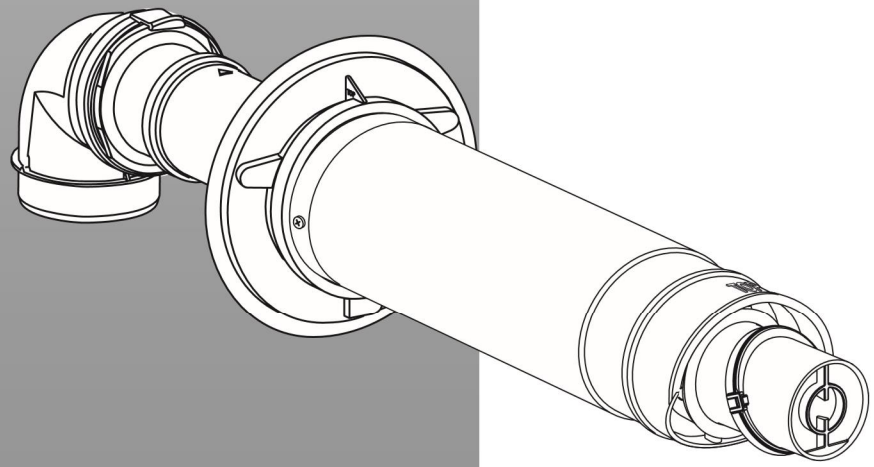
FLUE KIT INSTALLATION MANUAL

7 716 191 155 ROOM SEALED TELESCOPIC FLUE
7 716 191 086 PLUME MANAGEMENT SYSTEM

GREENSTAR
60/100 HORIZONTAL FLUE

FOR USE WITH WORCESTER GREENSTAR GAS-FIRED APPLIANC
Greenstar FS 30CDi Regular, Greenstar FS 42CDi Regular,
Greenstar Highflow 440CDi, Greenstar Highflow 550CDi.

DO NOT USE WITH ANY OTHER MODEL OF APPLIANCE



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KEY TO SYMBOLS AND SAFETY INSTRUCTIONS

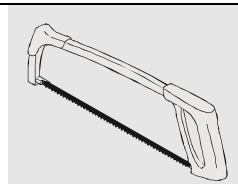
1 KEY TO SYMBOLS AND SAFETY INSTRUCTIONS

1.1 EXPLANATION OF SYMBOLS

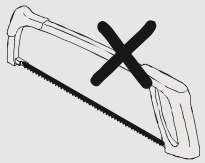
WARNING SYMBOLS SYMBOLS

Signal words indicate the seriousness of the hazard in terms of the consequences of not following the safety instructions.

- **NOTICE** indicates possible damage to property or equipment, but where there is no risk of injury.
- **CAUTION** indicates possible injury.
- **WARNING** indicates possible severe injury.
- **DANGER** indicates possible risk to life.



Cutting required



Cutting not required

	Safety instructions in this document are framed and identified by a warning triangle which is printed on a grey background.
	Electrical hazards are identified by a lightning symbol surrounded by a warning triangle.

Table 3 Symbols

IMPORTANT INFORMATION



Notes contain important information in cases where there is no risk of personal injury or material losses and are identified by the symbol

shown on the left. They are bordered by horizontal lines above and below the text.

ADDITIONAL SYMBOLS

Symbol	Meaning
B	a step in an action sequence
	a reference to a related part in the document or to other related documents
•	a list entry
–	a list entry (second level)

Table 1 Documentation symbols

ABBREVIATIONS

Ø	Diameter
RS	Room Sealed

Table 2 Abbreviations

1.2 SAFETY PRECAUTIONS

IF YOU SMELL GAS:

- **CALL** NATIONAL GAS EMERGENCY SERVICE ON 0800 111 999
- **DO NOT** TURN ELECTRICAL SWITCHES ON OR OFF
- **DO NOT** STRIKE MATCHES OR SMOKE
- KEEP PEOPLE AWAY FROM THE AFFECTED AREA
- PUT OUT NAKED FLAMES
- OPEN DOORS AND WINDOWS
- TURN OFF THE CONTROL VALVE AT THE METER

benchmark COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.

Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the scheme.
Visit **centralheating.co.uk** for more information.

HEALTH AND SAFETY

The appliance contains no asbestos and no substances have been used in the construction process that contravene the COSHH Regulations (Control of Substances Hazardous to Health Regulations 1988).

COMBUSTION AND CORROSIVE MATERIALS

Do not store or use any combustible materials (paper, thinners, paints etc.) inside or within the vicinity of the appliance.

Chemically aggressive substances can corrode the appliance and invalidate any warranty.

FITTING AND MODIFICATIONS

Fitting the appliance and any controls to the appliance may only be carried out by a competent engineer in accordance with the current Gas Safety (Installation and Use) Regulations.
Flue systems must not be modified in any way other than as described in the fitting instructions. Any misuse or unauthorised modifications to the appliance, flue or associated components and systems could invalidate the warranty. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

SERVICING

Advise the user to have the system serviced annually by a competent, qualified Gas Safe registered engineer. Approved spares must be used to help maintain the economy, safety and reliability of the appliance.

IMPORTANT:

The service engineer must complete the Service Record on the Benchmark Checklist after each service.

INSTALLATION REGULATIONS

Current Gas Safety (Installation & Use) Regulations:

All gas appliances must be installed by a competent person in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution.

The appliance must be installed in accordance with, and comply to, the current: Gas Safety Regulations, IEE Regulations, Building Regulations, Building Standards
(Scotland) (Consolidation), Building Regulations
(Northern Ireland), local water by-laws, Health & Safety Document 635 (The Electricity at Work Regulations 1989) and any other local requirements.

British Standards:

The relevant British Standards should be followed, including:

BS5440:1	Flues and ventilation for gas appliances of rated heating not exceeding 70kW (net): Flues
BS5440:2	Flues and ventilation for gas appliances of rated heating not exceeding 70kW (net): Air Supply
BS6798:	Installation of gas fired boilers of rated input up to 70kW (net)

Where no specific instruction is given, reference should be made to the relevant British Standard codes of Practice.

Timber framed building:

Where the boiler is to be fitted to a timber framed building the guidelines laid down in BS5440: Part 1 and IGE "Gas Installations in Timber Frame Buildings" should be followed.

PRODUCT INFORMATION

2.1 TELESCOPIC FLUE COMPONENTS

	60/100 mm TELESCOPIC FLUE KIT: Part No.: 7 716 191 155
1	TELESCOPIC FLUE ASSEMBLY
2	HORIZONTAL FLUE CONNECTOR
3	93° ELBOW
4	FLUE ADAPTOR
5	WALL INNER SEAL
6	WALL OUTER SEAL
7	INSTALLATION MANUAL
8	ALUMINIUM TAPE
9	ACCESSORY PACK

Table 4 Telescopic flue components

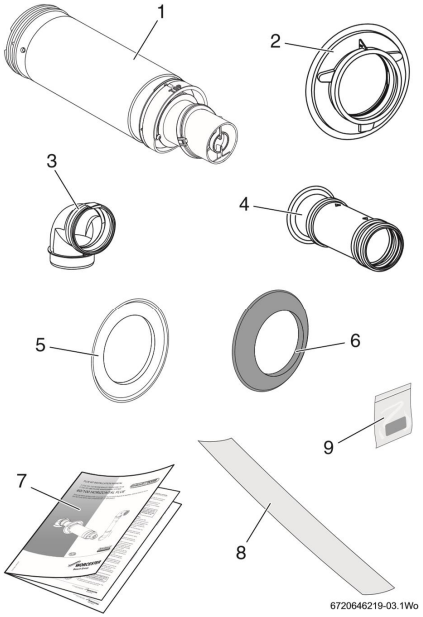


Fig. 1 Telescopic flue components

60/100mm - 220mm		**Part No.: 7 716 191 133**
1	Extension tube assembly plus: grease pack - two No. 8 screws & grease sachet	
60/100mm - 1000mm		**Part No.: 7 716 191 083**
2	Extension tube assembly plus: grease pack - two No. 8 screws & grease sachet	
60/100mm - 2000mm		**Part No.: 7 716 191 172**
3	Extension tube assembly plus: grease pack - two No. 8 screws & grease sachet	
60/100 flue connector		**Part No.: 7 716 191 164**
4	Vertical flue connector plus: Screw pack	
60/100mm 45° bend:		**Part No.: 7 716 191 085**
5	45° bend x 2 plus: grease pack - two No. 8 screws & grease sachet	
60/100mm 90° bend:		**Part No.: 7 716 191 084**
6	90° bend assembly plus: grease pack - two No. 8 screws & grease sachet	
60/100mm Support Part No.: 7 716 191 092 bracket kit:		
7	Wall bracket, swivel bracket, clamp, fixing screws and wall plugs	

FLUE EXTENSION COMPONENTS

Table 5 Flue extension components

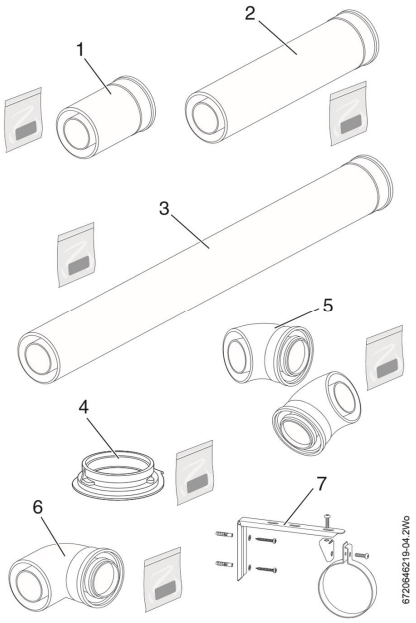


Fig. 2 Flue extension components

3 PRE-INSTALLATION

3.1 FLUE TERMINAL POSITIONS

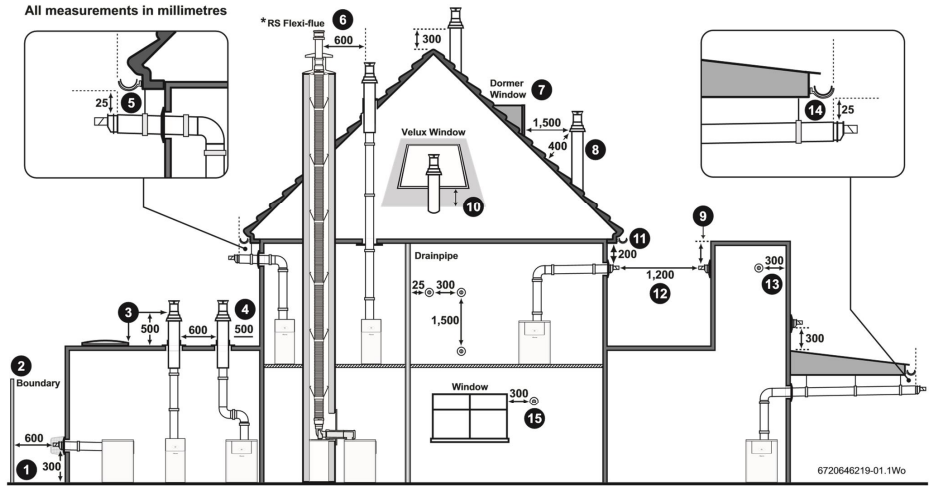


Fig. 3 Flue terminal positions

NOTE:

- All measurements are the minimum clearances required.
- Terminals must be positioned so to avoid combustion products entering the building.
- Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fittings (Flue bracket part numbers.: 100mm - 7 716 191 092.

Key to illustration

1. Flue clearance must be at least 300mm from the ground. Terminal guards must be fitted if the flue is less than 2 metres from the ground or if a person could come into contact with the flue terminal.
2. 600mm distance to a boundary, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to boundaries.
3. 600mm minimum clearance from a skylight to a vertical flue.
4. Vertical flue clearance, 500mm to non-combustible building material, and 1,500mm clearance to combustible building material.
5. The dimension below eaves, gutters, pipes and drains can be reduced to 25mm, as long as the flue terminal is extended to clear any overhang. Any external flue joints must be sealed with a suitable silicon sealant.
6. 600mm clearance to room sealed flue or 1,500mm to an open flue.
7. 1,500mm between a vertical flue terminal and a window or dormer window.
8. 400mm from a pitched roof or in regions with heavy snow fall 500mm.
9. The flue cannot be lower than 1,000mm from the top of a light well due to the build up of combustion products.
10. 2,000mm below a Velux window, 600mm above or to either side of the Velux window.
11. 200mm below eaves and 75 mm below gutters, pipes and drains.
12. 1,200mm between terminals facing each other.
13. 300mm to an internal or external corner.

Installations in car ports are not recommended.

14. The dimension below eaves, balconies and car ports can be reduced to 25 mm, as long as the flue terminal is extended to clear any overhang. Any external flue joints must be sealed with suitable silicon sealant.
15. 300mm above, below and either side of an opening door, air vent or opening window.

3.2 FLUE SYSTEMS IN VOIDS

When installing a new flue system consider the following information.

CAUTION: Flue systems in ceilings or roof voids.

Where a flue system is not going to be accessible, provision for access must be made for service and inspection:

- Voids containing concealed flues must have at least one inspection hatch no less than 300mm square.
- Flue joints within the void must not be more than 1.5m from the edge of the inspection hatch.
- Inspection hatches should be located at changes of flue direction.
- If this is not possible, bends should be viewable from both directions.

FLUE SYSTEMS IN CEILINGS OR ROOF VOIDS

When installing a flue system in a ceiling or roof void, the following points must be observed:

1. Access points for inspection of the flue system must be sufficiently sized for visual inspection, particularly at any joint in the flue system.
2. The flue system must not pass through a neighbouring property, as access may not be possible at the time of inspection.
3. Any access must not contravene any other building regulations or fire regulations. Refer to Building Regulations Approved Documents B, L and E.
4. The access panels must be no less than 300mm square. Larger access panels can be considered if the whole flue system needs to be viewed.
5. The flue system must be adequately supported at regular interval, approximately every 1.5 metres.

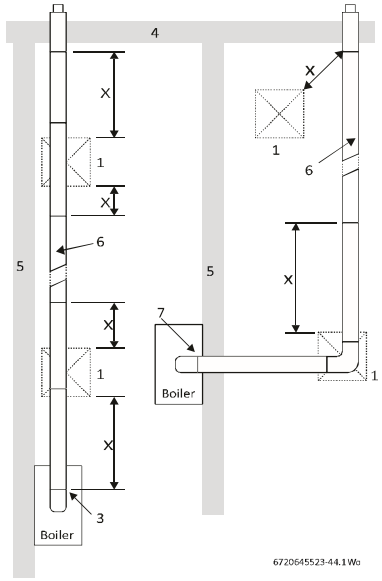


Fig. 4 Flue in voids

X	This dimension must not be more than 1.5 metres
1	Inspection hatch
2	Flue terminal
3	Concealed flue connection
4	External wall
5	Internal wall
6	Any intervening joints must be visible within 1.5 metres of the inspection hatch
7	Accessible flue connection

Table 6

ANNUAL INSPECTION

When the flue system is inspected under the annual service, the engineer must inspect and confirm that:

- the flue system is continuous without any breaks.
- all joints in the flue system are sound and correctly assembled according to the manufacturers instructions.
- the flue has a fall of 3° (52 millimetres per metre) back to the boiler.

3.3 FLUE MEASURING AND CUTTING

Maximum effective flue lengths	L max. (mm)
HF 440/500 CDi & FS 30/42 CDi	4000

Cutting the flue to an exact measurement is not normally required as the telescopic flue terminal can allow for some adjustment.

3.3.1 FLUE EXTENSION EXAMPLE

The terminal end projects beyond the outside wall by the distance shown in fig. 5

1. Measure the flue length L from the centre line of the flue turret, along the route of the flue system, to the face of the outside wall.

NOTE: FLUE LENGTH

- Do not exceed the maximum straight length for a horizontal 60/100mm flue or a 60mm plume management system (if used) as stated in the relevant Installation, Commissioning & Servicing Instructions manual or addendum.

2. Select the required number of extensions and bends to achieve the require flue run.

Table 7 Maximum flue lengths

3. If the flue requires cutting
   - Set the telescopic flue length to 400mm.
   - Secure the joint with the screw and tape provided.
   - Subtract 400mm from the measured flue length L to determine the amount to be cut of an extension.

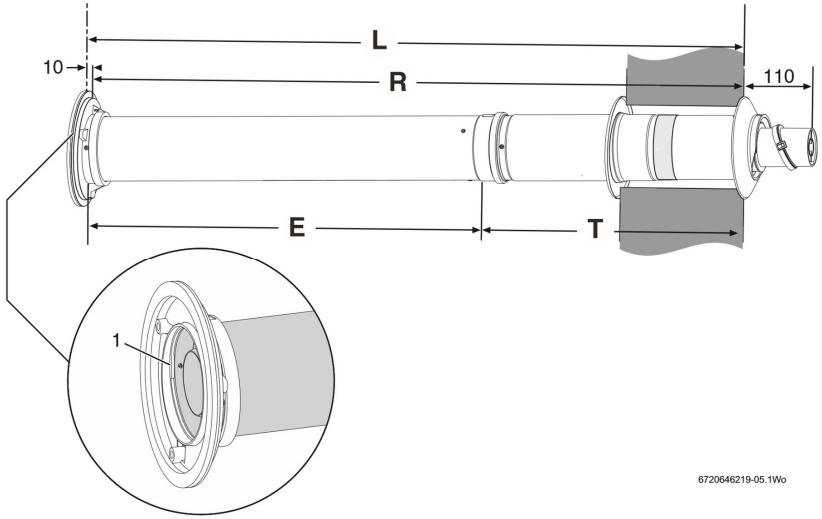


Fig. 5 Flue length determination

L	Effective length of the flue system
R	Actual length of the flue sections (L-50 = R)
E	Extension flue length

T	Telescopic flue length

Table 8 Key to figure 5

3.3.2 FLUE LENGTH GUIDE

Flue length range (mm)	Cut	Number of extensions
130 - 265	YES	None
350 - 570	NO	None
570 - 790	NO	None
790 - 1300	YES	1
1300 - 1520	NO	1
1520 - 2250	YES	2
2250 - 2470	NO	2
2470 - 3200	YES	3
3200 - 3420	NO	3
3420 - 4000	YES	4

Table 9 Flue extension guidance up to 4000mm

FLUE BENDS

NOTE: EFFECTIVE LENGTH

B Each flue bend is rated as a certain straight length of flue, refer to table 10 below. The "effective length" of each bend is added to the straight length of flue. Adding bends to the flue system reduces the actual flue length available. The effective length of the flue must not exceed that stated in the relevant appliance Installation, commissioning and service manual.

	Effective length in millimetres
Bend	HF 440/550 & FS 30/42 CDi
90°	1500
45°	750

Table 10

90° BENDS

Figure 6 shows the actual length added by a 90° bend when used in either orientation.

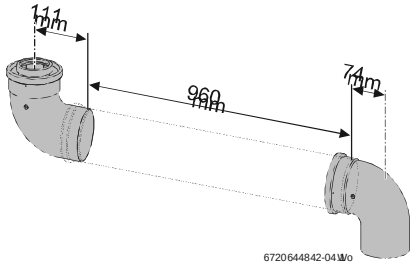


Fig. 6 90° Bend offset dimensions

ADJUSTING THE TELESCOPIC FLUE LENGTH:

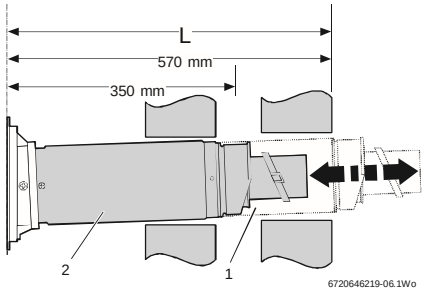


Fig. 7 Standard telescopic flue

Extend tube (1) by withdrawing from tube (2) to achieve the flue length required, between 350- 570mm.

Secure with screw provided and seal joint with the aluminium tape supplied.

REDUCING THE TELESCOPIC FLUE LENGTH

Ensure that the TOP label of both sections are aligned before securing the two parts at the required length.

The flue terminal MUST be fitted with the 'TOP' label uppermost to allow the correct fit and use of the plume management system.

B Remove securing screws (3) to detach the terminal assembly from the turret.

B Slide terminal section (2) from the terminal assembly and discard.

B To use terminal (1) without cutting remove the location lug (4) on the inner flue tube (5) and remove any burrs.

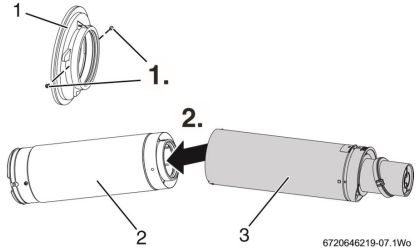


Fig. 8 Reducing the telescopic terminal

To reduce the telescopic flue length further:

B Mark the length required for the terminal as shown in figure 9 (min. 130mm) and cut square, taking care not to damage the tubes.

B Remove any burrs and chamfer the outer edge of the tubes to assist ease of connection and prevent seal damage.

The aluminium tape is not required when reducing the terminal.

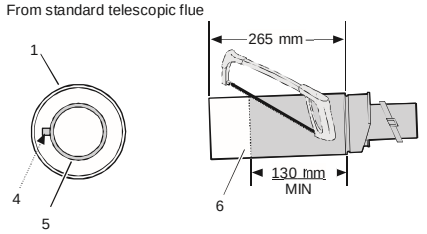


Fig. 9 Further reduction

REDUCING EXTENSION FLUE TUBE LENGTH

A 220mm short extension is available

B Mark the extension tube to the required distance, measuring from the socket end and cut the tube square, taking care not to damage the tubes.

B Remove any burrs and chamfer the outer edge of the tubes to ease the connection and prevent damage to the seals.

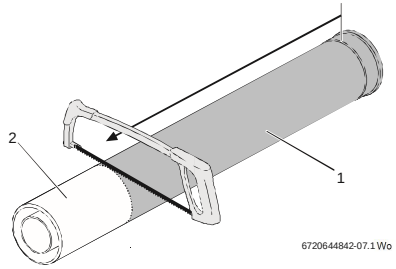


Fig. 10 Cutting an extension tube

FLUE OUTLETS

	FS CDi flue configuration and adapter required	
1	Vertical	Unmodified adapter
2	Left exit	93° bend and short adapter
3	Right exit	93° bend and longer adapter
4	Rear exit	93° bend and short adapter

Table 11

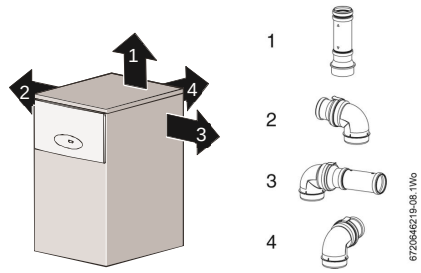


Fig. 11 Flue exit options

CUTTING THE FLUE ADAPTOR

The flue adaptor must be cut to suit all **horizontal** fluing configurations.

1. Remove seal from flue adaptor.
2. Cut square to mark, as shown, deburr and clean.
3. Replace seal.

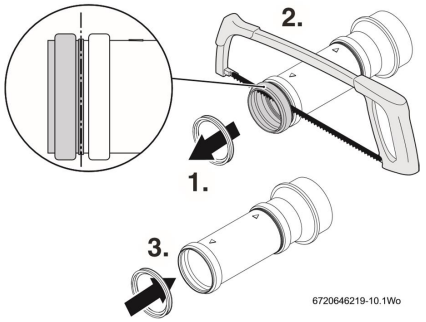


Fig. 12 Long adapter for horizontal flue

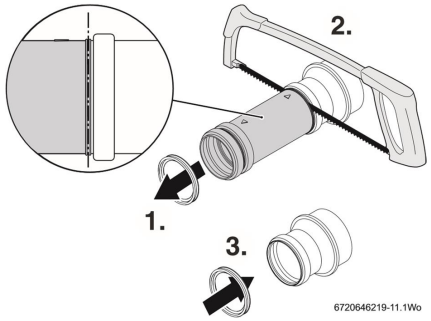


Fig. 13 Short adaptor horizontal flue

CONVERT FROM REAR FLUE OUTLET

The boiler is supplied ready to fit a rear flue outlet. To flue from the sides or top of the boiler, follow the procedure below:

1. Remove the required side or top 'knock-out' panel from the outer casing.
2. Remove the flue outlet blanking plate comprising the cover and gasket from the inner and the three screws.
3. Refit the outlet blanking plate over the rear flue outlet.

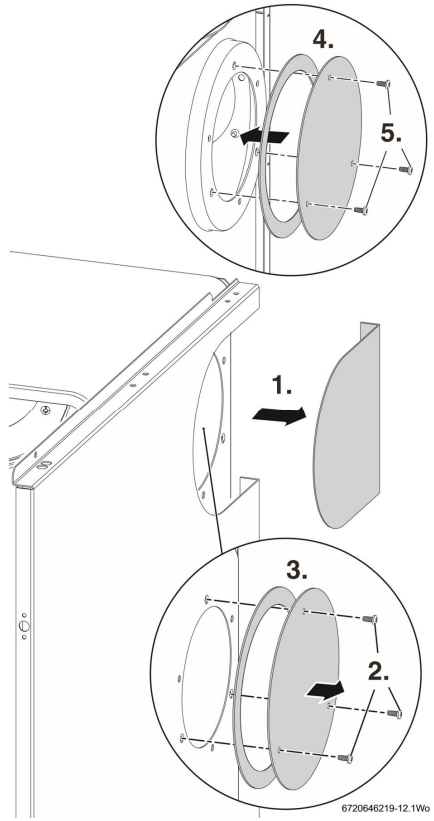


Fig. 14 Converting from rear to side flue outlet

4 INSTALLATION

4.1 STANDARD FLUE INSTALLATION

To ease assembly of the flue components, grease seals lightly with the solvent-free grease supplied.

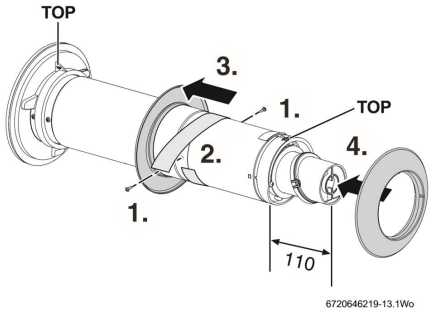
NOTE:

- Check all the seals are seated properly in the grooves provided and are in good condition.
- All flue joints must be sealed to prevent leakage of condensate and flue products.

- When using a 100 mm diameter flue, a 125mm diameter hole through the wall is required.
  However, if installing the flue from inside the property and fitting the weather sealing collar before the flue is pushed through the hole, then a 150 mm diameter hole is required.
- The flue connector for the 100 mm flue has an in-built 3° angle.
- If extensions are to be added then the complete flue must rise at an angle of 3° or 52mm for every metre of flue length.
- Drill the hole using a suitable core drill.

1. Set the flue terminal to the distance required, secure with screw
2. Seal the joint with the aluminium tape supplied.
3. Slide the inner wall seal onto the terminal as shown.If fitting from inside the building; slide the outer wall seal onto terminal.
4. Position terminal through the flue opening in the wall to the outside of the building by the distance shown. If fitting from the outside of the building; slide the outer wall seal onto terminal to fit against the outer wall.

The flue terminal MUST be fitted with the 'TOP' uppermost to allow the correct fit and use of the plume management system.



1. For horizontal, low level side entry flues,

Fig. 15 Telescopic flue fitting

1. Roll the boiler into position on the floor mounting frame. Position connector (1) with 'TOP' uppermost to align with the three holes in the boiler inner casing.
2. Secure the connector (1) to the boiler case using three hexagonal bolts.

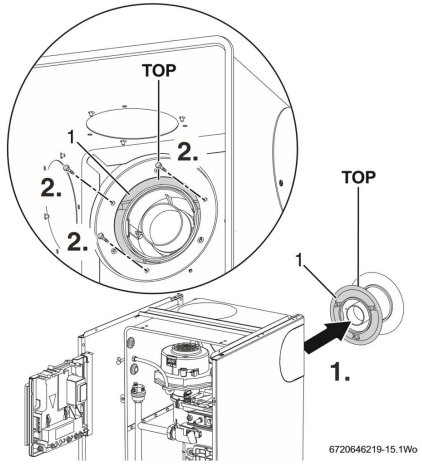


Fig. 16 Fitting flue outlet

1. Push-fit the adapter into the elbow until secured with the clip.

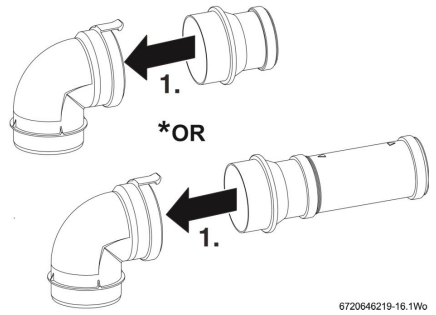


Fig. 17 Adaptor/elbow assembly

2. Secure the flue adapter from inside the boiler case with the three hexagonal screws provided.

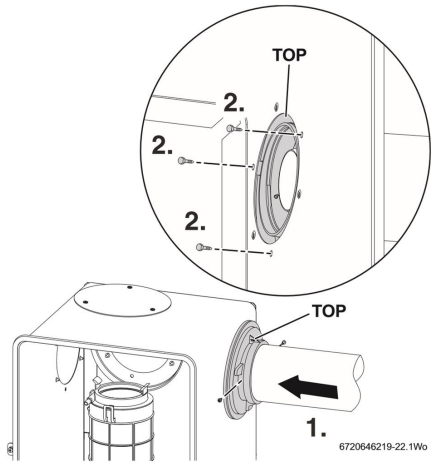


Fig. 18 Side flue fitting

1. Slide the adaptor into the inner flue tube of terminal as shown in figure 19.
2. Push the elbow into flue outlet until secured with the retaining clips (1) ensuring a good seal is made.

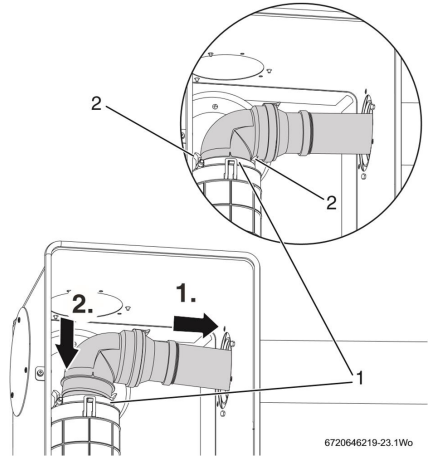


Fig. 19 Fitting the adaptor/elbow

4.2 INSTALLING A HIGH LEVEL TELESCOPIC FLUE

INSTALLATION

1. Referring to figure 20, remove and retain the screws securing the telescopic flue to the connector. Disconnect the flue from the connector and discard the connector.
2. Slide the inner wall seal on to the terminal.
3. Set the telescopic flue to the required length and secure with the screws provided.
4. Seal the joint with the aluminium tape supplied.
5. If fitting the flue from inside the property, slide on the outer wall seal, locating the ridge on the seal with the groove on the terminal.

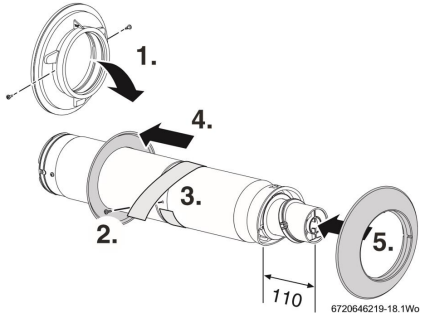


Fig. 20 Preparing the telescopic flue

1. Referring to figure 21, slide the vertical flue adaptor over the inner flue tube. Push the adapter almost all the way into the flue, leaving enough of the adapter showing to be able to pull the adapter down later, as shown in the inset of figure 21.
2. Fit the telescopic flue firmly into the 90° bend.
3. Fit the 90° bend firmly into the extension piece.
4. Fit the vertical flue adapter to the end of the extension.
5. Position the flue and vertical flue adapter over the flue opening in the boiler inner case.
6. Position the flue terminal through the opening in the wall to the outside of the building by the distance shown.

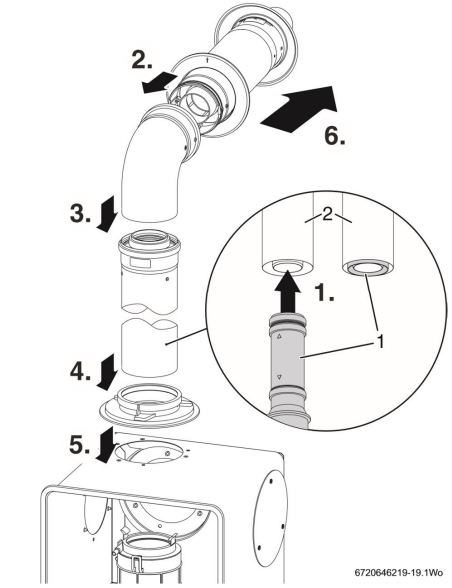


Fig. 21 Assembling the extensions

1. Push the inner seal up against the wall.
2. Push the vertical adapter down into flue outlet , secure with the retaining clips ensuring a good seal. 3. Drill two holes 180° apart, if possible, through the outer flue tube of each fitting. Take care not to drill through the inner tube. Secure the telescopic flue, bends and extensions with the screws provided.
4. Align the holes in the adapter with the holes in the boiler case. Secure the vertical flue adapter from inside the boiler case, with the screws provided, as shown in the inset of figure 22.

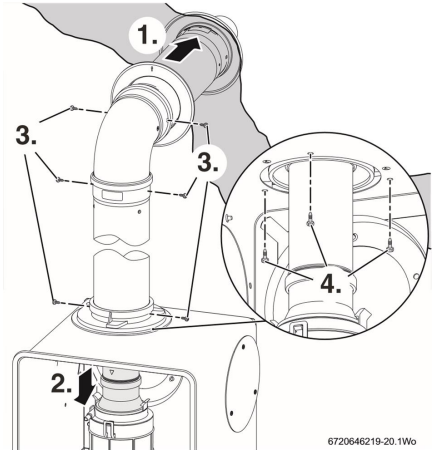


Fig. 22 Fitting the high level horizontal flue

4.3 FLUE TERMINAL PLUME RE-DIRECTION

The flue discharge can be re-directed to allow some plume redirection control. Alternatively, a complete plume management system can be fitted to the flue terminal.

RE-DIRECTING THE FLUE DISCHARGE

NOTE: DO NOT ROTATE THE COMPLETE FLUE TERMINAL ASSEMBLY.

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

1. Using a suitable tool, unclip the end of the terminal.
2. Rotate the end by 180° and refit the terminal end, ensuring to engage the clips to secure.
3. Loosen the screws securing the entire outlet assembly and rotate by ± 80° to the desired position and re-secure the assembly.

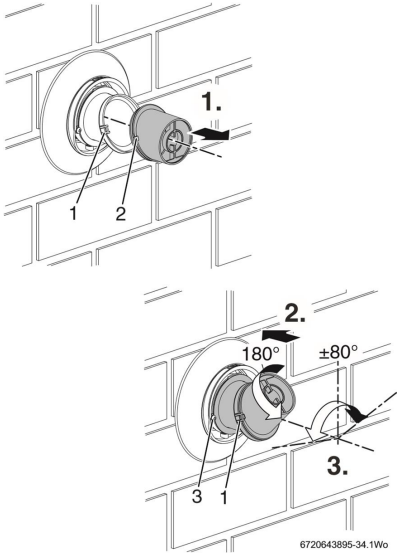


Fig. 23 Plume redirection

NOTE: OUTLET POSITIONS

B The flue terminal outlet position must follow those stated in figure 3.
When redirecting the flue discharge the terminal end must be at least 1500mm from any opening in the direction of the discharge to prevent combustion products from entering the building as shown

1	Opening in building
2	Flue discharge
3	Terminal end
4	Minimum 1500mm from an opening in the building

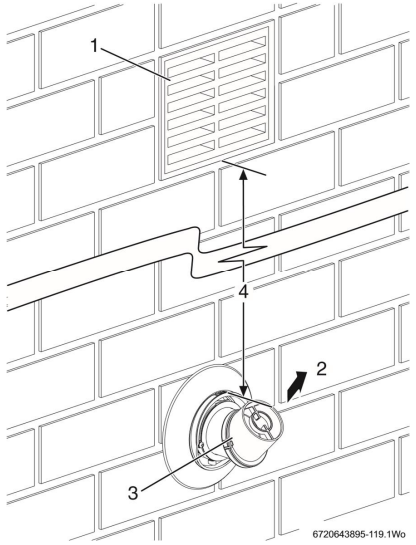


Fig. 24 Plume distance to opening

Table 12 Key to figure 24

4.4 EXTENDED FLUE INSTALLATION

NOTE: CONDENSATE DISPOSAL

B All horizontal flue sections must rise by at least 52mm per metre away from the boiler to ensure that the condensate flows back into the boiler for safe disposal via the condensate waste pipe.

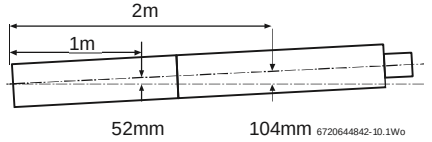


Fig. 25 Slope for condensate disposal

To ease assembly of the flue components, lightly grease the seals with the solvent-free grease supplied.
Check all the seals are properly seated in the grooves provided and are in good condition.
All flue joints must be sealed to prevent leakage of condensate and flue products.

INSTALLING AN EXTENDED FLUE

The flue terminal MUST be fitted with the "TOP" upper most to allow the correct fit and use of the plume management system.

1. Slide the support clamp (optional item 3) onto the flue extension as shown.
2. Push fit the extension (4) as far as possible into the flue turret.
3. Drill through the turret screw holes into the flue outer tube, take care not to drill into the inner tube. Secure the extension to the turret with the screws removed earlier.

B Refer to figure 26 and slide the support clamps (1) onto the additional flue extensions (2).

1. Working from the boiler, fit the support clamps (1) and extensions (2), to take the weight of the flue.
2. Drill two holes, 180° apart, through the outer flue tube of each extension, take care not to drill into the inner flue tube, and secure with the screws provided.

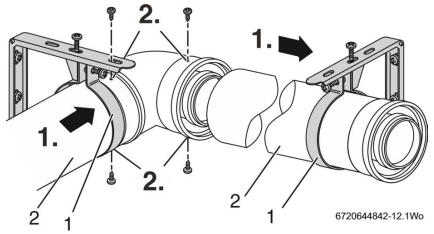


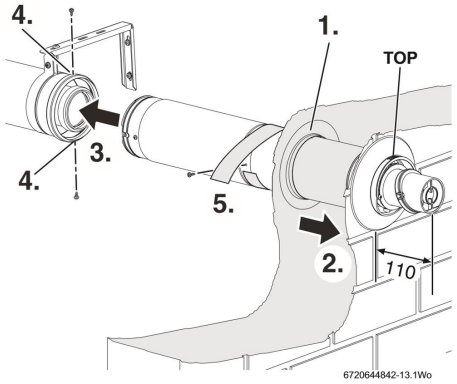
Fig. 26 Extensions

1. Refer to figure 27 and slide the inner wall seal onto the terminal.
   – If fitting the flue from inside the building, slide the outer wall seal onto the terminal, locating the ridge on the seal with the groove on the terminal.
2. Position the terminal assembly through the opening in the wall to the outside.
3. Push the flue into the extension as far as possible.
4. Drill two holes, 180° apart, through the outer flue tube of each extension, take care not to drill into the inner flue tube, and secure with the screws provided.
5. If using the telescopic flue, slide the assembly until the flue terminal projects out of the wall by 110mm.
   – Secure the flue with the screw provide and seal the joint with the tape provided.

B If fitting from outside the building, slide the outer wall seal onto the terminal, locating the ridge on the seal with the groove on the terminal.

Fig. 27 Extended flue

PLUME MANAGEMENT COMPONENTS Ø 60mm PLUME MANAGEMENT KIT comprising: Part No.: 7 716 191 086	
1	Terminal bend
2	Extension 500mm
3	Outlet assembly
4	Clamp pack



EXTENSION COMPONENTS Ø 60mm EXTENSION comprising: Part No.: 7 716 191 087	
5	Extension 1000mm
6	Clamp pack
90° BEND comprising: Part No.: 7 716 191 088	
7	90° Bend
45° BEND comprising: Part No.: 7 716 191 089	
8	45° Bend x 2
Terminal guard Part No.: 7 716 191 176	
9	Terminal guard

5 PRODUCT INFORMATION

5.1 PLUME MANAGEMENT SYSTEM COMPONENTS

Table 13 60mm Plume management kit

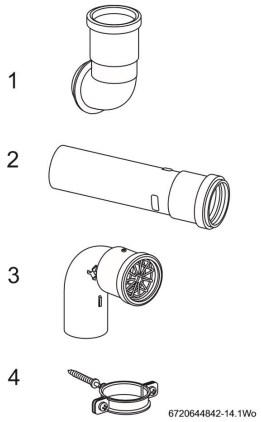


Fig. 28 Plume management kit components

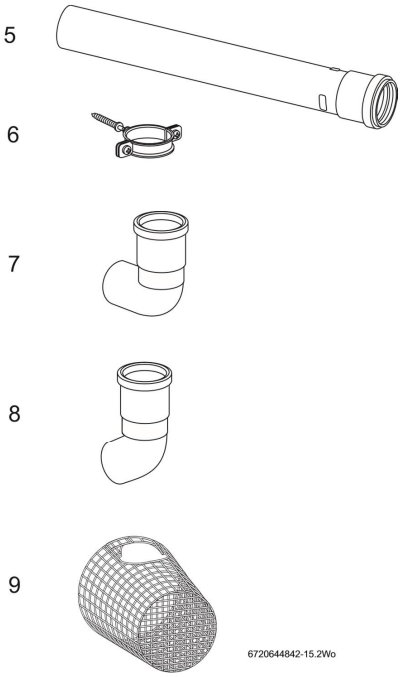


Table 14 60mm Extension

Fig. 29 Plume management extension components

6 PRE-INSTALLATION

6.1 PLUME MANAGEMENT TERMINAL POSITIONS

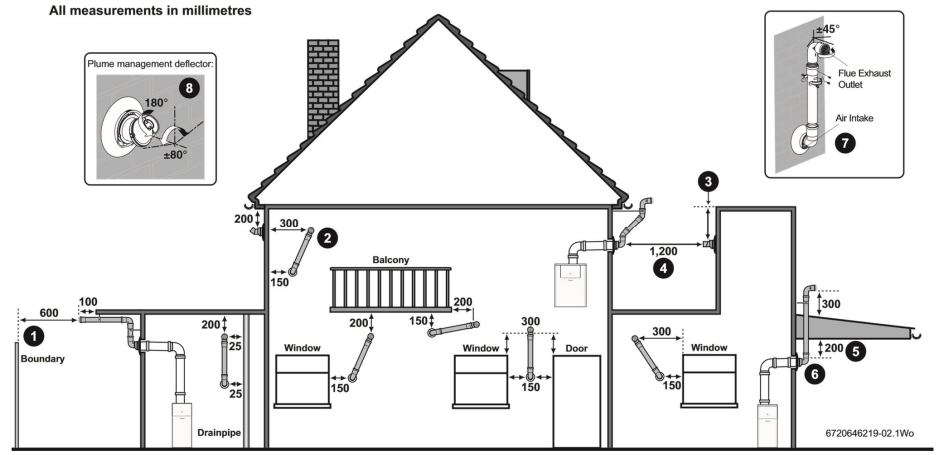


Fig. 30 Plume terminal positions

NOTE:

B Refer to figure 3 for all concentric flue terminal positions unless the flue position is specified on the figure above "Plume terminal positions".

B All measurements are the minimum clearances required.

B Terminals must be positioned so to avoid combustion products entering the building.

B Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fittings.

Key to illustration

1. 600 mm distance to a boundary or surface facing a boundary, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to boundaries.
2. Internal/external corners. The air intake clearance can be reduced to 150 mm providing the flue exhaust outlet has a 300 mm clearance.
3. The flue cannot be lower than 1,000 mm from the top of the light well due to the build up of combustion products.
4. 1,200 mm between air intake and facing terminal.
5. Clearance no less than 200 mm from the lowest point of the balcony or overhang.

Installations in car ports are not recommended.

6. 1,200 mm from an opening in a car port on the same wall i.e. door or window leading into dwelling.
7. Using a Plume Management Kit the air intake measurement can be reduced to 150 mm providing the flue exhaust outlet has a 300 mm clearance. Plume kits running horizontally must have a 10° fall back to the boiler for proper disposal of condensate. For details on specific lengths see relevant boiler Technical & Specification information.
8. This feature allows some basic plume re-direction options on a standard telescopic horizontal flue terminal.
   300 mm minimum clearances to a opening e.g. window.
   However the minimum clearance to an opening in direction that the plume management is facing, must be increased to 1,500 mm.
   Where the flue is less than 150 mm to a drain pipe and plume re-direction is used the deflector should not be directed towards the drainpipe.

6.2 PLUME MANAGEMENT OPTIONS & MEASUREMENT

NOTE: PLUME MANAGEMENT

B All plume management sections must rise away from the terminal by a minimum of 173mm per metre (10°) to allow the condensate to drain back to the boiler.

The figure 31 shows the components required for typical plume management configurations.

PLUME MANAGEMENT KIT

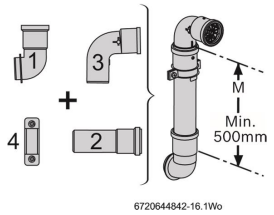


Fig. 31 Plume management components

1	Terminal bend
2	Extension 500mm
3	Outlet assembly
4	Clamp

Table 15 Key to figure 31

PLUME MANAGEMENT OPTIONAL KIT

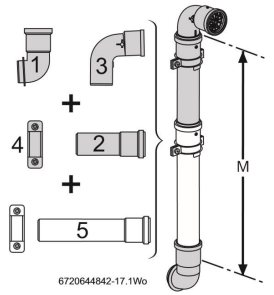


Fig. 32 Optional components

5	Extension tube 100mm and Clamp
6	90° Bend
7	45° Bend

Table 16 Key to figure 32

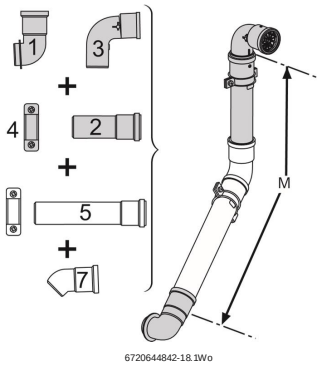
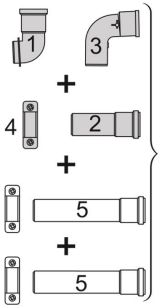


Fig. 33 Plume management with bend



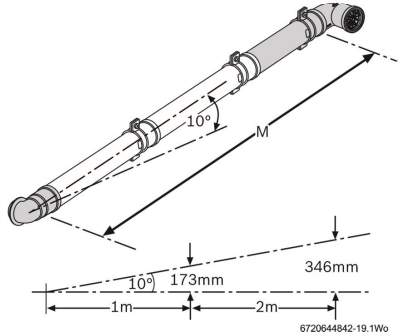


Fig. 34 Plume management with straight extension

NOTE: PLUME MANAGEMENT LENGTH

B Measurement M must be a minimum of 500mm and must not exceed the maximum straight length for a horizontal Ø 60/100mm flue or a 60mm plume management system as stated in the relevant appliance Installation, commissioning and service manual or addendum.

6.2.1 DETERMINE THE PLUME MANAGEMENT SYSTEM LENGTH

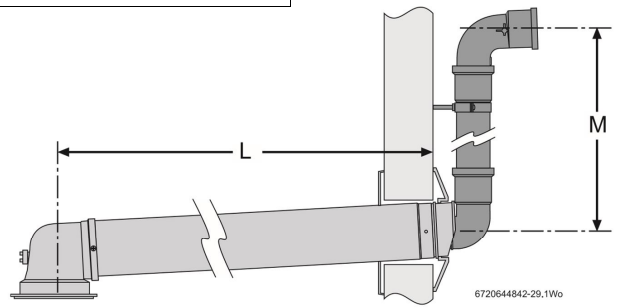


Fig. 35 Effective lengths L and M



Fig. 36 Effective flue lengths versus plume management lengths

PLUME LENGTH

The minimum plume length for all boilers stated on the front page of this manual is 500mm.

Refer to figure 36 to determine the appropriate plume length versus the flue length (L).

The flue length is the effective length (L), which includes the effective length of any bends plus the straight flue lengths.

Once the length L is know, find that value on the vertical scale of the graph and read that across to the line that represents the installed boiler.
From that point read down to the horizontal scale to determine the maximum plume length (M) allowed.

For the CDi range of boilers, the available plume length (M) is reduced as the flue length (L) increases. Any flue must have a minimum of 500mm plume length.

6.2.2 MEASURING FOR A PLUME MANAGEMENT SYSTEM

All boilers have a maximum permissible plume management length, refer to figure 36.

1. Measure the plume management flue (M) from the centre of terminal, along the required route to the centre of the plume outlet.

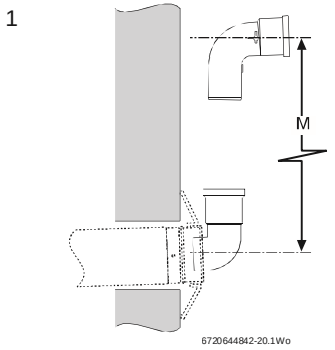


Fig. 37 Plume management length M

ADDITIONAL BENDS:

2. Adding bends to the plume management system reduces the actual plume management length. Each bend has an equivalent straight length and must be factored into the overall effective length.

   – 90° bend is equivalent to 1500mm. – 45° bend is equivalent to 750mm

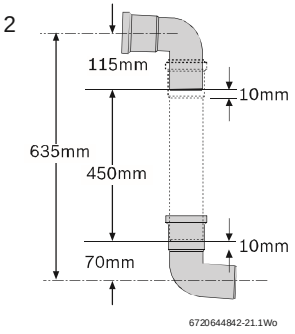


Fig. 38 Plume management bends

EXAMPLE:

Using two 45° bends will reduce the permissible length by 1500mm.

A Greenstar 28i junior has a maximum permissible plume management length of 4500mm, so using two 45° bends will reduce the straight length to 3000mm.

7 INSTALLATION

7.1 STANDARD PLUME MANAGEMENT INSTALLATION

To ease assembly of the flue components, lightly grease the seals with the solvent-free grease supplied.
Check all the seals are properly seated in the grooves provided and are in good condition.
All flue joints must be sealed to prevent leakage of condensate and flue products.

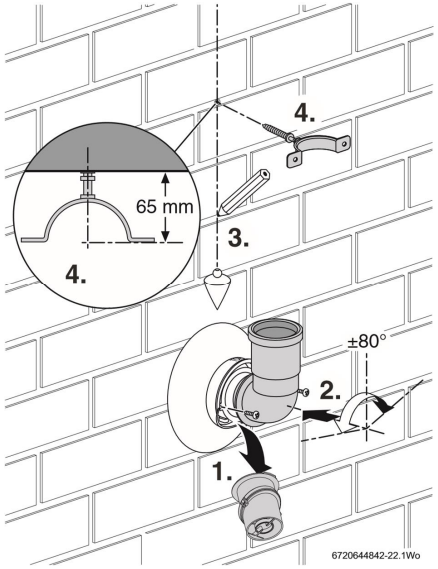
NOTE: PLUME MANAGEMENT

B All plume management sections must rise away from the terminal by a minimum of 173mm per metre (10°) to allow the condensate to drain back to the boiler.

FITTING THE STANDARD PLUME MANAGEMENT SYSTEM:

Refer to figure 39 for terminal bend installation.

1. Remove and retain the screws and discard the terminal end.



2. Fit the new terminal bend to the terminal outlet and secure with the screws removed previously.
3. Mark the position for the wall clamp so that it coincides with the extension tube just below the top fitting (Refer to figure 40 point 2).
   Drill a hole to suit the wall plug and fit the wall plug.
4. Screw the clamp into the wall plug to the distance shown in figure 39.

NOTE: DO NOT ROTATE THE COMPLETE FLUE TERMINAL ASSEMBLY.

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

Refer to figure 40 plume management installation.

1. Push the extension tube fully into the terminal bend, then withdraw the tube by approximately 10mm to allow for expansion.
2. Secure the extension to the wall with the clamp and screws provided.
3. Push the outlet assembly fully into the extension tube.
4. Rotate the outlet assembly to the required direction.
5. Secure the outlet to the extension with the selftapping screw provided.

Fig. 39 Terminal bend installation

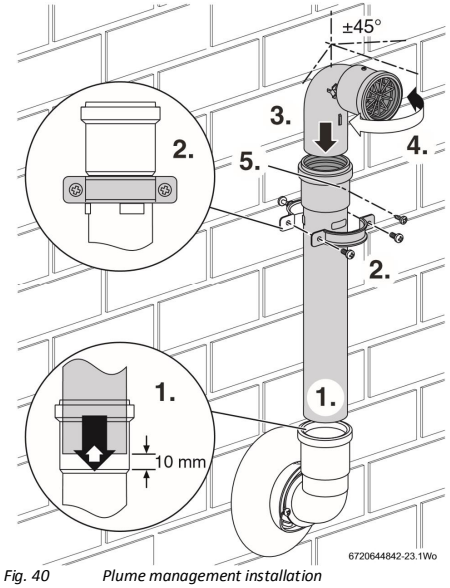


Fig. 40 Plume management installation

7.2 EXTENDED PLUME MANAGEMENT INSTALLATION

To ease assembly of the flue components, lightly grease the seals with the solvent-free grease supplied.
Check all the seals are properly seated in the grooves provided and are in good condition.
All flue joints must be sealed to prevent leakage of condensate and flue products.

NOTE: PLUME MANAGEMENT

B All plume management sections must rise away from the terminal by a minimum of 173mm per metre (10°) to allow the condensate to drain back to the boiler.

FITTING THE EXTENDED PLUME MANAGEMENT:

1. Refer to figure 39 and remove and retain the screws securing the terminal end and discard the terminal end.
2. Fit the terminal bend to the terminal outlet and secure with the screws retained earlier.
3. If required, rotate the terminal bend for angled fluing.

NOTE: DO NOT ROTATE THE COMPLETE FLUE TERMINAL ASSEMBLY.

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

Refer to figure 41 and assemble the plume extensions.

1. Mark the position for the wall clamp that coincides with the extension tube, as shown.
   Drill a suitable hole and fit the wall plug.
   Screw the clamp into the wall plug as shown.
2. Push the extension tube fully into the terminal bend, then withdraw the tube by approximately 10mm to allow for expansion.
3. Secure the extension to the wall with the clamp and screws provided.
4. Mount the other extension tubes as before and secure to the wall
5. Push the outlet assembly fully into the extension tube.
6. Rotate the outlet assembly to the required direction and secure the outlet to the extension with the selftapping screw provided.

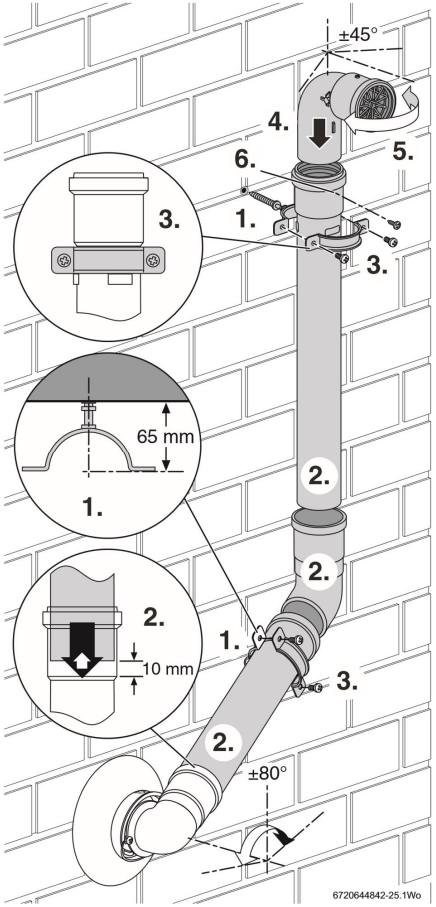


Fig. 41 Plume extensions

7.3 INSTALLING A TERMINAL GUARD

A Terminal guard must be fitted if the flue is less than two metres from the ground or if a person could come into contact with the flue terminal outlet.

NOTE: The terminal end must not be redirected inside the guard.
The terminal end must be mounted at right angles with respect to the wall.

The terminal guard does not have to be fitted over the flue inlet, but is recommended to protect the flue from third party damage.

B Fit the terminal guard centrally over the flue inlet or outlet.

B Mount the terminal guard to the wall utilising the three mounting points attached to the guard.

B Fold the gates in the order stated below or they will not latch properly.

1. Fold the single pronged gate in and latch onto the guard frame.
2. Fold the two pronged gate in and latch onto the guard frame.

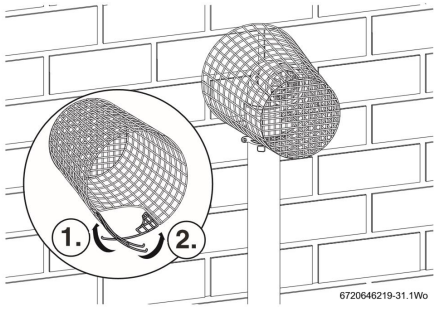


Fig. 42 Terminal guard - flue outlet

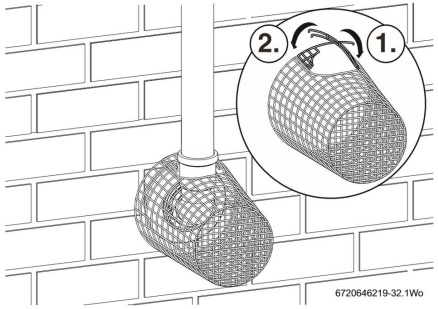


Fig. 43 Terminal guard - flue inlet

7.4 REDIRECTING THE FLUE DISCHARGE

The plume deflector can be adjusted to redirect the flue discharge.

NOTE: FLUE DISCHARGE

B The Plume terminal outlet position must follow those stated in figure 30. When redirecting the flue discharge the outlet must be at least 1500mm from and angle at 45° away from any opening in the direction of the discharge, as shown. This is to prevent combustion products from entering the building.

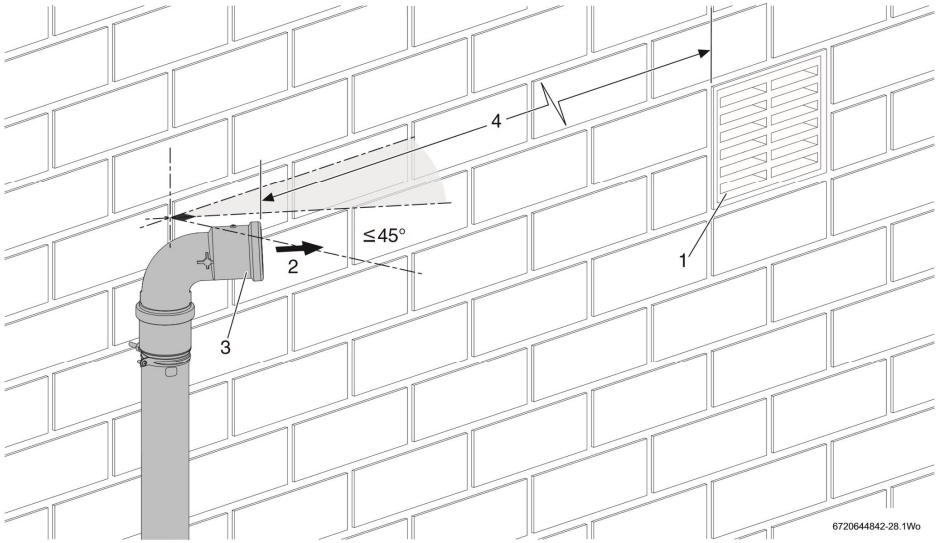


Fig. 44 Plume direction conditions

1	Opening in the building i.e. air brick, window.
2	Direction of flue products, must be more than 45° from the wall or structure
3	Plume terminal
4	At least 1500mm from any opening in the building

Table 17 Key to figure 44

7.5 EXTENDED PLUME MANAGEMENT INSTALLATION FOR A BALCONY / OVERHANG

To ease assembly of the flue components, lightly grease the seals with the solvent-free grease supplied.
Check all the seals are properly seated in the grooves provided and are in good condition.
All flue joints must be sealed to prevent leakage of condensate and flue products.

INSTALLATION

1. Refer to figure 39 and remove and retain the screws and terminal end.
2. Fit the terminal bend to the terminal outlet and secure with the screws removed earlier.
3. If required, rotate the terminal bend for angled fluing.

NOTE: DO NOT ROTATE THE COMPLETE FLUE TERMINAL ASSEMBLY.

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

1. Refer to figure 45 and mark the position for the wall clamp that coincides with the extension tube just below the top fitting.
   Drill a suitable hole and fit the wall plug.
   Screw the clamp into the wall plug as shown.
2. Push the extension tube fully into the terminal bend, then withdraw the tube by approximately 10mm to allow for expansion.
3. Secure the extension to the wall with the clamp and screws provided.

B Mount the other extension tubes as before and secure to the wall.

Ensure that the plume outlet, projects at least 100mmpassed the balcony/overhang.

4. Remove the screw from the terminal end and remove the grill.
5. Drill a hole through the plume outlet end and secure the grill in place.

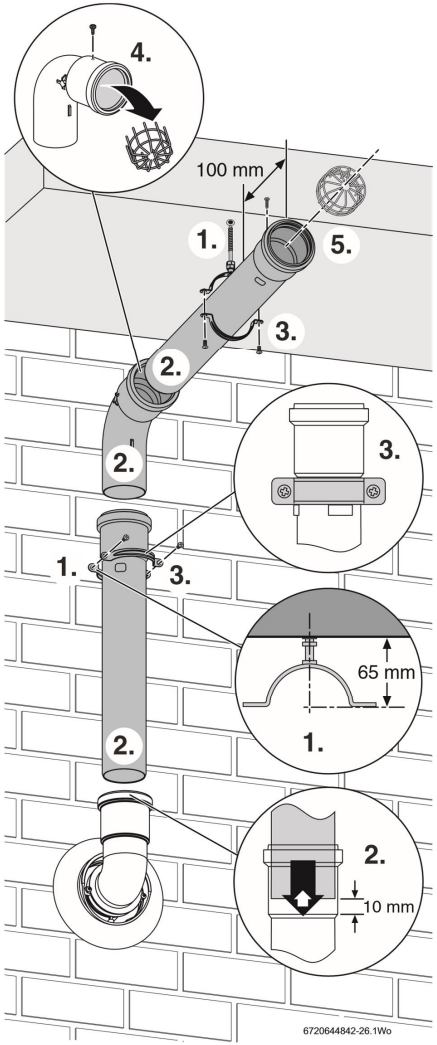


Fig. 45 Under balcony installation **SERVICE AND SPARES**

8 SERVICE AND SPARES

8.1 SERVICING AND MAINTENANCE

An annual visual check of the plume management kit must be carried out.

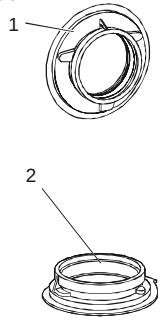
NOTE: PAINTING

B DO NOT paint the plume management kit!

8.2 SPARE PARTS

Ø 60/100mm Telescopic horizontal flue	
1	Horizontal Flue Connector: Part Number: 8 716 114 137 0
2	Vertical Flue Connector: Part Number: 8 718 682 361 0
3	Flue adaptor: Part Number: 8 718 680 382 0
4	Terminal outlet assembly: Part Number: 8 716 111 209 0
5	Wall seal - Inner: Part Number: 8 716 111 211 0
6	Wall seal - Outer: Part Number: 8 716 111 212 0

Table 18 Key to figure 46



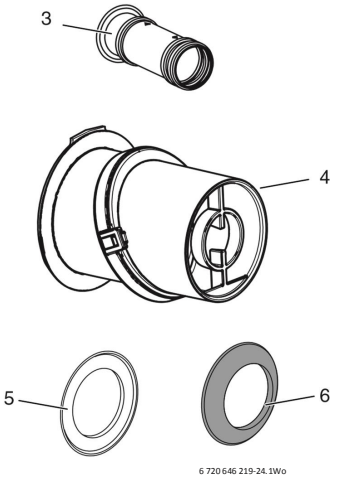


Fig. 46 Spare parts

WORCESTER, BOSCH GROUP:

TECHNICAL SUPPORT:	0844 892 3366
APPOINTMENTS:	0844 892 3000
SPARES:	01905 752571
LITERATURE:	0844 892 9800
TRAINING:	01905 752526
SALES:	01905 752640

Worcester, Bosch Group
Cotswold Way, Warndon, Worcester WR4 9SW.
Tel. 0844 892 9900
Worcester, Bosch Group is a brand name of Bosch Thermotechnology Ltd.

worcester-bosch.co.uk

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