

# The **Greenstar Danesmoor, Utility & Wall Mounted** regular oil-fired condensing boiler series

Technical and specification information



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PRODUCT

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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 Danesmoor, Utility & Wall Mounted oil-fired condensing boiler series



The Greenstar Danesmoor, Utility and Wall mounted series is part of a market-leading range of energy-saving condensing floor standing oil-fired boilers.

### Higher efficiency and highly cost effective

Up to an incredible 93% of the oil consumed by a Greenstar Danesmoor, Utility and Wall Mounted condensing boiler is converted into heat for the heating and/or hot water system. Other types of boiler achieve around 85% efficiency. Therefore, compared with a new non-condensing regular boiler, these fuel efficient boilers can cut heating and hot water bills by between 5-10% and they're up to 25% cheaper to run than an older boiler.

The Greenstar series of oil-fired boilers is SEDBUK Band A rated and delivers energy-saving performance by extracting additional latent heat from the exhaust gases – a highly efficient use of energy which also reduces carbon dioxide emissions into the atmosphere.

And to all these major benefits you can add yet more: renowned Worcester quality and reliability; outputs to comfortably satisfy the heating and hot water demands of the larger household with more than one bathroom; and truly exceptional all-round value for money. Greenstar Danesmoor, Utility and Wall Mounted boilers come with the reassurance of a 2 year\* parts and labour warranty with a 5 year\* warranty on the primary heat exchanger.

## The Greenstar Danesmoor, Utility & Wall Mounted series at a glance

		Greenstar Danesmoor 18/25
Output to CH	Min	18kW
	Max	25kW
Kitchen model		•

		Greenstar Utility 18/25	Greenstar Utility 32/50	Greenstar Utility 50/70
Output to CH	Min	18kW	32kW	50kW
	Max	25kW	50kW	70kW
Utility model		•	•	•

		Danesmoor WM 12/18	Danesmoor WM 18/25
Output to CH	Min	12kW	18kW
	Max	18kW	25kW
Kitchen model		•	•

Features	Benefits
Same footprint as previous Danesmoor boilers (floor standing models)	Less disturbance during boiler replacement installations
Compatible with Greenskies solar panels	Renewable and sustainable energy for the home
100% testing of heat exchangers and burners	Quality assurance
Conventional flue or room sealed balanced flue from one model	Siting flexibility, product availability
Circular 'push-fit' flue system	Time saving
Top, left, right and rear flue options	Siting flexibility
Optional fascia-mounted programmer – Danesmoor models only	Reduced wiring
2 year* warranty on boiler 5 year* warranty on primary heat exchanger 10 year* warranty on secondary heat exchanger	Peace of mind for the user
Robust quality manufacture	Quality assurance
Oil isolation valve	Money saving
Manual reset thermostat	Sealed system compatibility
Condensate trap supplied	Ease of installation
Stainless steel secondary heat exchanger	High efficiency, SEDBUK Band A

Please note that this leaflet is a guide to installation only. For full details please refer to the installation and servicing instructions.

\*Subject to conditions

# The Greenstar Danesmoor, Utility & Danesmoor Wall Mounted condensing boiler series

## Options

There are 3 versions of the new Greenstar oil-fired boiler series, the Danesmoor, Utility and Danesmoor Wall Mounted boilers.

### **Greenstar Danesmoor**

The Greenstar Danesmoor version is supplied as standard with a light grey fascia panel which is mounted with the boiler temperature controller, demand and lock out indicator lights.

The Greenstar Danesmoor also features a removable panel into which the optional 7 day timer can be fitted allowing the hot water and central heating system to be operated from the boiler.

### **Greenstar Utility**

The Greenstar Utility version is an economical series of appliances finished in a durable white casing. Within the cabinet are the temperature controller and reset buttons.

### **Greenstar Danesmoor WM**

The Greenstar Danesmoor WM (Wall Mounted) appliances have a light grey fascia panel into which the optional plug-in programmer can be fitted. The panel also includes easily accessible reset buttons.

## Models

The Greenstar Danesmoor & Utility floor standing series of oil-fired domestic and light commercial central heating boilers includes outputs from 18-25kW, 32-50kW and 50-70kW and is available with a wide choice of different fluing options. The 18/25 model is available as a Danesmoor Kitchen or Utility model. The 32/50 and 50/70 models are available in Utility version.

The Greenstar Danesmoor Wall Mounted boiler is available in both 12/18kW and 18/25kW outputs.

## Oil

These appliances are for use with 28 sec Kerosene fuel only.

## Applications

- Greenstar Danesmoor and Utility appliances are designed to serve central heating and hot water requirements ranging from 12 to 25kW and 32 to 70kW
- The Greenstar Danesmoor and Utility 18/25 floor standing models have been designed to fit neatly within standard kitchen units and are therefore ideally suited to kitchen or utility room installation
- Greenstar Utility 32/50 and 50/70 models are designed for installation into non-kitchen areas, such as a utility room or boilerhouse.

The Greenstar series is suitable for connection to a fully pumped primary water system. A gravity hot water system is no longer allowed under the Part L Building Regulations.

## Advantages

- All Greenstar oil-fired boilers are highly economical, operating at thermal efficiencies within SEDBUK Band A – the highest energy efficiency rating
- The optional plug-in programmer on the Greenstar Danesmoor 18/25 and Danesmoor WM models eliminates the need for external wiring of a programmer
- The flue fitted to horizontal discharge and balanced flue terminals ensures quiet operation
- All Greenstar appliances are approved to the Boiler Efficiency Directive and are listed within the SEDBUK database as Band A
- All Greenstar floor standing and wall mounted oil-fired boilers have at least a 5mm mild steel inner primary heat exchanger surface and a 3mm outer. This, combined with a stainless steel secondary heat exchanger which extracts additional latent heat within the flue gases, ensures a solid, robust product.

## Special features

- Designed for easy installation and servicing
- Many years' development has produced the optimum match of burner to boiler, ensuring maximum efficiency and exceptionally clean and quiet operation
- Greenstar Danesmoor, Utility and Wall Mounted boilers come with the reassurance of a 2 year\* parts and labour warranty with a 5 year\* warranty on the primary heat exchanger.

## Flue options

The Greenstar range can be connected to a conventional flue system or a multi-directional balanced flue room sealed system. After choosing the most suitable flue system and route, the appropriate flue kit(s) need to be specified. See page 20 for further details.

## User controls

An electronic 7 day twin-channel digital programmer is available as an optional extra. This may be fitted into the removable panel on the fascia. No wiring is required as the programmer simply plugs in (Greenstar Danesmoor 18/25 and Danesmoor WM models only).

Provision is made within the appliance for wiring external controls e.g. room thermostat.

## Greenstar literature

The appliance is dispatched complete with comprehensive installation, maintenance and user instructions.

User operating instructions for the 7 day twin channel programmer are contained within the programmer box.



Greenstar Danesmoor



Greenstar Danesmoor WM

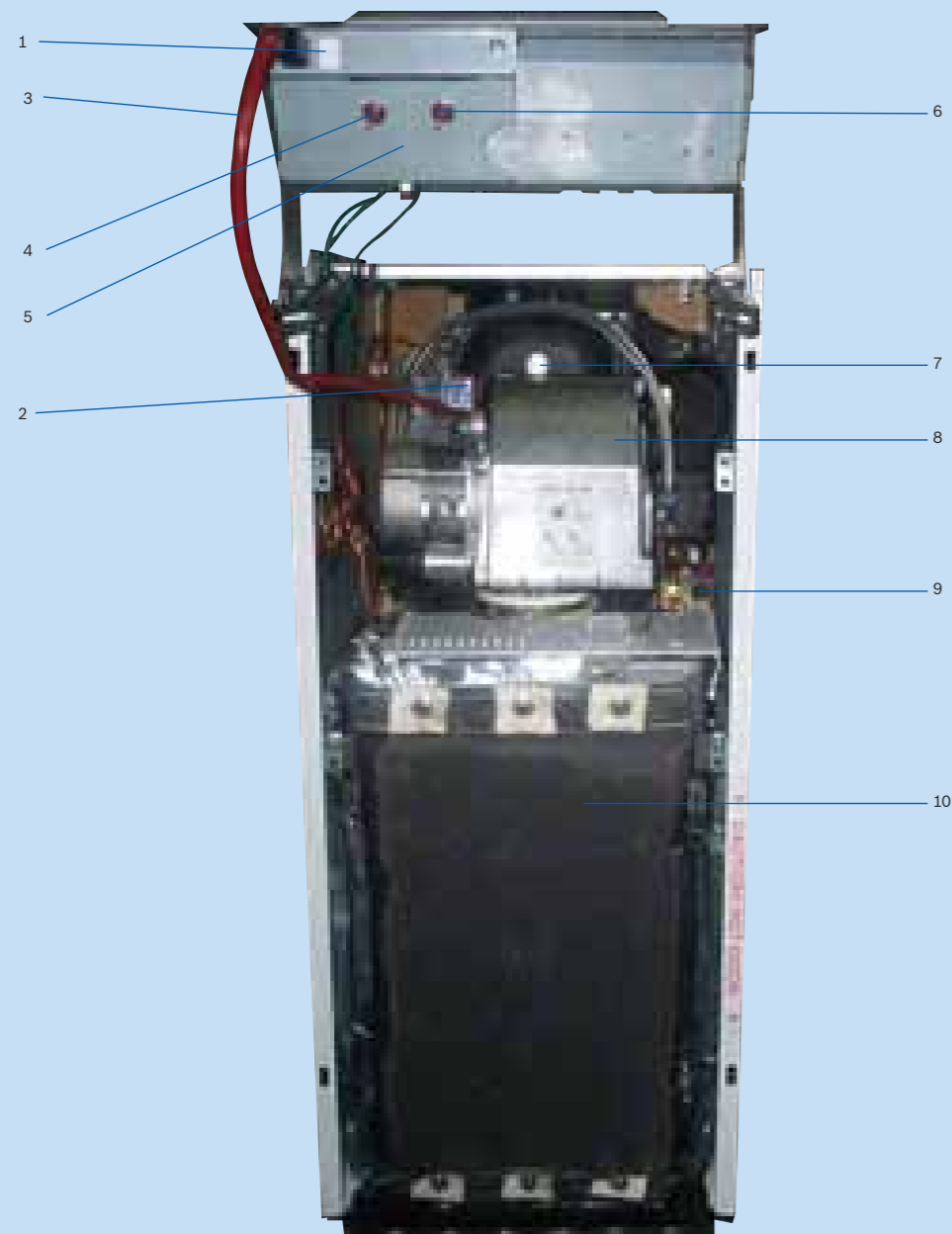
\*Subject to conditions

## Technical data – Greenstar Danesmoor, Utility and Danesmoor Wall Mounted series

Model	Greenstar Danesmoor 18/25	Greenstar Utility 18/25	Greenstar Utility 32/50	Greenstar Utility 50/70
Height (mm)	855	855	1,012	1,012
Width (mm)	370	370	520	520
Depth (mm)	600	600	815	815
Weight – dry (kg)	119	120	270	280
SEDBUK value % / band	92.9%/Band A	92.9%/Band A	93%/Band A	92.5%/Band A
Solar compatible	•	•	•	•
Heating / return connections	22mm copper	22mm copper	28mm copper	28mm copper
CH flow / open vent	1" BSP	1" BSP	1½" BSP	1½" BSP
CH make-up – cold feed	1" BSP	1" BSP	1½" BSP	1½" BSP
Condensate connection	21.5mm plastic pipe	21.5mm plastic pipe	21.5mm plastic pipe	21.5mm plastic pipe
Primary water content (litres)	24.5	24.5	50	51
Max. static head (m)	30	30	30	30
Min. static head (m)	1	1	1	1
Water side resistance – 20°C difference (mbar)	57	57	26	40
Exit flue gas mass flow (kg/hr)	40	40	76	106
Fuel line – compression (mm)	10	10	10	10
Electrical power supply voltage (AC V)	230	230	230	230
Frequency (Hz)	50	50	50	50
Max. power consumption (W)	155	155	190	220
Typical boiler flow temperature range – min. / max. (°C)	55/81	55/81	60/82	60/82
CH control thermostat differential (°C)	5	5	5	5
Boiler high limit thermostat – cut-out (°C)	95	95	100	100
Boiler manual reset overheating thermostat – cut-out (°C)	105	105	110	110
Flue reset overheating thermostat – cut-out (°C)	110	110	120	120
Max. hearth temperature (°C)	<100	<100	<100	<100
Appliance protection rating	IP 20	IP 20	IP 20	IP 20
Output to central heating kW (Btu)	18 - 25 (61,400 - 85,300)	18 - 25 (61,400 - 85,300)	32 - 50 (109,184 - 170,600)	50 - 70 (170,600 - 238,840)
Conventional flue – min. diameter required (mm)	100	100	130	130
Room sealed flue diameter (mm)	80/125	80/125	100/150	100/150
Max. vertical flue (mm) (125mm dia.) inc. terminal	6,000	6,000	–	–
Max. vertical flue (mm) (150mm dia.) inc. terminal	–	–	6,000	6,000
Max. horizontal flue (mm) (125mm dia.)	4,000	4,000	–	–
Max. horizontal flue (mm) (150mm dia.)	–	–	3,000	3,000

Model	Greenstar Danesmoor WM 12/18	Greenstar Danesmoor WM 18/25
Height (mm)	880	880
Width (mm)	600	600
Depth (mm)	380	380
Weight – dry (kg)	108.5	108.5
Lift weight (kg)	72.5	72.5
SEDBUK value % / band	92.6%/Band A	92.8%/Band A
Solar compatible	•	•
Heating / return connections	22mm copper	22mm copper
CH flow / open vent	22mm copper	22mm copper
CH make-up – cold feed	22mm copper	22mm copper
Condensate connection	21.5mm plastic pipe	21.5mm plastic pipe
Primary water content (litres)	23	23
Max. static head (m)	30	30
Min. static head (m)	1	1
Water side resistance – 20°C difference (mbar)	30	69
Exit flue gas mass flow (kg/hr)	29	40
Fuel line – compression (mm)	10	10
Electrical power supply voltage (AC V)	230	230
Frequency (Hz)	50	50
Max. power consumption (W)	150	160
Typical boiler flow temperature range – min. / max. (°C)	55/81	55/81
CH control thermostat differential (°C)	5	5
Boiler high limit thermostat – cut-out (°C)	95	95
Boiler manual reset overheating thermostat – cut-out (°C)	105	105
Flue reset overheating thermostat – cut-out (°C)	110	110
Appliance protection rating	IP 20	IP 20
Output to central heating kW (Btu)	12 - 18 (40,950 - 61,400)	18 - 25 (61,400 - 85,300)
Conventional flue – min. diameter required (mm)	100	100
Room sealed flue diameter (mm)	80/125	80/125
Max. vertical flue (mm) (125mm dia.) inc. terminal	6,000	6,000
Max. horizontal flue (mm) (125mm dia.)	4,000	4,000

# The Greenstar Danesmoor & Utility 18/25 condensing boilers – inside story

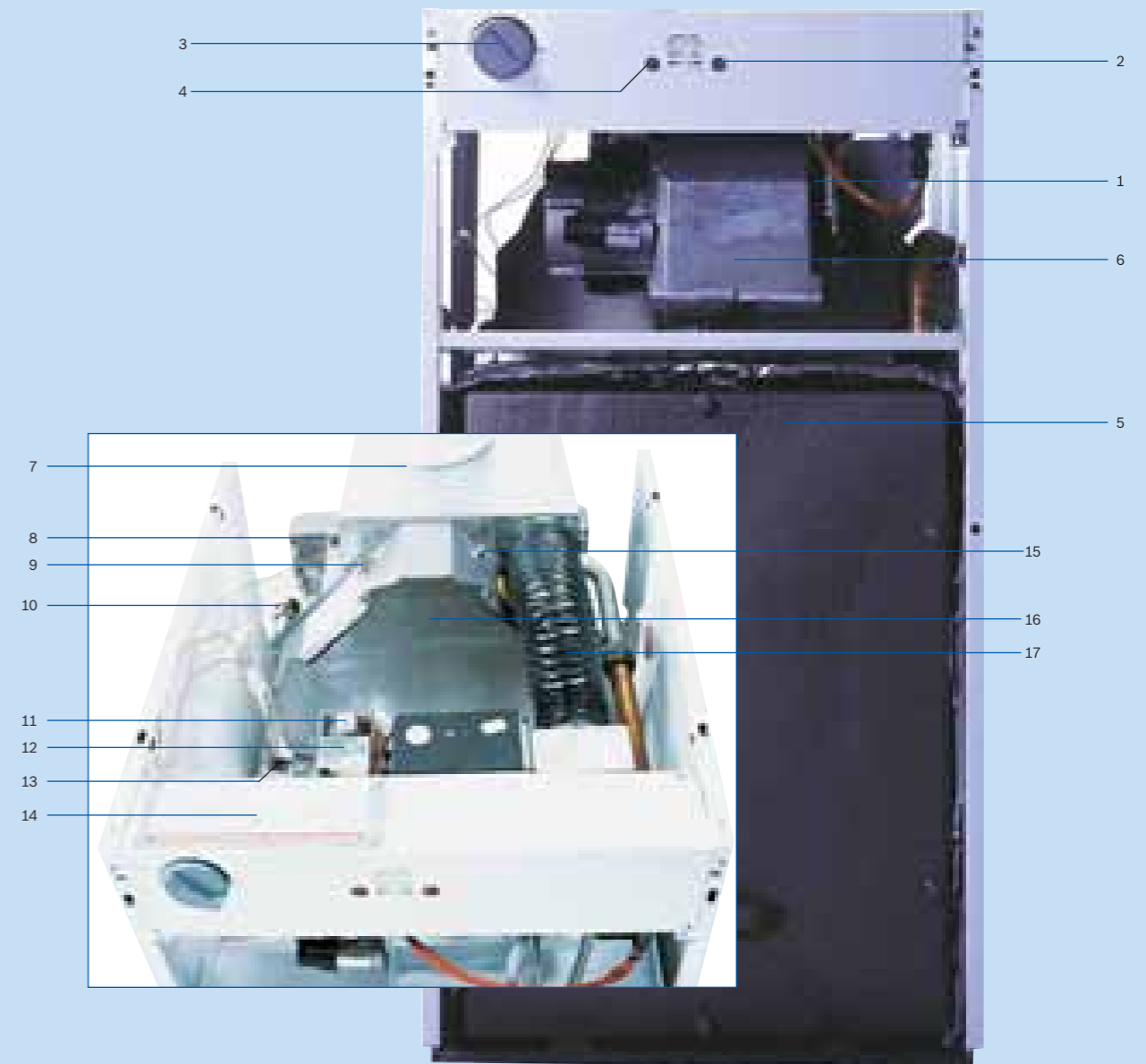


Greenstar Danesmoor 18/25 shown

### Key to components

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1. Lockout Reset Button (Greenstar Danesmoor 18/25 only)</li> <li>2. Lockout Reset Button (Greenstar Utility 18/25)</li> <li>3. Burner Lead</li> <li>4. Flue Gas Thermostat Reset Button</li> <li>5. Electrical Box Assembly</li> </ul> | <ul style="list-style-type: none"> <li>6. Overheat Thermostat Reset Button</li> <li>7. Flue Gas Analysis Test Point</li> <li>8. Burner</li> <li>9. Oil Isolating Valve</li> <li>10. Primary Heat Exchanger Service Access Door</li> </ul> |
|--|---|

# The Greenstar Utility 32/50 & 50/70 condensing boilers – inside story



### Key to components

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1. Burner Lead</li> <li>2. Flue Gas Reset Button</li> <li>3. Temperature Control</li> <li>4. Overheat Thermostat Reset Button</li> <li>5. Primary Heat Exchanger Service Access Door</li> <li>6. Burner</li> <li>7. Multi Directional Flue Outlet Box (RS only)</li> </ul> | <ul style="list-style-type: none"> <li>8. Air Vent to Secondary Heat Exchanger</li> <li>9. Flue Gas Overheat Thermostat</li> <li>10. Return</li> <li>11. Lock Out Reset Button</li> <li>12. Burner Control Box</li> <li>13. Thermostat Pocket</li> <li>14. Data Label</li> <li>15. Flue Gas Analysis Point</li> <li>16. Service Access Door to Secondary Heat Exchanger</li> <li>17. Burner Combustion Air Hose (RS only)</li> </ul> |
|---|--|

# The Greenstar Danesmoor WM regular condensing boilers – inside story



Greenstar Danesmoor WM 18/25 shown

### Key to components

- |  |                              |
|--|------------------------------|
| 1. Burner Service Hook   | 6. Riello RDB Burner         |
| 2. Thermostat Phial Pockets                                      | 7. Control Panel             |
| 3. Push Fit Flow and Return Burner Air Duct Pipework Connections | 8. Primary Heat Exchanger    |
| 4. Condense Trap   | 9. Flue Cowl                 |
| 5. Drip Tray   | 10. Secondary Heat Exchanger |

# Installing the Greenstar Danesmoor, Utility and Danesmoor Wall Mounted series

### Installation

#### General

Greenstar oil-fired floor standing and wall mounted appliances are not suitable for external installation unless a suitable enclosure is provided. The floor must be firm and level.

The floor on which the boiler is to be mounted should be capable of supporting an overall weight of approximately 160kg or 300kg (depending on model). All models have a hearth temperature of below 100°C. The boilers do not therefore require a constructional hearth.

The appliances should however be positioned on a non-combustible solid base as near to the flue location point as possible: care should be taken to ensure that the appliance is level.

Wall mounted models are supplied with a wall mounting frame and the primary pipework can be installed prior to the installation of the appliance.

**Important: The wall must be capable of supporting the overall weight of the appliance, accessories and water content – approximately 135kg.**

#### Flue system

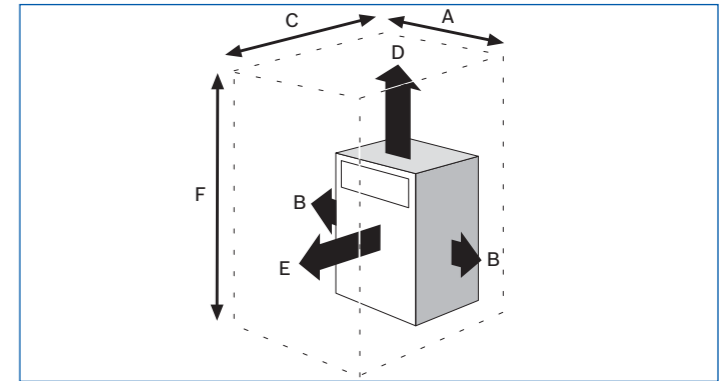
The appliances can be connected to either a conventional flue system or a multi-directional, room sealed balanced flue. In either case either the suitable flue kit needs to be specified. See page 20.

#### Siting of appliance

#### Clearances

The clearances shown opposite should be allowed for installation and servicing.

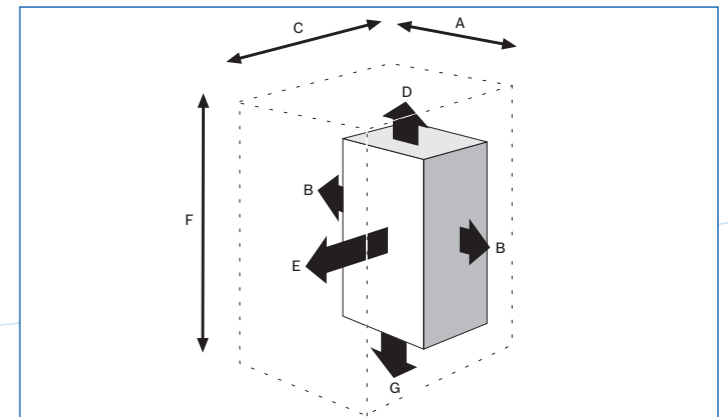
### Recommended installation clearances – Greenstar Danesmoor 18/25, Greenstar Utility 18/25, 32/50 & 50/70



Dimensions (mm)			
Key	18/25	32/50	50/70
A	570	720	720
B	100	100	100
C	1,200	1,415	1,415
D	300	300	300
E	600	600	600
F	1,155	1,297	1,297

### Recommended installation clearances – Greenstar Danesmoor WM 12/18 & 18/25

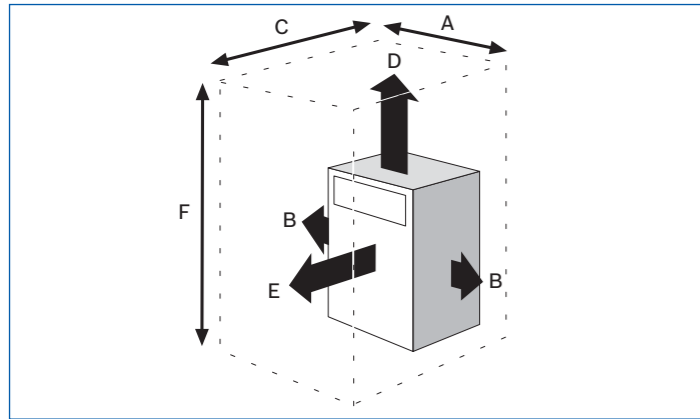
The minimum space required to install the boiler.



Dimensions (mm)		
Key	Danesmoor WM 12/18	Danesmoor WM 18/25
A	620	620
B	10	10
C	1,010	1,010
D	300	300
E	600	600
F	1,380	1,380
G	200	200

**Service clearances – Greenstar Danesmoor 18/25, Greenstar Utility 18/25, 32/50 & 50/70**

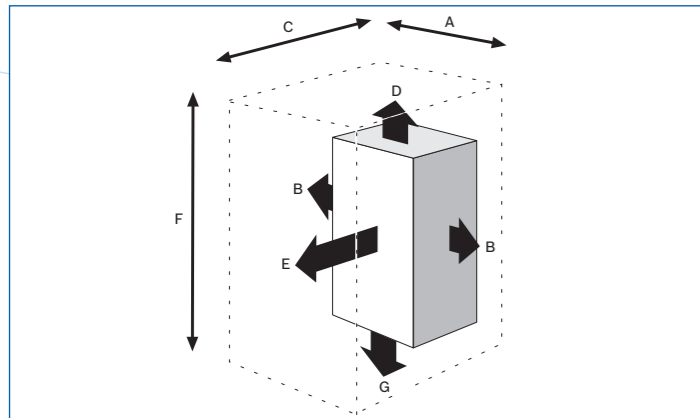
The minimum space required to service the boiler only.



Dimensions (mm)			
Key	18/25	32/50	50/70
A	380	540	540
B	5	10	10
C	1,200	1,415	1,415
D	300	300	300
E	600	600	600
F	1,155	1,312	1,312

**Service clearances – Greenstar Danesmoor WM 12/18 & 18/25**

The minimum space required to install the boiler.

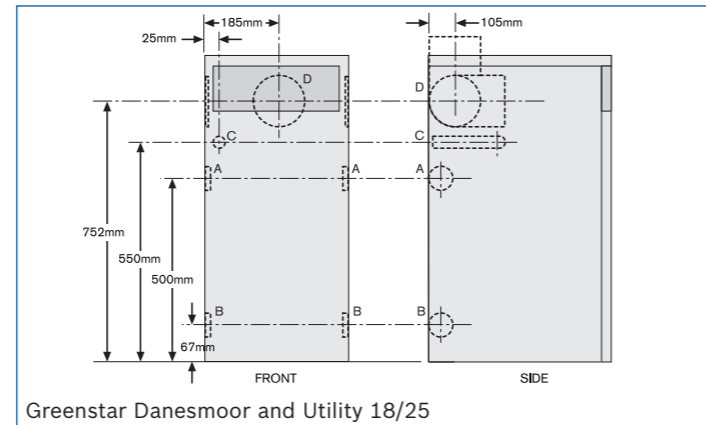


Dimensions (mm)		
Key	Danesmoor WM 12/18	Danesmoor WM 18/25
A	620	620
B	10	10
C	1,010	1,010
D	300	300
E	600	600
F	1,380	1,380
G	200	200

**Pipework connections**

**Pipework positions – Greenstar Danesmoor 18/25 & Greenstar Utility 18/25**

A to D (below) show the pipe positions from the front and side of the boiler:

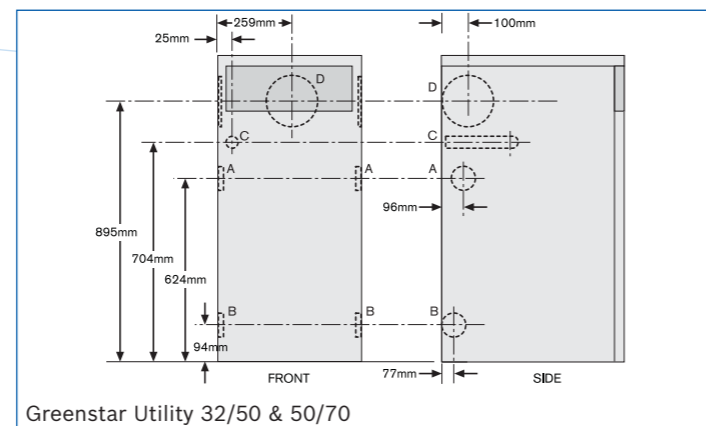


Pipework positions		
Key	Description	Greenstar Danesmoor & Utility 18/25
A	CH flow/open vent	1" dia. BSP
B	Primary feed/drain	1" dia. BSP
C	CH return	22mm dia. plain ended copper
D	Flue outlet	•

Note: For servicing purposes, keep the condensate and pressure relief discharge pipes away from components and pipework connections.

**Pipework positions – Greenstar Utility 32/50 & 50/70**

A to D (below) show the pipe positions from the front and side of the boilers:



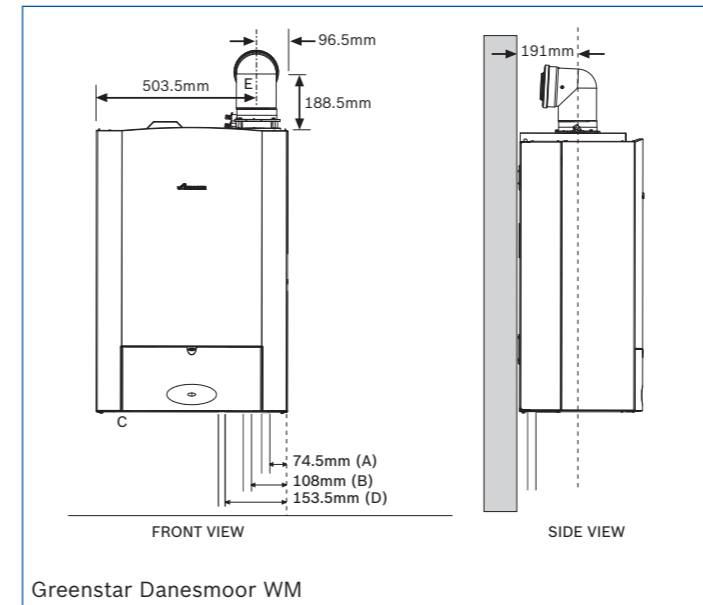
Pipework positions		
Key	Description	Greenstar Utility 32/50 & 50/70
A	CH flow/open vent	1 1/2" dia. BSP
B	Primary feed/drain	1 1/2" dia. BSP
C	CH return	28mm dia. plain ended copper
D	Flue outlet	•

Note: For servicing purposes, keep the condensate and pressure relief discharge pipes away from components and pipework connections.

**Pipework positions –**

**Greenstar Danesmoor WM 12/18 & 18/25**

A to E (below) show the pipe positions from the front and side of the boilers:



Pipework positions		
Key	Description	Greenstar Danesmoor WM 12/18 & 18/25
A	Flow	22mm dia. copper
B	Return	22mm dia. copper
C	Primary drain hose connection	1/2" BSP
D	Condensate outlet	21.5mm dia.
E	Flue outlet	80/125mm

Note: For servicing purposes, keep the condensate and pressure relief discharge pipes away from components and pipework connections.

**Condensate disposal**

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

The amount of condensate generated depends on the efficiency and operating status of the appliance. Depending on operating temperatures, the appliance will condense in both heating and hot water modes and can generate up to 2.5 litres of condensate an hour.

**Never terminate or discharge into any open source, including: sink, bath, shower, bidet, toilet etc.**

**Note: any external condensate pipework should be protected with weather resistant insulation to help prevent freezing or be run in 32mm or larger polypropylene waste pipe.**

**Condensate pipework**

**Routing the pipework:**

**Wherever possible, the condensate pipework should be routed internally to prevent freezing.**

- The condensate pipework must fall at least 50mm per metre towards the outlet
- Take the shortest practicable route
- Support the pipe at least every 0.5m for near horizontal sections and 1m for vertical sections

When a boiler is to be installed in an unheated location, such as a garage, all condensate drainage pipes should be considered as external.

**External pipework**

- The pipework length should be kept to a minimum and the route as vertical as possible
- Do not exceed 3 metres outside the dwelling
- Terminate as close to the ground or drain as possible (below the grating and above the water level) while still allowing for safe dispersal of the condensate. This helps to reduce wind blowing up the pipe and freezing

Connection of a condensate drainage pipe to a drain may be subject to local building controls.

- Pipework subject to extreme cold or wind chill conditions should be 32mm dia. pipe
- Protect **all** external pipework with weather resistant insulation and box-in, if necessary, to reduce the risk of freezing

**Making it safe**

- Condensate pipework must not leak, freeze or block up
- Condensate traps must be filled before firing up the boiler to prevent possibility of potentially harmful flue products evacuating via the condensate route
- Do not dispose condensate water into a water recovery system where it is reclaimed for reuse

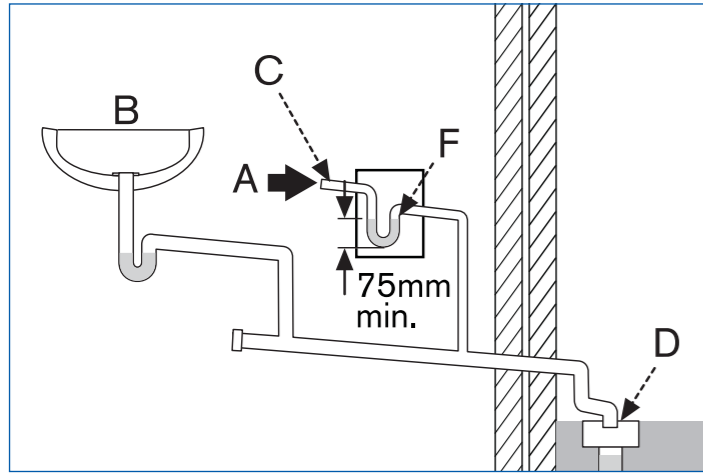
Condensate can be discharged into a rainwater hopper which is part of a sewer system carrying both rainwater and foul water.



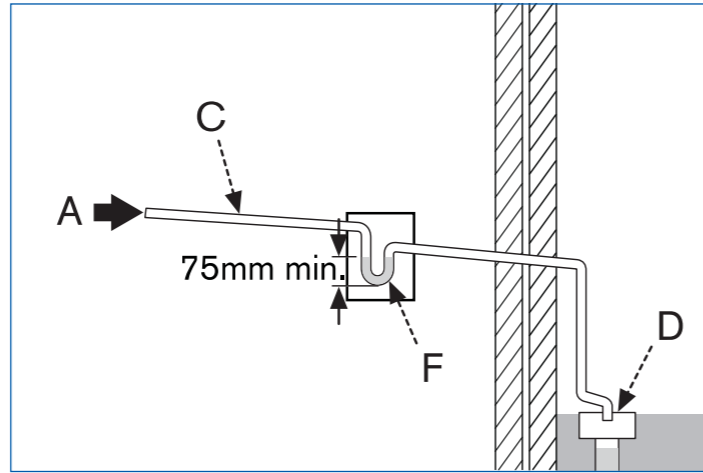
## Condensate termination and route

The condensate connection on Worcester appliances is in 21.5mm polypropylene. The pipe should be extended and directed away from the appliance with a constant minimum fall of 3° or 52mm in every metre.

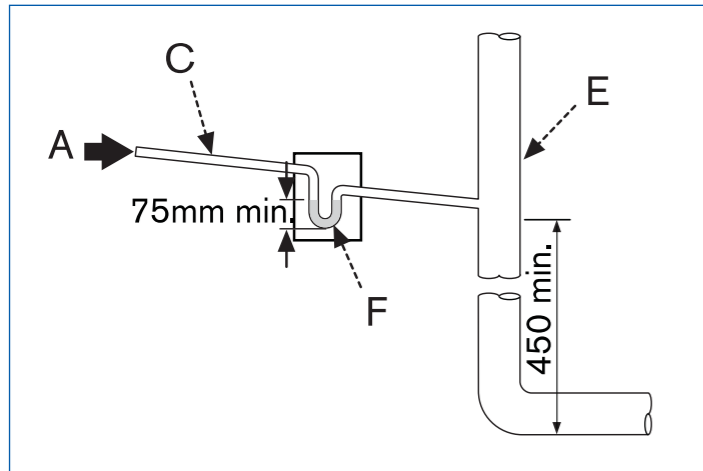
The condensate pipe can terminate into any one of four areas:



Internal waste drainage system

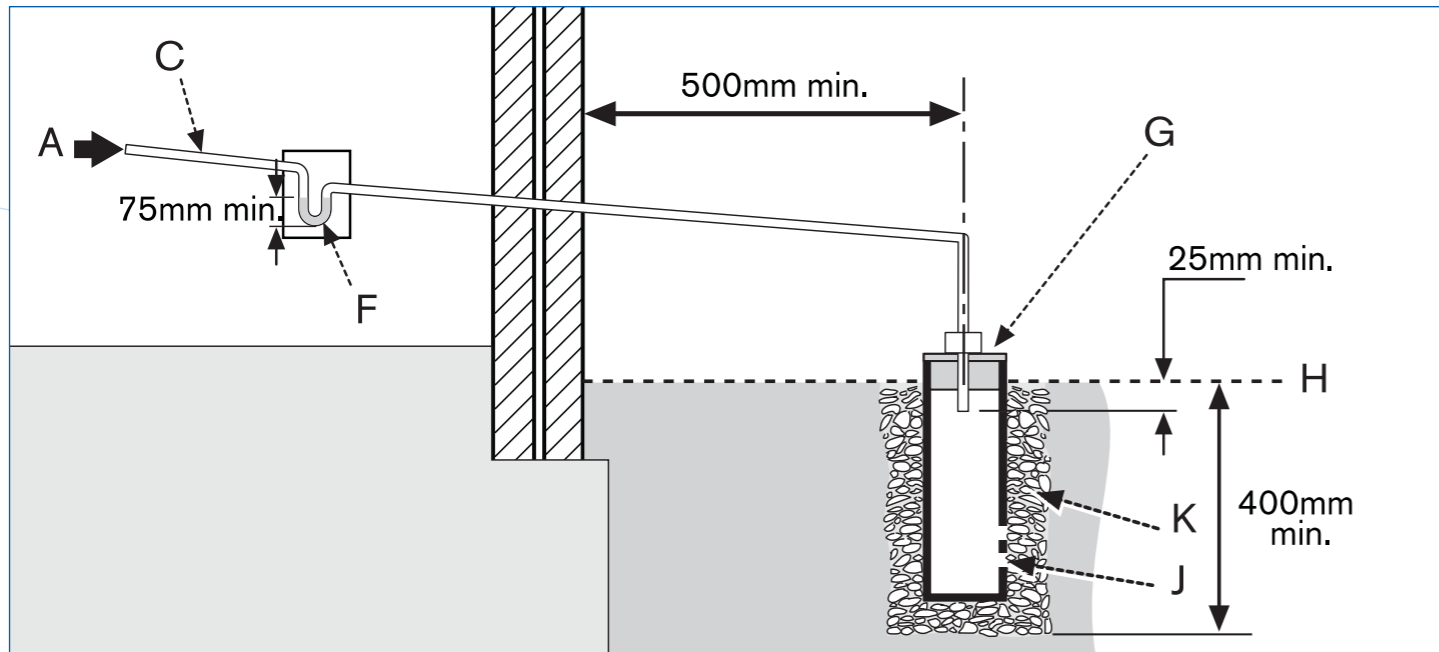


External drainage system



Soil/vent stack

- A Condensate from boiler
- B Sink
- C 21.5mm dia. plastic polypropylene condensate pipe
- D Drain
- E Internal soil and vent stack
- F Condensate trap – supplied
- G 300mm x 100mm dia. sealed plastic tube
- H Ground level
- J Drainage holes 50mm from base of tube (12mm dia. at 25mm centres) facing away from building
- K Limestone chippings



External condensate absorption point – unsuitable for clay soil types

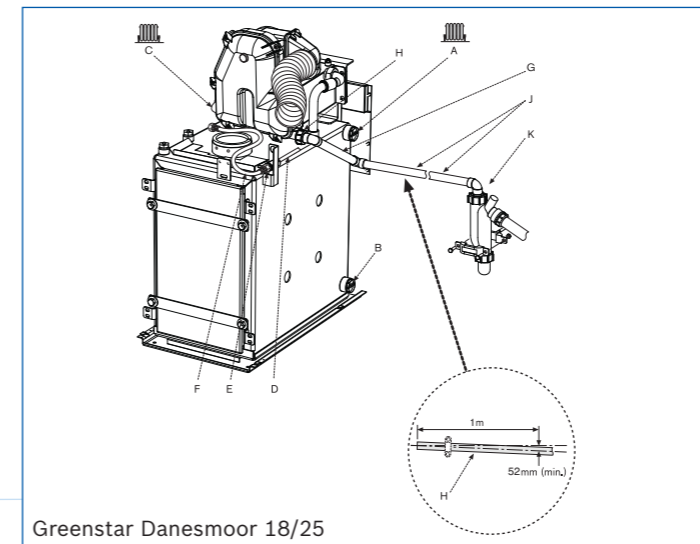
Whilst all of the above methods are acceptable it is best practise to terminate the condensate pipe via an internal waste system. This will eliminate the need for any external condensate pipe runs which can be susceptible to freezing in extreme weather. Best practise is not to run external condensate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

## External condensate pipework

The Greenstar oil-fired condensing range is supplied with a condensate waste trap that needs to be connected outside of the boiler cabinet but as close as possible to the appliance in a serviceable position.

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 protected with weather resistant insulation to help prevent freezing or be run in 32mm or larger polypropylene waste pipe
- The pipework should be installed with the minimum of horizontal runs and with a downward slope of at least 3° or 52mm in every metre
- The maximum external condensate run is 3 metres.

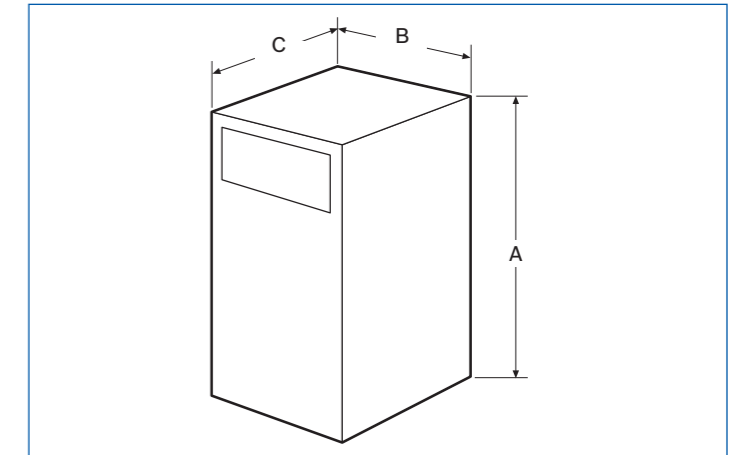


Greenstar Danesmoor 18/25

- A CH flow/open vent 1" dia. BSP
- B Primary cold feed/drain 1" dia. BSP
- C CH return 22mm dia. plain ended copper
- D Oil supply pipe (10mm dia.) – not supplied
- E Oil pipe isolating valve
- F Flexible oil pipe
- G Condensate outlet (21.5mm dia.)
- H Flue manifold outlet
- J Condensate pipe – not supplied
- K Condensate trap with wall clamp – supplied

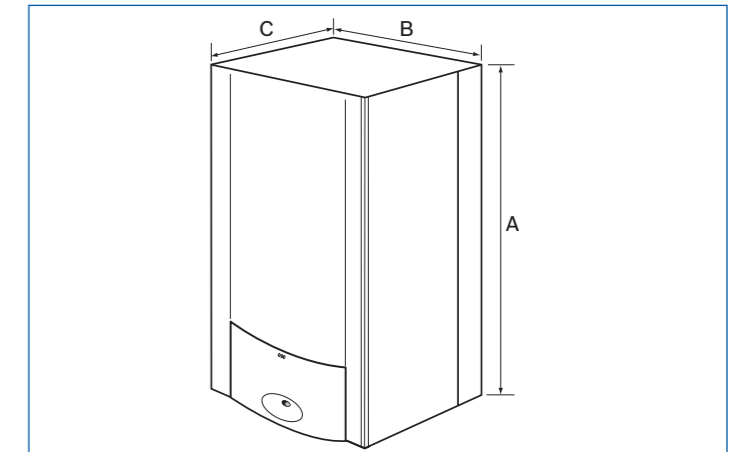
## Casing dimensions

**Greenstar Danesmoor 18/25, Greenstar Utility 18/25, 32/50 & 50/70**



Cabinet dimensions (mm)			
Key	18/25	32/50	50/70
A	855	1,012	1,012
B	370	520	520
C	600	815	815

**Greenstar Danesmoor WM 12/18 & 18/25**



Cabinet dimensions (mm)		
Key	WM 12/18	WM 18/25
A	880	880
B	600	600
C	380	380

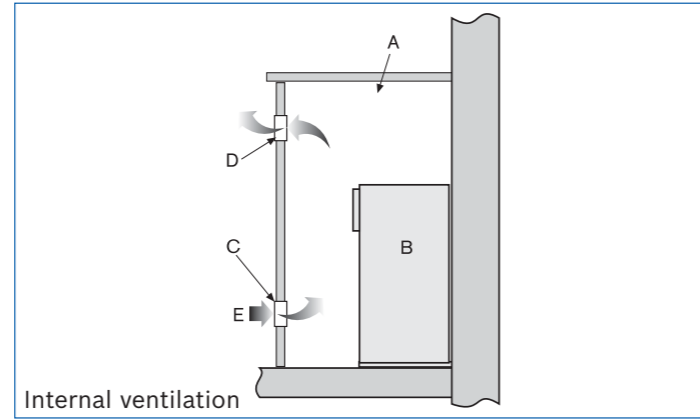
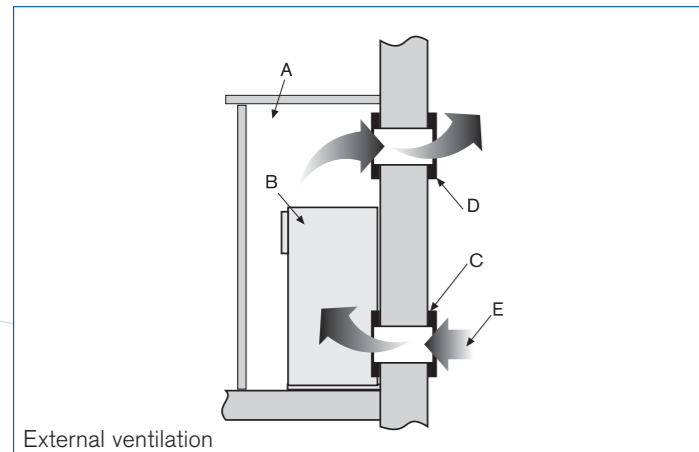
## Compartment clearances

Follow the requirements of BS 5410 and note:

- Minimum clearances must be maintained
- An access door is required to install, service and maintain the boiler and any ancillary equipment, i.e. condensate trap
- If fitting the boiler into an airing cupboard use a non-combustible material (if perforated, maximum hole sizes of 13mm) to separate the boiler from the airing space.

## Venting compartments

- Ventilation must be provided for boilers fitted into compartments as described in BS 5410
- A minimum of 2 air vents must be fitted, one at low level (C) and another at high level (D) onto the same wall using the same air (E) for circulation
- Free air must not be taken from a room or internal space containing a bath or shower and must not communicate with a protected area such as a hall, stairway, landing, corridor, lobby, shaft etc
- Air vents must allow access for clean free air and must be sited to comply with the flue terminal position requirements
- Air ducting runs must not exceed 3m
- Low level air vents must be less than 450mm from the floor
- A warning label must be added to the vents with a statement to the effect: "Do not block this vent. Do not use for storage"



A Compartment  
B Boiler  
C Low level vent  
D High level vent  
E Air supply

## Air supply

### Air supply – CF (conventional flue)

An adequate supply of free air must be delivered to the boiler for combustion purposes through a permanent inlet, such as an air brick, into the area where the boiler is situated.

Min. area of air inlet for combustion	
Model	Area (cm <sup>2</sup> )
18/25	138*
32/50	275*
50/70	385*
WM 12/18	99*
WM 18/25	138*

\*Due to changes in BS 5410 and modern building design these figures no longer incorporate the adventitious ventilation allowance.

### Conventional flue

Model	Minimum air vent area (cm <sup>2</sup> ) for appliances installed in a compartment			
	Internal* ventilation		External** ventilation	
	High level (D)	Low level (C)	High level (D)	Low level (C)
18/25	275	413	138	275
32/50	550	825	275	550
50/70	770	1,155	385	770
WM 12/18	198	297	99	198
WM 18/25	275	413	138	275

### Room sealed flue

Model	Minimum air vent area (cm <sup>2</sup> ) for appliances installed in a compartment			
	Internal* ventilation		External** ventilation	
	High level (D)	Low level (C)	High level (D)	Low level (C)
18/25	275	275	138	138
32/50	550	550	275	275
50/70	770	770	385	385
WM 12/18	198	198	99	99
WM 18/25	275	275	138	138

\*Internal air to and from a space/room inside the building.

\*\*External air to and from directly outside the building.

Due to changes in BS 5410 and modern building design these figures no longer incorporate the adventitious ventilation allowance.

## Boiler location & clearances

### Bathrooms

#### IMPORTANT:

Any switch or appliance control using mains electricity must not be within reach of a person using the bath or shower.

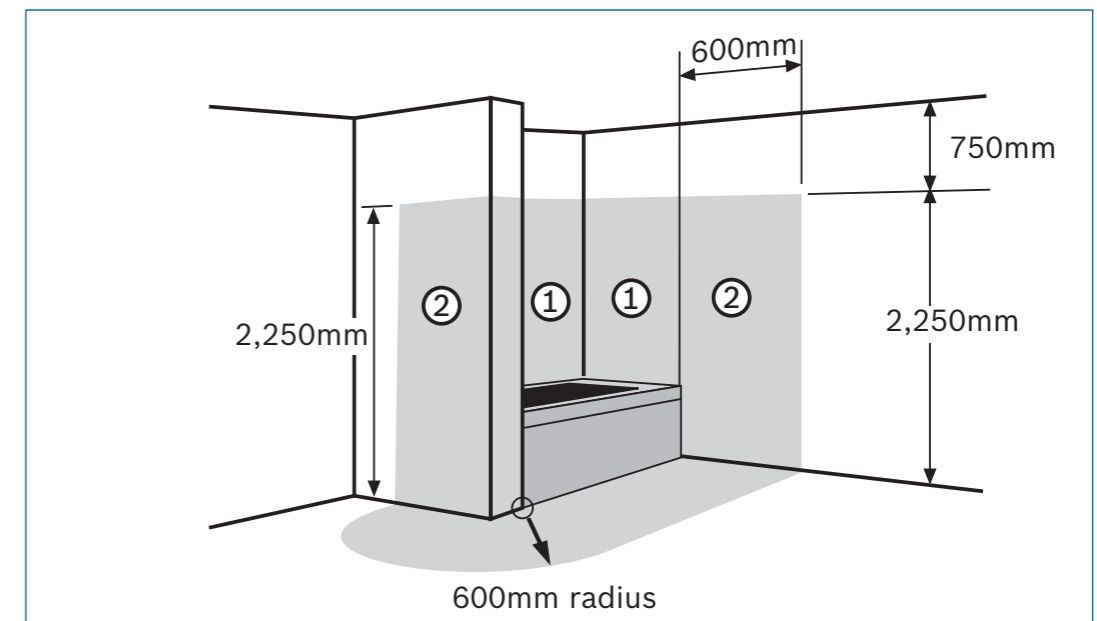
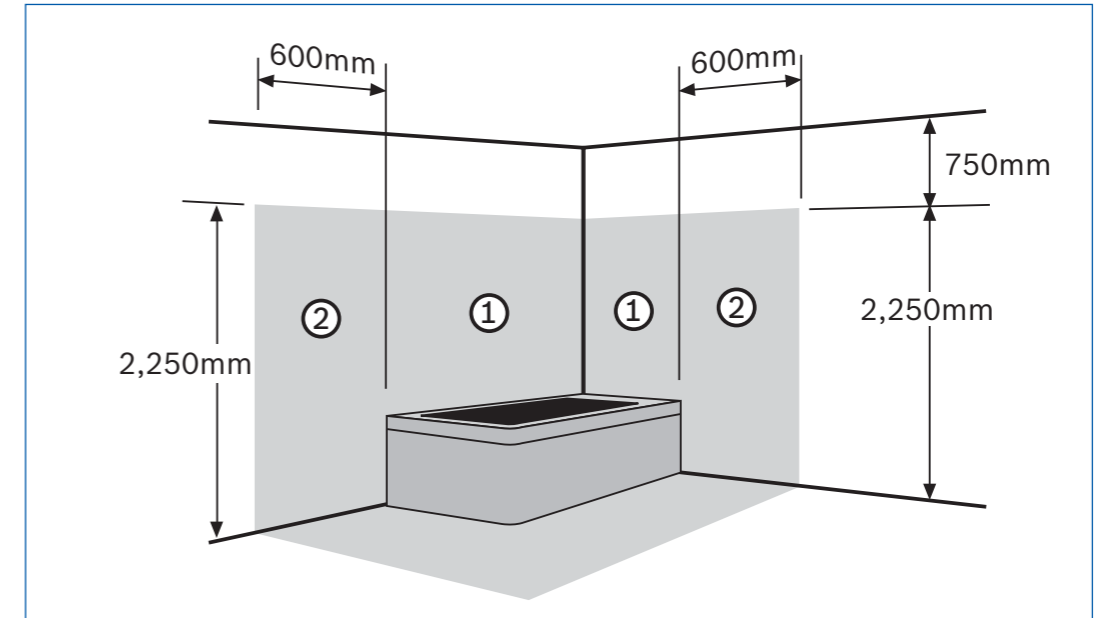
Electrical switches, fused spurs and socket outlets must not be situated in the bathroom.

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

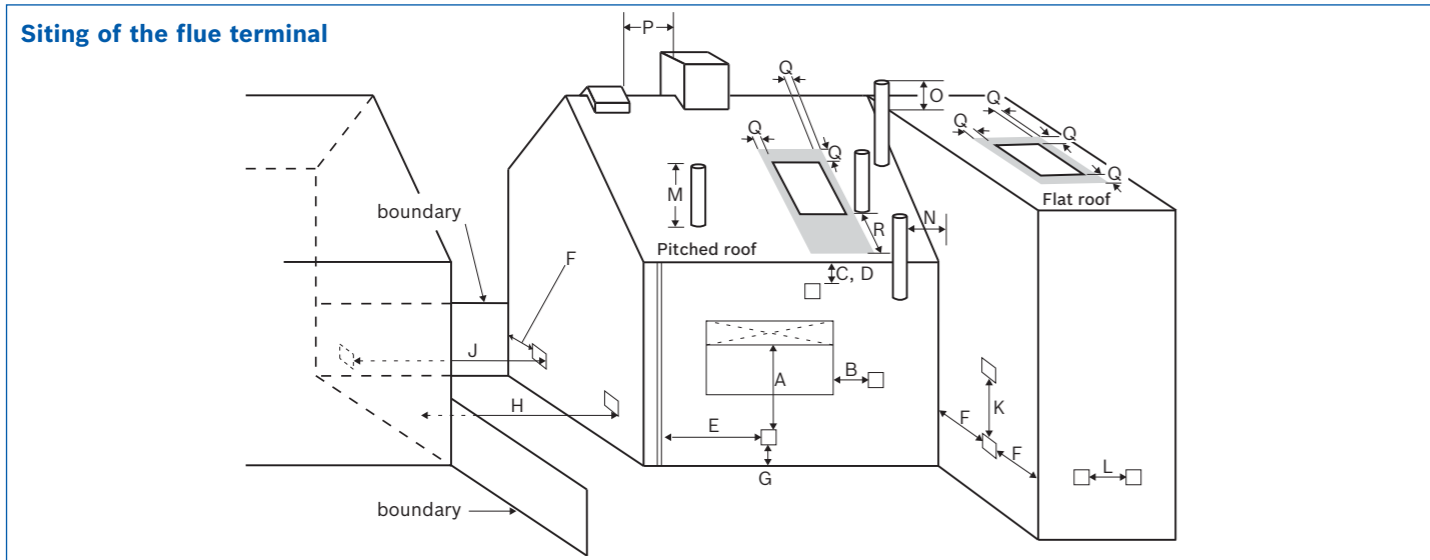
A boiler with a mechanical timer or RF mechanical timer with a room thermostat must only be installed outside the shaded area.

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

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



## Flue terminal positioning



### Key to illustration

Minimum dimensions of flue terminal positions for oil-fired appliances:

Terminal position (mm)	CF	RS(H)	RS(V)
A <sup>12</sup> Directly below an opening, air brick, opening window, etc	N/A	600	N/A
B <sup>12</sup> Horizontally to an opening, air brick, opening window, etc	N/A	600	N/A
C Below a plastic/painted gutter, drainage pipe or eaves if combustible material protected	N/A	75	N/A
D <sup>3</sup> Below a plastic/painted gutter, drainage pipe or eaves without protection to combustible material	N/A	600	N/A
E From vertical sanitary pipework	N/A	300	N/A
F From an external or internal corner or from a surface or boundary alongside the terminal	N/A	300	N/A
G Above ground or balcony level	N/A	300*	N/A
H From a surface or boundary facing the terminal	N/A	600**	N/A
J From a terminal facing the terminal	-	1,200**	-
K Vertically from a terminal on the same wall	N/A	1,500	N/A
L Horizontally from a terminal on the same wall	-	750	-
M Above the point of highest intersection with the roof	600	-	600
N From a vertical structure on the side of the terminal	750	-	750
O Above a vertical structure less than 750mm from the side of the terminal	600	-	600
P From a ridge terminal to a vertical structure on the roof	1,500	-	N/A
Q Above or to the side of any opening on a flat or sloping roof	300	-	300
R Below any opening on a sloping roof	1,000	-	1,000

Key: - N/A Not allowed, CF Conventional Flue, RS(H) Room Sealed Horizontal flue, RS(V) Room Sealed Vertical flue.

#### Notes:

- Terminals should be positioned so as to avoid products of combustion accumulating in stagnant pockets around the building or entering into buildings.
- Vertical structure in N, O and P includes tank or lift rooms, parapets, dormers etc.
- Terminating positions should be at least 1.8m from an oil storage tank unless a wall with at least 30 min fire resistance and extending 300mm higher and wider than the tank is provided between the tank and the terminating position.
- Where a flue is terminated less than 600mm away from a projection above it and the projection consists of plastics or has a combustible or painted surface, then a heat shield of at least 750mm wide should be fitted.
- If the lowest part of the terminal is less than 2m above the ground, balcony, flat roof or other place to which any person has access, the terminal should be protected by a guard.
- Notwithstanding the dimensions given above, a terminal should not be sited closer than 300mm to combustible material. In the case of a thatched roof, double this separation distance should be provided. It is also advisable to treat the thatch with a fire retardant material and close wire in the vicinity of the flue.
- It is essential that a flue or chimney does not pass through the roof within the shaded area delineated by dimensions Q and R.
- Where protection is provided for plastic components, such as guttering, it is essential that this is to the standard specified by the manufacturer of the plastic components.

- Flue terminals must be positioned to avoid combustion products entering into buildings.
- The flue must be fitted and terminated in accordance with the recommendations of BS 5410.
- The flue must not cause an obstruction.
- Discharge from the flue outlet must not be a nuisance.
- Flue gases have a tendency to plume and in certain weather conditions a white plume of condensation will be discharged from the flue outlet which could be regarded as a nuisance, for example, near security lighting.
- There should be no restriction preventing the clearance of combustion products from the terminal.
- 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 5410.
- A protective terminal guard must be fitted if the terminal is 2m or less above a surface where people have access. The guard must be spaced equally (minimum 50mm) around the flue and fixed to the wall with plated screws.

### Stainless steel flue terminal guard

#### Greenstar Danesmoor & Greenstar Utility 18/25 models

Part No. 7 716 190 050

#### Greenstar Utility 32/50 & 50/70 models

Part No. 7 716 190 051

#### Greenstar Danesmoor WM 12/18 & WM 18/25 models

Part No. 7 716 190 050

The following additional guidelines (from part L Exceptions Guidance Document) are recommended when determining the flue outlet position:

- Avoid discharging flue gases into car ports or narrow passageways.
- \*Minimum distance of the flue terminal from above ground is 2,100mm where directed to a public footpath, private access route or a frequently used area and 2,500mm from a car parking area.
- \*\*Minimum distance of the flue terminal to a facing wall, fence, building or property boundary is 2,500mm.

# Greenstar Danesmoor and Utility series horizontal fluing options

## Horizontal RS flue



Flue diameter	125mm dia.	150mm dia.
Minimum flue length	18/25	140mm
	32/50	N/A
	50/70	140mm
Maximum flue length	18/25	4,000mm
	32/50	N/A
	50/70	3,000mm

## Telescopic flue kit

### 125mm dia. telescopic flue kit -

#### Greenstar Danesmoor & Greenstar Utility 18/25

Comprises:

- 1 x telescopic terminal assembly
- 1 x internal finishing plate(s)
- 1 x external weather seal
- 1 x flue clamp

Short telescopic flue kit, 350mm to 460mm

Part No. 7 716 190 062

Standard telescopic flue kit, 460mm to 670mm

Part No. 7 716 190 064

## Standard flue kit

### 150mm dia. standard flue kit -

#### Greenstar Utility 32/50 & 50/70 models

Comprises:

- 1 x terminal assembly
- 1 x bend
- 1 x wall plate(s)
- 1 x air hose
- 1 x airbox assembly

Part No. 7 716 190 043

## Accessories

Components	Part no.	Description
<b>125mm diameter</b>		
	7 716 190 062	125mm dia. Short telescopic flue kit, 350mm - 460mm
	7 716 190 064	125mm dia. Standard telescopic flue kit, 460mm - 670mm
	7 716 190 033	125mm dia. Extension flue kit (1,000mm)
	7 716 190 034	125mm dia. 90° Bend
	7 716 190 035	125mm dia. 45° Bend (pair)
	7 716 190 050	125mm dia. Flue terminal guard

150mm diameter		
	7 716 190 043	150mm dia. Standard flue kit
	7 716 190 045	150mm dia. Extension flue kit (1,000mm)
	7 716 190 046	150mm dia. 90° Bend
	7 716 190 047	150mm dia. 45° Bend (pair)
	7 716 190 051	150mm dia. Flue terminal guard

The following criteria should be noted when planning the installation.

- The flue system inclines 3° (52mm per metre) from the appliance, to allow condensate to drain back to 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.

The Greenstar oil-fired series can be connected to an open or conventional flue system or a multi-directional room sealed balanced flue system.

## Conventional flue

### Open (conventional) flued appliances must not be installed in a bedroom, bathroom or bedsitting room.

- The flue system must be in accordance with BS 5410 and the current Building Regulations.
- The flue must be constructed of materials suitable for use with condensing combustion products.
- External flue systems must be of the insulated type.
- Brick and masonry chimneys must be lined with a suitable non-combustible material and properly jointed to withstand the effects of the working temperature (minimum rating of material 120°C) of the appliance and any condensate which may form.
- All flue joints must be sealed to prevent the leakage of condensate and combustion products.
- Ensure that joints are made so that the condensate runs away and is not collected within the joint.

NOTE: The flue can be increased in size from the boiler take off point providing the joint is correctly sealed. Never reduce the flue diameter from the boiler take off point.

#### CF Sizing:

- 18/25 = 100/103mm dia.
- 32/50 = 130mm dia.
- 50/70 = 130mm dia.
- Because the flue operates at a lower temperature on a condensing boiler compared to that of a conventional appliance, the flue draught will be lower. Typically the draught will be between 0.5mmwg and 4.4mmwg, measured with the flue warm but the burner not firing. The actual figure will vary depending on weather conditions, flue height and position.
- The flue should be vertical and contain as few bends as possible, a maximum of two 135° bends should be used.
- The flue outlet must be extended beyond the eaves of the building and where possible, above the apex.
- Fit a suitable anti down-draught terminal where down draughts are experienced.

To convert the appliance to a conventional flue system the vertical flue adaptor needs to be specified:

#### Greenstar Danesmoor & Greenstar Utility 18/25 models

CF flue adaptor

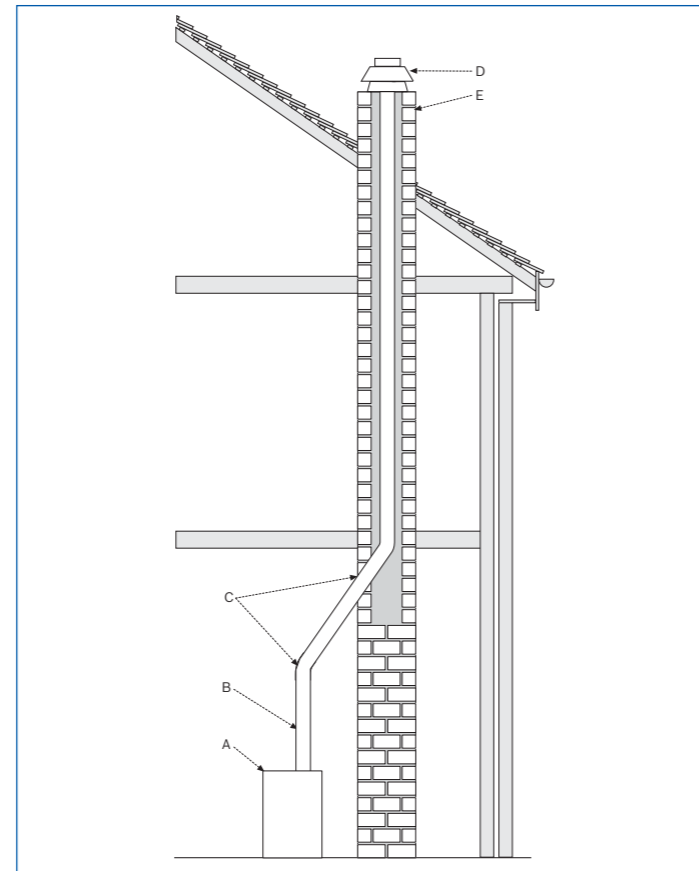
**Part No. 7 716 190 036**

#### Greenstar Utility 32/50 & 50/70 models

CF flue adaptor

**Part No. 7 716 190 049**

The flue must be constructed of materials suitable for the use of condensing combustion products.



A Boiler  
B Flue  
C Maximum 2 bends at 135°  
D Anti down-draught terminal  
E Chimney

## Room sealed flue options

The diagrams (next page) show the components used and the maximum flue length (L) for each flue configuration.

In all cases L is measured from the outside of the boiler casing.

- To achieve the maximum flue length (L), a flue section will have to be reduced in length.
- Only the flue terminal or straight flue extensions can be reduced in length by cutting.
- The horizontal flue terminal can be fitted from the inside or outside of the building.

**IMPORTANT: All horizontal sections must rise away from the boiler by 52mm per metre (3°) to allow the condensate to drain back to the boiler.**

#### Calculating the flue length

Measure the total flue length required, noting that the maximum straight flue length including the terminal is:

Horizontal 80/125mm dia.: 4,000mm  
(excluding 120mm of terminal extending outside the building)

Vertical 80/125mm dia.:  
(measured from the boiler top panel)

- Greenstar Danesmoor & Utility series = 6,000mm

Then reduce the total straight flue length for each extra flue bend (excluding the vertical flue kit 90° elbow) by:

1,000mm for 90°  
500mm for 45°

#### Flue extension lengths

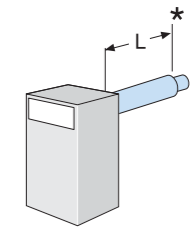
Horizontal and vertical 80/125mm dia.:  
1,000mm overall length.

Effective length when engaged into sockets within the flue run is 950mm.

#### Flue terminal lengths

Horizontal 80/125mm dia.: 720mm  
Vertical 80/125mm dia.: 1,080mm + cage

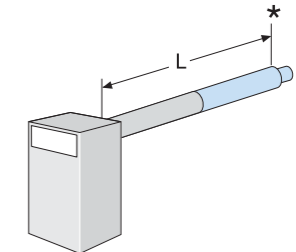
### Option 1 Standard rear flue assembly



\*to outside wall

Maximum length (mm)		Components required	
125mm	390		1
150mm	630		1

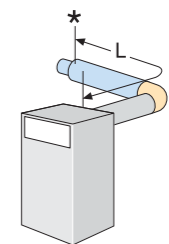
### Option 2 Extended rear flue assembly



\*to outside wall

Maximum length (mm)		Components required	
125mm	4,000		up to 4
150mm	3,000		up to 3

### Option 3 Extended rear flue assembly with a 90° bend



\*to outside wall

Maximum length (mm)		Components required		
125mm	3,000		up to 3	
150mm	2,000		up to 2	

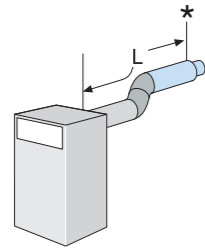
#### Notes:

Flue length (L) is measured from the side/top of the boiler to the outside wall for the Greenstar Oilfit flue kits 125mm and 150mm.  
All components for the left horizontal and right horizontal outlet come within the Greenstar Oilfit horizontal flue kit (150mm) for the Greenstar Utility 32/50 and 50/70 models.

# Greenstar Danesmoor Wall Mounted series horizontal fluing options

## Option 4

Extended rear flue assembly with 45° bends

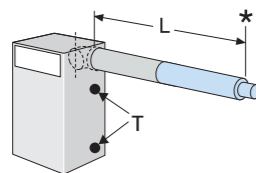


\*to outside wall

Maximum length (mm)	Components required		
125mm 3,000	1	up to 3	2
150mm 2,000	1	up to 2	2

## Option 5

Side flue extension

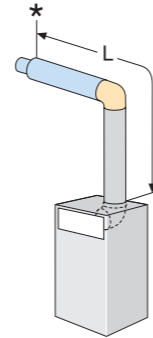


\*to outside wall

Maximum length (mm)	Components required		
125mm 3,000	1	up to 3	1
150mm 3,000	1	up to 3	N/A

## Option 6

High level side discharge



\*to outside wall

Maximum length (mm)	Components required		
125mm 2,000	1	up to 2	2
150mm 2,000	1	up to 2	1

## Horizontal RS flue



Flue diameter	125mm dia.
Minimum flue length	160mm
Maximum flue length	4,000mm

## 125mm dia. telescopic flue kit -

Comprises:

- 1 x telescopic terminal assembly
- 1 x internal finishing plate(s)
- 1 x external weather seal
- 1 x flue clamp

Short telescopic flue kit, 350mm to 460mm

**Part No. 7 716 190 062**

Standard telescopic flue kit, 460mm to 670mm

**Part No. 7 716 190 064**

## Accessories

Components	Part no.	Description
<b>125mm diameter</b>		
	7 716 190 062	125mm dia. Short telescopic flue kit, 350mm - 460mm
	7 716 190 064	125mm dia. Standard telescopic flue kit, 460mm - 670mm
	7 716 190 033	125mm dia. Extension flue kit (1,000mm)
	7 716 190 034	125mm dia. 90° Bend
	7 716 190 035	125mm dia. 45° Bend (pair)

The following criteria should be noted when planning the installation.

- The flue system inclines 3° (52mm per metre) from the appliance, to allow condensate to drain back to 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.

The Greenstar oil-fired series can be connected to an open or conventional flue system or a multi-directional room sealed balanced flue system.

## Conventional flue

To convert the appliance to a conventional flue system the vertical flue adaptor needs to be specified:

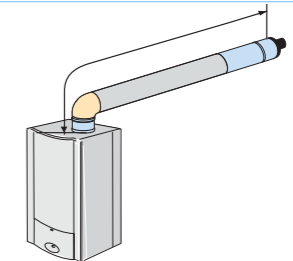
CF flue adaptor

**Part No. 7 716 190 036**

The flue must be constructed of materials suitable for the use of condensing combustion products.

## Option 1

Extension flue horizontal



Maximum length (mm)	Components required		
125mm 4,000	1	up to 4	1

Notes:

Flue length (L) is measured from the side/top of the boiler to the outside wall for the Greenstar Oilfit flue kits 125mm and 150mm.

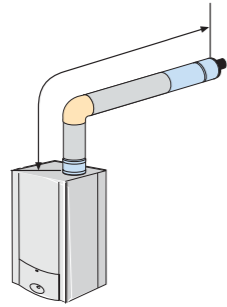
All components for the left horizontal and right horizontal outlet come within the Greenstar Oilfit horizontal flue kit (150mm) for the Greenstar Utility 32/50 and 50/70 models.




To use the left hand boiler flue outlet the expansion vessel must be removed and the connection from the boiler capped off. The expansion vessel must be fitted outside the boiler and connected to one of the boiler right hand side 1" BSP tappings (T)

# Greenstar Danesmoor and Utility series vertical fluing options

## Option 2

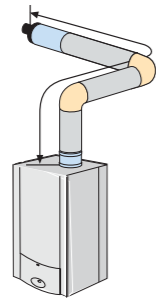
Extension flue horizontal and upwards

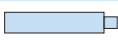
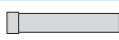



Maximum length (mm)	Components required		
			
125mm 4,000	1	up to 4	1

## Option 3

Extension flue upwards and horizontal using a second 90° bend



Maximum length (mm)	Components required		
			
125mm 3,000	1	up to 4	2



## Vertical RS flue

Flue diameter	125mm	150mm
Flue terminal assembly diameter	138mm	163mm
Maximum flue length (inc. terminal)	18/25	6,000mm
	32/50	N/A
	50/70	6,000mm
Flue terminal assembly length	18/25	1,020mm
	32/50	N/A
	50/70	1,290mm

### 125mm dia. vertical balanced flue kit – Greenstar Danesmoor & Greenstar Utility 18/25 models

- Comprises:
- 1 x flue terminal assembly
  - 1 x bend
  - 1 x clamp bracket
  - 1 x fire stop plate
  - 1 x pipe clamp
  - 1 x drill pack











**Part No. 7 716 190 032**

### 150mm dia. vertical balanced flue kit – Greenstar Utility 32/50 & 50/70 models

- Comprises:
- 1 x flue terminal assembly
  - 1 x bend
  - 1 x bend support bracket
  - 1 x fire stop plates
  - 1 x flue spigot
  - 1 x airbox assembly

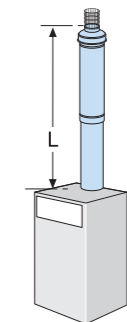
**Part No. 7 716 190 044**



## Accessories

Components	Part no.	Description
<b>125mm diameter</b>		
	7 716 190 032	125mm dia. Vertical balanced flue kit
	7 716 190 033	125mm dia. Extension flue kit (1,000mm)
	7 716 190 034	125mm dia. 90° Bend
	7 716 190 035	125mm dia. 45° Bend (pair)
	7 716 191 090	Flashing – flat roof
	7 716 191 091	Flashing – pitched roof
<b>150mm diameter</b>		
	7 716 190 044	150mm dia. Vertical balanced flue kit
	7 716 190 045	150mm dia. Extension flue kit (1,000mm)
	7 716 190 046	150mm dia. 90° Bend
	7 716 190 047	150mm dia. 45° Bend (pair)

## Option 1

Minimum height

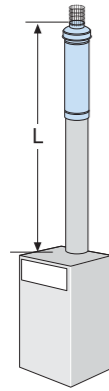


Minimum length (mm)	Components required	
		
125mm 1,020	1	1
150mm 1,275	1	1

# Greenstar Danesmoor Wall Mounted series vertical fluing options

## Option 2

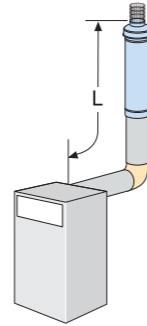
Vertical flue system no offset



Maximum length (mm)		Components required	
125mm	150mm	Terminal	Extension
6,000	6,000	1	up to 6
		1	up to 6

## Option 4

High level rear discharge

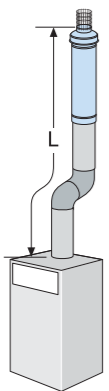


Maximum length (mm)		Components required		
125mm	150mm	Terminal	Extension	Bend
6,000	6,000	1	up to 5	N/A
		1	up to 5	1*

\*90° bend 7 716 190 046 applicable only to 150mm.

## Option 3

Vertical balanced flue system with two 45° bends



Maximum length (mm)		Components required		
125mm	150mm	Terminal	Extension	Bend
5,000	5,000	1	up to 4	2
		1	up to 4	2



## Vertical RS flue

Flue diameter	80/125mm dia.
Flue terminal assembly diameter	125mm
Maximum flue length (inc. terminal)	6,000mm
Flue terminal assembly length	1,080mm

## 125mm dia. vertical balanced flue kit -

Comprises:

- 1 x flue terminal assembly
- 1 x bend
- 1 x clamp bracket
- 1 x fire stop plate
- 1 x pipe clamp
- 1 x drill pack

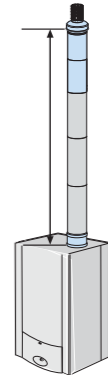
Part No. 7 716 190 032

## Accessories

Components	Part no.	Description
125mm diameter		
	7 716 190 032	125mm dia. Vertical balanced flue kit
	7 716 190 033	125mm dia. Extension flue kit (1,000mm)
	7 716 190 034	125mm dia. 90° Bend
	7 716 190 035	125mm dia. 45° Bend (pair)
	7 716 191 090	Flashing - flat roof
	7 716 191 091	Flashing - pitched roof

## Option 2

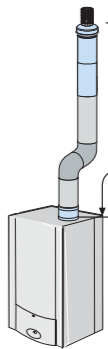
Vertical balanced flue system no offset



Maximum length (mm)		Components required	
125mm	150mm	Terminal	Extension
6,000	6,000	1	up to 6

## Option 3

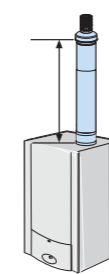
Vertical balanced flue system with two 45° bends



Maximum length (mm)		Components required		
125mm	150mm	Terminal	Extension	Bend
5,000	5,000	1	up to 4	2

## Option 1

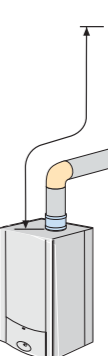
Vertical balanced flue system minimum height



Minimum length (mm)	Components required
125mm 1,080	1

## Option 4

Vertical balanced flue system with two 90° bends



Maximum length (mm)		Components required		
125mm	150mm	Terminal	Extension	Bend
4,000	4,000	1	up to 3	2

# Oilfit flexible flue liner



## Conventional vertical flue kit

To convert the appliance to a conventional flue system the vertical flue adaptor needs to be specified:

### 100mm dia. conventional vertical flue kit – Greenstar Danesmoor, Greenstar Danesmoor Wall Mounted & Greenstar Utility 18/25 model

Comprises:

- 1 x adaptor (80mm dia. to 100mm dia.)
- 1 x adaptor (80mm dia. to 103mm dia.) – *not required for the flexible flue liner installation*
- 1 x bend
- 1 x bolt and solvent-free grease sachet
- 1 x support bracket

**Part No. 7 716 190 036**

### 130mm dia. conventional vertical flue kit – Greenstar Utility 32/50 & 50/70 models

Comprises:

- 1 x adaptor (100mm dia. to 130mm dia.)
- 1 x bend
- 1 x bend support bracket

**Part No. 7 716 190 049**

The flue must be constructed of materials suitable for the use of condensing combustion products.

## Accessories

Components	Part no.	Description
<b>100mm diameter</b>		
	7 716 190 036	100mm dia. Conventional vertical flue kit
	7 716 190 066	100mm dia. 1,000mm Extension kit*
	7 716 190 067	100mm dia. 500mm Extension kit*
	7 716 190 068	100mm dia. Telescopic extension*
	7 716 190 069	100mm dia. 45° Bend*
	7 716 190 074	100mm dia. Wall cover plate kit
	8 716 110 299 0	100mm dia. Spare seal

\*Stainless steel

<b>130mm diameter</b>		
	7 716 190 049	130mm dia. Conventional vertical flue kit
	7 716 190 070	130mm dia. 1,000mm Extension kit*
	7 716 190 071	130mm dia. 500mm Extension kit*
	7 716 190 072	130mm dia. Telescopic extension*
	7 716 190 073	130mm dia. 45° Bend*
	7 716 190 075	130mm dia. Wall cover plate kit
	8 716 110 155 0	130mm dia. Spare seal

\*Stainless steel

## Conventional flexible flue liner kit

### 100mm dia. Oilfit flexible flue liner kit – Greenstar Danesmoor, Greenstar Danesmoor Wall Mounted & Greenstar Utility 18/25 model

Comprises:

- 1 x chimney cowl
- 1 x terminal
- 1 x support collar
- 1 x support bracket assembly
- 1 x centralising spacer
- 1 x flexible to rigid adaptor kit (includes liner & seal)
- 1 x flexible liner
- 1 x rigid to flexible adaptor kit (includes liner & seal)

**Part No. 7 716 190 076** (8m)

**Part No. 7 716 190 077** (12m)

**Part No. 7 716 190 078** (15m)

### 130mm dia. Oilfit flexible flue liner kit – Greenstar Utility 32/50 & 50/70 models

Comprises:

- 1 x chimney cowl
- 1 x terminal
- 1 x support bracket assembly
- 1 x centralising spacer
- 1 x flexible to rigid adaptor kit (includes liner & seal)
- 1 x flexible liner
- 1 x rigid to flexible adaptor kit (includes liner & seal)

**Part No. 7 716 190 079** (8m)

**Part No. 7 716 190 080** (12m)

**Part No. 7 716 190 081** (15m)

## Typical installations

**Open (conventional) flued appliances must not be installed in a bedroom, bathroom or bed-sitting room.**

Before installation commences it must be checked that:

- The chimney is structurally sound and free of obstructions
- The chimney has been thoroughly swept to remove deposits since it was last used.

The flexible flue pipe is only suitable for lining chimneys that conform to the Building Regulations and it should not be used as a chimney on its own or outside a masonry or flueblock chimney.

All the flexible liner and adaptors must be within the chimney with rigid stainless steel flue pipe connecting to the boiler.

**The first 600mm of the stainless steel flue pipe off the boiler must be vertical with no bends or restrictions.**

There must be at least a 25mm clearance between the S/S flue pipe and any combustible material.

The data label must be secured onto the chimney or chimney hearth using the plate provided.

If it is not possible to attach the plate to the chimney, the plate can be attached, in a visible position, next to the electricity consumer unit.

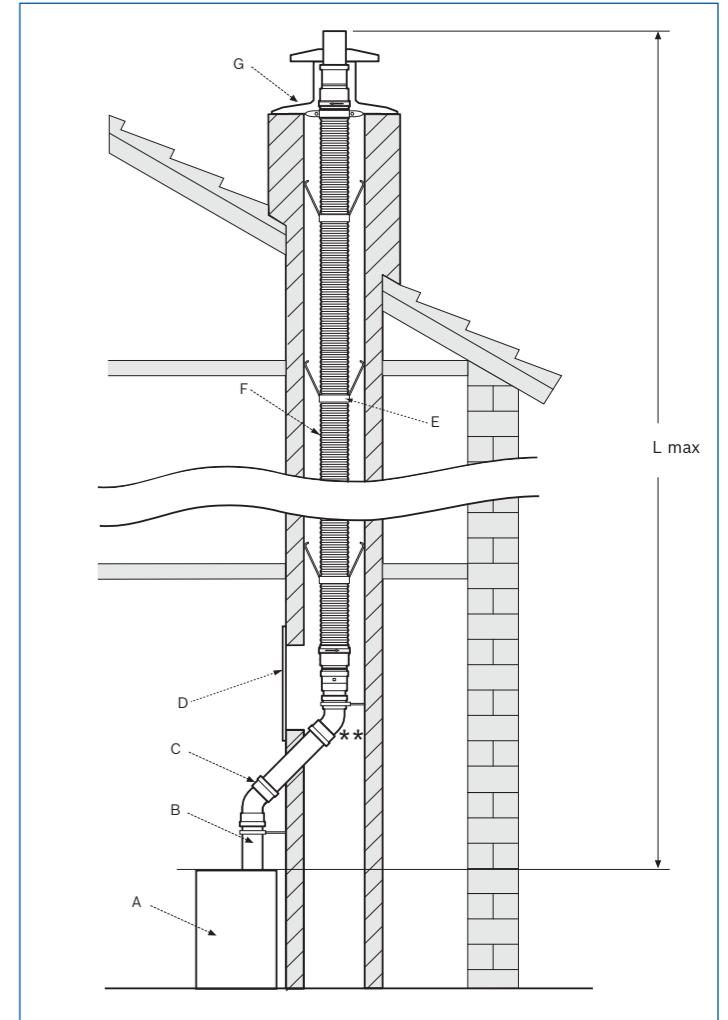
Do not attach the data plate or label to the flue system.

The terminal should not be modified and an extra cowl or cover must not be fitted, the boiler is designed so that any rain that enters the flue will be directed down to the condensate drain.

## Calculating the length:

L maximum = boiler maximum minus 1m\*.  
(Each 45° bend has a 0.5m equivalent flue length)

\*If the chimney has an additional offset, then L will be reduced by an extra metre.  
\*\*The top 45° bend may not be required if there is sufficient room in the chimney to turn the flexible liner through 45° within the chimney. The stainless steel section must be adequately supported.



A Boiler  
B S/S vertical section (min. 600mm)  
C Maximum 2 bends at 135°  
D Fire stop plate/inspection plate  
E Centralising spacer  
F Flexible liner  
G Chimney cowl

Model	Flue diameter (mm)	Max. flue length (mm)
<b>Greenstar Danesmoor</b>		
18/25	100	15,000
<b>Greenstar Danesmoor Wall Mounted</b>		
12/18	100	15,000
18/25	100	15,000
<b>Greenstar Utility series</b>		
18/25	100	15,000
32/50	130	15,000
50/70*	130	15,000

\*For 70kW adjust the first and second stage pump pressure to 125psi.



### Typical installations

Open (conventional) flued appliances must not be installed in a bedroom, bathroom or bed-sitting room.

The first 600mm of the stainless steel flue pipe off the boiler must be vertical with no bends or restrictions.

### Calculating the flue length:

L maximum = boiler maximum\*.

\*If the chimney has an additional offset, then L will be reduced by an 1m.

Note: depending upon the opening situation, a fire stop plate can be used.

Model	Flue diameter (mm)	Max. flue length (mm)
<b>Greenstar Danesmoor</b>		
18/25	100	15,000
<b>Greenstar Danesmoor Wall Mounted</b>		
12/18	100	15,000
18/25	100	15,000
<b>Greenstar Utility series</b>		
18/25	100	15,000
32/50	130	15,000
50/70	130	15,000

# Oilfit external flue system

## Horizontal balanced external flue

### Balanced flue terminal and extensions

#### Horizontal terminals only:

The terminal outlet must face directly away from the wall or no more than 45° from this direction. All flue clearances must be measured from the end of the terminal in the direction the terminal is facing during use.

Each extension must be supported using the wall clamps supplied or a suitable alternative.

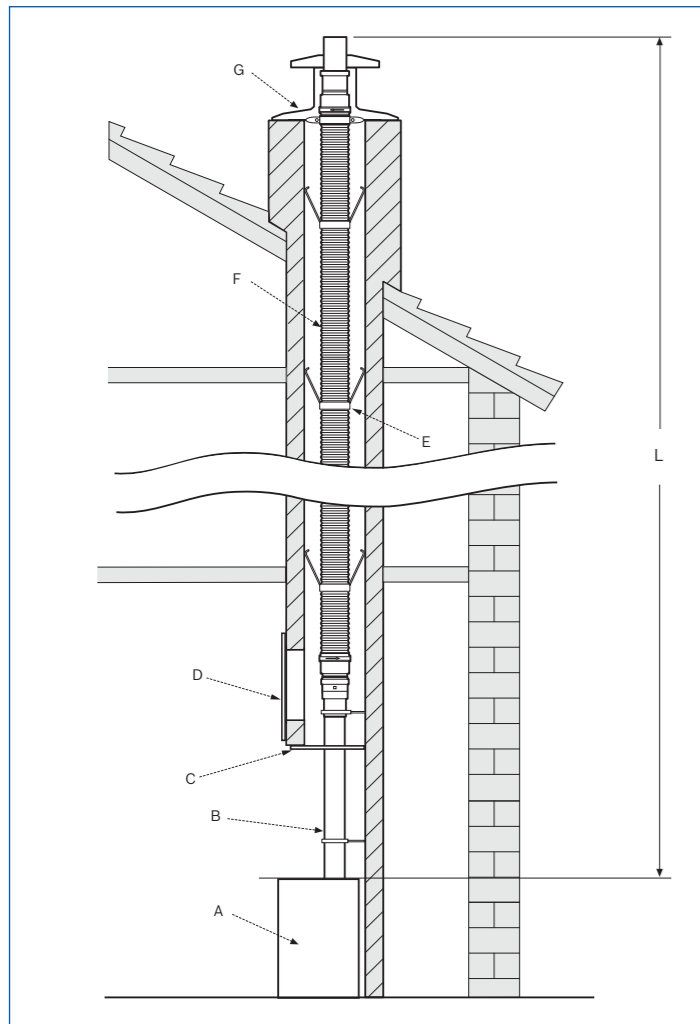
### Calculating the flue length

The diagrams (opposite) show the components used and the maximum flue length (L) for each flue configuration.

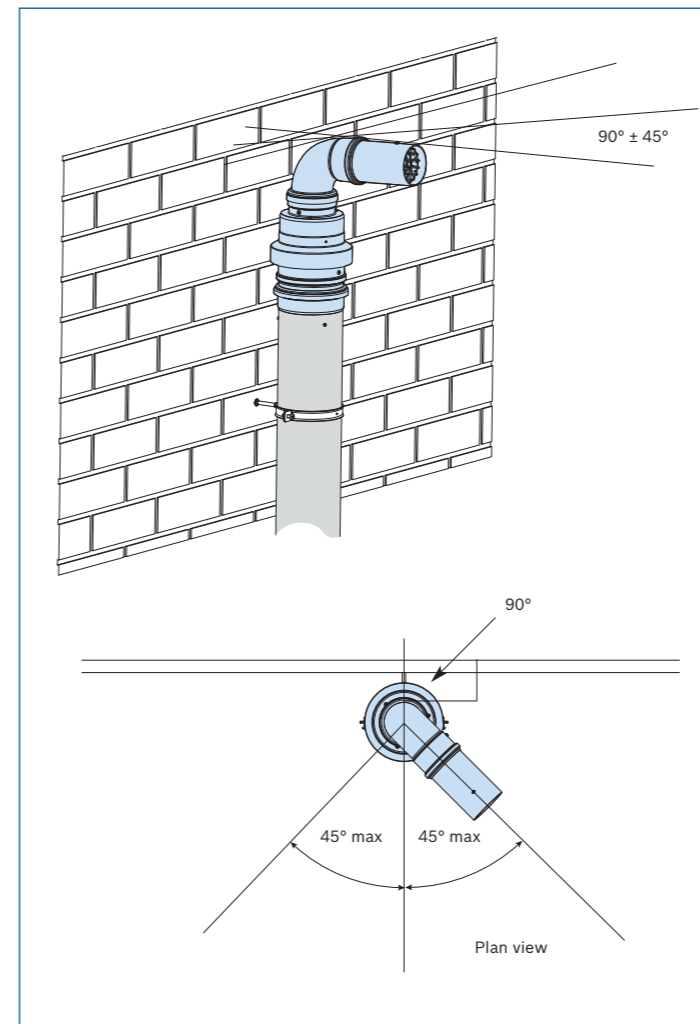
To achieve the maximum flue length (L), a flue section will have to be reduced in length.

Only flue extensions can be reduced in length by cutting.

**Important:** All horizontal sections must rise away from the boiler by 52mm per metre (3°) to allow condensate to drain back to the boiler.



- A Boiler
- B S/S vertical section (min. 600mm)
- C Fire stop plate
- D Inspection plate
- E Centralising spacer
- F Flexible liner
- G Chimney cowl



- 1). Measure the total flue length required, noting that the maximum straight flue length including the terminal is:

Flue diameter	80/125mm dia.
<b>Greenstar Danesmoor and Utility series</b>	
Maximum flue length	2,000mm*

\*From the boiler casing, (the horizontal kit bend is ignored when calculating the flue length).

- 2). Reduce the total straight flue length for each extra flue bend by:
  - 1,000mm for each 90° bend
  - 500mm for each 45° bend.

### Flue extension lengths:

Horizontal 1,000mm overall length. Effective length when engaged into sockets within the flue run is 950mm.

### Flue terminal lengths:





Horizontal 80/125mm dia.: 305mm

**80/125mm dia. horizontal external flue kit – Greenstar Danesmoor, Greenstar Danesmoor Wall Mounted & Greenstar Utility series**

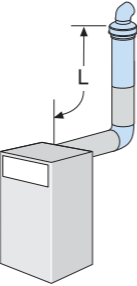
- Comprises:
- 1 x terminal assembly
  - 1 x 80/125 weather seal
  - 1 x external bend
  - 1 x external cabinet flue seal and plate
  - 1 x clamp bracket
  - 1 x drill pack



**Part No. 7 716 190 057**

**Accessories**

Components	Part no.	Description
<b>80/125mm diameter</b>		
	7 716 190 057	80/125mm dia. Horizontal external flue kit
	7 716 190 054	80/125mm dia. External flue extension
	7 716 190 055	80/125mm dia. External 90° bend
	7 716 190 056	80/125mm dia. External 45° bends (pair)

**Option 1**  
Horizontal terminal option



Maximum length (mm)	Components required	
125mm	 1	 up to 2

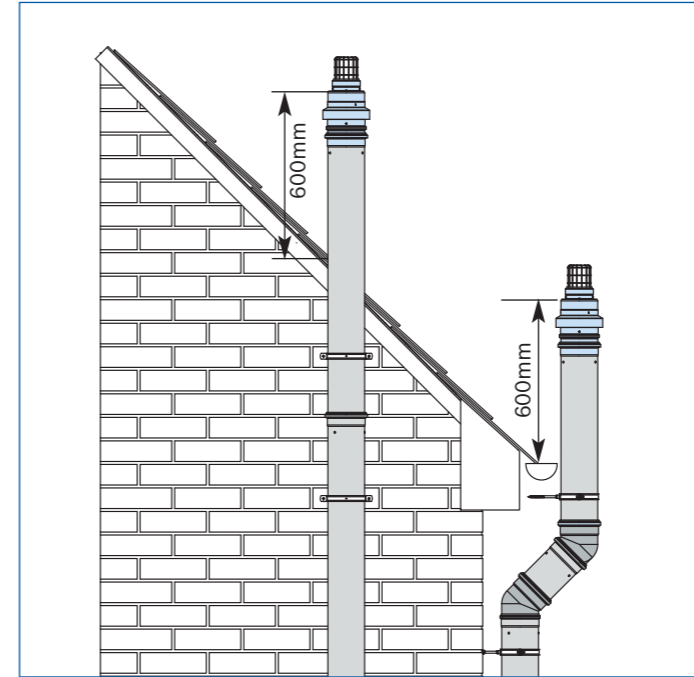
\*From the boiler casing, (the horizontal kit bend is ignored when calculating the flue length).

## Vertical balanced external flue

**Balanced flue terminal and extensions**

**Vertical terminals only:**

- The terminal must extend beyond the roof or wall by 600mm.
- The terminal must be at least 600mm horizontally from any vertical structure.
- Each extension must be supported using the wall clamps supplied or a suitable alternative.



**Calculating the flue length**

To achieve the maximum flue length (L), a flue section will have to be reduced in length.

Only flue extensions can be reduced in length by cutting.

**Important:** All horizontal sections must rise away from the boiler by 52mm per metre (3°) to allow condensate to drain back to the boiler.

- Measure the total flue length required, noting that the maximum straight flue length including the terminal is:

Flue diameter	80/125mm dia.	100/150mm dia.
<b>Greenstar Danesmoor and Utility series</b>		
Maximum flue length	6,000mm*	–

\*From the boiler casing, (the vertical kit bend is ignored when calculating the flue length) maximum 2m of horizontal flue.

- Reduce the total straight flue length for each extra flue bend by:
  - 1,000mm for each 90° bend
  - 500mm for each 45° bend

**Flue extension lengths:**

Vertical 1,000mm overall length. Effective length when engaged into sockets within the flue run is 950mm.

**Flue terminal lengths:**





Vertical 80/125mm dia.: 185mm + cage

**80/125mm dia. vertical external flue kit – Greenstar Danesmoor, Greenstar Danesmoor Wall Mounted & Greenstar Utility series,**

- Comprises:
- 1 x terminal assembly
  - 1 x 80/125 weather seal
  - 1 x external bend
  - 1 x external cabinet flue seal and plate
  - 1 x clamp bracket
  - 1 x drill pack

**Part No. 7 716 190 053**

**Accessories**

Components	Part no.	Description
<b>80/125mm diameter</b>		
	7 716 190 053	80/125mm dia. Vertical external flue kit
	7 716 190 054	80/125mm dia. External flue extension
	7 716 190 055	80/125mm dia. External 90° bend
	7 716 190 056	80/125mm dia. External 45° bends (pair)

**Option 1**  
Top outlet

Maximum length (mm)		Components required		
125mm	5,000	1	up to 5	2

**Option 3**  
Rear outlet

Maximum length (mm)		Components required	
125mm	5,000	1	up to 5

**NB: Horizontal run cannot be longer than 2 metres.**

**Option 2**  
Side outlet

Maximum length (mm)		Components required		
125mm	4,000	1	up to 4	1

**NB: Horizontal run cannot be longer than 2 metres.**

**NB: Horizontal run cannot be longer than 2 metres.**

# Installation requirements

## Installation regulations

The appliance should be installed by a competent person. The person installing the appliance should be aware of the Health and Safety at Work Act and take appropriate action to ensure that the regulations are adhered to. In order to give optimum efficiency and trouble-free operation the appliance must be commissioned by a qualified OFTEC engineer.

The compliance with a British Standard does not, of itself, confer immunity from legal obligations. In particular the installation of this appliance must be in accordance with the relevant requirements of the following British Standards and regulations in respect of the safe installation of equipment.

BS 5410: Parts 1 & 2: Code of Practice for Oil Fired Boilers.

BS 799: Part 5: Specification for Oil Storage Tanks.

BS 7593: Code of Practice for treatment of water in domestic hot water central heating systems.

BS 5449: Part 1: Specification for forced circulation hot water central heating for domestic premises.

BS 5955: Part 8: Specification for the installation of thermoplastic pipes and associated fittings for use in domestic hot and cold water services and heating systems.

BS 7291: Thermoplastic pipes and associated fittings for hot and cold water for domestic purposes and heating installations in buildings.

BS 7074: Part 1: Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems.

BS 7671: IEE Wiring Regulations, current edition.

The Building Regulations Part J, P and L1 England and Wales; Part F and Part J Section III Scotland; Part L and Part F Northern Ireland.

Local water company bye-laws.

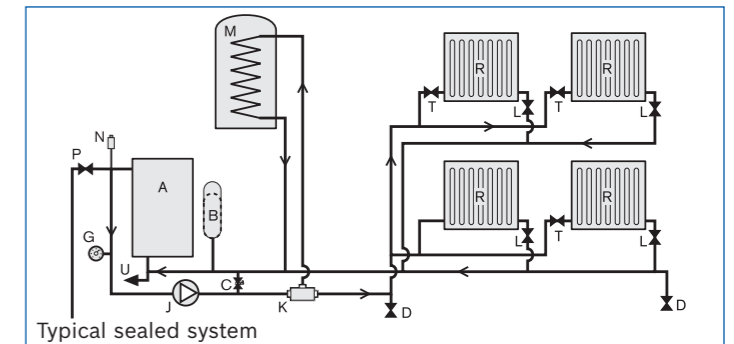
The Control of Pollution (Oil) Regulations.

OFTEC Standards.

To ensure that the installation will perform to the highest standards, the system and components should conform to those mentioned in these instructions.

## Fully pumped sealed primary system

- A pressure relief valve (P) (spring loaded safety valve set to operate at 3bar) must be fitted to the heating flow pipe as close as possible to the boiler
- An expansion vessel (B) should be fitted to the heating return pipe close to the boiler and pressurised for the system volume according to the instructions supplied with the vessel
- A pressure gauge (G) (3bar min.) must be fitted to the heating flow pipe
- An automatic vent (N) must be fitted.



A Appliance	L Lockshield valve
B Expansion vessel	M Hot water cylinder
C Automatic bypass valve	N Automatic air vent
D Drain cock	P Pressure relief discharge
G Pressure gauge	R Radiators
J Circulating pump	T TRV
K Diverter valve	U To filling system

## Plastic pipework

- **Greenstar Danesmoor & Utility 18/25 models ONLY**  
Polymeric plastic pipe can be used on primary sealed systems provided that there is a minimum of 1,000mm of copper pipe directly from the boiler connections
- **Greenstar Utility 32/50 & 50/70 models**  
**Do not use plastic pipework on sealed primary systems**
- Plastic pipework used for underfloor heating must be correctly controlled with a thermostatic blending valve limiting the temperature of the circuits to approx. 50°C. The pipework from the boiler to the blending valve must be in copper or steel (protected from corrosion) if used in a sealed primary water system.

**Note: For satisfactory flue performance it is recommended that no more than 2m of the vertical flue is run horizontally.**

### Primary system/connections/valves

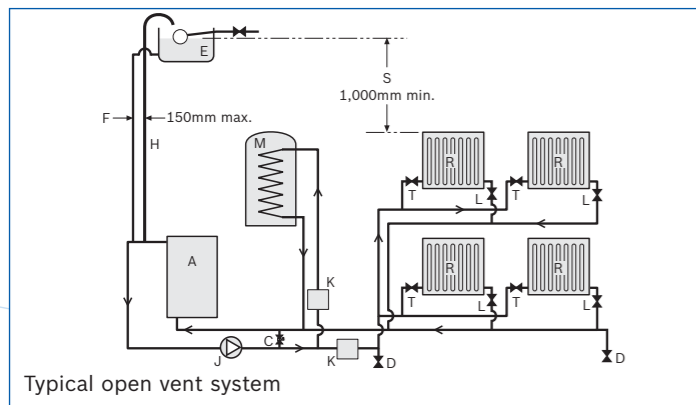
- **Do not use galvanised pipes or radiators**
- All system connections, taps and mixing valves must be capable of sustaining a pressure up to 3bar
- Radiator valves should conform to BS 2767:10
- All other valves should conform to BS 1010
- On new installations Thermostatic Radiator Valves (TRVs) must be used on all radiators except the radiator where the room thermostat is sited, this must be fitted with lockshield valves and left open. All boiler replacement installations should have TRVs fitted to radiators at least within the sleeping accommodation
- To comply with Building Regulations an automatic bypass valve must be connected between the heating flow and return
- Drain cocks are required at all the lowest points on the system
- Air vents are required at all the high points on the system.

### Open vented primary systems

The feed and expansion cistern (E) must be positioned to provide a static head (S) of at least 1 metre above the highest point in the heating system to the water level in the expansion tank (E).

The open vent pipe (H) and feed and expansion pipe (F) must rise continuously from the appliance.

The open vent pipe (H) must be at least 22mm dia.



Typical open vent system

A Appliance	K Zone valve
C Automatic bypass valve	L Lockshield valve
D Drain cock	M Hot water cylinder
E Feed and expansion cistern	R Radiators
F Feed and expansion 15mm dia. min	S Static head
H Open vent 22mm dia. min	T TRV
J Circulating pump	

### Electricity supply

The electrical connection to the boiler must allow complete isolation of the appliance via a double pole isolator with a contact separation of 3mm in all poles supplying the boiler and controls only. A 5 amp fuse should be fitted in the mains supply.

### Oil tanks

#### Tanks – general

Tanks should be located in the most unobtrusive position possible, however thought should always be given to the needs of safety, filling, maintenance and if necessary the provision of a head of oil above the burner.

Reference must be made to OFTEC – Technical Information note T1/133 covering the risk assessment of environmental damage being caused by spillage from oil storage tanks, this assessment must be completed by an approved OFTEC technician to establish the type of tank necessary.

There should be a minimum distance of 600mm from the tank and any foliage intended as a screen.

Oil storage installations fall into three classes – Class 1, Class 2 and Class 3.

Class 1 – are those installations where the boiler does not exceed 45kW or oil storage does not exceed 3,500 litres, these installations are covered in BS 5410 : Part 1.

Class 2 – are those installations where the boiler exceeds 45kW or the oil storage exceeds 3,500 litres, these installations are covered in BS 5410 : Part 2.

Class 3 – Large buildings and places of public entertainment or assembly.

In England, the control of pollution (oil storage) (England) regulations 2001 apply to storage over 200 litres for non domestic properties or for any installation over 3,500 litres.

These appliances would generally fall into Class 1. If the installation falls into class 2 or 3, OFTEC Book Three and technical information sheet T1/136 must be consulted.

### Size of tank

It is recommended that the minimum size of tank for the Greenstar Danesmoor & Utility 18/25 kW boilers is 2,000 litres and 3,500 litres for the Greenstar Utility 32/50 and 50/70. However this can be adjusted accordingly to the customer's requirements.

### External tank installations

#### Building Regulations – England and Wales

In England and Wales installations in single family dwellings must comply with Building Regulations Part J. This in turn requires compliance with BS 5410 : Part 1 and Part 2. All tanks deemed to be at risk or with a capacity of more than 2,500 litres will require a bund.

#### Building Regulations – Scotland

In Scotland Building Regulation part F applies. This in turn requires compliance with BS 5410 : Part 1 and 2. All tanks deemed to be at risk or with a capacity of more than 2,500 litres will require a bund.

#### Northern Ireland

In Northern Ireland the building regulations do not cover the installation of Oil storage tanks, guidance should be sought from BS 5410 : Part 1 and Part 2.

### Bunds – when are they necessary?

These are 'enclosures' designed to contain spillage from the oil tank. Reference must be made to OFTEC – Technical information note T1/133 covering the risk assessment of environmental damage being caused by spillage from oil storage tanks to determine if a bund is required.

There are two main ways to comply if a bund is required.

1. Bunded tanks – are now the most popular way in which to meet the standards and regulations if a bund is required, these tanks are in essence a 'tank within a tank' which prevent leakage from the inner 'oil' tank escaping into the environment by containing it in the outer tank. The use of these tanks avoids the work of constructing a masonry or concrete wall bund as in point 2.

Integrally bunded plastic tanks must comply to OFTEC Standard OFS T100 and integrally bunded steel tanks must comply to OFTEC standard OFS T200. Both must have an OFCERT license to show compliance.

2. External bunds are masonry or concrete enclosures built around a single skinned plastic or steel tank and lined with an oil resistant material to contain the spillage. The bund must be constructed to CIRIA report 163.

Both of these bunds must be capable of holding 110% of the contents of the tank in the event of a leak or spillage during filling.

The following criteria must be considered before choosing the type of oil tank and its location.

British Standard 5410 : Part 1 does not require tanks installed externally to be fitted with a bund unless its absence creates a hazardous situation. OFTEC has published a risk assessment form T1/133, which lists the requirements to be met if the tank is not to be fitted with a bund. The risk assessment must be completed in all cases. The assessment must be completed by an OFTEC approved technician. The situations overleaf would require the provision of a bund in all cases.

1. Tank capacity in excess of 2,500 litres.
2. Tank sited less than 10 metres from controlled water.
3. Tank sited where spillage could run off into an open drain or to a loose fitting manhole cover.
4. Tank within 50 metres of a borehole or spring.
5. Tank on hard surfaced ground that could enable spillage run off to reach controlled water.
6. Tank sited in a position where the vent pipe outlet is not visible from the filling point.
7. Tank supplying heating oil to a building other than a single family dwelling.
8. Any other potential hazard individual to the site.

### Internal tank installations

Always inform the local Fire officer and Insurers of any internal installations.

Oil tanks installed internally must never be sited in an habitable area and must be within an enclosed chamber. This chamber comprises a fully enclosed ventilated space and must have 60 minute fire resistant wall, floor, door and roof with a self closing door that opens outwards. The door must be able to be opened from the inside without the aid of a key. The chamber must act as a bund so the door must open above the top level of any constructed bund. If the use of an internally bunded tank is made then the chamber only has to provide the correct fire protection, the door can be at floor level. The chamber must be vented directly to open atmosphere. Space for access to the tank in the chamber must be provided. In the case of steel tanks adequate space for painting and maintenance is required. Any electrical lighting should be of the bulk head type with switches mounted externally.

Oil storage tanks may be installed in a garage but the guidance in OFTEC Technical sheet T1/127 must be followed.

### Underground tank installations

All underground oil storage tanks must be fitted with overflow protection.

In all cases the potential buoyancy of the tank should be considered if the water table in the area can rise above the level of the oil in the tank.

Underground installation can be located closer than 1,800mm to an adjacent building and 760mm to a boundary without additional protection.

All underground tanks must be specially constructed to withstand the pressures placed upon them by the surrounding ground. GRP tanks in either single or double skinned versions are suitable, Polyethylene models are also suitable. If steel tanks are used they must be of the double skinned type.

### Steel tanks

Steel tanks are available but are being superseded by maintenance free plastic tanks due to their need for siting on piers and painting.

They must be positioned with a slight back fall away from the Oil outlet (40mm per metre) to the drain/sludge cock at the opposite end to enable any water or sludge to drain out of the tank.

Steel tanks should be constructed to comply with OFTEC Standard OFS T200 and must be covered by an OFCERT license.

Galvanised steel tanks and pipework should never be used in oil storage or supply.

### Plastic tanks

Plastic tanks do not require painting and can be sited directly onto a suitable base (no need for piers) as they do not suffer from corrosion, although the head of oil above the boiler's burner should always be considered and access for cleaning the oil filter and water trap be available.

Plastic tanks should be constructed to OFTEC Standard OFS T100 and must be covered by an OFCERT license.

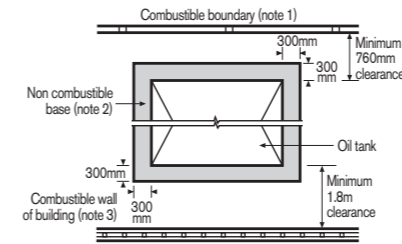
### Position in relation to buildings and boundaries

The position of the oil storage tank relative to buildings and boundaries needs consideration in terms of fire protection, the storage tank itself does not constitute a fire hazard but needs protection from a fire which may originate nearby. For Class 1 installations, as mentioned earlier, no special fire protection is needed if the tank is situated more than 1,800mm away from the building and not less than 760mm from the site boundary.

Figs. 1 to 6 (see next page) illustrate the requirements of a Class 1 tank installation in relation to buildings (combustible wall and non combustible wall) and boundaries (combustible and non combustible).

**Fig. 1 Tank installation near combustible buildings & boundaries.**

Clearances required when additional protection is not provided.



NOTES: Relevant to Fig. 1

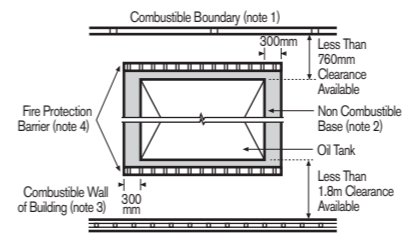
1. Combustible Boundary (has less than 30 minutes fire resistance)
2. Non-combustible base. Covers area beneath tank and extends 300mm outside the tank on all sides except:
3. Combustible wall of building (has fire resistance of less than 30 minutes to internal fire).

Where the tank is next to a non combustible wall (minimum 30 minutes fire resistance)

Where the tank is located over an existing non combustible surface.

**Fig. 2 Tank installation near combustible buildings & boundaries**

Protection required where clearances in Fig. 1 are not provided.



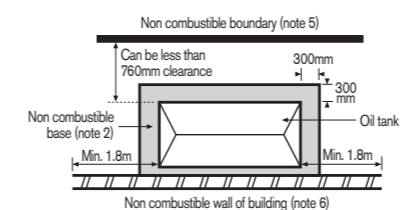
NOTES: Relevant to Fig. 2

1. Combustible boundary (has less than 30 minutes fire resistance).
2. Non-combustible base. Covers area beneath tank and extends 300mm outside the tank on all sides except:
3. Combustible wall of building (has fire resistance of less than 30 minutes to internal fire)
4. Fire protection barrier (non-combustible, minimum fire resistance of 30 minutes, extends 300mm beyond both ends of tank and 300mm higher than the tank).

Where the tank is located over an existing non combustible surface.

**Fig. 3 Tank installation near non combustible buildings & boundaries**

Building wall without openings. No added protection required.



NOTES: Relevant to Fig. 3

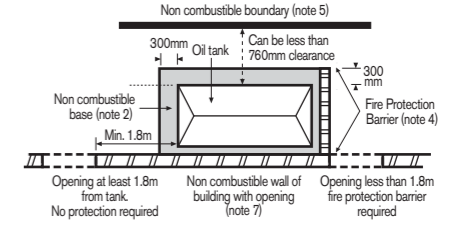
2. Non-combustible base. Covers area beneath tank and extends 300mm outside the tank on all sides except:
5. Non-combustible boundary (has minimum fire resistance of 30 minutes). Must extend 300mm higher than the tank and 300mm beyond both ends of the tank.
6. Non-combustible wall of building (has minimum fire resistance of 30 minutes). Any part of the wall within 1.8m of the tank must have a fire resistance to internal fire of not less than 30 minutes and have no openings other than airbricks.

Where the tank is next to a non combustible wall (minimum 30 minutes fire resistance)

Where the tank is located over an existing non combustible surface.

**Fig. 4 Tank installation near non combustible buildings & boundaries**

Building wall with openings. Opening protection required.

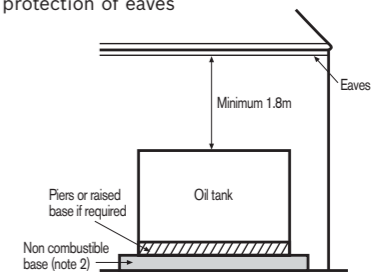


NOTES: Relevant to Fig. 4

2. Non-combustible base. Covers area beneath tank and extends 300mm outside the tank on all sides except:
4. Fire protection barrier (non-combustible, minimum fire resistance of 30 minutes, extends to non-combustible wall, 300mm beyond both ends of tank and 300mm higher than the tank).
5. Non-combustible boundary (has minimum fire resistance of 30 minutes). Must extend 300mm higher than the tank and 300mm beyond both ends of the tank.
7. If wall has openings closer than 1.8m to tank then a fire protection barrier 300mm higher than the tank and 300mm beyond the tank can be fitted. The non-combustible building wall and the barrier must protect the tank from fire coming through the opening.

**Fig. 5 Tank installations under eaves**

Without protection of eaves

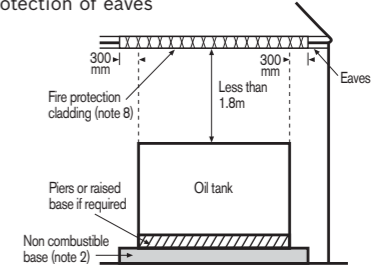


NOTES: Relevant to Fig. 5

2. Non-combustible base. Covers area beneath tank and extends 300mm outside the tank on all sides except:
- Where the tank is next to a non combustible wall (minimum 30 minutes fire resistance).
- Where the tank is located over an existing non combustible surface.

**Fig. 6 Tank installations under eaves**

With protection of eaves



NOTES: Relevant to Fig. 6

2. Non-combustible base. Covers area beneath tank and extends 300mm outside the tank on all sides except:
8. Fire protection to combustible eaves (must provide a minimum resistance to fire of 30 minutes, extends the length of the eaves over the tank with an additional 300mm at both ends). The cladding of the eaves is to prevent fire spreading to the roof from the area of the tank.

Where the tank is next to a non combustible wall (minimum 30 minutes fire resistance).

Where the tank is located over an existing non combustible surface.

## Oil supply

All oil burners on Worcester floor standing appliances are supplied with a single flexible fuel line from the oil pump which the installer connects the main oil supply line (via the isolation valve), within the appliance. This enables the burner to be removed without the need for disconnection of the fuel line.

The maximum permissible head for a Single Pipe Gravity Feed System is 4 metres. If the head is greater, then a head breaking device must be incorporated into the oil supply line.

The oil pump's primary job is to pressurise the oil once in the pump and force it out of the nozzle at high pressure to atomise the fuel to give clean and efficient combustion. This same pump can also be converted to 'draw' up the fuel line in cases where the oil tank is lower than the appliance's burner. This conversion is undertaken by the installing engineer.

All oil pumps on Worcester appliances can easily be converted to a two pipe oil line (details of this operation are within the Installation and Servicing instructions which come with the appliance).

More advice on fuel lines can be sought from OFTEC Book Three and Technical sheet TI/134.

## De-aeration devices

A de-aeration device is a container of oil about the size of a pint glass with an automatic air vent on top and three connections on the bottom. It saves running a return oil pipe back to the tank from the burner as in Fig.11. Its function is to provide a reservoir of oil from which the oil pump draws oil whilst venting any air in the oil to the atmosphere preventing nuisance 'lockout' of the burner. Not all the oil drawn is consumed and any excess is returned to the de-aeration device, so whilst the burner is firing there is a continuous flow and return of oil. The third connection is for the main fuel line from the oil tank. There is usually a non-return valve located in this connection to prevent oil draining back towards the oil tank under gravity and creating a vacuum. When the burner is firing the whole fuel supply system is under negative pressure i.e. suction, therefore it is imperative that all joints on the fuel supply system are sound. Whilst there may be no obvious signs of an oil leak externally, when the burner is firing, it may be possible for air to be drawn in through a bad joint, reducing the capability of the oil pump, resulting in a lack of fuel to the oil pump and nuisance 'lockouts'. This may manifest itself as a very low level of oil or 'foaming' of the oil inside the de-aeration device whilst the burner is trying to fire.

Most de-aeration devices are made of plastic and vent to the atmosphere. For this reason they must always be located externally. If sited internally they would constitute an increased fire hazard (see Fig. 12).

Metal types do exist which do not emit vapour. These can be located internally or externally.

Top outlet oil tanks should have the non-return valve removed from the end of the oil feed pipe within the tank if installed in conjunction with a de-aeration device.

## Supply pipe

The oil supply pipe itself would normally be annealed copper tube with a protective plastic coating which is easily manipulated around bends and usually enables the fuel line to be run in a continuous length without joints. If joints must be used, they must be accessible, even if underground via an access duct and should be of the flared manipulative type. Plastic pipe specifically for oil lines does exist and is acceptable but must only be used underground.

Galvanised pipe, fittings and soldered joints must not be used in oil lines.

More advice on fuel lines can be sought from OFTEC Book Three and Technical sheet TI/134.

## Supply pipe sizing

The diameter of the oil supply pipe itself is subject to the distance from the oil tank to the appliance and the head of oil whether it be positive or negative.

Tables 1 and 2 give the required diameter of supply pipe when cross referenced with the head. Table 3 gives the diameter of the supply pipe when the use of a de-aeration device is made.

**Table 1 Single pipe gravity feed system**

Maximum allowable pipe run (metres)		
Head (m)	8mm inside dia. pipe (10mm OD copper)	10mm inside dia. pipe (12mm OD copper)
0.5	12	30
1.0	25	69
1.5	37	91
2.0	49	100
2.5	62	100
3.0	74	100
3.4	87	100
4.0	99	100

**Table 2 Double pipe sub-gravity feed system**

Maximum allowable pipe run (metres)		
Head (m)	8mm inside dia. pipe (10mm OD copper)	10mm inside dia. pipe (12mm OD copper)
0	50	100
-0.5	44	100
-1.0	38	95
-1.5	32	80
-2.0	26	66
-2.5	20	51
-3.0	14	37
-3.5	8	22

**Table 3 Single pipe suction lift with de-aerator**

Maximum allowable run from tank to de-aerator (metres)	
Fuel flow rate	2.5(kg/h)
Head (m)	6mm inside dia. pipe (8mm OD copper)
0	100
0.5	95
1.0	80
1.5	70
2.0	60
2.5	45
3.0	35
3.5	25

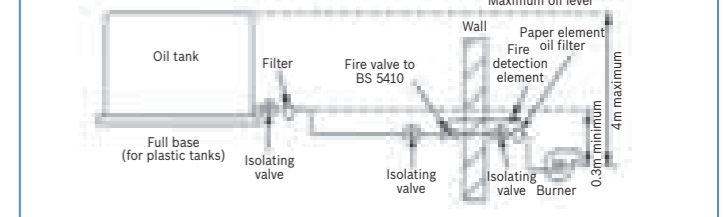
## Oil filters

Oil filters must always be incorporated in the oil supply line, one on the outlet from the oil tank to filter deposits from within the tank or fuel and one near the appliance to filter deposits from within the fuel line itself. It is supplied and fitted by the installing engineer and is not part of the boiler's components. They should be able to be serviced without the need for draining down the fuel supply line. There must be sufficient clearance below the filter to enable servicing operations to be carried out easily. Filters must comply to OFTEC standard OFS E104.

## Fire valves

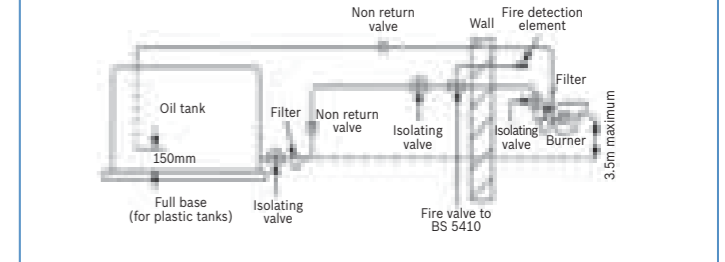
A fire valve is an essential part of the oil supply system. It is supplied and fitted by the installing engineer and is not part of the boiler's components. Its purpose is to cut off the flow of oil outside the building in the event of fire within the boiler area. The valve should be located at the point of entry into the building of the fuel line. It must be activated by a remote sensor located over the burner. A clip is provided within the appliance for the sensor. Fire valves must comply with OFTEC standard OFS E101.

**Fig. 10 Single pipe system**

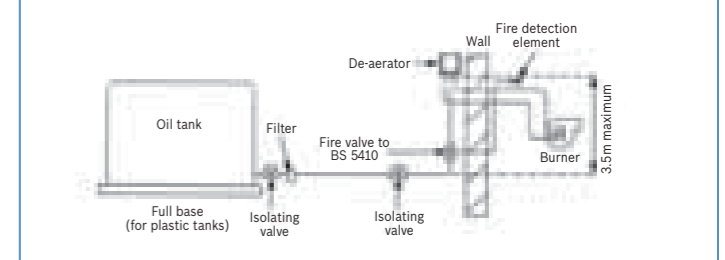


## Two pipe systems

**Fig. 11 Two pipe system**



**Fig. 12 Single pipe lift system with de-aerator**



## Warranty

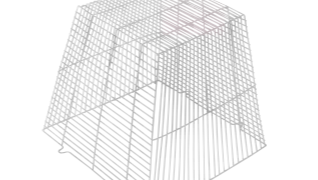
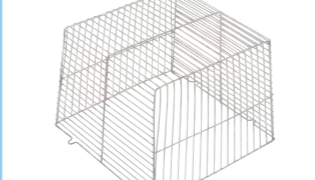
Greenstar Danesmoor, Utility and Wall Mounted boilers come with the reassurance of a 2 year\* parts and labour warranty with a 5 year\* warranty on the primary heat exchanger. Ongoing service and maintenance contracts can be arranged through the Worcester Customer Service Department.

\*Subject to conditions.




## Oilfit internal flue system accessories – Greenstar Danesmoor, Utility & Danesmoor Wall Mounted series

<p><b>Telescopic flue kit standard (125mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 064</p>	<p><b>Telescopic flue kit short (125mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 062</p>	<p><b>Horizontal flue kit (150mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 043</p>	<p><b>Vertical flue kit (125mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 032</p>
<p><b>Vertical flue kit (150mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 044</p>	<p><b>Flue extension (125mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 033</p>	<p><b>Flue extension (150mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 045</p>	<p><b>45° bend (125mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 035</p>
<p><b>45° bend (150mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 047</p>	<p><b>90° bend (125mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 034</p>	<p><b>90° bend (150mm dia.)</b></p>  <p>Worcester Part No. 7 716 190 046</p>	<p><b>Conventional flue adaptor kit (100/103mm dia.) – 18/25 models</b></p>  <p>Worcester Part No. 7 716 190 036</p>
<p><b>Conventional flue adaptor (130mm dia.) – 32/50 &amp; 50/70 models</b></p>  <p>Worcester Part No. 7 716 190 049</p>	<p><b>Digital plug-in 7 day twin channel programmer</b></p>  <p>Worcester Part No. 7 716 192 033</p>	<p><b>Flashing kit (flat roof)</b></p>  <p>Worcester Part No. 7 716 191 090</p>	<p><b>Flashing kit (pitched roof)</b></p>  <p>Worcester Part No. 7 716 191 091</p>

## Oilfit internal flue system accessories – Greenstar Danesmoor, Utility & Danesmoor Wall Mounted series

<p><b>Stainless steel flue terminal guard</b></p>  <p>Worcester Part No. 7 716 190 051</p>	<p><b>Stainless steel flue terminal guard</b></p>  <p>Worcester Part No. 7 716 190 050</p>
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## Oilfit flexible flue kit accessories – Greenstar Danesmoor, Utility & Danesmoor Wall Mounted series

<p><b>Oilfit flexible flue kit</b></p>  <p>Worcester Part No.</p> <p><b>100mm dia.</b> 7 716 190 076 (8m) 7 716 190 077 (12m) 7 716 190 078 (15m)</p> <p><b>130mm dia.</b> 7 716 190 079 (8m) 7 716 190 080 (12m) 7 716 190 081 (15m)</p>	<p><b>Stainless steel 1,000mm extension kit</b></p>  <p>Worcester Part No.</p> <p><b>100mm dia.</b> 7 716 190 066</p> <p><b>130mm dia.</b> 7 716 190 070</p>	<p><b>Stainless steel 500mm extension kit</b></p>  <p>Worcester Part No.</p> <p><b>100mm dia.</b> 7 716 190 067</p> <p><b>130mm dia.</b> 7 716 190 071</p>	<p><b>Stainless steel Telescopic extension</b></p>  <p>Worcester Part No.</p> <p><b>100mm dia.</b> 7 716 190 068</p> <p><b>130mm dia.</b> 7 716 190 072</p>
<p><b>Stainless steel 45° bend</b></p>  <p>Worcester Part No.</p> <p><b>100mm dia.</b> 7 716 190 069</p> <p><b>130mm dia.</b> 7 716 190 073</p>	<p><b>Wall cover plate kit</b></p>  <p>Worcester Part No.</p> <p><b>100mm dia. flue</b> 7 716 190 074</p> <p><b>130mm dia. flue</b> 7 716 190 075</p>		

## Oilfit external flue system accessories – Greenstar Danesmoor, Utility & Danesmoor Wall Mounted series



## Greenskies FKC and FKT series – the next generation of solar panels



Worcester Greenskies solar panels are an ideal partner to the new range of high efficiency Greenstar condensing regular and system boilers, with different models available in both oil and gas, which require a separate cylinder for the storage of hot water. When used together, a Greenstar boiler and a Greenskies solar package provide a highly efficient heating and hot water system.

For more information refer to the Greenskies Technical and Specification brochure (part no. 8 716 110 080) or visit [www.worcester-bosch.co.uk/solar](http://www.worcester-bosch.co.uk/solar)

Greenskies solar kits now available to order

**NEW**

For added convenience Greenskies solar systems are now available to order as complete kits. Each kit contains 2 solar panels, solar pump station, solar controller and all of the parts required for installation. The following kits are available:

Greenstar Danesmoor and Utility condensing boilers are compatible with Greenskies solar water heating systems to enable households to take advantage of renewable and sustainable energy. Worcester Greenskies solar panels harness the energy in both direct and diffused sunlight and convert it to heat for the production of hot water for the home.

If your central heating system provides a store of hot water in a cylinder, Greenskies from Worcester is very good news – because it means you now have the opportunity to make significant savings on your water heating bills. Greenskies solar water heating can supply 50-70% of the hot water you use every year. The remaining portion of your hot water demand will be provided by your central heating boiler in the normal way. Installing Worcester Greenskies solar panels provides immediate savings on your fuel bills and major benefits to the environment.

The solar panels have been designed as a complement to existing heating systems which use a store of hot water in a cylinder. The existing cylinder is exchanged for a cylinder with two heat exchanger coils; one from the boiler in the property and a second from the solar panels.

- FKC-1S standard 2 panel portrait kit on roof  
Part number: 7 716 150 000
- FKC-1S standard 2 panel portrait kit in roof  
Part number: 7 716 150 001
- FKC-1W standard 2 panel landscape kit on roof  
Part number: 7 716 150 002
- FKC-1W standard 2 panel landscape kit in roof  
Part number: 7 716 150 003
- FKT-1S high 2 panel portrait kit on roof  
Part number: 7 716 150 004
- FKT-1S high 2 panel portrait kit in roof  
Part number: 7 716 150 005
- FKT-1W high 2 panel landscape kit on roof  
Part number: 7 716 150 006
- FKT-1W high 2 panel landscape kit in roof  
Part number: 7 716 150 007



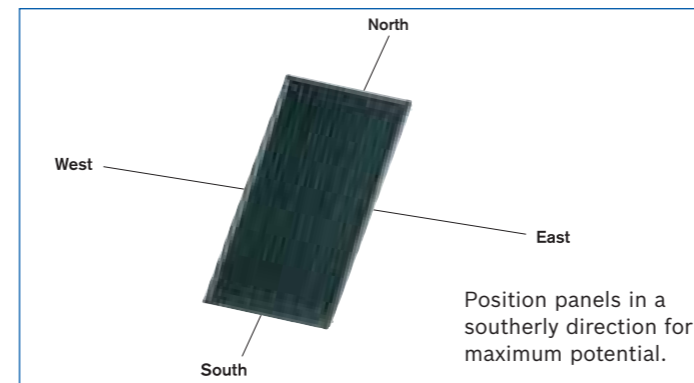
# Technical data – Worcester Greenskies solar panel series

Model	Greenskies FKC-1S Solar Panel	Greenskies FKC-1W Solar Panel	Greenskies FKT-1S Solar Panel	Greenskies FKT-1W Solar Panel
Orientation	Portrait	Landscape	Portrait	Landscape
Height (mm)	2,070	1,145	2,070	1,145
Width (mm)	1,145	2,070	1,145	2,070
Depth (mm)	90	90	90	90
Gross collector area (m <sup>2</sup> )	2.37	2.37	2.37	2.37
Aperture area (m <sup>2</sup> )	2.25	2.25	2.25	2.25
Absorber area (m <sup>2</sup> )	2.23	2.23	2.23	2.23
Solar glass transmission (%)	91.5	91.5	91.5	91.5
Stagnation temperature (°C)	188	188	202	202
Fluid content (litres)	0.86	1.25	1.43	1.76
Weight empty (kg)	41	42	44	45
Coating	Highly selective (black chrome)	Highly selective (black chrome)	Highly selective (PVD)	Highly selective (PVD)
Absorption	95% ± 2%	95% ± 2%	95% ± 2%	95% ± 2%
Emission	12% ± 2%	12% ± 2%	5% ± 2%	5% ± 2%
Max. operation pressure (bar)	6	6	10	10
Nominal flow rate (litres/hr)	50	50	50	50
Glass	3.2mm solar safety glass, 91.5% ± 0.5% solar transmission	3.2mm solar safety glass, 91.5% ± 0.5% solar transmission	3.2mm solar safety glass, 91.5% ± 0.5% solar transmission	3.2mm solar safety glass, 91.5% ± 0.5% solar transmission
Frame	UV and weatherproof fibre glass profile with plastic corner	UV and weatherproof fibre glass profile with plastic corner	UV and weatherproof fibre glass profile with plastic corner	UV and weatherproof fibre glass profile with plastic corner
Rear panel	0.6mm aluminium-zinc coated steel sheet	0.6mm aluminium-zinc coated steel sheet	0.6mm aluminium-zinc coated steel sheet	0.6mm aluminium-zinc coated steel sheet
Insulation	55mm mineral wool, high temperature resistant	55mm mineral wool, high temperature resistant	55mm mineral wool, high temperature resistant	55mm mineral wool, high temperature resistant
Fluid for solar circuit	Water-propylene glycol mixture 50/50	Water-propylene glycol mixture 50/50	Water-propylene glycol mixture 50/50	Water-propylene glycol mixture 50/50
Absorber	Copper strip absorber with harp hydraulic, ultrasonic welded	Copper strip absorber with harp hydraulic, ultrasonic welded	Copper strip absorber with double meander hydraulic, ultrasonic welded	Copper strip absorber with double meander hydraulic, ultrasonic welded
Certificates	CE Solar Keymark	CE Solar Keymark	CE Solar Keymark	CE Solar Keymark
Zero-loss collector efficiency	77	77	80.3	80.3
Heat loss coefficient	3.681	3.681	3.56	3.56

## Operation

Worcester Greenskies solar panels form part of a system which remains separate from the boiler heating system.

The panels are mounted on a surface which is selected for its exposure to sunlight and usually connected, via pipe work, to the lower coil of a twin-coil solar cylinder. The energy in the sun's rays is absorbed by the panel and the heat is transferred into the pipe work in the absorber plates. The pipe work is filled with a ready-mixed liquid, containing glycol and water, which is circulated by a pump to the coil in the hot water cylinder. The heat is deposited in the storage cylinder and the glycol returns to the panel to absorb more free solar energy. The system is equipped with a simple unit to control the flow of energy from the panels to the storage cylinder.



## Solar Radiation in the British Isles

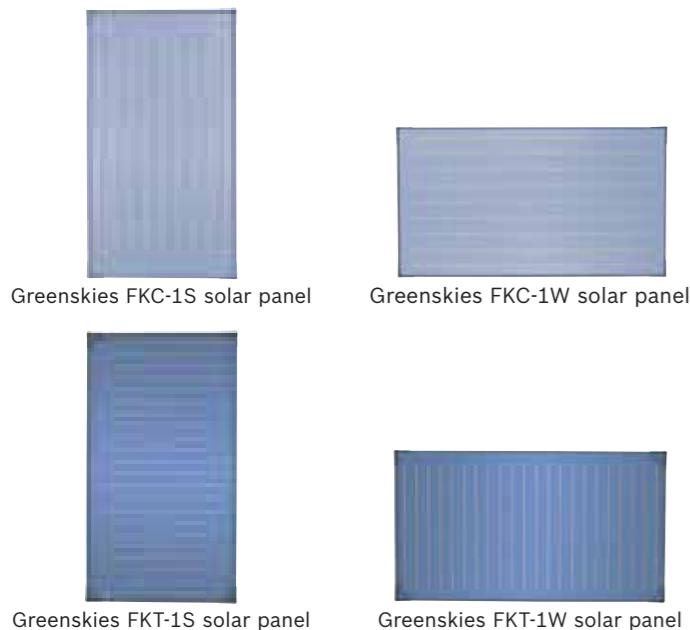
Contrary to popular belief the amount of solar radiation received by the UK is enough for solar water heating to be a viable supplement to existing domestic water heating. Perhaps surprisingly the UK receives 65% of the amount of solar radiation that is received by the south of Spain. The radiation in the UK is made up of direct radiation on sunny days, which accounts for around 40%, and diffused radiation on cloudy days, accounting for 60% of the total.

Summer will provide the largest amount of radiation over the year but a useful contribution will be provided by other seasons.

As an indication, a well sized typical installation will provide the following proportion of the household domestic hot water requirement:

% of requirement fulfilled by solar	
Season	%
Summer	80 - 90
Spring & Autumn	40 - 50
Winter	20 - 30

This translates to over half of the typical annual domestic hot water requirement.



Features	Benefits
Efficient collector with 95% absorption rate	Increases performance of panel
Robust panel design	Minimises risk of damage and prolongs service life
Environmentally friendly	All materials recyclable, environmentally conscious manufacture
Quick fitting	Labour and money saving
Easy to fit	Reduces complexity of installation
Simple to use controller	Allows quick setting of functions
Selective coating on absorber	Increases collector performance even on cloudy days
Strong solar glass cover	Protects collector from damage
Larger absorber surface*	Better performance
Lower lift weight*	Easier handling

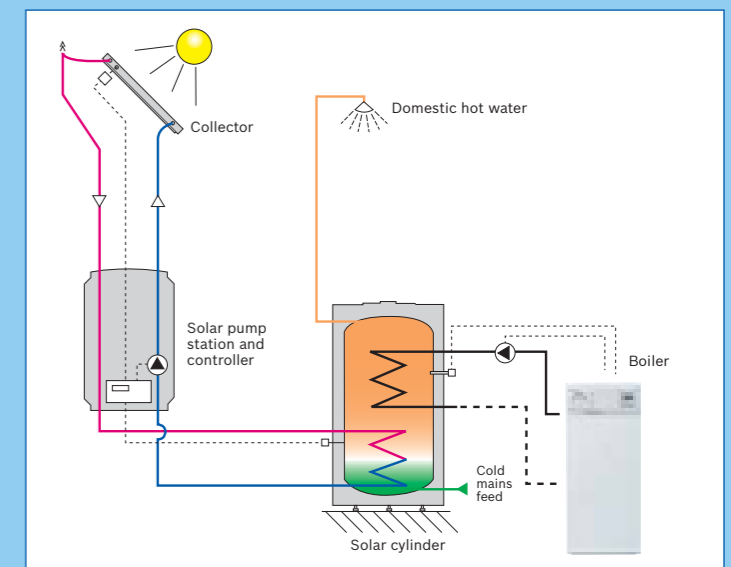
\*Compared to FK240 panel

## Typical solar system for hot water with twin coil cylinder and conventional boiler

The most common solar system layout uses a twin coil cylinder which is fed by both a boiler (or other heat source) and the solar panels. The solar system and the regular heating system do not come into direct contact with each other and the only shared part is the cylinder.

The solar system has its own pump, expansion vessel, pressure relief valve, air vent and controller.

The Worcester solar package is ideally suited for use with Worcester oil- or gas-fired regular or system boilers.



# Worcester Greenskies Cylinder series

## Notes



Features
Inlet control set (pressure reducing valve, strainer, non-return valve and expansion relief valve)
Temperature & pressure relief valve
15mm/22mm Tundish
Expansion vessel 18 litre or expansion vessel 24 litre
Wall mounting bracket (for the expansion vessel)
22mm DZR compression connections
1 x 15mm end feed tee
Expansion valve (to discharge)
Expansion vessel hose
Immersion heater with thermostat and thermal cut out
2 x two port valves
Wiring centre
Pockets for thermostat points
1 x dual thermostat and 1 x high limit thermostat
Greenskies cylinders are WRAS and BBA approved products to meet G3 Building Regulations

Only for use with one fossil fuel appliance and one solar system (the use of two fossil fuel appliances is not permitted)

Worcester Greenskies Cylinders are Indirect Unvented Twin Coil Solar Cylinders. These cylinders can be used in various applications, however, in Worcester's case they are to be used in conjunction with the Greenskies Solar Package. Solar heat is fed in via the lower coil, with the boiler feeding the upper coil.

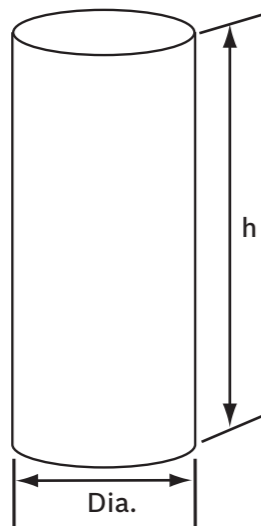
### Product size (mm)

**Greenskies 180 Cylinder** – 1281(h) x 550(dia.)

**Greenskies 210 Cylinder** – 1469(h) x 550(dia.)

**Greenskies 250 Cylinder** – 1719(h) x 550(dia.)

**Greenskies 300 Cylinder** – 2032(h) x 550(dia.)



## Technical data – Worcester Greenskies Cylinder series

Greenskies Cylinder technical details				
	180	210	250	300
Height (mm)	1,281	1,469	1,719	2,032
Diameter (mm)	550	550	550	550
Capacity (litres)	180	210	250	300
Weight empty (kg)	50	55	60	65
Weight full (kg)	230	265	310	365

Greenskies Cylinder product range	
Product name	Part number
Greenskies 180 Cylinder	7 716 192 554
Greenskies 210 Cylinder	7 716 192 555
Greenskies 250 Cylinder	7 716 192 556
Greenskies 300 Cylinder	7 716 192 557

# 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 – 8.00pm  
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 products. Our experienced team of technical experts provides answers to queries of a technical nature across the entire Worcester range.

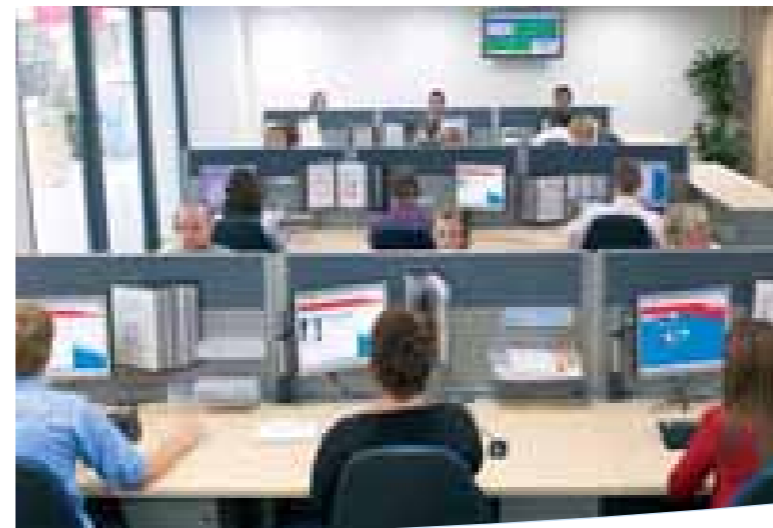
Worcester also has a pre-sales department, which provides assistance in selecting a boiler system to suit a particular application, along with full guidance on installation. As well as this we will also assist in finding a recommended installer. For more information please contact the Technical Helpline 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.

With the increase of renewables technologies in the UK, the need for training has never been greater.

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 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 a more in-depth course for the servicing and fault finding engineers.



Training lab at West Thurrock Academy

## Training Centres throughout the UK

Worcester's network of regional training venues is strategically located across the country and includes our state-of-the-art Academy at the Company Headquarters in Worcester. This facility has recently been upgraded to include a heat pump training lab, showcasing our range of ground and air source heat pumps.

Further academies are located at West Thurrock in Essex, Bradford, Clay Cross in Derbyshire and Bangor in Northern Ireland, 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 01905 752556 for your copies, or visit [www.worcester-bosch.co.uk](http://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



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

# Worcester training courses



## One stop shop training

We are here to provide you with training and assistance for all areas of your business, not just product training. IT Skills and Sales & Marketing are just 2 of the courses we now offer to help your business grow. Call us on 01905 752526 to order a full training course portfolio.

Worcester training courses	
<b>Greenstar CDi gas-fired condensing combi boilers</b>	
Models covered	Greenstar 27/30/37/42CDi
Duration	1 day
<b>Greenstar i Junior &amp; Si gas-fired condensing combi boilers</b>	
Models covered	Greenstar 24/28i Junior Greenstar 25/30Si
Duration	1 day
<b>Greenstar Highflow CDi &amp; FS CDi regular floor standing gas-fired condensing combi and regular boilers</b>	
Models covered	Greenstar Highflow 440/550CDi Greenstar FS 30/42CDi Regular
Duration	1 day
<b>Greenstar system &amp; 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 FX controls</b>	
Models covered	MT10/MT10RF/DT20RF/DT20/DT10RF/TD200/RT10/ FR10/FR110/FW100/ISM1
Duration	1 day
<b>Greenstar Danesmoor, Heatslave &amp; Camray high efficiency condensing oil-fired boilers – pre-OFTEC training</b>	
Models covered	Greenstar Danesmoor series Greenstar Heatslave series Greenstar Camray series
Duration	1 day
<b>Greenskies solar system</b>	
Covering	Installation, Commissioning and Servicing
Duration	2 days
<b>Greenstore ground source heat pumps</b>	
Covering	Installation, Commissioning and System Design
Duration	2 days
<b>Greensource heat pumps – air to water</b>	
Covering	Installation, Commissioning and System Design
Duration	2 days
<b>Greensource heat pumps – air to air</b>	
Covering	Installation, Commissioning and System Design
Duration	1 day

OFTEC ASSESSMENT	
<b>OFTEC 101</b>	
Covering	Domestic/Light Commercial Pressure Jet Commissioning and Servicing
Duration	3 day course
<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
<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
<b>Mobile OFTEC</b>	
All above covered throughout the country on the mobile training vehicle as well as in all our centres.	
<b>Unvented cylinder course</b>	
Covering	All G3 Regulations for the Installation, Servicing and Commissioning of Unvented Cylinders. This course is certified by Logic Certification.
Duration	1 day
<b>Chemical water treatment</b>	
Covering	Water treatment of domestic heating systems in accordance with BS 7593: 2006
Duration	1 day



**NB: Please note to attend OFTEC courses you must have a minimum of 12 months' experience installing/servicing oil boilers. For inexperienced candidates, our Greenstar Danesmoor, Heatslave and Camray course offers pre-OFTEC training.**

## Useful numbers

### Sales

Tel: 01905 752640  
Fax: 01905 456445

### Contact Centre

Tel: 08457 256206  
Fax: 01905 757536  
Livingston (Scotland)  
Fax: 01506 441687

### Spare Parts

Tel: 01905 752576  
Fax: 01905 754620

### Training

Tel: 01905 752526  
Fax: 01905 752535

### Technical (Pre & Post Sales)

Tel: 08705 266241  
Fax: 01905 752741

### Literature Line

Tel: 01905 752556  
or download instantly  
from our website

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



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