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Cotswold Way, Warndon, Worcester, WR4 9SW
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WORCESTER
Bosch Group

Heating and Hot Water Comfort

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Part No. 8 716 106 251

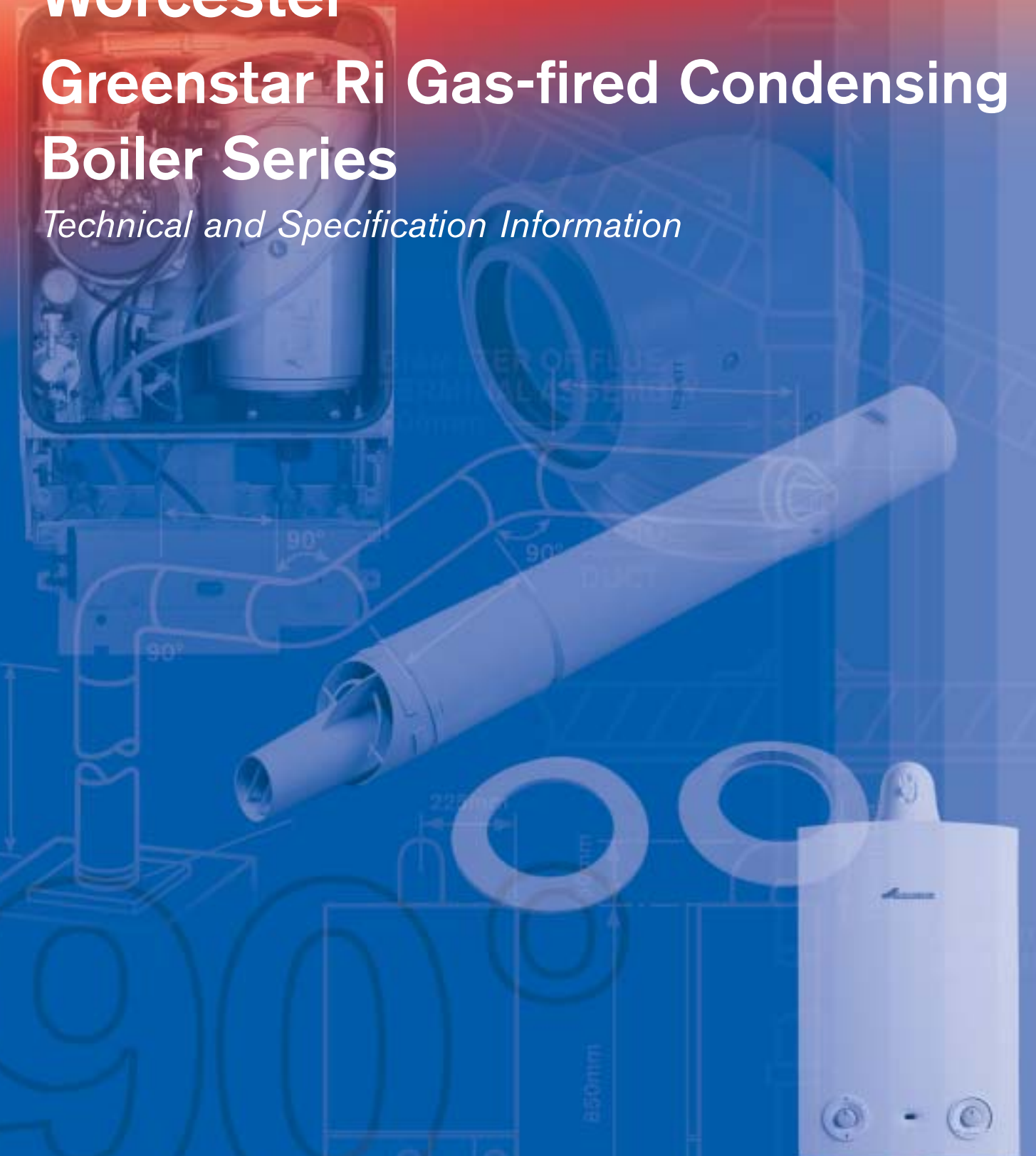
Issue B

SEDBUK Band A
Gas Boilers

WORCESTER
Bosch Group
Heating and Hot Water Comfort

Worcester Greenstar Ri Gas-fired Condensing Boiler Series

Technical and Specification Information



The Greenstar Ri Condensing boiler series

The Greenstar Ri Condensing Boiler Series

Features

- Compact dimensions.
- SEDBUK Band A.
- Aluminium-Silicon heat exchanger.
- Robust heat exchanger.
- Pre-fabricated pipe connections.
- Multi-directional Condensfit II fluing.
- Fault finding diagnostics.
- Operational status indicator.
- No ventilation grilles required in compartments.*
- Modulation control.
- Anti-cycle control.
- Rigid 22mm gas connection.
- Built-in frost protection for boiler.
- Optional anti-theft security fittings.

Benefits

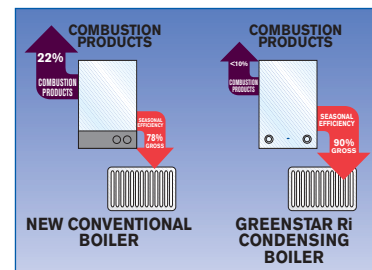
- Fits within kitchen cabinet.
- High efficiency.
- More tolerant to existing systems.
- No pre-fabrication of pipework.
- Siting flexibility.
- Time saving.
- Consumer friendly.
- Labour and money saving.
- Energy saving.
- No pre-forming of gas supply.
- Greatly reduces risk of theft when installed.

It's often said that you can't please everybody all of the time – but the advanced new series of Greenstar Ri condensing boilers from Worcester has so much to offer that it's already disproving such a notion.

Here is a groundbreaking range of energy-saving boilers which is very good news for the environment and excellent news for specifiers, developers, installers and consumers alike.

HE stands for Higher Efficiency. And for Highly Cost Effective

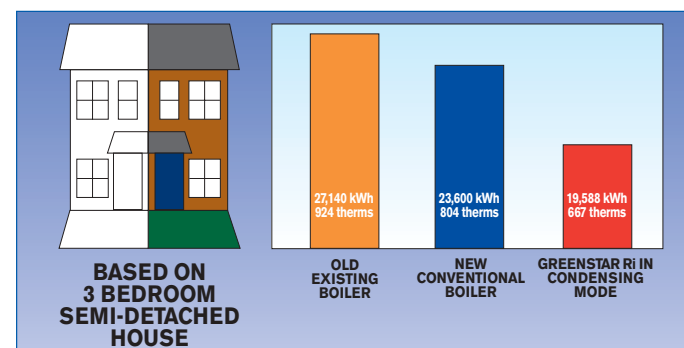
The Greenstar Ri condensing boilers have an average annual efficiency (SEDBUK value) of over 90%, efficiently producing heat for your heating and/or hot water system. Other types of boiler achieve around 78% efficiency. Therefore, compared with a new conventional boiler, a Greenstar Ri can cut heating and hot water bills and it's cheaper to run than an older boiler.



Hence SEDBUK Band A ratings for all models in the new Greenstar Ri condensing range.

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

To all these major benefits you can add yet more: superlative Worcester quality and reliability; a range of outputs to satisfy the heating demands of a range of household; and truly exceptional all-round value for money.

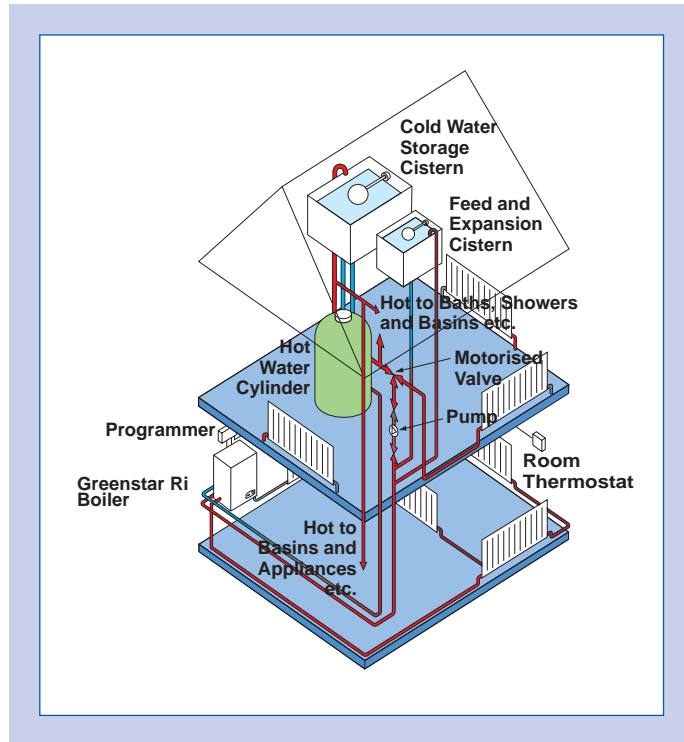


The Greenstar Ri Series at a glance

		12Ri	15Ri	18Ri	24Ri
Output kW	Min	4kW	5kW	6kW	8kW
	Max	12kW	15kW	18kW	24kW
Primary temperature control		3	3	3	3
Fully modulating		3	3	3	3
Natural gas model		3	3	3	3
LPG model		3	3	3	3
Electronic ignition		3	3	3	3
SEDBUK Band		A	A	A	A

*If clearances met. See page 9.

The Greenstar Ri condensing boiler series



The Worcester Greenstar Ri is a wall-mounted gas fired condensing "heating only" or regular boiler. The appliance combines within one casing a cast-aluminium heat exchanger, fan, gas valve and other electronic and mechanical equipment necessary to provide full central heating.

The Greenstar Ri is a room sealed fan assisted (RSF) appliance only, designed for use with a multi directional balanced flue system.

The flue may be run horizontally and vertically with additional 90° and 45° bends.

The Greenstar Ri design benefits in operation

Whenever a demand for DHW or CH is made, the boiler's electronic control system is energised and the burner electronically ignited via a flame ionisation system.

The pre-mix burner automatically adjusts to the set level. The flow temperature of the boiler is then maintained at the customer setting by the facia mounted variable control. Should the system requirements reduce during operation (TRV's closing down etc.) and the flow temperature exceed the customer setting then the burner will modulate downwards to match the system demand level. Should the flow temperature continue to rise then the burner will be de-energised and the control system will go into an anti-cycle mode and not allow the appliance to re-fire for a set period.

Options

Fluing - Condensfit II

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

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

More details are shown on page 10.

Ri security features

- 1 Security coding
- 1 Non-removable wall screws.

Versatility

Gas

The Greenstar Ri is manufactured for natural gas and LPG.

Greenstar Ri regular boilers

The Greenstar Ri regular boilers are designed for connection to a fully pumped heating and hot water system i.e. Y or S plan. For this reason no plug-in controls are available on Ri models. The advice of a controls manufacturer e.g. Invensys, should be sought.

Controls

The Worcester Greenstar Ri facia incorporates a combined temperature control and burner reset knob.

The facia also displays 2 operational status neons indicating the following:

- 1 Mains on/lockout
- 1 Burner on

The mains on/lockout indicator also operate as fault finding diagnostics flashing in different sequences in the unlikely event of a boiler fault.

The new Building Regulations Section L 2002 require a minimum

level of controls to be installed on all heating systems, both on new build and refurbishment.

This would require:

- 1 Room thermostat
- 1 TRV's on all radiators, or at least those radiators in sleeping areas if not already fitted. Do not fit TRV's in the room in which the room thermostat is installed.
- 1 Time and temperature control for central heating and domestic hot water.
- 1 Automatic by-pass.*

Please refer to Good Practice Guide 302 for guidance.



Control panel

Applications

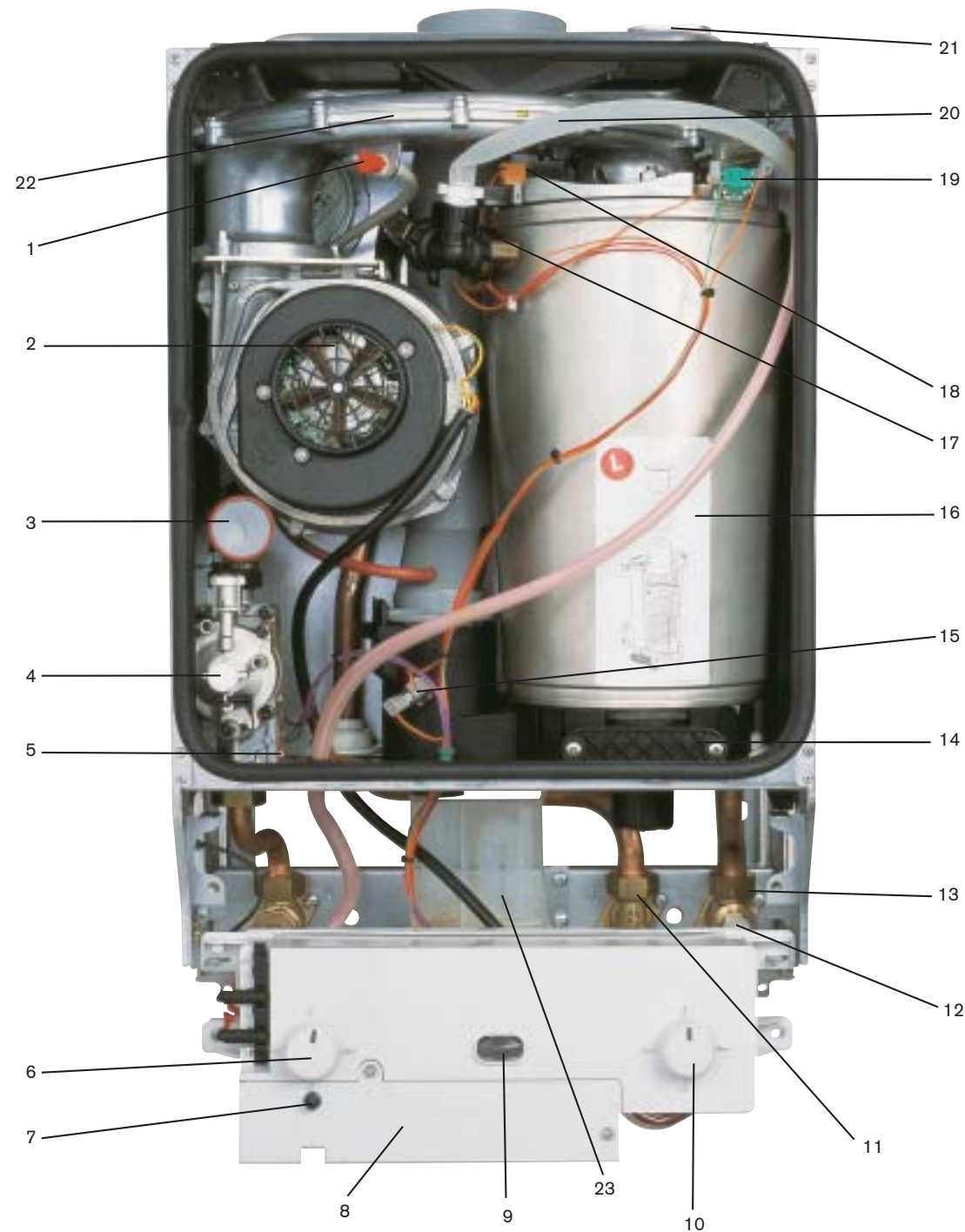
- 1 The Ri boilers are suitable for a wide range of heating loads allowing extension to the heating system without upgrading the boiler.
- 1 The Ri is capable of operating on both open vent and sealed primary water systems.
- 1 Two or more Ri boilers can be linked together to cater for commercial or industrial applications.

Technical data – Greenstar Ri Series

CLASSIFICATION	Greenstar 12Ri	Greenstar 15Ri	Greenstar 18Ri	Greenstar 24Ri
Output	4 - 12 kW Fully Modulating	5 - 15 kW Fully Modulating	6 - 18 kW Fully Modulating	8 - 24 kW Fully Modulating
Lift Weight (kg)	22.6kg	22.6kg	22.6kg	22.6kg
Primary Water Content	1.1 litres	1.1 litres	1.1 litres	1.1 litres
Maximum Flow Temperature	82°C (180°F)	82°C (180°F)	82°C (180°F)	82°C (180°F)
Flow and Return Connections	22mm	22mm	22mm	22mm
Gas Inlet	22mm	22mm	22mm	22mm
Casing Height	600mm	600mm	600mm	600mm
Casing Width	390mm	390mm	390mm	390mm
Casing Depth	270mm	270mm	270mm	270mm
NOx	Class 5	Class 5	Class 4	Class 5
Noise Output Level	39 dB(A)	42.7 dB(A)	43.7 dB(A)	41 dB(A)
SEDBUK Number	NG 90.1% Band A LPG 91.4% Band A	NG 90.1% Band A LPG 91.4% Band A	NG 90.1% Band A LPG 91.4% Band A	NG 90.2% Band A LPG 92.0% Band A

*Where requested – see installation booklet for further details.

The Greenstar Ri inside story



Key to components

- | | | |
|--|--|--|
| 1. Fan pressure test point | 9. Power and fault indicator (blue) | 17. Manual vent point |
| 2. Fan | 10. Boiler thermostat and reset knob | 18. Sensor boiler flow |
| 3. Air/Gas adjustment screw | 11. Flow connection 22mm compression | 19. Over-heat thermostat |
| 4. Gas valve | 12. Drain point | 20. Silicon tube (use to vent air from heat exchanger) |
| 5. Inlet pressure test point | 13. Return connection 22mm compression | 21. Removable top case for servicing |
| 6. Boiler power switch | 14. Access point for cleaning heat exchanger | 22. Air/Gas manifold |
| 7. Flame indicator (green) | 15. Flue overhear thermostat | 23. Syphonic trap |
| 8. Cover for external wiring connections | 16. WB3 Heat exchanger | |

Installing the Greenstar Ri boiler

The Greenstar Ri regular boilers are designed for connection to a traditional heating and hot water system. The major benefits of the Greenstar Ri boiler are:

- 1 The boiler is compatible with S and Y plan systems.
 - 1 The boiler comes supplied with a wall mounting bracket.
- Greenstar Ri boilers are exceptional for their number of additional time saving installation features:
- 1 Built-in frost sensor for boiler protection
 - 1 Built-in fault finding diagnostics
 - 1 Automatic gas pressure adjustment
 - 1 Highly versatile multi-directional fluing system
 - 1 Combined ignition and control board means fewer connections
 - 1 Reversible pipes allowing top and bottom exits from the boiler without unsightly bends
 - 1 A rigid 22mm compression gas connection eliminating the need for pre-fabricating the gas pipe onto the isolating valve
 - 1 The large output range capability of the appliances.

Siting of appliance

General

The appliance is not suitable for external installation.

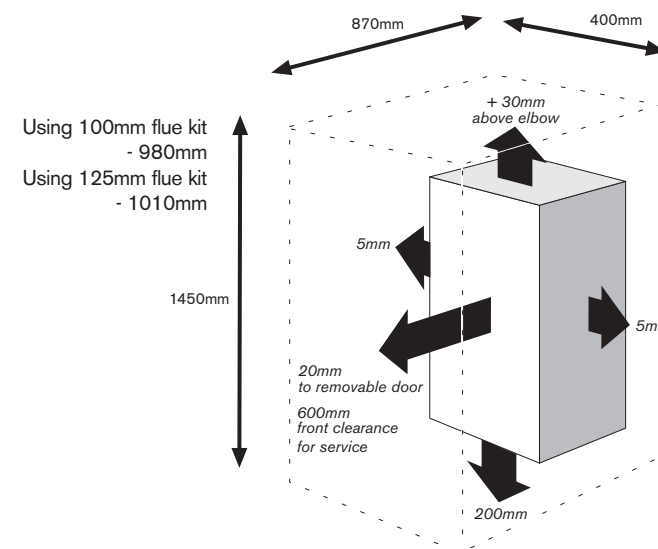
The wall on which the boiler is to be mounted should be capable of supporting an overall weight of approximately 40kg.

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

The appliance may be installed into an airing cupboard if required. See section "Compartment Installation" on page 8.

Clearances

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



Wall preparation

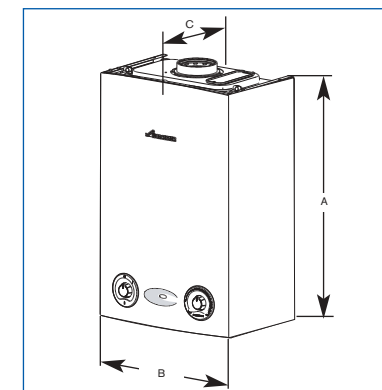
Greenstar Ri boilers come complete with a wall mounting bracket which enables a simple and straightforward method of attaching the boiler to the wall surface. After fixing to the wall, the flow, return and gas supply can be connected. The boiler also features levelling screws which allow the alignment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



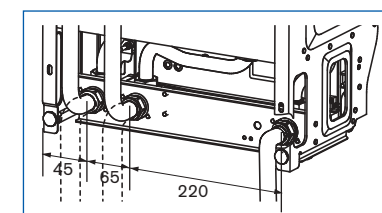
Greenstar Ri pipe re-orientation

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

Pipework connections and casing dimensions



Cabinet dimensions	
	Ri
A	600mm
B	390mm
C	270mm



Pipework connections		
A	CH Flow	22mm
B	CH Return	22mm
C	Gas Inlet	22mm

Condensate disposal

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

The amount of condensate generated depends on the efficiency and operating status of the appliance. The Greenstar Ri boilers can generate up to 2 litres of condensate water an hour.

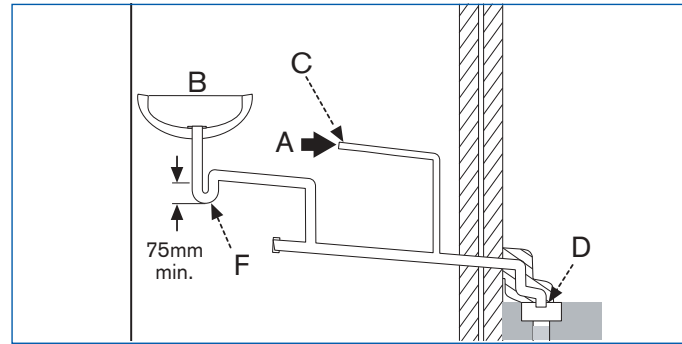
Condensate termination and route

The condensate connection on the Worcester appliances is in 22mm plastic. The pipe should be extended and run away from the appliance with a constant fall of 2.5 degrees or 45mm in every metre. Below is a key to explain the diagrams.

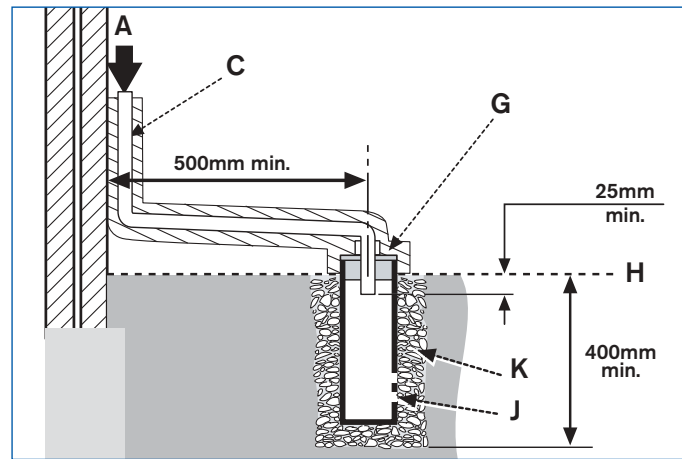
The condensate pipe can terminate into any one of five areas:

Whilst all of the methods are acceptable it is always the best practice 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.

It is considered best practice to limit condensate runs to no longer than 3m externally. If the condensate pipe is run externally the installer may consider increasing the diameter to 35mm.

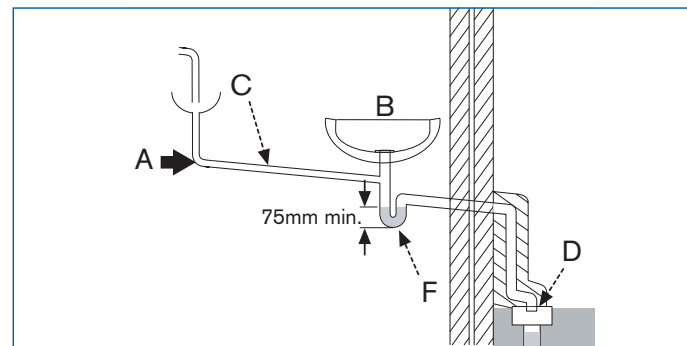


Internal waste drainage system

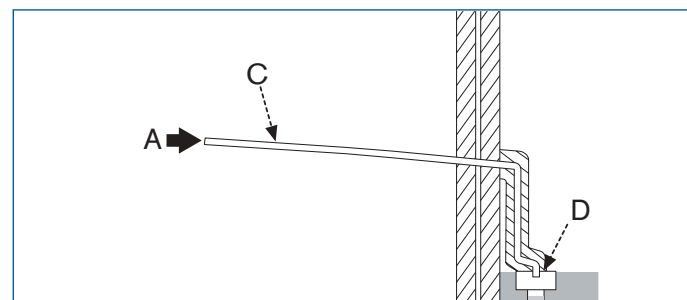


External condensate absorption point

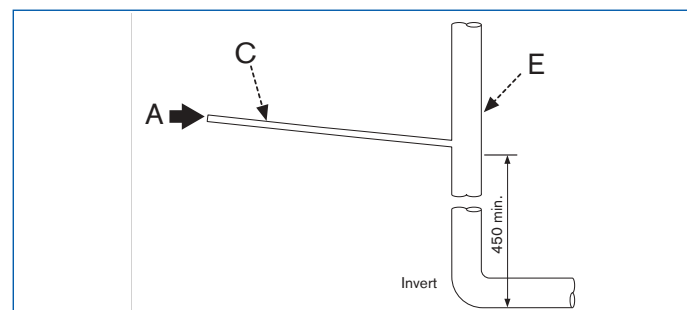
Key	
A	Condensate from boiler
B	Sink
C	22mmØ plastic condensate pipe
D	Gulley
E	Internal soil and vent stack
F	Waste trap (75mm min.)
G	300mm x 100mmØ sealed plastic tube
H	Ground level
J	Drainage holes 50mm from base of tube (12mmØ at 25mm centres) facing away from building
K	Limestone chippings



Internal sink/washing machine drain



External drainage system



Soil/vent stack

* Greenstar Ri boilers have an in-built trap eliminating the need for an external one.

External condensate pipework

All wall hung Worcester condensing boilers have within a syphonic condensate trap. Rather than the condensate constantly dripping into the discharge pipe, the condensate is collected into a trap which releases it in 100 ml quantities. This will help prevent freezing occurring.

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

- The pipe run should take the shortest practical route.
- The pipework should be insulated with weather resistant insulation.
- The pipe should terminate as close as possible to the ground or drain, whilst still allowing the condensate to safely disperse. This would prevent wind blowing up the pipe.
- The pipework should be installed with the minimum of horizontal runs and with a downward slope of at least 2.5 degrees.

Fluing options

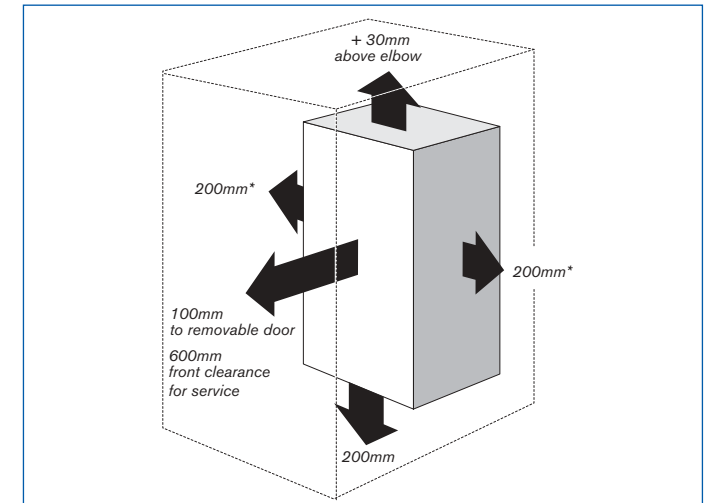
The appliance may be installed in any room, although particular attention is drawn to the requirements of the IEE regulations applicable and in Scotland the electrical provisions with respect to installation in a room containing a bath or shower.

Compartment installation

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

Position of Appliance	Ri Minimum Clearance
In front	100mm
Below	200mm
Right Side	200mm
Left Side	200mm
Above Flue Elbow (when using Condensfit II flue)	30mm

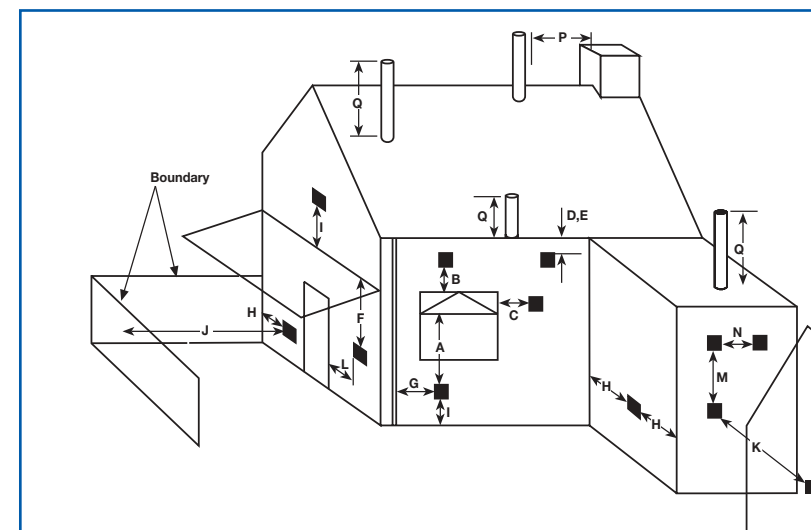
Ventilation free compartment installation – minimum clearances



*This space can be reduced to 50mm for one side only as long as both the side clearances add up to the total of both of the side measurements shown or more.

Flue terminal positioning

RSF horizontal and vertical



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

General position

- The terminal must not cause an obstruction nor the discharge a nuisance.
- If a terminal is fitted less than 2 metres above a surface to which people have access, then a guard must be fitted. A terminal protective guard is available from Tower Flue Components, Vale Rise, Tonbridge. Tel No. (01732) 351555. Terminal guard GC No. 393553.
The terminal guard must be securely fixed to the wall using suitable plugs and corrosion resistant screws. The guard must be symmetrically positioned about the terminal assembly and spaced such that there is a gap of 50mm between the end of the terminal and the guard.
- In certain weather conditions a terminal may steam and siting where this could be a nuisance should be avoided.
- The air inlet/outlet duct and the terminal of the boiler must not be closer than 25mm to any combustible material. Detailed recommendations on protection of combustible materials are given in BS 5440:1.

Key to Illustration

Terminal Position	Min Distance
A' Directly below an opening, air brick, opening windows etc.	300mm
B' Above an opening, air brick, opening window etc.	300mm
C' Horizontally to an opening, air brick, opening window etc.	300mm
D Below gutters, soil pipes or drain pipes	200mm
E Below eaves	200mm
F Below balconies or car port roof (lowest point)	200mm
G From a vertical drain pipe or soil pipe	150mm
H From an internal or external corner	300mm
I Above ground, roof or balcony	300mm
J From a surface facing the terminal	600mm
K From a terminal facing the terminal	1200mm
L From an opening in the car port (e.g. door, window) into the dwelling	not recommended
M Vertically from a terminal on the same wall	1500mm
N Horizontally from a terminal on the same wall	300mm
P From a vertical structure on the roof	500mm
Q Above intersection with roof	*

¹ In addition, the terminal should not be nearer than 150 mm (fanned draught) to an opening in the building fabric formed for the purpose of accommodating a built-in element such as a window frame.

* See instructions supplied with vertical flue kits

Greenstar Ri series horizontal fluing options

The Greenstar Ri series has the choice of 2 differently sized horizontal RSF flue systems, 100mm OD and 125mm OD. Both systems have different maximum lengths. Options 1 to 8 detail the permissible lengths.



Horizontal RSF Flue

Flue Diameter	100mm	125mm
Minimum Flue Length	250mm	250mm
Maximum Flue Length	4,000mm	13,000mm

Standard flue kit

Comprises:

- 1 x Flue Turret Elbow
- 600mm (100mm dia) of flue duct
- 1,030mm (125mm dia) of flue duct including terminal (as measured from centre of flue outlet)

Part No. 7 719 002 497 (100mm dia)
Part No. 7 719 002 350 (125mm dia)

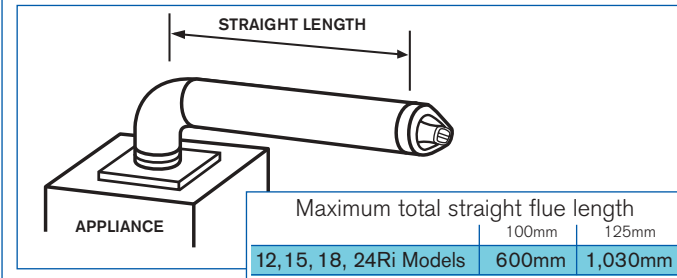
Accessories

	Worcester Part No.	
	100mm	125mm
Extension Flue Kit 1,000mm long	7 719 002 349	7 719 001 892
90° Elbow	7 719 002 348	7 719 001 891
45° Elbow	7 719 002 347	7 719 001 899
Vertical Adaptor	7 719 002 432	7 719 002 433

The following criteria should be noted when planning the installation.

- The flue system inclines 2½" (44mm per metre) from the appliance, to prevent condensation from dripping from the flue terminal.*
- Because the appliance operates at high efficiency a white plume of condensation will be emitted from the terminal. Care must be taken when selecting the flue terminal position.

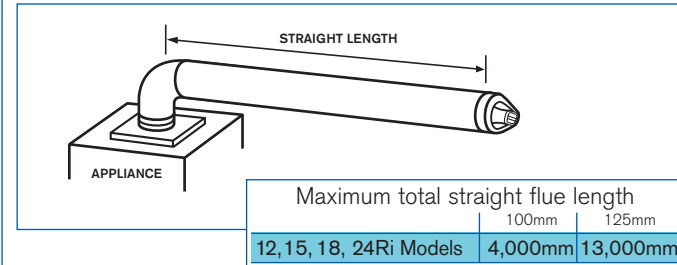
Option 1 STANDARD HORIZONTAL FLUE ASSEMBLY



Flue Components Required 12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Standard Flue Kit	1	7 719 002 497
125mm	Standard Flue Kit	1	7 719 002 350

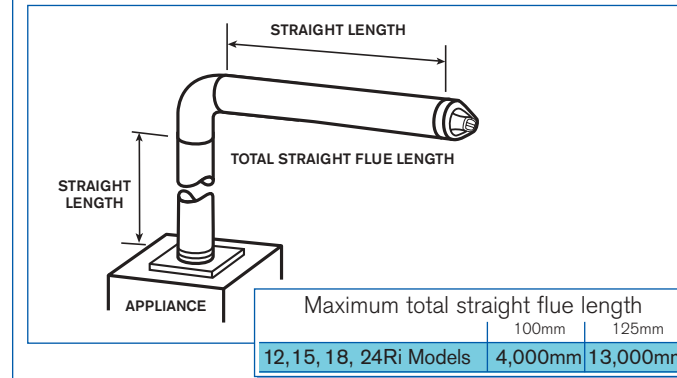
Option 2 EXTENSION FLUE HORIZONTAL



Flue Components Required 12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Standard Flue Kit	1	7 719 002 497
100mm	Extension Flue Kit	up to 4	7 719 002 349
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Extension Flue Kit	up to 12	7 719 001 892

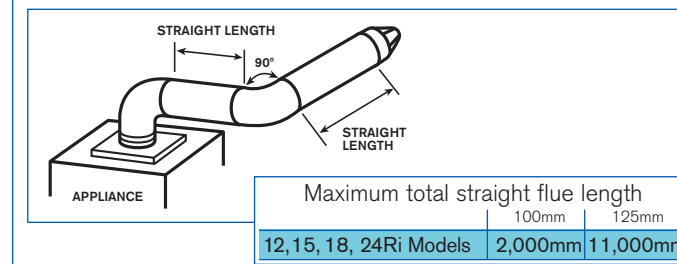
Option 3 EXTENSION FLUE HORIZONTAL AND UPWARDS



Flue Components Required 12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Standard Flue Kit	1	7 719 002 497
100mm	Extension Flue Kit	up to 4	7 719 002 349
100mm	90° Elbow	1	7 719 002 348
100mm	Vertical Adaptor	1	7 719 002 432
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Extension Flue Kit	up to 12	7 719 001 892
125mm	90° Elbow	1	7 719 001 891
125mm	Vertical Adaptor	1	7 719 002 433

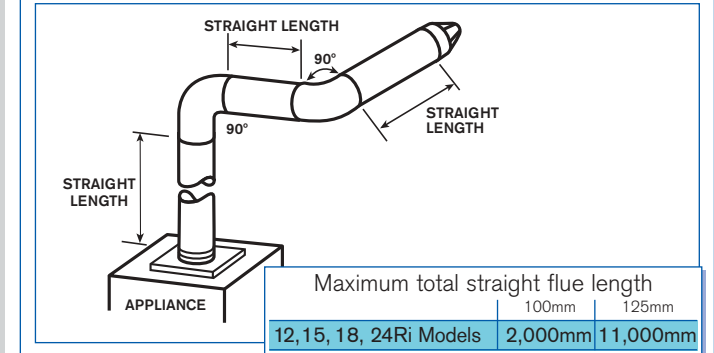
Option 4 EXTENSION FLUE HORIZONTAL USING A SECOND 90° BEND



Flue Components Required 12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Standard Flue Kit	1	7 719 002 497
100mm	Extension Flue Kit	up to 2	7 719 002 349
100mm	90° Elbow	1	7 719 002 348
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Extension Flue Kit	up to 10	7 719 001 892
125mm	90° Elbow	1	7 719 001 891

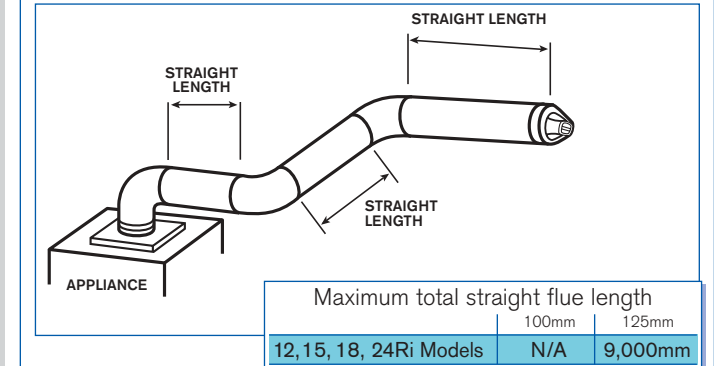
Option 5 EXTENSION FLUE UPWARDS AND HORIZONTAL USING A SECOND 90° BEND



Flue Components Required 12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Standard Flue Kit	1	7 719 002 497
100mm	Extension Flue Kit	up to 2	7 719 002 349
100mm	90° Elbow	2	7 719 002 348
100mm	Vertical Adaptor	1	7 719 002 432
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Extension Flue Kit	up to 10	7 719 001 892
125mm	90° Elbow	2	7 719 001 891
125mm	Vertical Adaptor	1	7 719 002 433

Option 6 EXTENSION FLUE HORIZONTAL USING A THIRD 90° BEND



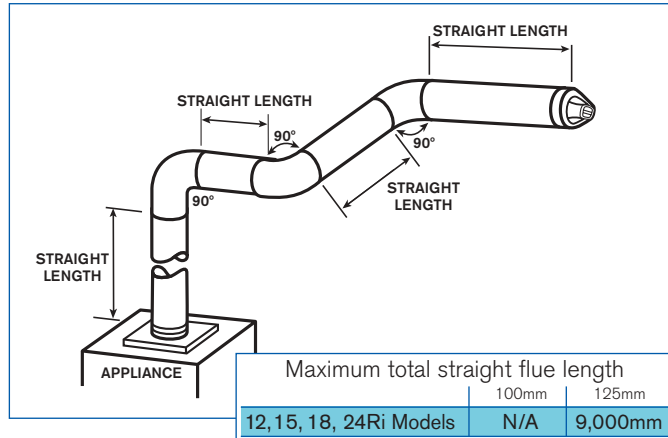
Flue Components Required 12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Extension Flue Kit	up to 8	7 719 001 892
125mm	90° Elbow	2	7 719 001 891

*The 100mm flue system exhaust pipe inclines 2 degrees within the 100mm air duct.

Greenstar Ri series vertical fluing options

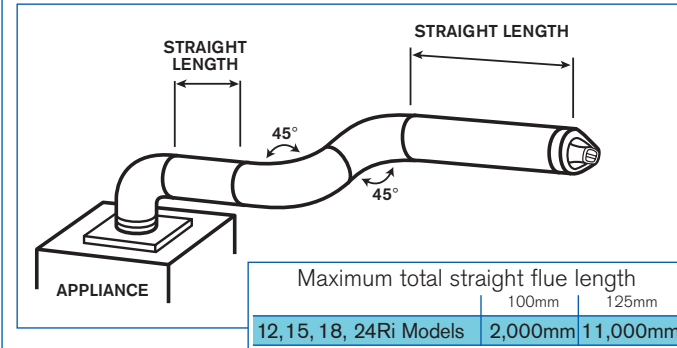
Option 7 EXTENSION FLUE UPWARDS AND HORIZONTAL USING A THIRD 90° BEND



Flue Components Required 12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Extension Flue Kit	up to 8	7 719 001 892
125mm	90° Elbow	3	7 719 001 891
125mm	Vertical Adaptor	1	7 719 002 432

Option 8 EXTENSION FLUE HORIZONTAL USING TWO 45° FLUE BENDS



Flue Components Required 12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Standard Flue Kit	1	7 719 002 497
100mm	Extension Flue Kit	up to 2	7 719 002 349
100mm	45° Bend	2	7 719 002 347
125mm	Standard Flue Kit	1	7 719 002 350
125mm	Extension Flue Kit	up to 10	7 719 001 892
125mm	45° Bend	2	7 719 001 899

The Greenstar Ri series has the choice of 2 differently sized vertical RSF flue systems, 100mm OD and 125mm OD. Both systems have different maximum lengths. Options 1 to 4 detail the permissible lengths.

Vertical RSF Flue

Flue Diameter	100mm	125mm
Flue Terminal Assembly Diameter	120mm	135mm
Maximum Flue Length (inc terminal)	6,400mm All models	15,000mm
Assembly Length	1,140mm	1,365mm

Vertical balanced flue kit

Comprises:

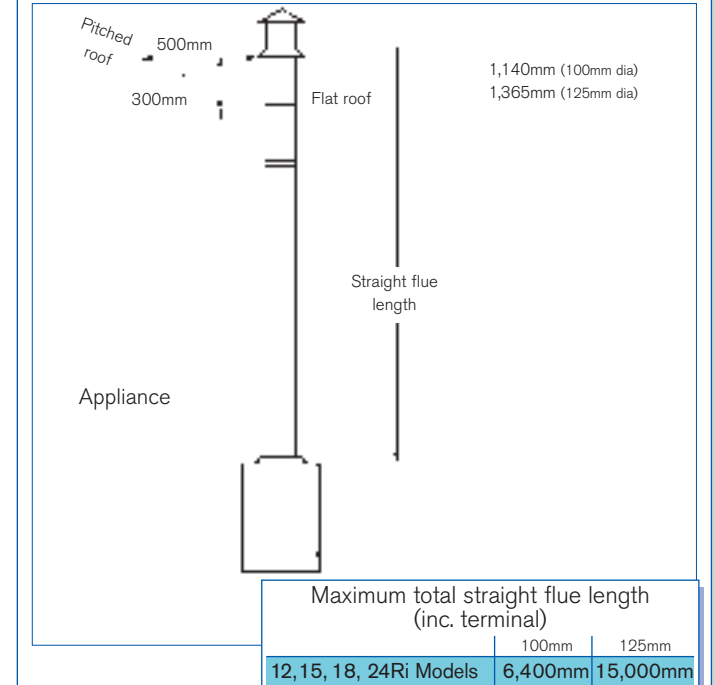
- 1 x Flue Terminal Assembly
 - 1 x Weather Sealing Collar
 - 1 x Fire Stop Spacer
 - 1 x Vertical Adaptor
- Part No. 7 719 002 430 (100mm dia)
Part No. 7 719 002 431 (125mm dia)

Accessories

	Worcester Part No.	
	100mm	125mm
Extension Flue Kit 1,000mm long	7 719 002 349	7 719 001 892
90° Elbow	7 719 002 348	7 719 001 891
45° Elbow	7 719 002 347	7 719 001 899

Note: The roof flashing is not supplied by Worcester.

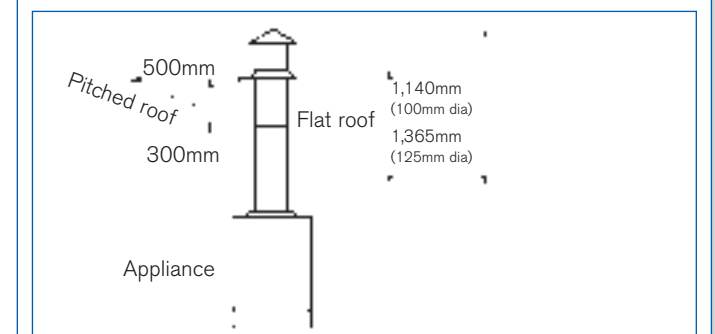
Option 1 VERTICAL BALANCED FLUE SYSTEM MAXIMUM HEIGHT



Flue Components Required 12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Vertical Flue Kit	1	7 719 002 430
100mm	Flue Extension	up to 5	7 719 002 349
125mm	Vertical Flue Kit	1	7 719 002 431
125mm	Flue Extension	up to 14	7 719 001 892

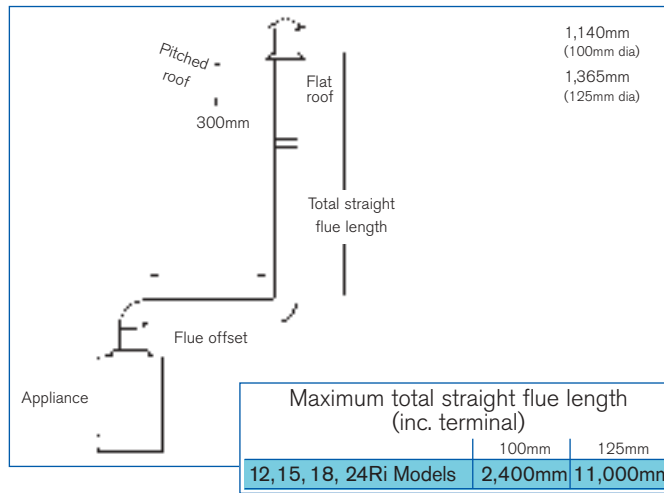
MINIMUM HEIGHT



Flue Components Required 12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Vertical Flue Kit	1	7 719 002 430
125mm	Vertical Flue Kit	1	7 719 002 431

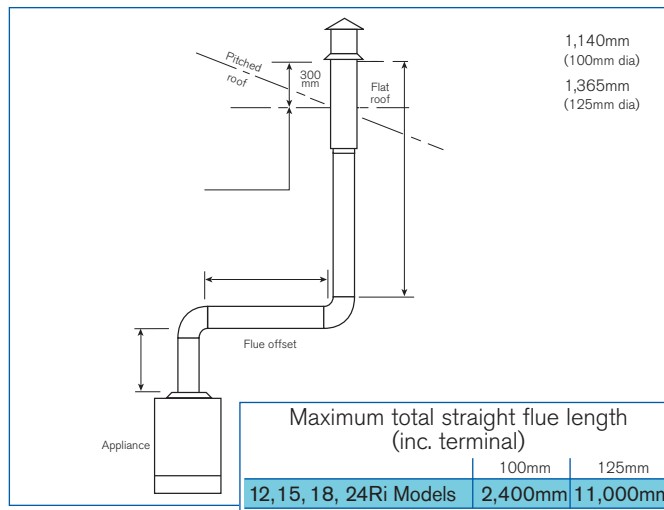
Option 2
VERTICAL BALANCED FLUE SYSTEM WITH AN OFFSET AND FLUE DIRECTLY ON TOP OF THE GREENSTAR APPLIANCE



Flue Components Required
12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Vertical Flue Kit	1	7 719 002 430
100mm	Extension Flue Kit	1	7 719 002 349
100mm	90° Elbow	2	7 719 002 348
125mm	Vertical Flue Kit	1	7 719 002 431
125mm	Extension Flue Kit	up to 10	7 719 001 892
125mm	90° Elbow	2	7 719 001 891

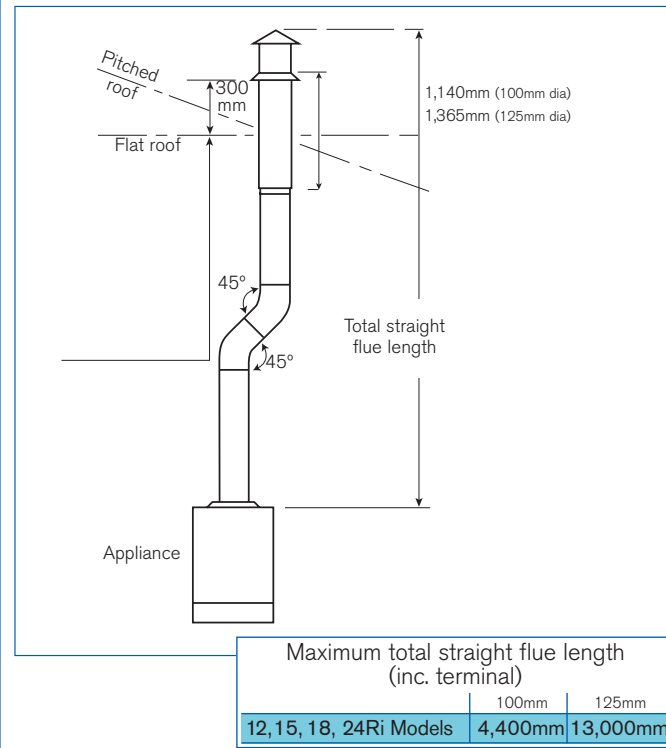
Option 3
VERTICAL BALANCED FLUE SYSTEM WITH AN OFFSET AND VERTICAL SECTION DIRECTLY ON TOP OF THE GREENSTAR APPLIANCE



Flue Components Required
12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Vertical Flue Kit	1	7 719 002 430
100mm	Extension Flue Kit	1	7 719 002 349
100mm	90° Elbow	2	7 719 002 348
125mm	Vertical Flue Kit	1	7 719 002 431
125mm	Extension Flue Kit	up to 10	7 719 001 892
125mm	90° Elbow	2	7 719 001 891

Option 4
VERTICAL BALANCED FLUE SYSTEM WITH TWO 45° BENDS



Flue Components Required
12, 15, 18, 24Ri Models

Flue Diameter	Description	Quantity	Worcester Part No.
100mm	Vertical Flue Kit	1	7 719 002 430
100mm	Extension Flue Kit	1	7 719 002 349
100mm	90° Elbow	2	7 719 002 348
125mm	Vertical Flue Kit	1	7 719 002 431
125mm	Extension Flue Kit	up to 10	7 719 001 892
125mm	45° Elbow	2	7 719 001 899

Notes

Installation requirements

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

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

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

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

Sealed primary systems

The appliance is fitted with a manual reset high limit thermostat and is suitable for use with a sealed primary system.

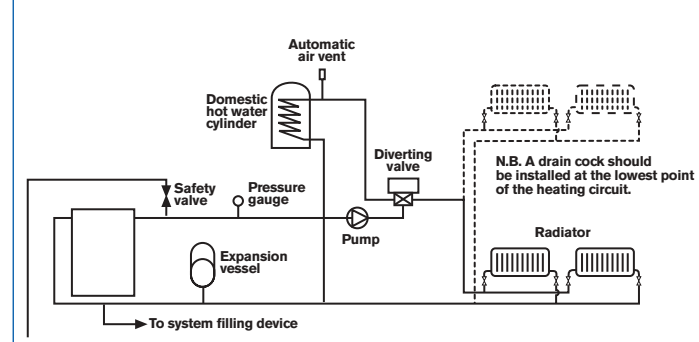
The system should be installed in compliance with the requirements of BS 5449: Part1. The boiler must be fitted with a spring loaded safety valve set to operate at 3bar (45 psi) and the pipe connections made through the system must be capable of sustaining a pressure of up to 3bar.

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

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

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

Typical fully pumped sealed system



Plastic pipework

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

Open vented primary systems

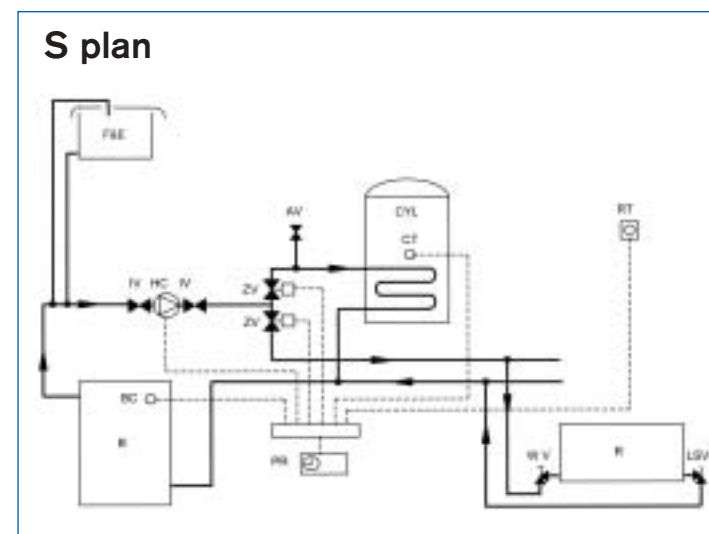
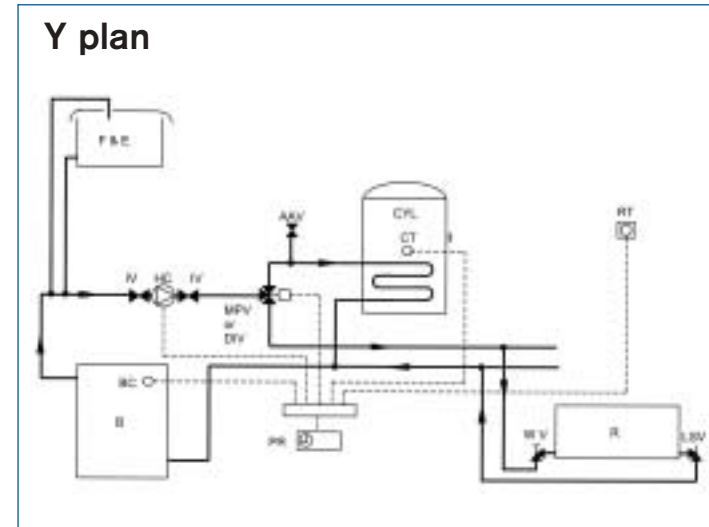
The Greenstar Ri boilers are designed for connection to an open vented fully pumped heating and hot water system.

The following points are for guidance only. The system installation should be carried out in accordance with BS 5449:Part1.

The feed and expansion pipes must rise continuously from the appliance and must be of the minimum diameter shown below.

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

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



Air supply

The Worcester Greenstar Ri is a room sealed appliance; the room in which it is installed does not therefore require a purpose provided combustion air vent.

Natural gas supply

The appliances, when on demand at full output will require 1.3m³/h (47ft³/hr) for the 12Ri, 1.63m³/h (58ft³/hr) for the 15Ri, 1.96m³/h (69ft³/hr) for the 18Ri, and 2.67m³/h (94.3ft³/hr) for the 24Ri.

The gas meter and supply pipes must be capable of supplying this quantity of gas in addition to the demand from any other appliance being served. Under no circumstances should the size of the gas supply pipe be less than that of the appliance inlet connection (22mm diameter). The meter outlet governor should be capable of ensuring a dynamic nominal pressure of 20mbar (8in wg) at the appliance. Particular consideration should be given to the resistance to gas flow created by elbows, bends etc. Pipework should be sized to overcome this resistance, and details of this are given in the following table.

Gas Discharge Rate m ³ /h	Total length of Gas Supply Pipe (metres)			Pipe Diameter (mm)
	3	6	9	
8.7	8.7	5.8	4.6	22
18.0	18.0	12.0	9.4	28

Approximate Additional Length to be Allowed

Elbows or Tees		90° Bends	
Metres	Feet	Metres	Feet
0.5	2	0.3	1

Propane gas supply

The Ri appliance may be converted to a propane gas version by using a conversion kit available separately. The appliance, when on demand at full output will require 0.5m³/h, 0.96Kg/h, (17.7ft³/hr) for the 12Ri, 0.63m³/h, 1.20Kg/h, (22.25ft³/hr) for the 15Ri, 0.76m³/h, 1.44Kg/h, (26.70ft³/hr) for the 18Ri, and 1.01m³/h, 1.91Kg/h (35.7ft³/hr) for the 24Ri.

The gas tank or bottles must be capable of supplying this quantity of gas at a nominal pressure of 37mbar (14.8in wg) at the appliance. The table below shows the propane gas discharge through varying lengths of pipe and the resistance to flow created by elbows, bends etc. Pipework should be sized to overcome this resistance.

Gas Discharge Rate m ³ /h	Total length of Gas Supply Pipe (metres)			Pipe Diameter (mm)
	3	6	9	
1.49	1.49	0.8	-	15
8.0	8.0	5.2	4.2	22
15.9	15.9	8.8	8.3	28

Approximate Additional Length to be Allowed

Elbows or Tees		90° Bends	
Metres	Feet	Metres	Feet
0.6	2	0.3	1

Electricity supply

A 3 amp fused three pin plug and unswitched shuttered socket outlet (both complying with BS 1363) or preferably a double pole isolator with a contact separation of 3mm in all poles supplying the appliance should be used.

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

Warranty

Worcester Greenstar Ri appliances are offered with a full 2 year guarantee on parts and labour. Ongoing service may be arranged through the Worcester Customer Service Department.

The Greenstar Ri series accessories



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 one of Worcester's Field Service Engineers then our fully trained Contact Centre staff, based at our head office in Worcester, are ready to take your calls. Whether it is for a routine service or something more major our contact centre operators along with our nationwide team of engineers are ready to help resolve the matter. Alternatively, you can visit our website to request an appointment.

Boiler Protection Options

To protect and maintain your boiler it is recommended that you invest in a comprehensive maintenance contract. For more information please discuss with your CORGI/OFTEC registered installer or alternatively contact Worcester Service Contracts Team on 01905 754 624.



Contact Centre

Tel: 08457 256 206

Fax: 01905 754 701

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.

Customer Technical Support

The Worcester Technical Helpline is a dedicated phone line – committed to providing a comprehensive service to compliment the brand name and quality of our boiler products. Our experienced team of technical experts provide the 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 Hotline or alternatively visit our website where literature can be downloaded www.worcester-bosch.co.uk

Technical

Tel: 08705 266 241

Fax: 01905 752 741

Opening Times

Monday – Friday: 8.00am – 6.00pm

Saturday: 8.30am – 1.00pm

The very best training programmes from Worcester

Worcester has always placed great emphasis on support and training for installers and service engineers. Today this need is greater than ever: one in every two boilers now purchased in the UK is a combi boiler and, month by month, an increasing number of condensing boilers are being installed. The differences between a combi, conventional and condensing boiler are substantial, and the technology of each continues to advance at a rapid pace.

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

Courses available

The Worcester Training Department has on 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.



State-of-the-art Worcester Training Academy

A recent addition to the excellent training facilities at the company's Worcester headquarters, this unique and advanced academy is the only one in the UK dedicated entirely to successful installation and commissioning of gas-fired and oil-fired boilers. The set-up is unique too: 4 custom-built workshops guide you step by step through a first-class troubleshooting course.

Regional Worcester Training Centres

The Worcester network of regional training centres is strategically located across the country to help put you within convenient travelling distance of the courses you wish to attend.

In addition to the outstanding facilities at the company's headquarters near Worcester, there are centres at Clay Cross in Derbyshire, Rochester in Kent, Blantyre in Scotland and Bangor, Northern Ireland. There are also additional training opportunities available throughout the UK. Please phone 01905 752526 for more information about a course near you. Each course is run by specialist trainers and is superbly equipped to deliver a combination of classroom theory and practical hands-on experience that's second to none.

New Product Advance Training

Exclusive to Business Initiative members, these invaluable courses give you an introduction and insight into new Worcester products as soon as they are released on to the market.

College Links

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

Distance Learning

A joint initiative from key names in the heating and plumbing industry, this offers a choice of low-cost home study elements compiled by experts. As a Business Initiative member you will receive a free Distance Learning CD which is packed with information.

Get on course for a more profitable future now

Call now for more information

01905 752526



Worcester Training Courses

Greenstar CDi, Highflow 440 and HE Plus gas-fired condensing combi boilers

Models covered	Greenstar 25/30/35/40CDi Greenstar Highflow 440 Greenstar 30/35/40 HE Plus
Duration	1 day

Greenstar i junior and Si gas-fired condensing combi boilers

Models covered	Greenstar 24/28i Junior Greenstar 25/30Si
Duration	1 day

Greenstar system and regular gas-fired condensing boilers

Models covered	Greenstar 12/24Ri Greenstar 30/40CDi Conventional Greenstar 12/24i System
Duration	1 day

i Junior and Si II gas-fired combi boilers

Models covered	24i Junior 28i Junior 24Si II 28Si II
Duration	1 day

Danesmoor, Heatslave and Greenstar HE oil-fired boilers

Models covered	Danesmoor Heatslave Greenstar
Duration	1 day

OFTEC Training

OFTEC 101

Covering	Domestic/Light Commercial Pressure Jet Commissioning and Servicing
Duration	3 day course (2 days training plus 1 days assessment)

OFTEC 105e

Covering	Domestic/Light Commercial Pressure Jet Boiler installation
Duration	1 day assessment

OFTEC 101 & 105e

Covering	Domestic/Light Commercial Pressure Jet Installation, Commissioning and Servicing
Duration	3 day course (2 days training plus 1 days assessment comprising 2 theory and 1 practical)

OFTEC 600a

Covering	Oil Tank Installation and Associated Controls
Duration	1 day assessment course

Certificate in Energy Efficiency for Domestic Heating Course

Covering	Key elements of energy-efficient heating and hot water systems and products, compliance with the latest Building Regulations, how condensing boilers work and how they differ to non condensing products.
Duration	1 day

New 'A' Rated Academy

Covering	Installation and Commissioning Flues and Air Supply Gas and Oil Supply System Design and Flushing Electrical Wiring and Control
Duration	2 days

Greenskies FK240 Solar Panels

Covering	Installation, Commissioning and Marketing
Duration	1½ days



