

# The Greenstar i Junior & i System gas-fired condensing boiler series

Technical and specification information



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FEATURES



Worcester, Bosch Group headquarters

## Worcester and you. Making a difference.

Working together for many years, heating professionals and Worcester have been making a real difference in hundreds of thousands of homes across the UK. We are recognised as a market leader in high efficiency, condensing boiler technology and are also committed to providing renewable energy solutions.

As part of the Bosch Group, our products are designed and manufactured to provide the high levels of quality and reliability which are synonymous with the Bosch name throughout the world.



We're a leading British company, employing approximately 2,000 people at our headquarters and manufacturing plants in Worcester and at Clay Cross in Derbyshire, including a nationwide network of over 300 Service Engineers and over 80 technically-trained Field Sales Managers.

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 we feel you deserve.

*"At Worcester we recognise the vital role you, our customer, has in the specification and installation of 'A' rated, energy efficient appliances in homes across the UK. We will continue to invest in our products, people, facilities and added value services such as training, to give you the support you require in providing a total solution for your customers' comfort."*

Richard Soper,  
Managing Director, Worcester, Bosch Group

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# The Greenstar i Junior & i System condensing boiler series



## Higher efficiency therefore highly cost effective

Worcester's market-leading condensing boiler series has been developed to provide the high level of heating and hot water comfort you come to expect from a company which is part of the renowned Bosch Group. At the heart of every boiler is the WB3 cast aluminium silicon heat exchanger, which has been installed in over <sup>3</sup>/<sub>4</sub> million boilers since its introduction in 2004.

It is this incredibly efficient unit that is responsible for converting 97% of the gas consumed by Greenstar i Junior and i System condensing boilers into heat for the heating and hot water system. In comparison, older, non-condensing boilers achieve only around 78% efficiency, resulting in higher heating and hot water bills.

Hence SEDBUK Band A ratings for all models in the new Greenstar i Junior and i System condensing range.

Greenstar i Junior and i System condensing boilers deliver this energy-saving performance by ingeniously recycling exhaust gases to extract and re-use the latent heat – a highly efficient use of energy which also significantly reduces carbon dioxide emissions into the atmosphere.

To all these major benefits you can add yet more: superlative Worcester quality and reliability; a range of outputs to satisfy the heating demands of a range of households; and truly exceptional all-round value for money. And at the end of its life, 88% of the Greenstar i Junior components can be recycled\*.

## The Greenstar i Junior & i System series at a glance

	24i Junior	28i Junior	12i System	24i System
<b>Output kW to central heating (CH)</b>	Min	7.2kW	7.2kW	3kW
	Max	24kW	24kW	12kW
<b>Flow rate at 35°C Δ T</b>	9.8l/min	11.4l/min	N/A	N/A
<b>CH temperature control</b>	•	•	•	•
<b>Modulating control</b>	•	•	•	•
<b>Natural gas</b>	•	•	•	•
<b>LPG boiler</b>	•	•	•	•
<b>Electronic ignition</b>	•	•	•	•
<b>SEDBUK band</b>	A	A	A	A

\*Recycling percentage calculated by components' strip down weight (kg).

Features	Benefits
Aluminium silicon heat exchanger	High efficiency and reliability
Boiler keep hot facility	Instantly heated hot water
SEDBUK Band A	Saves energy and money
Less than 28kg lift weight	One man lift
Wall mounting jig included with boiler	Allows pre-plumbing; saves time
Compact dimensions	Space saving, ease of siting
Modulation control	Energy saving
Optional filling link	Labour saving
Optional plug-in fascia mounted mechanical and digital timeclocks	Eliminates the need for external wiring
Optional radio frequency controlled room thermostat	Eliminates wiring, helps comply with Part L of Building Regulations and meets the requirements of Part P
Anti-cycle control	Energy saving

Features	Benefits
Electronic ignition	Energy saving
Built-in frost protection	Money saving, economical protection
Multi-directional fluing	Siting flexibility
No ventilation grilles required for compartment installations	Money and labour saving
Fault finding diagnostics	Time saving
Operational status indicator	Consumer friendly
Built-in boiler bypass	Efficient heating of water on demand
Pump seizure protection	Prevents callbacks
2m mains cable pre-wired to control board	Improved electrical installation; saves time
Comprehensive and well-illustrated literature	Market-leading documentation in print and download versions
Inhibitor introduction point via compact hydraulic drain point	Simple system maintenance

# The Greenstar i Junior & i System condensing boiler series

A condensing boiler is more efficient due to its ability to extract more heat from the flue gases normally lost to the environment through the flue system.

All the Greenstar i Junior & i System models use the same WB3 aluminium-silicon heat cell. Worcester's heat exchanger has been designed to optimise clean burning combustion over an extra large surface area. Each heat cell is factory set and 100% tested so, as long as the gas inlet pressure is correct, commissioning couldn't be any easier. The heat exchanger requires minimal servicing which means fewer spare parts during its lifetime. The heat cell can be cleaned in situ via an inspection hatch saving time during service.

As the flue gases pass through the heat exchanger this extra surface area cools the flue gases to around 55°C whereupon the latent heat within, which would normally be lost to the atmosphere, is instead released and applied to the system.

It is this ability to extract as much heat as possible from the gas it burns that gives the Greenstar i Junior & i System series an exceptionally high level of operating efficiency.

This higher efficiency is recognised within section L of the Building Regulations, subsequently achieving a higher SAP or NHER rating.

Key features of the Greenstar i Junior condensing boilers include the separate plate domestic hot water heat exchanger, which is guaranteed for 5 years.\*

This, combined with the 'keep hot' facility, ensures that hot water is delivered instantly to the tap.

## Combi boilers

### Hot water mode

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

### Keep hot facility

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

## Eco mode

With the Eco mode button activated on Greenstar i Junior models, 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 the Eco mode. By selecting Eco mode less gas or LPG will be used as energy is used only on demand.

## Central heating mode

On a central heating demand, the boiler will initially fire at minimum output before modulating upwards to meet the actual system requirement. Electronics within the boiler continually monitor the heating flow temperature increasing or decreasing output on demand. A built-in bypass and anti-cycling device makes the Greenstar i Junior & i System range particularly suitable for use on systems with Thermostatic Radiator Valves (TRVs).

## Options

### Fluing

The Greenstar i Junior & i System series features 2 different sizes of multi-directional RSF flue systems, 100mm or 125mm.

The flue can be run horizontally or vertically with additional 90° or 45° in-line bends allowing changes of route or direction, providing an extremely flexible and versatile fluing system enabling the appliance to be sited virtually anywhere.

## Versatility

### Gas

The Greenstar i Junior & i System series are manufactured in both natural gas and Liquid Petroleum Gas (LPG) variants. This gives you a full range of fuel options and eliminates the need for fuel conversion.

## Greenstar i Junior combi and i System models

The Greenstar i Junior & i System series features easy to understand fascia buttons and switches for installers and users:

- Power on/off switch
- Central heating variable temperature control selector
- An integral fascia with status display lights which also operate as a fault diagnostic display.



*\*Subject to conditions*

More details are shown on page 19.

## The advantages of a combi boiler

A combi (or combination boiler) is a compact and highly efficient unit giving all the heating and hot water you need, with significant savings on running and installation costs.

Unlike a conventional heating and hot water system, a combi boiler system does not store domestic hot water. It heats water directly from the cold mains – as you use it. There's no hot water cylinder, no tank in the loft (and so less risk of freezing and flooding), and none of the connecting pipework. So you not only save space, but also reduce hot water costs – which can account for up to 60% of a typical domestic fuel bill.

A combi also supplies hot water at mains pressure, giving you exhilarating power showering without the need for a pump. And as, on average, a shower uses considerably less water than a typical bath, the savings on hot water costs and water consumption can be significant.



Regular boiler layout



Combi boiler layout

## The advantages of a system boiler

A system boiler is a compact and highly efficient unit giving all the heating and hot water you need, with significant savings on running and installation costs.

The Greenstar i System boiler incorporates all the major components built-in, including an expansion vessel and circulating pump. All of them pre-wired, pre-plumbed and pre-tested for greater reliability as well as a quicker and neater installation.



System boiler layout

(System boiler with low pressure hot water cylinder)



System boiler layout

(System boiler with unvented hot water cylinder)

# Optional plug-in controls

The Greenstar i Junior series of condensing combi boilers is available with a range of easy-to-use controls, ranging from a simple mechanical timer to a sophisticated radio-frequency digistat. All fascia mounted controls offer simple plug-in connection to the boiler circuit board.

The Greenstar i System range is not suitable for use with the controls below. However, if the optional diverter valve is fitted, then the DT20RF, DT20 and DT10RF controls may be installed.



### MT10 mechanical timer\*

A simple easy-to-operate mechanical timer with 15 minute switching points over a 24 hour period. The timer features a clock face with raised hands to facilitate setting by visually impaired users.



### MT10RF mechanical RF thermostat\*

A simple, easy-to-operate 24 hour mechanical timer combined with a radio frequency room thermostat. The thermostat features individual higher and lower temperature sensors.



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

A wall-mounted RF room thermostat with digital display, combined with a twin channel digital timer in the boiler fascia. The fascia mounted programmer benefits from automatic time and date setup, automatic summer/wintertime changeover and a backlight for use in low light conditions.



### DT20 twin channel digital programmer\*

A versatile, easy-to-learn, 7 day, digital programmer offering up to 3 on/off settings per day. The programmer has a host of innovative features including automatic setup, which sets the correct time and date at power-up, automatic summer/wintertime changeover and a green backlight for use in low light conditions.



### DT10RF digistat\*

A familiar wall-mounted 24 hour programmable RF digital thermostat combined with a fascia mounted single channel programmer to time the hot water combi preheat functions. The programmer includes a built-in receiver for the room thermostat and all of the functionality of the DT20.

\*Combi only

\*Combi (and system if optional diverter valve is used).

# Technical data – Greenstar i Junior & i System series

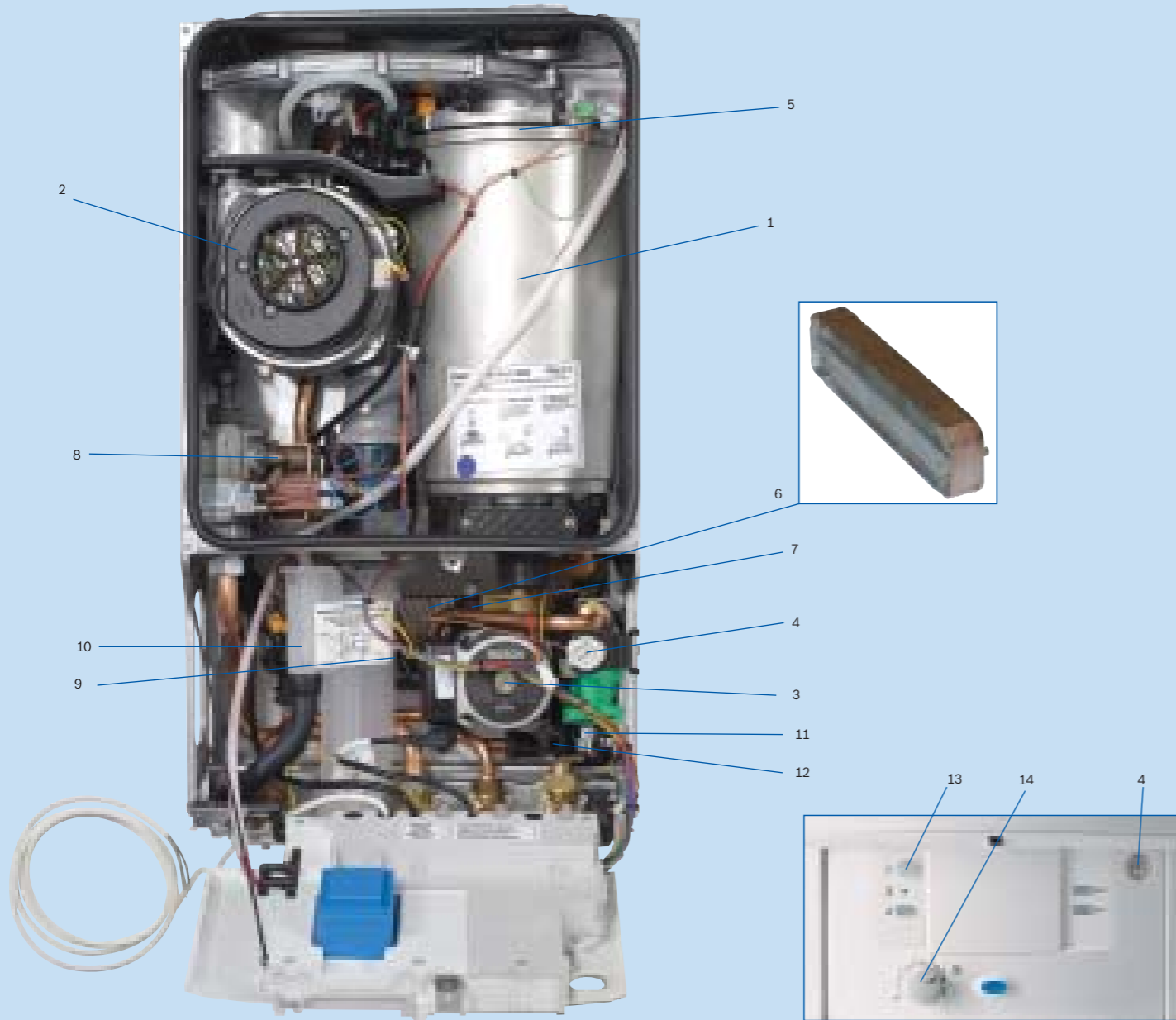
Model	Greenstar 24i Junior	Greenstar 28i Junior	Greenstar 12i System	Greenstar 24i System
Height (mm)	710mm (max)*	710mm (max)*	710mm (max)*	710mm (max)*
Width (mm)	400mm	400mm	400mm	400mm
Depth (mm)	330mm (max)*	330mm (max)*	330mm (max)*	330mm (max)*
Weight – lift (kg)	27.1	27.1	27.1	27.1
SEDBUK value %/band	90.1%/Band A	90.1%/Band A	90.1%/Band A	90.1%/Band A
Heating flow/return connections	22mm compression	22mm compression	22mm compression	22mm compression
Hot/cold water connections	15mm compression	15mm compression	N/A	N/A
Pressure relief valve (mm dia.)	15	15	15	15
Condensate connection	22mm plastic pipe	22mm plastic pipe	22mm plastic pipe	22mm plastic pipe
Gas connection	22mm compression	22mm compression	22mm compression	22mm compression
Primary water content (litres)	3.0	3.0	3.0	3.0
Min. domestic inlet pressure for max. DHW flow rate (bar)	1.3	1.3	N/A	N/A
Min. domestic inlet pressure to operate the appliance (bar)	0.2	0.2	N/A	N/A
Max. domestic inlet pressure (bar)	10	10	N/A	N/A
Min. flow rate to operate the appliance (l/min)	1.9	1.9	1.9	1.9
DHW flow rate @ 35°CΔT (l/min)	9.8	11.4	N/A	N/A
Output to central heating kW (Btu)	7.2 - 24 (24,560 - 82,000)	7.2 - 24 (24,560 - 82,000)	3 - 12 (10,236 - 40,950)	7.2 - 24 (24,560 - 82,000)
Wall mounting jig	•	•	•	•
Filling link	• (optional)	• (optional)	• (optional)	• (optional)
Plug-in timers	• (optional)	• (optional)	• (optional)	• (optional)
Diverter valve kit	N/A	N/A	• (optional)	• (optional)
Optimising room temperature controller	• (optional)	• (optional)	• (optional)	• (optional)
Max. vertical flue (mm) (100mm dia.) inc. terminal	6,400	6,400	6,400	6,400
Max. vertical flue (mm) (125mm dia.) inc. terminal	15,000	15,000	15,000	15,000
Max. horizontal flue (mm) (100mm dia.)	4,600	4,600	4,600	4,600
Max. horizontal flue (mm) (125mm dia.)	13,000	13,000	13,000	13,000
NOx classification	Class 5	Class 5	Class 5	Class 5
Ingress protection (IP)	IPX4D	IPX4D	IPX4D	IPX4D

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

## Increased SAP ratings

As well as the Greenstar i Junior and Greenstar i System models achieving very high SAP ratings for dwellings, the addition of the optimising temperature controller further increases these ratings as well as being part of the recommended best practice, as covered by the CHES design standard.

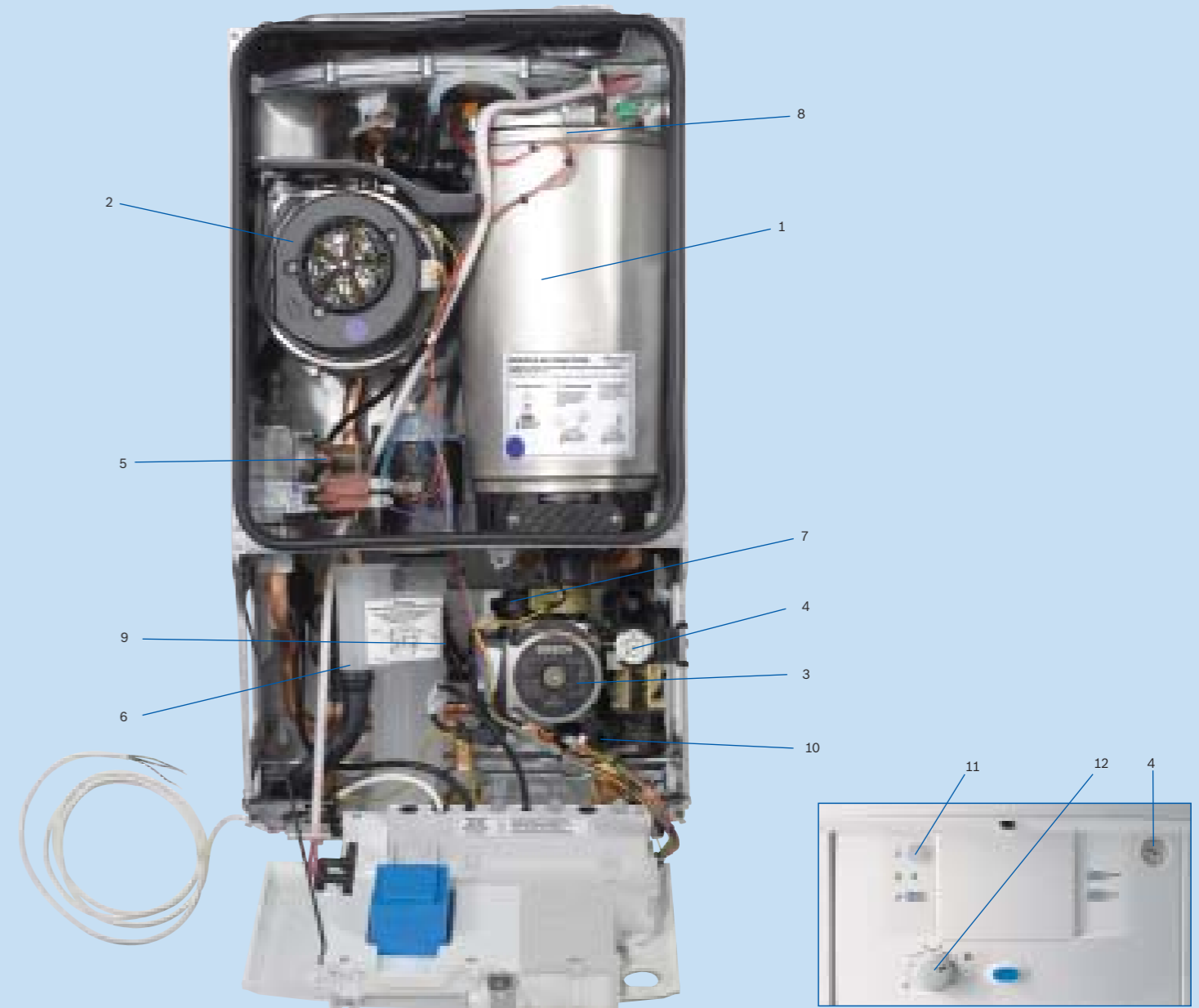
# The Greenstar i Junior condensing combi boiler series – inside story



## Key to components

- |                                         |                                         |
|-----------------------------------------|-----------------------------------------|
| 1. Aluminium/Silicon WB3 Heat Exchanger | 8. Gas Valve                            |
| 2. Pre-mix Fan                          | 9. Expansion Vessel Connection          |
| 3. Circulating Pump                     | 10. Condensate Syphon                   |
| 4. Pressure Gauge                       | 11. Diverter Valve                      |
| 5. Down Firing Low NOx Burner           | 12. Drain Point                         |
| 6. Plate DHW Heat Exchanger             | 13. On/Off Button                       |
| 7. Automatic Air Vent                   | 14. Central Heating Temperature Control |

# The Greenstar i System condensing system boiler series – inside story



## Key to components

- |                                         |                                         |
|-----------------------------------------|-----------------------------------------|
| 1. Aluminium/Silicon WB3 Heat Exchanger | 8. Down Firing Low NOx Burner           |
| 2. Pre-mix Fan                          | 9. Expansion Vessel Connection          |
| 3. Circulating Pump                     | 10. Drain Point                         |
| 4. Pressure Gauge                       | 11. On/Off Button                       |
| 5. Gas Valve                            | 12. Central Heating Temperature Control |
| 6. Condensate Syphon                    |                                         |
| 7. Automatic Air Vent                   |                                         |

# Installing the Greenstar i Junior & i System boiler series

## Greenstar 12i & 24i System boilers

All system boilers are easier to install than conventional boilers and consequently require less time. The major benefits of the i System boiler are:

- One man lift
- Built-in pump, expansion vessel, pressure relief valve and pressure gauge
- The boiler comes pre-wired and pre-plumbed
- The boiler can be connected to either low pressure open vent cylinders or mains pressure unvented units
- There is less pipework
- There is no feed and expansion cistern in the loft space.

## Greenstar 24i & 28i Junior combi boilers

Combination boilers require less time to install than either a conventional or system type boiler, for these reasons:

- One man lift
- All the major components, including the pump, are contained within the boiler casing and do not need to be fitted separately
- 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.

## Siting of appliance

### General

The appliance is not suitable for external installation.

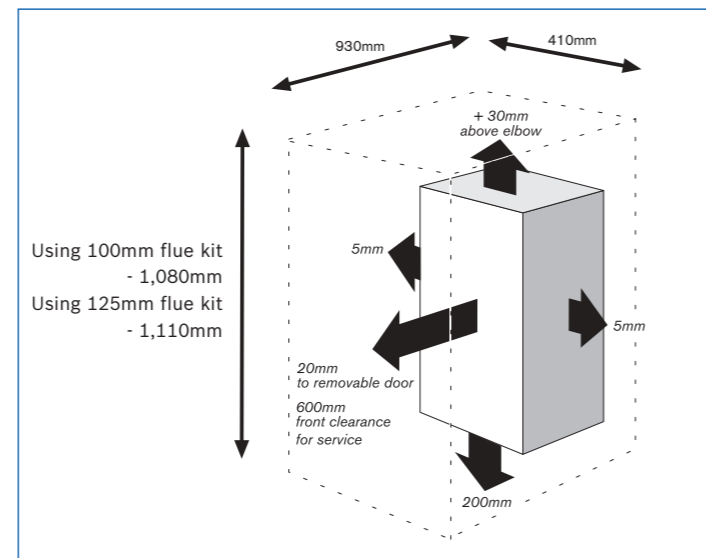
The wall on which the boiler is to be mounted should be capable of supporting an overall weight of approximately 40kg.

The wall does not require special protection. However, if the appliance is to be fitted in a timber frame building the guidelines laid down in BS 5440:Part 1 and the CORGI publication "Gas Installations in Timber Frame Buildings" should be adhered to.

The appliance may be installed into an airing cupboard if required. See section "Compartment Installation" on page 13.

### Clearances

The following clearances should be allowed for installation and servicing purposes.



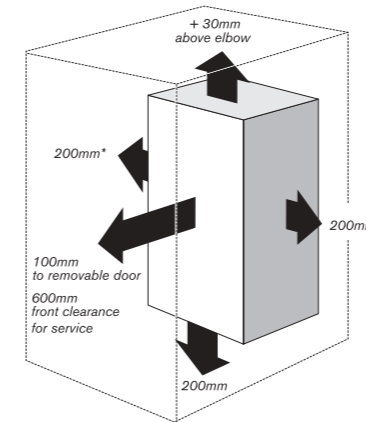
## Compartment installation

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

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

Compartment installation	
Position of appliance	Min. unventilated clearance (to removable door)
In front	100mm
Below	200mm
Right side	200mm*
Left side	200mm*
Above flue elbow	30mm

### Ventilation free compartment installation – minimum clearances



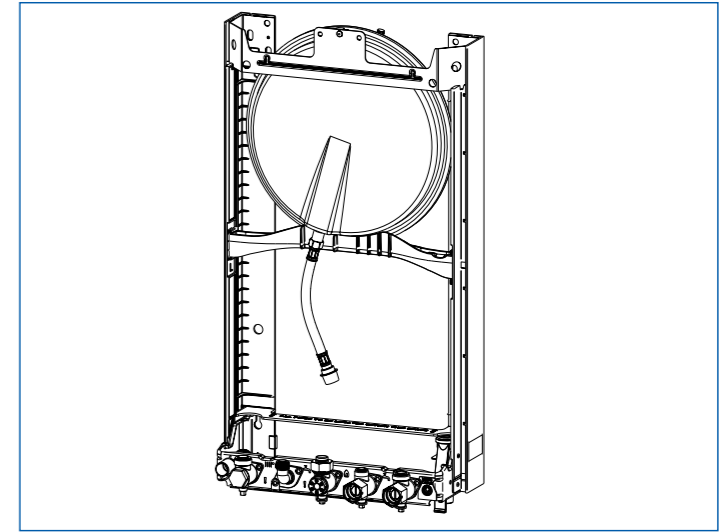
\*This can be reduced to 50mm for one side, provided that the total side clearances add up to 400mm or more.

## Wall preparation

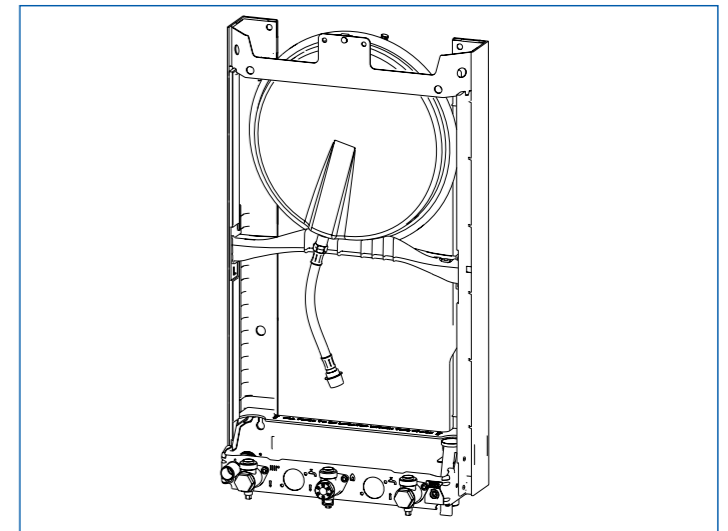
The pictures show the Greenstar i Junior & Greenstar i System wall mounting jigs which enable a simple and straightforward method of attaching the boiler to the wall surface. The new design wall mounting jig is made from light-weight polycarbonate ABS plastic with steel cross members.

Additional fixing points have been pre-drilled and a small integral spirit level will make hanging a Worcester Greenstar i boiler easier than ever.

After fixing the jig to the wall, the appliance, having a lift weight of less than 28kg, can be easily lifted by one man onto the jig and the union connections tightened. The pipework can be routed behind the boiler without the need for an additional wall spacing frame.



Greenstar i Junior



Greenstar i System

## Optional accessory

The vertical pre-piping assembly kit (7 716 192 570) comprises a set of pre-formed copper pipes and an electrical cross-bonding strip.

## Condensate disposal

All condensing boilers generate condensate discharge which needs to be piped away from the appliance in via a plastic pipe.

The amount of condensate generated depends on the efficiency and operating status of the appliance. The boilers will generally only produce condensate whilst operating in central heating mode.

## Condensate termination and route

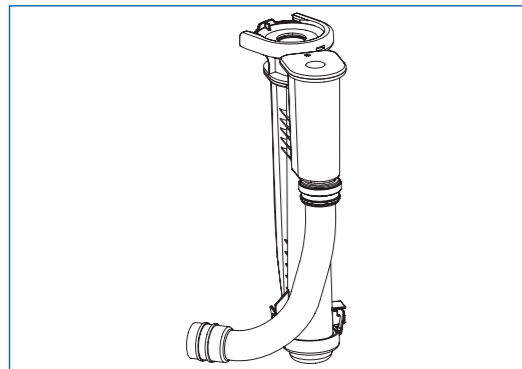
The condensate connection on the Worcester appliances is in 22mm polypropylene. The connection has been updated to include a universal fitting to accommodate slight variations in condensate pipe diameters  $\pm 22\text{mm}$ . The new universal fitting allows pre-piping of condensate pipework before boiler installation and is supplied already connected to the wall mounting jig. The pipe should be extended and run away from the appliance with a constant fall of  $3^\circ$  or 50mm in every metre.

The condensate pipe can terminate into any one of four areas (shown opposite).

Whilst all of the above methods are acceptable it is always the best practise to terminate the condensate pipe via an internal waste system. This will eliminate the need for any external condensate pipe runs which can be susceptible to freezing in extreme weather. Best practise is not to run external condensate pipe any further than 3m. If it is necessary to run more than 3m externally increase pipe size to 32mm.

## External condensate pipework

All Worcester condensing boilers have within a syphonic condensate trap made from polypropylene. Rather than the condensate constantly dripping into the discharge pipe, the condensate is collected into a trap which releases it in 100ml quantities. This will help prevent freezing occurring. The redesigned syphon has an easy slide-on push-fit connection to the sump secured by a retaining bracket. There is a removable service cap making in situ maintenance and cleaning quick and easy.



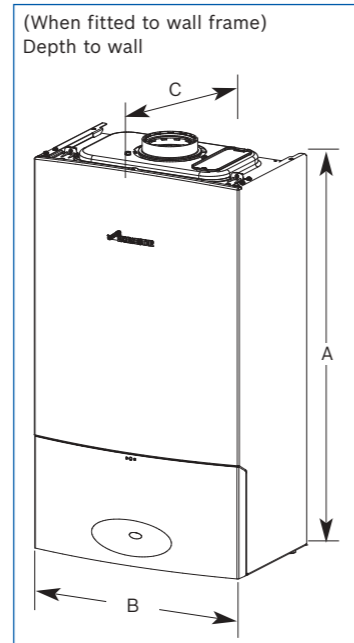
Syphon

If there is no alternative and the condensate pipe has to be externally run, the following should be considered:

- The pipe run should take the shortest practical route.
- The pipework should be insulated with weather-resistant insulation.

- The pipe should terminate as close as possible to the ground or drain, whilst still allowing the condensate to safely disperse. This would prevent wind blowing up the pipe.
- The pipework should be installed with the minimum of horizontal runs and with a continuous fall of  $3^\circ$ .

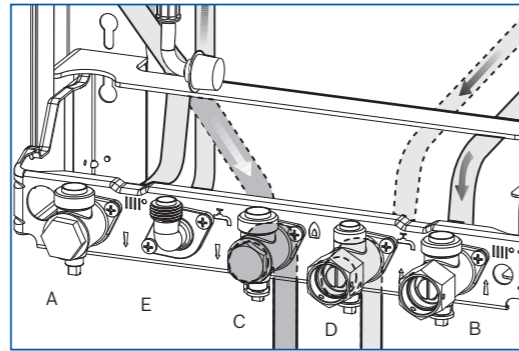
## Pipework connections and casing dimensions



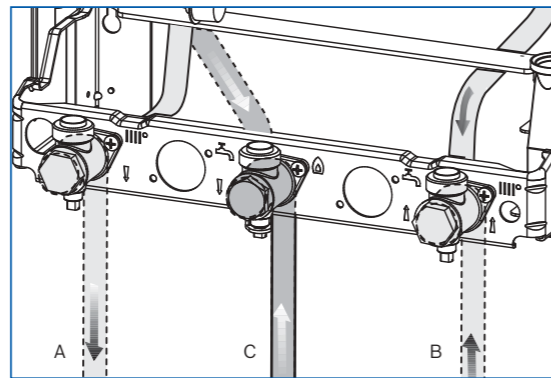
### Cabinet dimensions (mm)

A	700*
B	400
C	330

\*710mm to top of casing front.



Greenstar i Junior



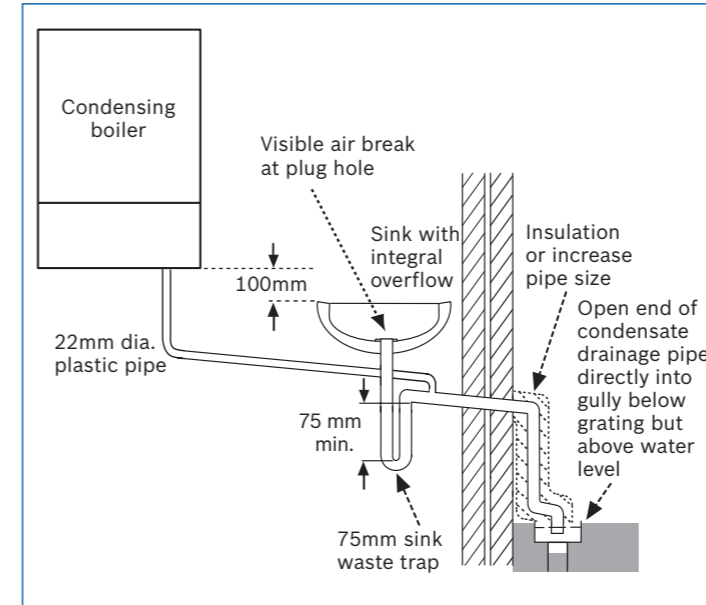
Greenstar i System

### Pipework connections

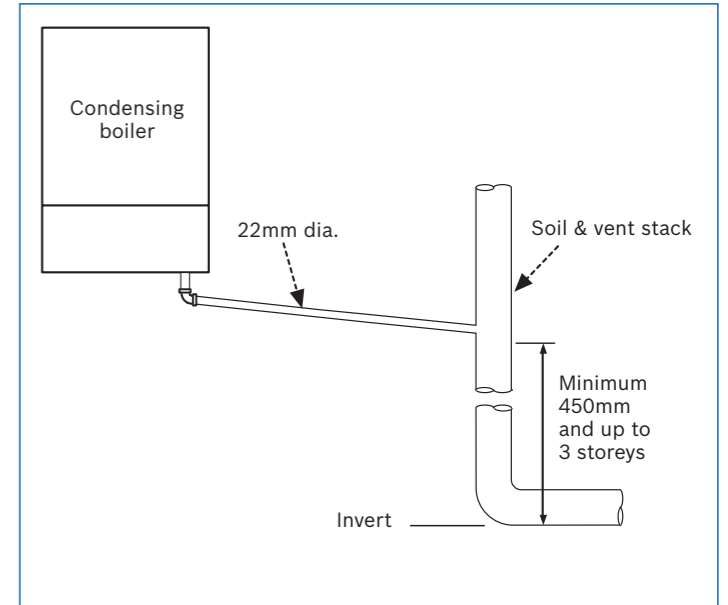
A	CH flow	22mm
B	CH return	22mm
C	Gas inlet	22mm
D	Mains water inlet	15mm*
E	DHW outlet	15mm*

\*Combi only

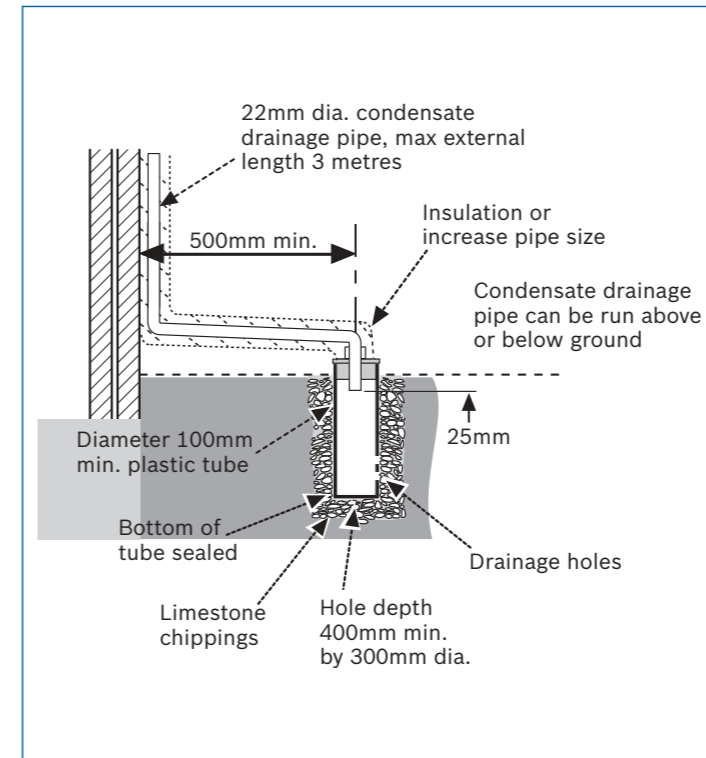
## Condensate termination and route



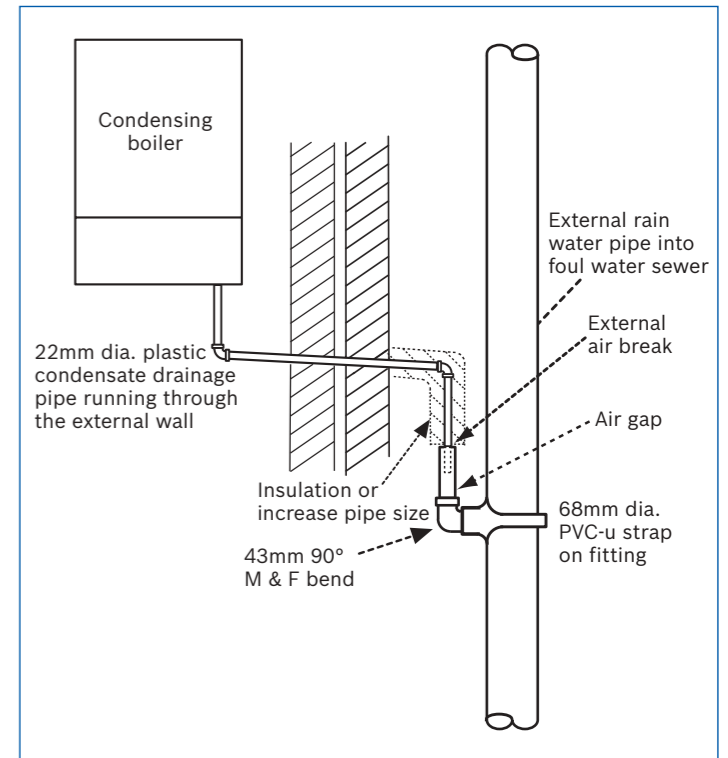
Internal sink/washing machine drain



Soil and vent stack



External condensate absorption point (unsuitable for clay soil types)



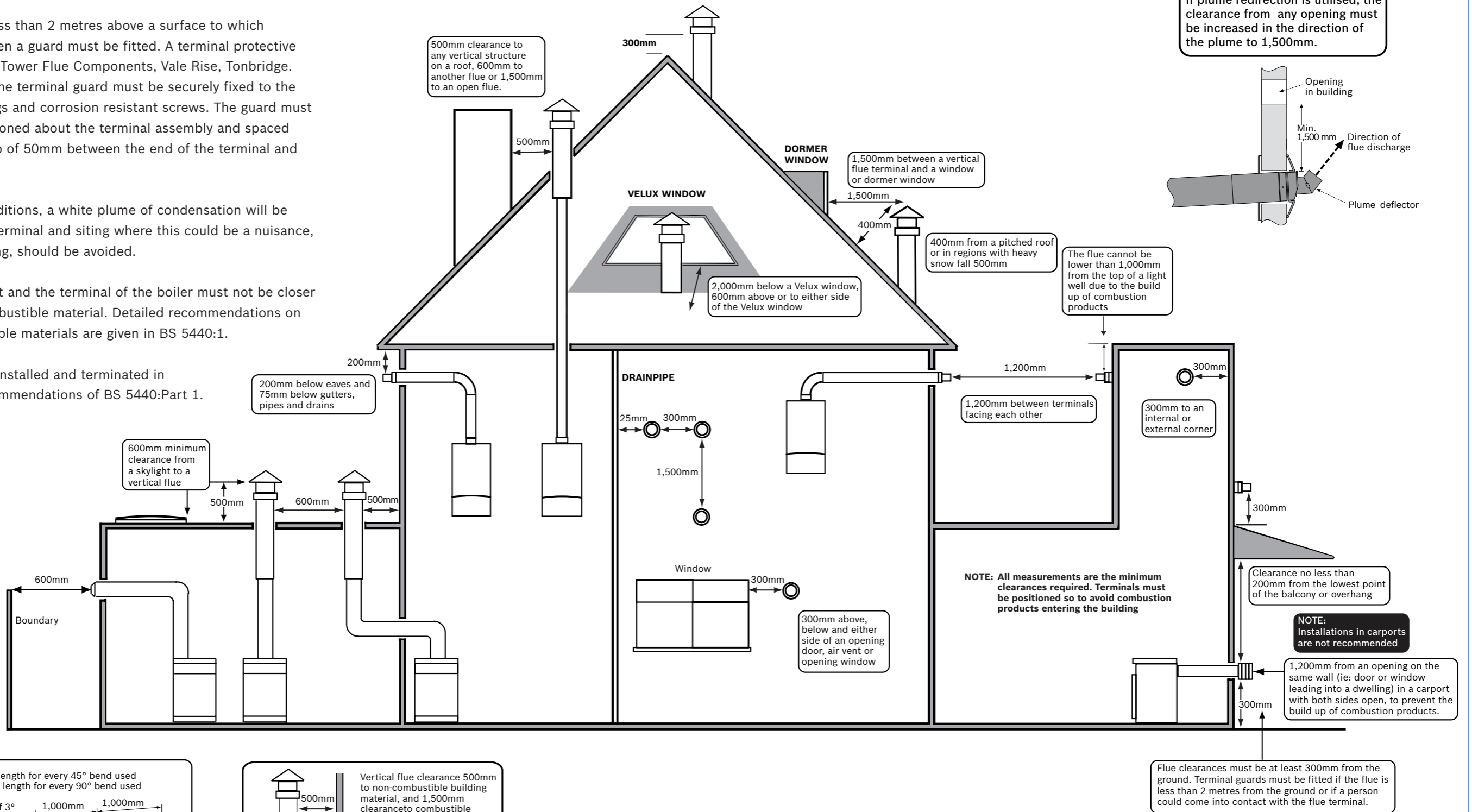
External air break when using a rain water down pipe

# Flue terminal positioning

## General position

1. The terminal must not cause an obstruction nor the discharge a nuisance. Particular care should be exercised with regards to the plumbing of the flue gases and any increase in noise levels.
2. If a terminal is fitted less than 2 metres above a surface to which people have access, then a guard must be fitted. A terminal protective guard is available from Tower Flue Components, Vale Rise, Tonbridge. Tel: (01732) 351555. The terminal guard must be securely fixed to the wall using suitable plugs and corrosion resistant screws. The guard must be symmetrically positioned about the terminal assembly and spaced such that there is a gap of 50mm between the end of the terminal and the guard.
3. In certain weather conditions, a white plume of condensation will be emitted from the flue terminal and siting where this could be a nuisance, i.e. near security lighting, should be avoided.
4. The air inlet/outlet duct and the terminal of the boiler must not be closer than 25mm to any combustible material. Detailed recommendations on protection of combustible materials are given in BS 5440:1.

The flue system must be installed and terminated in accordance with the recommendations of BS 5440:Part 1.



**NOTES:**  
Plume management kits are available for 100mm horizontally terminated flues. Please refer to the installation instructions supplied with the plume management kits.

If plume redirection is utilised, the clearance from any opening must be increased in the direction of the plume to 1,500mm.

600mm distance to a boundary, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to boundaries

600mm minimum clearance from a skylight to a vertical flue  
500mm  
600mm  
500mm

200mm below eaves and 75mm below gutters, pipes and drains

500mm clearance to any vertical structure on a roof, 600mm to another flue or 1,500mm to an open flue.

2,000mm below a Velux window, 600mm above or to either side of the Velux window

1,500mm between a vertical flue terminal and a window or dormer window

400mm from a pitched roof or in regions with heavy snow fall 500mm

The flue cannot be lower than 1,000mm from the top of a light well due to the build up of combustion products

**NOTE: All measurements are the minimum clearances required. Terminals must be positioned so to avoid combustion products entering the building**

Clearance no less than 200mm from the lowest point of the balcony or overhang

**NOTE: Installations in carports are not recommended**

1,200mm from an opening on the same wall (ie: door or window leading into a dwelling) in a carport with both sides open, to prevent the build up of combustion products.

Flue clearances 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.

Deduct one metre off the total flue length for every 45° bend used  
Deduct two metres off the total flue length for every 90° bend used

The flue turret has a built-in angle of 3° to ensure that the condensate flows back to the boiler for safe disposal via the condensate waste pipe.  
All horizontal flue sections must rise by 3° or at least 52mm for each metre away from the boiler to ensure condensate flows back into the boiler.

Vertical flue clearance 500mm to non-combustible building material, and 1,500mm clearanceto combustible building material

For more information on Worcester's plume management options, including reduced flue terminal clearances, please read the dedicated flue Technical & Specification Guide (8 716 112 174)

## Boiler location & clearances

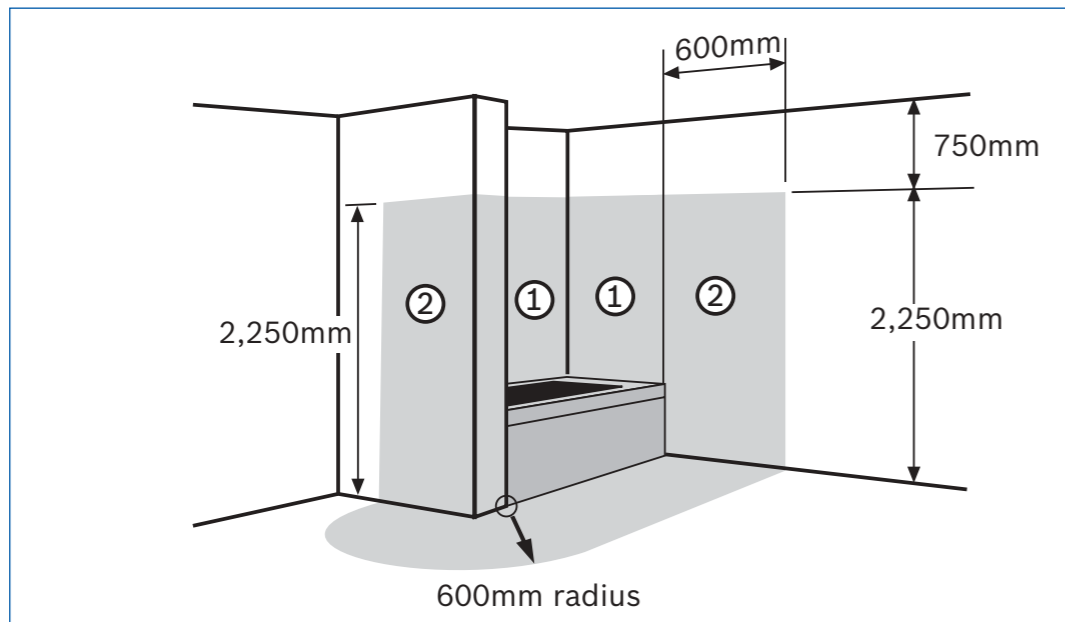
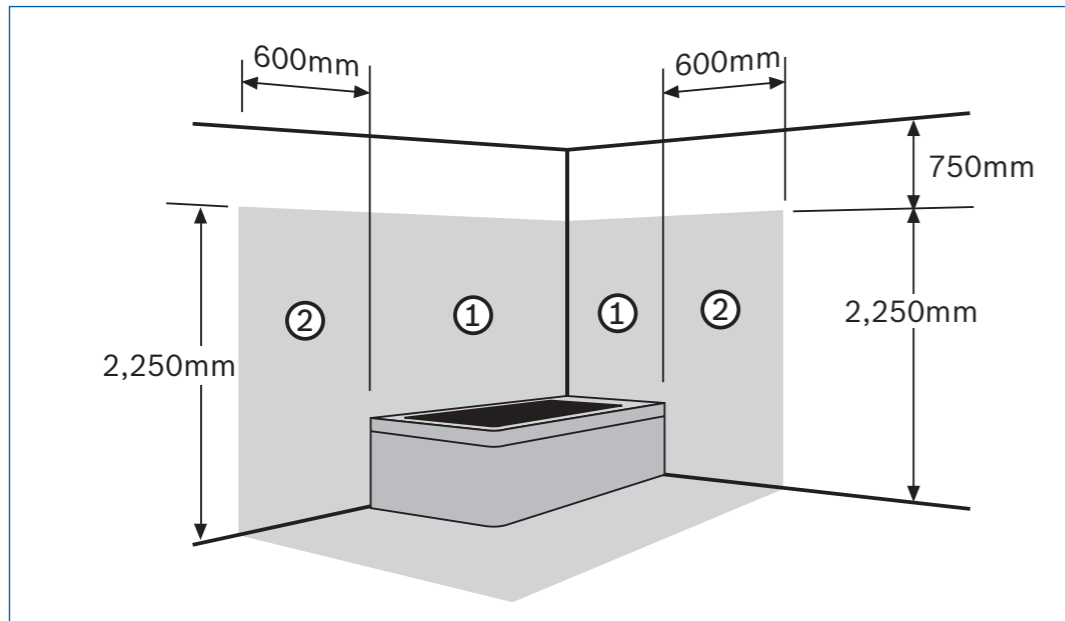
### Bathrooms

A boiler fitted with a non-mechanical timer or with no timer can be installed in zone 2 or outside the shaded area.

A boiler with a mechanical timer or RF mechanical timer with room thermostat must only be installed outside the shaded area.

Additional RCD (Residual Current Device) protection may be required.

**Refer to the latest IEE wiring regulations.**



# Greenstar i Junior & i System condensing boiler series horizontal fluing options

The Greenstar i Junior & i System series 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 kit. Both systems have different maximum lengths. Options 1 to 6 detail the permissible lengths.

## Horizontal RS flue



Flue diameter	100mm	125mm
Minimum flue length	350mm*	250mm
Maximum flue length	4,600mm	13,000mm

### 100mm dia. standard telescopic flue kit

Comprises:

- 1 x flue turret elbow
- 570mm (100mm dia.) of flue duct

**Part No. 7 716 191 082**

### 125mm dia. standard flue kit

- 1 x flue turret elbow
- 1,030mm (125mm dia.) of flue duct including terminal (as measured from centre of flue outlet)

**Part No. 7 719 002 350**

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

## Accessories

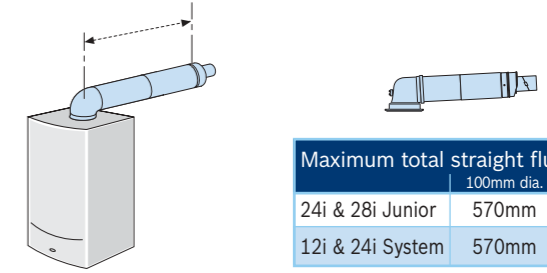
	Worcester Part No.	
	100mm dia.	125mm dia.
Extension Flue Kit (1,000mm)	7 716 191 083	7 719 001 892
Short Flue Extension (255mm)	7 716 191 133	-
90° Bend	7 716 191 084	7 719 001 891
45° Bend	7 716 191 085	7 719 001 899
High Level Horizontal Adaptor	7 719 002 432	7 719 002 433
Support Bracket Kit	7 716 191 092	-

The following criteria should be noted when planning the installation.

- The concentric flue system must be inclined at 3° (50mm per metre) from the appliance, to allow condensate to drain back into the boiler.
- 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.

## Option 1

Standard horizontal flue assembly

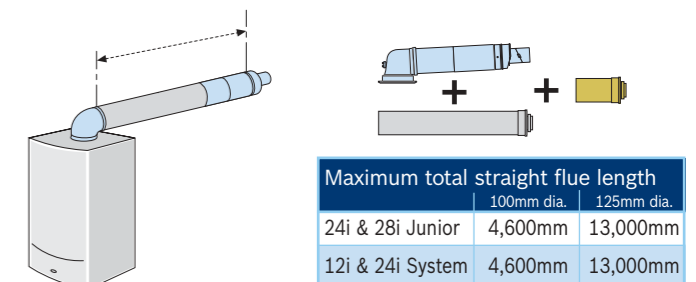


## Flue components required

Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
100mm	Standard Telescopic Flue Kit	1	7 716 191 082
125mm	Standard Flue Kit	1	7 719 002 350
<b>12i &amp; 24i System</b>			
100mm	Standard Telescopic Flue Kit	1	7 716 191 082
125mm	Standard Flue Kit	1	7 719 002 350

## Option 2

Extension flue horizontal

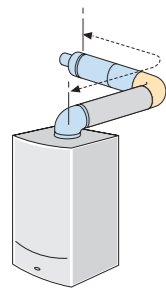


## Flue components required

Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
100mm	Standard Telescopic Flue Kit	1	7 716 191 082
100mm	1,000mm Extension Kit	up to 4	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Flue Extension	up to 13	7 719 001 892
<b>12i &amp; 24i System</b>			
100mm	Standard Telescopic Flue Kit	1	7 716 191 082
100mm	1,000mm Extension Kit	up to 4	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Flue Extension	up to 13	7 719 001 892

**Option 3**

Extension flue horizontal using a second 90° bend

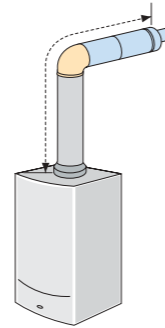


Maximum total straight flue length		
	100mm dia.	125mm dia.
24i & 28i Junior	2,600mm	11,000mm
12i & 24i System	2,600mm	11,000mm

Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
100mm	Standard Telescopic Flue Kit	1	7 716 191 082
100mm	1,000mm Extension Kit	up to 2	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
100mm	90° Bend	1	7 716 191 084
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Flue Extension	up to 11	7 719 001 892
125mm	90° Bend	1	7 719 001 891
<b>12i &amp; 24i System</b>			
100mm	Standard Telescopic Flue Kit	1	7 716 191 082
100mm	1,000mm Extension Kit	up to 2	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
100mm	90° Bend	1	7 716 191 084
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Flue Extension	up to 11	7 719 001 892
125mm	90° Bend	1	7 719 001 891

**Option 4**

Extension flue horizontal and upwards

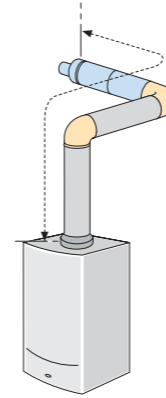


Maximum total straight flue length		
	100mm dia.	125mm dia.
24i & 28i Junior	4,600mm	13,000mm
12i & 24i System	4,600mm	13,000mm

Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
100mm	Standard Telescopic Flue Kit	1	7 716 191 082
100mm	1,000mm Extension Kit	up to 4	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
100mm	90° Bend	1	7 716 191 084
100mm	High Level Horizontal Adaptor	1	7 719 002 432
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Flue Extension	up to 13	7 719 001 892
125mm	90° Bend	1	7 719 001 891
125mm	High Level Horizontal Adaptor	1	7 719 002 433
<b>12i &amp; 24i System</b>			
100mm	Standard Telescopic Flue Kit	1	7 716 191 082
100mm	1,000mm Extension Kit	up to 4	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
100mm	90° Bend	1	7 716 191 084
100mm	High Level Horizontal Adaptor	1	7 719 002 432
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Flue Extension	up to 13	7 719 001 892
125mm	90° Bend	1	7 719 001 891
125mm	High Level Horizontal Adaptor	1	7 719 002 433

**Option 5**

Extension flue upwards and horizontal using a second 90° bend

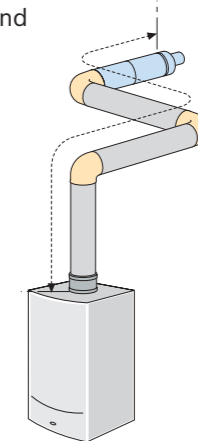


Maximum total straight flue length		
	100mm dia.	125mm dia.
24i & 28i Junior	2,600mm	11,000mm
12i & 24i System	2,600mm	11,000mm

Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
100mm	Standard Telescopic Flue Kit	1	7 716 191 082
100mm	1,000mm Extension Kit	up to 2	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
100mm	90° Bend	1	7 716 191 084
100mm	High Level Horizontal Adaptor	1	7 719 002 432
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Flue Extension	up to 11	7 719 001 892
125mm	90° Bend	2	7 719 001 891
125mm	High Level Horizontal Adaptor	1	7 719 002 433
<b>12i &amp; 24i System</b>			
100mm	Standard Telescopic Flue Kit	1	7 716 191 082
100mm	1,000mm Extension Kit	up to 2	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
100mm	90° Bend	1	7 716 191 084
100mm	High Level Horizontal Adaptor	1	7 719 002 432
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Flue Extension	up to 11	7 719 001 892
125mm	90° Bend	2	7 719 001 891
125mm	High Level Horizontal Adaptor	1	7 719 002 433

**Option 6**

Extension flue upwards and horizontal using a third 90° bend



Maximum total straight flue length		
	100mm dia.	125mm dia.
24i & 28i Junior	N/A	9,000mm
12i & 24i System	N/A	9,000mm

Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Flue Extension	up to 9	7 719 001 892
125mm	90° Bend	3	7 719 001 891
125mm	High Level Horizontal Adaptor	1	7 719 002 433
<b>12i &amp; 24i System</b>			
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Flue Extension	up to 9	7 719 001 892
125mm	90° Bend	3	7 719 001 891
125mm	High Level Horizontal Adaptor	1	7 719 002 433

# Greenstar i Junior & i System condensing boiler series vertical fluing options

The Greenstar i Junior & i System series have the choice of 2 differently sized vertical RSF flue systems, 100mm and 125mm. Both systems have different maximum lengths. Options 1 to 3 detail the permissible lengths.

## Vertical RSF flue

Flue diameter	100mm	125mm
Flue terminal assembly diameter	135mm	135mm
Maximum flue length (inc. terminal)	6,400mm	15,000mm
Flue terminal assembly length	1,140mm	1,365mm

## Vertical balanced flue kit

Comprises:

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

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

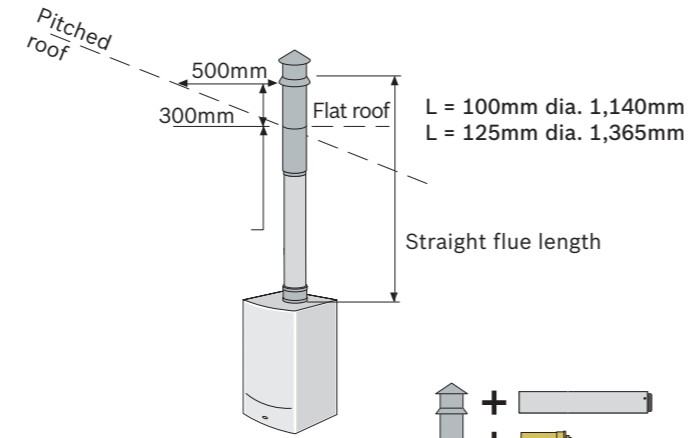
**Part No. 7 719 002 431 (125mm dia.)**

## Accessories

	Worcester Part No.	
	100mm dia.	125mm dia.
Extension Flue Kit (1,000mm)	7 716 191 083	7 719 001 892
Short Flue Extension (220mm)	7 716 191 133	N/A
90° Bend	7 716 191 084	7 719 001 891
45° Bend	7 716 191 085	7 719 001 899
Flashing – flat roof	7 716 191 090	7 716 191 090
Flashing – pitched roof	7 716 191 091	7 716 191 091

## Option 1

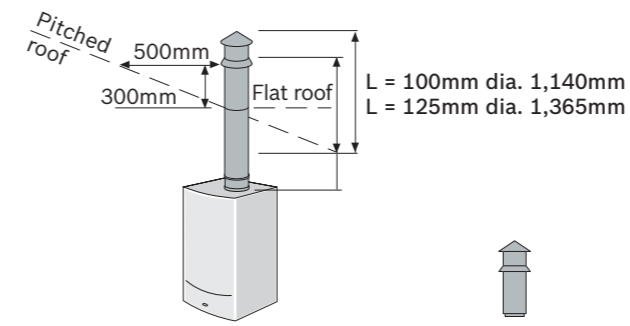
Vertical balanced flue system maximum height



	Maximum total straight flue length	
	100mm dia.	125mm dia.
24i & 28i Junior	6,400mm	15,000mm
12i & 24i System	6,400mm	15,000mm

Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
100mm	Vertical Flue Kit	1	7 719 002 430
100mm	Flue Extension	up to 6	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
125mm	Vertical Flue Kit	1	7 719 002 431
125mm	Flue Extension	up to 15	7 719 001 892
<b>12i &amp; 24i System</b>			
100mm	Vertical Flue Kit	1	7 719 002 430
100mm	Flue Extension	up to 6	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
125mm	Vertical Flue Kit	1	7 719 002 431
125mm	Flue Extension	up to 15	7 719 001 892

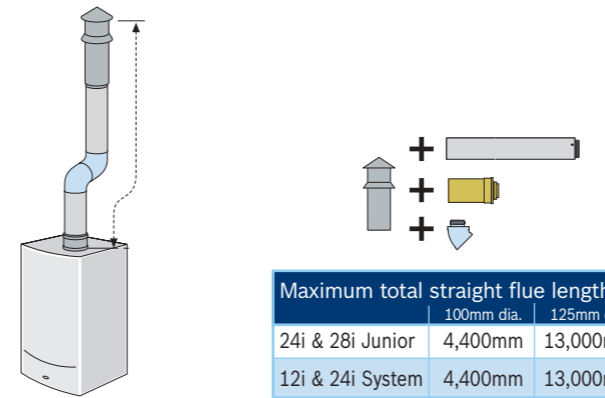
## Minimum height



Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
100mm	Vertical Flue Kit	1	7 719 002 430
125mm	Vertical Flue Kit	1	7 719 002 431
<b>12i &amp; 24i System</b>			
100mm	Vertical Flue Kit	1	7 719 002 430
125mm	Vertical Flue Kit	1	7 719 002 431

## Option 2

Vertical balanced flue system with two 45° bends

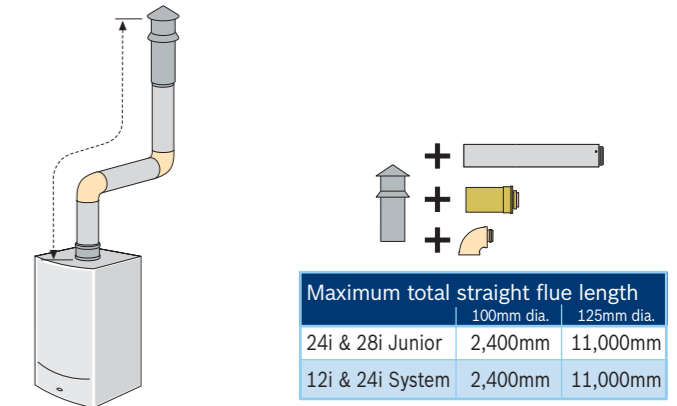


	Maximum total straight flue length	
	100mm dia.	125mm dia.
24i & 28i Junior	4,400mm	13,000mm
12i & 24i System	4,400mm	13,000mm

Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
100mm	Vertical Flue Kit	1	7 719 002 430
100mm	Flue Extension	up to 4	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
100mm	45° Bend	2	7 716 191 085
125mm	Vertical Flue Kit	1	7 719 002 431
125mm	Flue Extension	up to 13	7 719 001 892
125mm	45° Bend	2	7 719 001 899
<b>12i &amp; 24i System</b>			
100mm	Vertical Flue Kit	1	7 719 002 430
100mm	Flue Extension	up to 4	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
100mm	45° Bend	2	7 716 191 085
125mm	Vertical Flue Kit	1	7 719 002 431
125mm	Flue Extension	up to 13	7 719 001 892
125mm	45° Bend	2	7 719 001 899

## Option 3

Vertical balanced flue system with two 90° bends



	Maximum total straight flue length	
	100mm dia.	125mm dia.
24i & 28i Junior	2,400mm	11,000mm
12i & 24i System	2,400mm	11,000mm

Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
100mm	Vertical Flue Kit	1	7 719 002 430
100mm	Flue Extension	up to 2	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
100mm	90° Bend	2	7 716 191 084
125mm	Vertical Flue Kit	1	7 719 002 431
125mm	Flue Extension	up to 11	7 719 001 892
125mm	90° Bend	2	7 719 001 891
<b>12i &amp; 24i System</b>			
100mm	Vertical Flue Kit	1	7 719 002 430
100mm	Flue Extension	up to 2	7 716 191 083
100mm	Short Flue Extension	As required	7 716 191 133
100mm	90° Bend	2	7 716 191 084
125mm	Vertical Flue Kit	1	7 719 002 431
125mm	Flue Extension	up to 11	7 719 001 892
125mm	90° Bend	2	7 719 001 891

# Plume management system options

## Plume management system

### 60mm dia. plume management kit

Comprises:

- 1 x terminal elbow
- 1 x extension 500mm
- 1 x outlet assembly
- 1 x clamp pack

**Part No. 7 716 191 086**

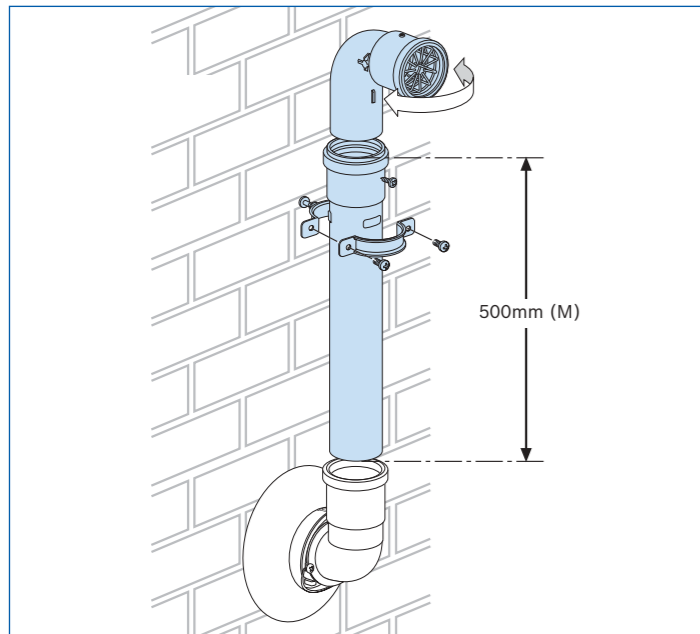
### Accessories

	Worcester Part No. 60mm dia.
Extension (1,000mm)	7 716 191 087
90° Bend	7 716 191 088
45° Bend (Pair)	7 716 191 089

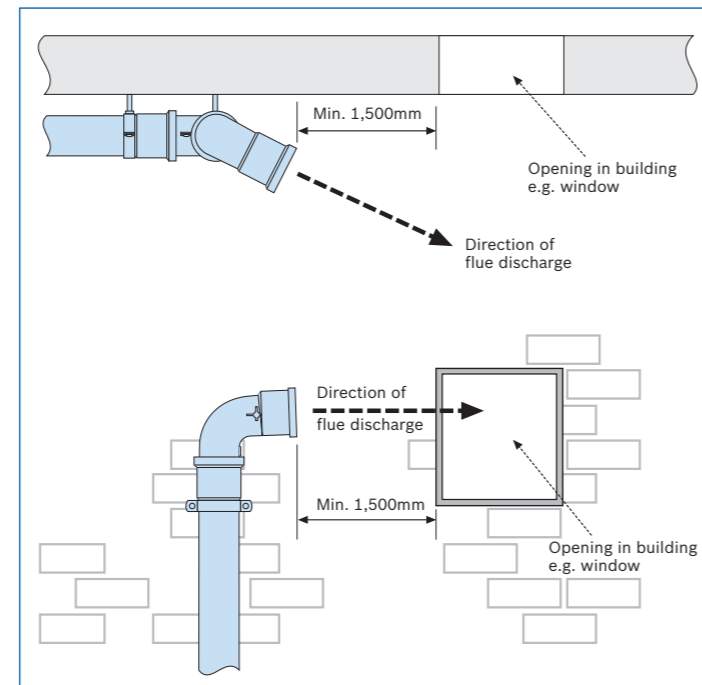
### Standard plume management system

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

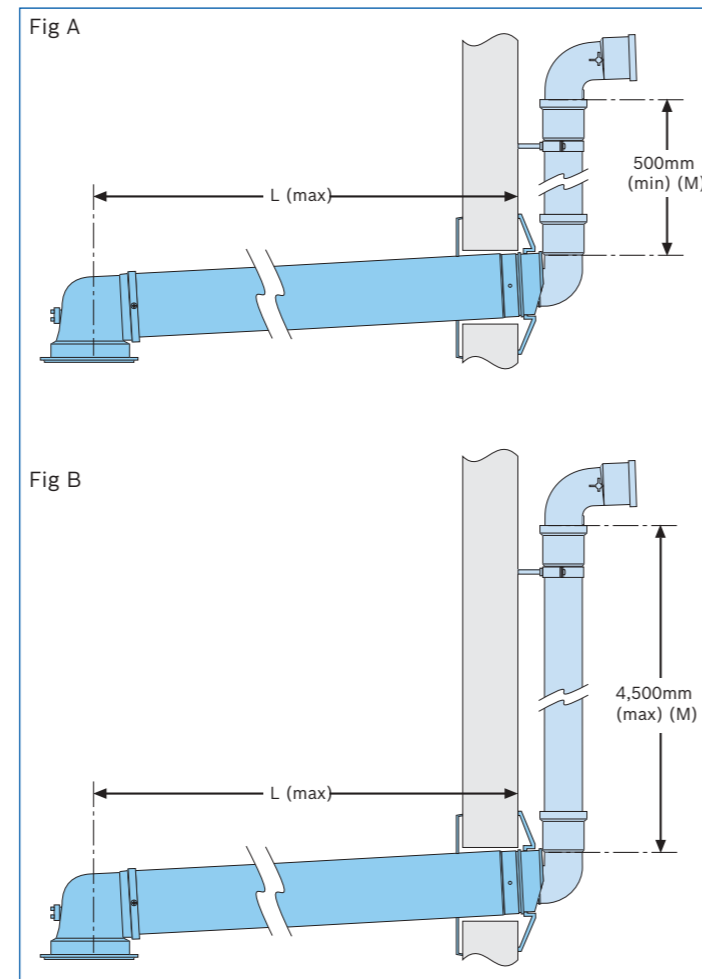
All plume management sections must rise by at least 173mm per metre (10°) from the terminal to ensure that condensate flows back into the boiler.



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



### Condensfit II telescopic flue and plume management system measuring



### Effective straight flue lengths for telescopic flue with plume management

Model	Fig. A Max. straight flue length (L) with min. plume management length (M)* (mm)	Fig. B Min. straight flue length (L) with max. plume management length (M)* (mm)
24i & 28i Junior	4,600	4,500
12i & 24i System	4,600	4,500

### NOTE:

**Plume management minimum straight length = 500mm**

**Plume management maximum straight length = 4,500mm**

### Condensfit II telescopic flue and plume management system measuring

#### 100mm dia. horizontal telescopic flue lengths with a 60mm dia. plume management system

The maximum effective straight flue lengths (L) are stated opposite for the relevant appliance together with the minimum and maximum lengths (M) of the plume management system connected, these lengths must not be exceeded.

#### 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):

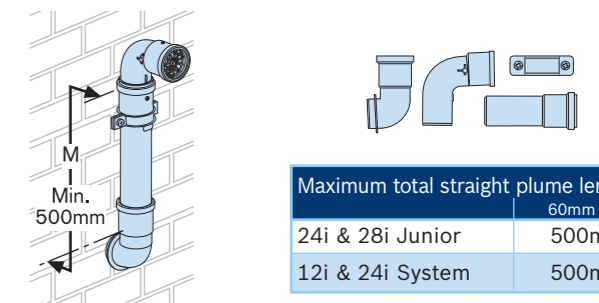
- 1,500mm for each extra 90° bend
- 750mm for each extra 45° bend

For plume management options with 60mm dia. extensions refer to pages 25 – 27.

**Note: For information on the Condensfit II Telescopic Flue System and Plume Management Kit, please see dedicated flue Technical and Specification leaflet 8 716 112 174.**

### Option 1

Plume management system

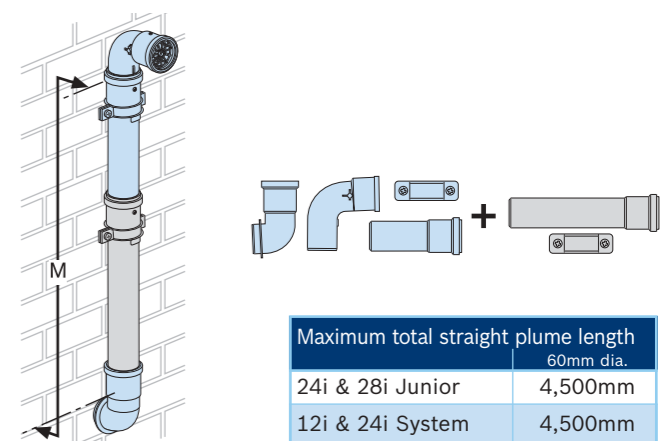


### Flue components required

Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
60mm	Plume Management Kit	1	7 716 191 086
<b>12i &amp; 24i System</b>			
60mm	Plume Management Kit	1	7 716 191 086

### Option 2

Plume management system with extensions

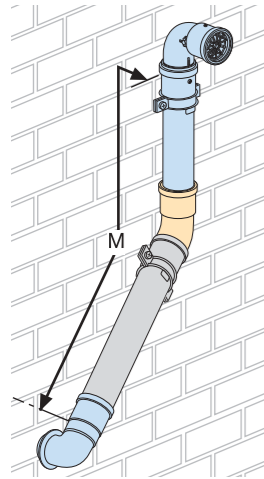


### Flue components required

Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
60mm	Plume Management Kit	1	7 716 191 086
60mm	1,000mm Extension	up to 4	7 716 191 087
<b>12i &amp; 24i System</b>			
60mm	Plume Management Kit	1	7 716 191 086
60mm	1,000mm Extension	up to 4	7 716 191 087

### Option 3

Plume management system with extensions and 45° bend

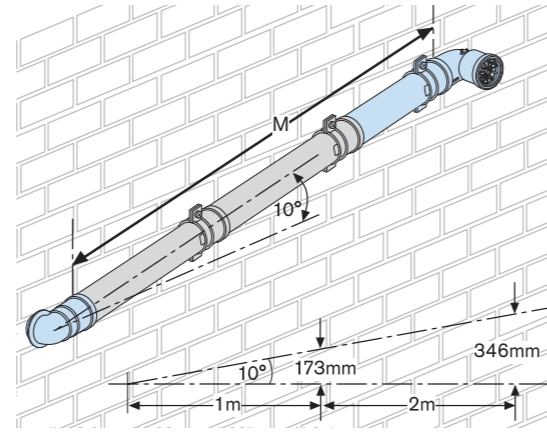


Maximum total straight plume length 60mm dia.	
24i & 28i Junior	3,750mm
12i & 24i System	3,750mm

Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
60mm	Plume Management Kit	1	7 716 191 086
60mm	1,000mm Extension	up to 3	7 716 191 087
60mm	45° Bend	1	7 716 191 089
<b>12i &amp; 24i System</b>			
60mm	Plume Management Kit	1	7 716 191 086
60mm	1,000mm Extension	up to 3	7 716 191 087
60mm	45° Bend	1	7 716 191 089

### Option 4

Plume management system with angled termination

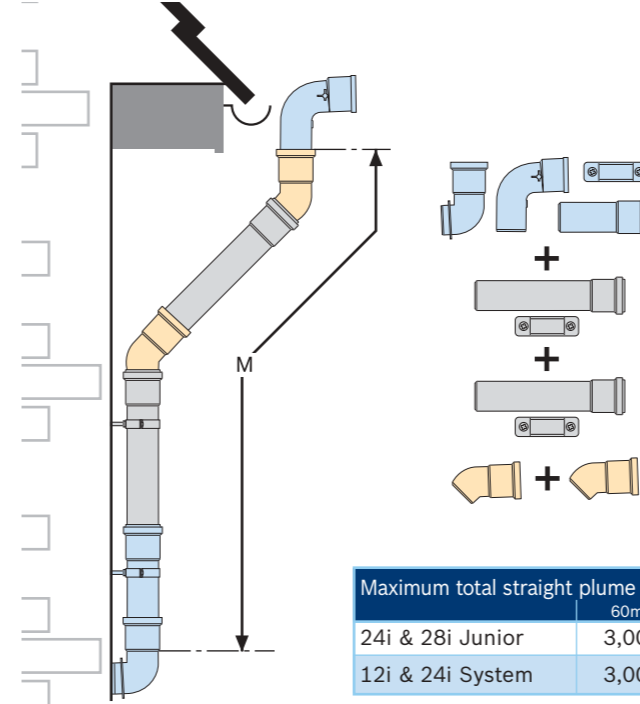


Maximum total straight plume length 60mm dia.	
24i & 28i Junior	4,500mm
12i & 24i System	4,500mm

Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
60mm	Plume Management Kit	1	7 716 191 086
60mm	1,000mm Extension	up to 4	7 716 191 087
<b>12i &amp; 24i System</b>			
60mm	Plume Management Kit	1	7 716 191 086
60mm	1,000mm Extension	up to 4	7 716 191 087

### Option 5

Plume management system with extensions and 45° bends



Maximum total straight plume length 60mm dia.	
24i & 28i Junior	3,000mm
12i & 24i System	3,000mm

Flue components required			
Flue Diameter	Description	Quantity	Worcester Part No.
<b>24i &amp; 28i Junior</b>			
60mm	Plume Management Kit	1	7 716 191 086
60mm	1,000mm Extension	up to 3	7 716 191 087
60mm	45° Bend	2	7 716 191 089
<b>12i &amp; 24i System</b>			
60mm	Plume Management Kit	1	7 716 191 086
60mm	1,000mm Extension	up to 3	7 716 191 087
60mm	45° Bend	2	7 716 191 089

# Installation requirements

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

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

Gas Safety (Installation and Use) Regulations. All gas appliances must be installed by a CORGI 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 i Junior combi and system boilers are supplied complete with all the necessary components to form a sealed primary system. Included are a pre-plumbed expansion vessel, a pressure relief valve (set at 3bar), an automatic air vent and a pressure gauge.

With an initial system pressure of 0.5bar a system capacity of approximately 83 litres can be accommodated. Refer to BS 7074:Part 1 for more information. The charge pressure can be increased by with a decrease in system volume.

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 Fernox (Tel: 01799 521133) for further details.

## System filling and make-up

To comply with the Water Authority requirements, the system should be filled via a temporary hose connection to the mains cold water supply, with a double check valve assembly and test point fitted to the mains water side of a temporary circuit. Alternatively, for the Greenstar i Junior combi boilers, the plug-in filling link option (part number 7 716 192 281), simply connects between the cold main connection and the heating return circuit on the wall mounting jig.

## 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.

## Greenstar 12i & 24i System diverter valve kit

The Greenstar i System boiler can be adapted to house an in-built diverting valve. The optional valve motor kit (part no: 12kW – 7 716 192 408 & 24kW – 7 716 192 409) allows the user to control the supply of heat to the hot water cylinder from the boiler.

## 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

Provided that the correct gas supply working pressure and gas rate can be achieved (refer to BS 6891), then it may be possible to reduce the gas supply pipe diameter for the 12i System appliance **only** to 15mm. Generally speaking, the appliance would need to be within 3 or 4 metres of the gas meter. However, this will depend on the distribution pipe size and route.

The appliances when on a hot water or full output demand will require up to 3.02m<sup>3</sup>/hr of gas (depending on the model). 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, details of this are given in the table below.

	Total length of gas supply pipe (m)			Pipe diameter (mm)
	3	6	9	–
Gas discharge rate m <sup>3</sup> /h	2.9	–	–	15
	8.7	5.8	4.6	22
	18.0	12.0	9.4	28

Approximate additional length to be allowed (natural gas)

Elbows or tees		90° bends	
Metres	Feet	Metres	Feet
0.5	2	0.3	1

## Liquid Petroleum Gas (LPG) supply

The Greenstar i Junior & i System series are available in an LPG gas version. The appliance when on a hot water or full output demand will require up to 2.22kg/h of gas (depending on the model). 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.

	Total length of gas supply pipe (m)			Pipe diameter (mm)
	3	6	9	–
Gas discharge rate m <sup>3</sup> /h	1.5	1.01	–	15
	8.0	5.2	4.2	22
	15.9	8.9	8.3	28

Approximate additional length to be allowed (LPG)

Elbows or tees		90° bends	
Metres	Feet	Metres	Feet
0.6	2	0.3	1

## 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 contact Worcester Technical Support Department.

### Pipe sizing

Unless the mains pressure is low, a standard 15mm diameter service pipe is normally suitable. A 15mm hot water distribution pipe to the first branch is recommended thereafter 15mm and/or 10mm to all draw off points.

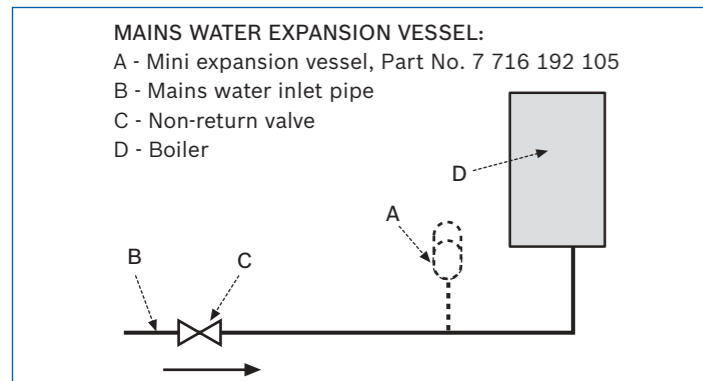
### Cold water connection

Connection should be made as shown in the pipework detail and the appliance installed generally in accordance with the layout shown on page 14.

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. 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

A domestic hot water flow regulator, set to give an optimum flow rate of 9.8 or 11.4l/min  $\pm$ 15% (dependent on model) is fitted to the cold supply of the hot water heat exchanger in the Greenstar 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 i Junior combi series appliance must be suitable for operating at a mains pressure and temperatures of 65°C (150°F).

#### Showers

When a loose head shower with a flexible hose is used over a bath or shower tray, the hose must be fixed so that the head cannot fall closer than 25mm (1in) above the top edge of the spill over level of the relevant bath or shower tray. Alternatively, the feed pipes to the shower should incorporate a double check valve assembly or a check valve and vacuum breaker.

With fixed head showers no provision is necessary.

The use of a thermostatically controlled shower will give added comfort and safeguard against high hot water temperatures. Alternatively, a pressure balancing shower valve specifically designed for constant temperature water heaters would be suitable.

#### Bidet

The supply of hot and cold water mains direct to a bidet is permitted provided that the bidet is of the overrim water feed type. The outlet(s) should be shrouded and not to have any temporary hand held spray attached. No other anti-siphonage arrangements are necessary.

#### 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.

#### Warranty

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

\*Subject to conditions.

# Greenstar i Junior & i System series accessories

<b>MT10 mechanical timer</b>  <b>Worcester Part No. 7 716 192 036</b>	<b>MT10RF mechanical RF thermostat</b>  <b>Worcester Part No. 7 716 192 037</b>	<b>DT20 twin channel digital programmer</b>  <b>Worcester Part No. 7 716 192 038</b>	<b>DT20RF digital RF thermostat with twin channel programmer</b>  <b>Worcester Part No. 7 716 192 054</b>
<b>DT10RF digistat</b>  <b>Worcester Part No. 7 716 192 052</b>	<b>Optional 24kW diverter valve kit</b>  <b>Worcester Part No. 7 716 192 409</b>	<b>Optional 12kW diverter valve kit</b>  <b>Worcester Part No. 7 716 192 408</b>	<b>Filling link</b>  <b>Worcester Part No. 7 716 192 281</b>
<b>Vertical pre-piping assembly</b>  <b>Worcester Part No. 7 716 192 570</b>	<b>RS telescopic flue kit (100mm dia.)</b>  <b>Worcester Part No. 7 716 191 082</b>	<b>Horizontal flue kit (125mm dia.)</b>  <b>Worcester Part No. 7 719 002 350</b>	<b>Vertical BF kit (100mm dia.)</b>  <b>Worcester Part No. 7 719 002 430</b>
<b>Vertical BF kit (125mm dia.)</b>  <b>Worcester Part No. 7 719 002 431</b>	<b>RS extension kit (100mm dia., 1,000mm)</b>  <b>Worcester Part No. 7 716 191 083</b>	<b>Short flue extension 220mm (100mm dia.)</b>  <b>Worcester Part No. 7 716 191 133</b>	<b>1m extension (125mm dia.)</b>  <b>Worcester Part No. 7 719 001 892</b>

Note: For information on the Condensfit II Telescopic Flue System and Plume Management Kit, please see dedicated flue Technical and Specification leaflet 8 716 112 174.

# Greenstar i Junior & i System series accessories

<p><b>45° bend (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 085</b></p>	<p><b>45° bend (125mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 001 899</b></p>	<p><b>90° bend (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 084</b></p>	<p><b>90° bend (125mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 001 891</b></p>
<p><b>High level horizontal adaptor (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 002 432</b></p>	<p><b>High level horizontal adaptor (125mm dia.)</b></p>  <p><b>Worcester Part No. 7 719 002 433</b></p>	<p><b>Support bracket kit (100mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 092</b></p>	<p><b>Plume management kit (60mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 086</b></p>
<p><b>1,000mm extension (60mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 087</b></p>	<p><b>90° bend (60mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 088</b></p>	<p><b>45° bend (60mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 089</b></p>	<p><b>Flat roof flashing kit (100mm &amp; 125mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 090</b></p>
<p><b>Pitched roof flashing kit (100mm &amp; 125mm dia.)</b></p>  <p><b>Worcester Part No. 7 716 191 091</b></p>			

Note: For information on the Condensfit II Telescopic Flue System and Plume Management Kit, please see dedicated flue Technical and Specification leaflet 8 716 112 174.

# 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 warranty applicable to all Worcester boilers, you and your customers have the assurance that every Worcester boiler is manufactured to both the appropriate British and European standards.

## Worcester Contact Centre

Should you require support, our fully trained Contact Centre staff, 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.

## Boiler Protection Options

Worcester offers boiler protection including service and maintenance contracts. Please call the Worcester Contact Centre for further details.

If you do not offer annual service and maintenance contracts please refer your customers to the Worcester Contact Centre:

**Tel: 08457 256 206**

**Fax: 01905 757 536**

## Opening Times

Monday – Friday: 7.00am – 10.00pm

Saturday: 8.00am – 5.00pm

Sunday: 9.00am – 12 noon

# All the technical advice you need

## Spares

Genuine replacement parts for all Worcester boilers are readily available from stock, on a next day delivery basis. For more information please call your local stockist. You can find a spares stockist on our website.

## 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 boiler 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 boiler system to suit a particular application, along with full guidance on installation. As well as this we will also assist in finding a recommended installer. For more information please contact the Technical Helpline or alternatively visit our website where literature can be downloaded at [www.worcester-bosch.co.uk](http://www.worcester-bosch.co.uk)

## Technical

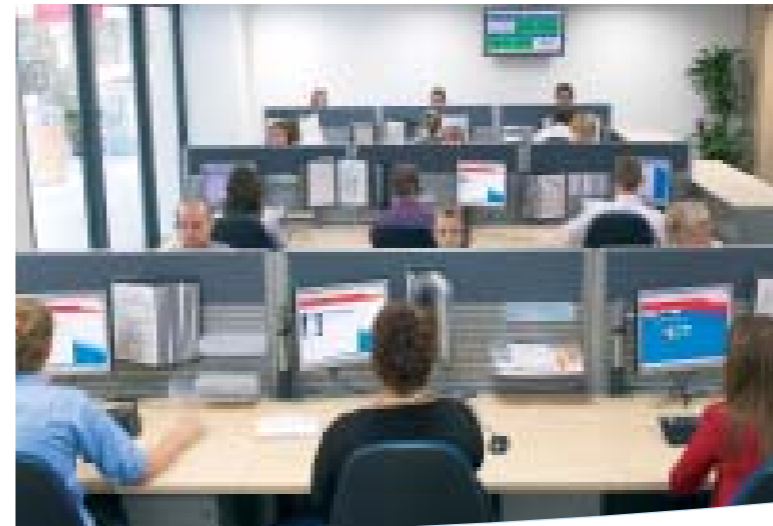
**Tel: 08705 266 241**

**Fax: 01905 752 741**

## Opening Times

Monday – Friday: 7.00am – 8.00pm

Saturday: 8.30am – 4.00pm



# The very best training programmes from Worcester

Worcester has always placed great emphasis on technical support and training for installers and service engineers. Today this need is greater than ever. The differences between a combi, conventional and system boiler are substantial, and the technology of each continues to advance at a rapid pace.

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

## Courses available

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



## Training Centres throughout the UK

Worcester's network of regional training centres are strategically located across the country and include the 'A' Rated Training Academy at the company's headquarters. This facility has recently been extended to include an oil-fired appliance workshop and a renewable energies workshop in addition to the extensive gas-fired training facilities.

In addition to these outstanding facilities there are centres at Clay Cross in Derbyshire and Bangor in Northern Ireland. Further 'A' Rated Academies are open at West Thurrock in Essex and Bradford in West Yorkshire as well as additional training opportunities available throughout the UK. 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

A number of the UK's leading proactive technical colleges are equipped with Worcester products and offer excellent practical tuition on a more local level.

## Distance Learning/Web Based Learning

Worcester has produced a selection of Distance Learning CD ROMs/DVDs which are packed with information. Call 01905 752556 for your copies, or visit [www.worcester-bosch.co.uk](http://www.worcester-bosch.co.uk) for information on Web Based Learning.

## Mobile training

Our 7.5 tonne mobile oil training vehicle with working boilers, is now available throughout the country for hands-on oil training and OFTEC courses.

Courses on Air to Water and Air to Air are now available please check with your local TSM and the Worcester website [www.worcester-bosch.co.uk](http://www.worcester-bosch.co.uk). Phone 01905 752526 to book your place.

Get on course for a more profitable future now.

Call now for more information  
01905 752526



[www.worcester-bosch.co.uk](http://www.worcester-bosch.co.uk)



# Worcester training courses

Worcester training courses	
<b>Greenstar CDi and Highflow CDi gas-fired condensing combi boilers</b>	
Models covered	Greenstar 27/30/37/42CDi Greenstar Highflow 440/550CDi
Duration	1 day
<b>Greenstar i Junior and Si gas-fired condensing combi boilers</b>	
Models covered	Greenstar 24/28i Junior Greenstar 25/30Si
Duration	1 day
<b>Greenstar system and regular gas-fired condensing boilers</b>	
Models covered	Greenstar 12/15/18/24Ri Greenstar 30/40CDi Conventional Greenstar FS 30/42CDi Regular Greenstar 30CDi System Greenstar 12/24i System
Duration	1 day
<b>Greenstar Camray high efficiency condensing oil-fired boilers</b>	
Models covered	Greenstar Camray (kitchen) Greenstar Camray (kitchen) System Greenstar Camray Utility Greenstar Camray Utility System Greenstar Camray External
Duration	1 day
<b>Greenstar Danesmoor &amp; Heatslave high efficiency condensing oil-fired boilers</b>	
Models covered	Greenstar Danesmoor Greenstar Utility Greenstar Heatslave Greenstar Heatslave External
Duration	1 day
<b>OFTEC Training</b>	
<b>OFTEC 101</b>	
Covering	Domestic/Light Commercial Pressure Jet Commissioning and Servicing
Duration	3 day course (2 days training plus 1 days assessment)
<b>OFTEC 105e</b>	
Covering	Domestic/Light Commercial Pressure Jet Boiler Installation
Duration	1 day assessment
<b>OFTEC 101 &amp; 105e</b>	
Covering	Domestic/Light Commercial Pressure Jet Installation, Commissioning and Servicing
Duration	3 day course (2 days training plus 1 days assessment comprising 2 theory and 1 practical)
<b>OFTEC 600a</b>	
Covering	Oil Tank Installation and Associated Controls
Duration	1 day assessment course
<b>OFTEC 101/105e/600e</b>	
Covering	Domestic/Light Commercial Pressure Jet Boiler Installation, Commissioning, Servicing and Oil Tank Installation and Associated Controls
Duration	4 days (2 days training and 2 days assessment)
<b>Mobile OFTEC</b>	
All above covered throughout the country on the mobile training vehicle as well as in all our centres.	

<b>Certificate in Energy Efficiency for Domestic Heating Course</b>	
Covering	Key elements of energy-efficient heating and hot water systems and products, compliance with the latest Building Regulations, how condensing boilers work and how they differ to non condensing products.
Duration	1 day
<b>Unvented Cylinder Course</b>	
Covering	All G3 Regulations for the Installation, Servicing and Commissioning of Unvented Cylinders. The course includes recognised accreditation by Logic Certification.
Duration	1 day
<b>Greenskies Solar System</b>	
Covering	Installation, Commissioning and Servicing The course includes recognised accreditation by Logic Certification for eligibility of low carbon buildings programme funding.
Duration	2 days
<b>Greenstore Ground Source Heat Pumps</b>	
Covering	Installation, Commissioning and System Design
Duration	2 days
<b>Greenstore Heat Pumps – Air to Water</b>	
Covering	Installation, Commissioning and System Design
Duration	2 days
<b>Greenstore Heat Pumps – Air to Air</b>	
Covering	Installation, Commissioning and System Design
Duration	1 day



## Useful numbers

### Sales

Tel: 01905 752640  
Fax: 01905 456445

### Spare Parts

Tel: 01905 752576  
Fax: 01905 754620

### Technical (Pre & Post Sales)

Tel: 08705 266241  
Fax: 01905 752741

### Service

Tel: 08457 256206  
Fax: 01905 757536

### Training

Tel: 01905 752526  
Fax: 01905 752535

### Literature Line

Tel: 01905 752556  
or download instantly  
from our website

# [www.worcester-bosch.co.uk](http://www.worcester-bosch.co.uk)



The Council for  
Registered Gas  
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ASSOCIATE



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HEATING & HOTWATER INDUSTRY COUNCIL



The mark of quality for domestic heating

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