000

Guarantee Registration

To register your Worcester guarantee,
please visit our website or
telephone 0844 892 2552

www.worcester-bosch.co.uk



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

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