



TECHNICAL MANUAL

VERSION 11

13: CHIMNEYS AND FLUES

13.

Chimneys and Flues

Contents

Functional Requirements

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Limitations of Functional Requirements

1. These Functional Requirements do not and will not apply to create any policy liability for any remedial works carried out by the contractor or otherwise, nor to any materials used in those remedial works.
2. The guidance provided in this Section, is guidance that provides a suggested solution to meeting the Functional Requirements. If an alternative solution is selected, then this must still meet the Functional Requirements.

Workmanship

1. A commissioning certification is required for any work completed by an approved installer.
2. All workmanship must be within the tolerance requirements set out in this Technical Manual.
3. All work is to be carried out by a technically competent person in a workmanlike manner.

Materials

1. All materials should be stored, installed and protected correctly in a manner that will not cause damage or deterioration of the product.
2. All materials, products and building systems shall be appropriately tested and approved for their intended purpose.
3. All load bearing structural elements providing support to the Home will have a service life of not less than 60 years, unless specifically agreed otherwise with us. All other parts of the Home will have a lesser durability and need planned maintenance, repair or replacement during that reduced period.
4. Whilst there is and can be no Policy responsibility and/or liability for any roof covering, window / door or 'Decorative external cladding' (i.e. Cladding which is decorative only and the substrate wall provides the main weather proof barrier) to achieve a performance service life of 60 years or less, such elements shall be designed and constructed so they have an intended service life of not less than where stipulated within this Manual.
5. All materials should be suitable for the relative exposure of the building in accordance with the relevant British Standards.

Design

1. Chimneys, flues, flue-pipes, fireplace recesses and hearths shall be designed and constructed so that they:
 - a. Ensure efficient operation of the fuel-burning appliance for which they have been designed;
 - b. Are provided with sufficient air for proper combustion of the fuel;
 - c. Are structurally sound and do not adversely affect the structural stability of the building where they pass through floors, walls or roofs;
 - d. Protect the structure and fabric of the building from the effects of fire;
 - e. Do not adversely affect the ability of the building to resist the effects of weather and ground moisture;
 - f. Discharge the products of combustion safely to the outside air.
2. Structural elements outside the parameters of Building Regulations must be supported by structural calculations provided by a suitably qualified expert.
3. Damp proofing works should prevent any external moisture passing into the internal environment of the building.

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Chimneys and Flues

13.1 Masonry

Provision of information

A full set of design drawings and specifications shall be made available to the Warranty Provider and all other interested parties prior to the associated works starting on site. This may include:

1. Design details indicating proposed chimney position, layout and height.
2. Details and specification of all materials to be used in the construction of a chimney (e.g. DPC, flashing, soakers, proposed flues, etc.)
3. Details of fire stopping in cavities around flue penetrations.
4. Details of fire places and hearths.
5. A copy of a commissioning certificate will be required at completion to be handed to the Warranty Surveyor.

The Warranty surveyor, at their discretion, may also request supporting information that demonstrates suitability for use of any materials or systems contained within the above.

Construction

Chimneys shall be designed and constructed so as to adequately support the flue liner, resist moisture penetration and be structurally sound.

- Foundations to chimneys must:
 - Be taken to the same depth as adjacent wall foundations.
 - Resist uneven settlement caused by potential loadings.
 - Where the chimney forms part of a wall the foundation should project at least 150mm wider than the chimney base.
- If the chimney is in a severe exposure zone the cavity should extend around the outside of the stack and be continuous up to roof level, as per BS 5628, Part 3.
- A 50mm cavity at the back of the chimney breast is maintained to prevent rainwater penetration. Please refer to the 'External Walls' section of the Technical Manual for further information.
- Where the chimney breast is gathered in, the lower projecting masonry should be protected with a suitable capping and cavity trays.
- Bricks and blocks used in the construction of masonry chimneys must take consideration of weather exposure and resistance to frost. Please refer to 'Appendix C' of the Technical Manual for guidance on appropriate selection of masonry products.
- Mortar used within the chimney must:
 - Take consideration of exposure to elements and frost.
 - Be the strongest appropriate for the type of masonry unit.

Flue liners should be used as specified with sockets uppermost and jointed with fire-resisting mortar. Flue liners should be:

- Non-combustible.
- Reasonably smooth internally.
- Correctly jointed with mortar with the space between the liners and the brickwork filled with weak insulating concrete, unless the manufacturer recommends an alternative specification.
- Properly jointed at the junctions with the starter block or lintel and outlet terminal.

Factory made insulated chimneys should have a operational life of at least 30 years and be designed in accordance with BS 4543 and BS EN 1859, and installed in accordance with BS 7566. Where a chimney is not directly over an appliance or opening, a soot box accessible for emptying should be formed.

Render directly applied to masonry chimney

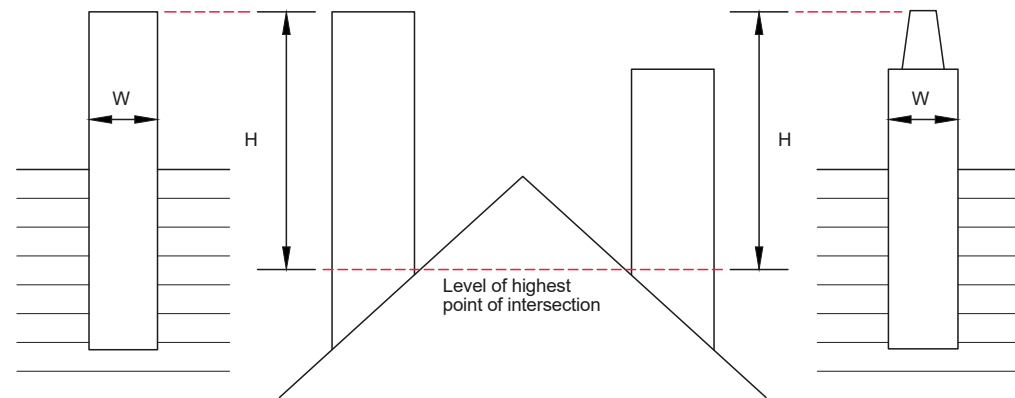
- Rendering to chimneys should only be carried out where the masonry contains little or no sulphates. An appropriate specialist sealer/bonding key coat should be applied prior to applying the main coat of render.
- A proprietary alkaline resistant mesh should be embedded throughout the render, the key coat should provide a sound substrate and be compatible with the subsequent render system.
- A specialist render system and mortar should be employed for chimneys with a masonry background.
- Traditional hand mix render using standard sand and cement is not accepted. Only a pre-blended bagged render system will be accepted as a suitable render system that has a third party accreditation and backed up with a manufacturer's specification.
- The chimney which is to be rendered should be examined for excessive moisture content prior to rendering. This is particularly important where the masonry background has no upper limit on its soluble salt content, e.g. 'N' designation clay bricks.
- Ensure that all joints are finished flush with the surface to avoid shade variations.
- To minimise the potential for differential thermal movement and effects that the different suction that each type of background material may create; the section of walling to receive the render should be constructed using the same type and density of material throughout.
- To control suction always apply a specialist sealer key coat or suitable render preparatory coat. Allow a minimum of 48 hours for the key coat to fully dry before applying the next coat.

- It is recommended that throats or drips to chimneys should project beyond the finished faces to throw water clear, a minimum of 40mm to the drip.
- Angles, stop beads and jointing sections should be secured with drilled or shot-fired fixings, and not with gypsum plaster.

Please refer to the 'External Walls' section for further guidance.

Proportions for masonry chimneys

If a chimney is not provided with adequate support using ties or not securely restrained, its height (measured to the top of the chimney) should not exceed 4.5 times its least horizontal dimension when measured from the highest point of intersection with the roof surface (density of masonry must be a minimum of 1500kg/m³).



Key:

W - is the least horizontal dimension of the chimney measured at the same point of intersection.
H - is measured to the top of any chimney pot or other flue terminal

Masonry chimneys in timber framed buildings

Where masonry chimneys are proposed in timber framed buildings, the following should be considered:

- The effect on the structural stability of the timber frame.
- The effect of differential movement caused by timber shrinkage between the frame and the chimney and/or by thermal movement of the chimney in use. There should also be consideration for the impact of differential movement on flashings and weathering details.
- The integrity of the fire resistance of the timber frame when penetrated by the chimney breast or stack.
- The proximity of combustible materials (timber frames, sheathing and floor decks) to the flue and fire recess.
- The continuation of the sound insulation of compartment and separating walls when chimneys are adjacent or pass through to these walls.

Coastal Locations

For the selection of construction materials and additional design requirements that may apply in coastal locations please refer to 'Appendix B - Coastal Locations' and 'Appendix C - Materials, Products, and Building Systems'

Lead work

Lead sheet used for roofs, flashings and weatherings should, in terms of suitability, be in accordance with BS EN 12588 or a UKAS (or European equivalent) valid third-party accreditation which demonstrates adequacy and durability for use (see 'Appendix C - Materials, Products, and Building Systems').

Corrosion of lead work

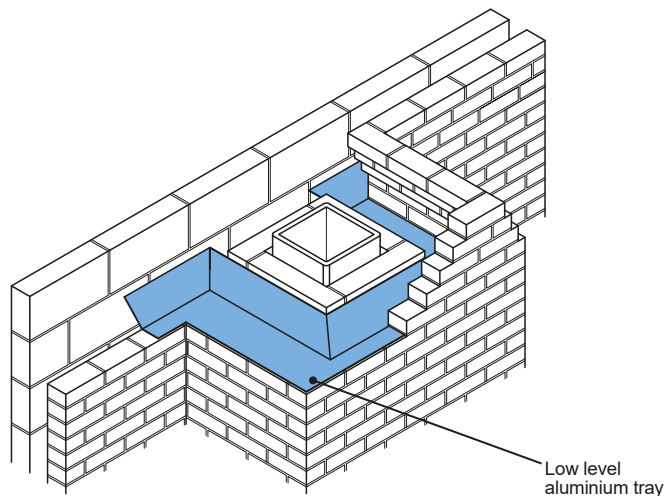
Where free lime from mortar comes into contact with lead trays or flashings (due mainly to the continual saturation of the brickwork) in areas such as chimneys:

- The lead should be protected from corrosion by the use of a thick coat of bitumen paint covering the faces likely to be in contact with the mortar.
- Lead work buried in mortar should be protected as per guidance issued by the Lead Sheet Training Academy. This treatment can also reduce staining of lead and brickwork.
- It is unnecessary to treat flashings buried only 40mm-50mm into mortar joints (cover flashings), as this close to the drying surface, the carbonation of free lime is rapid and there is no risk of corrosion in such circumstances.

Chimney tray - low level

A chimney tray is required at low level where a cavity-walled chimney with brick shoulders is built onto an external wall. The tray prevents water that may enter the shoulders from penetrating to the inner leaf of the wall.

The material used is 1mm aluminium alloy sheet to BS EN 485-2; Aluminium and aluminium alloys. Sheet strip and plate, mechanical properties. This has a higher melting point than lead, so is suitable for installation close to a heat source.

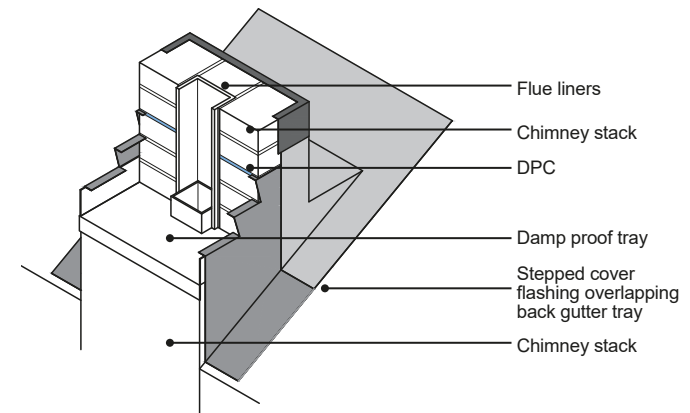


Chimney tray - high level

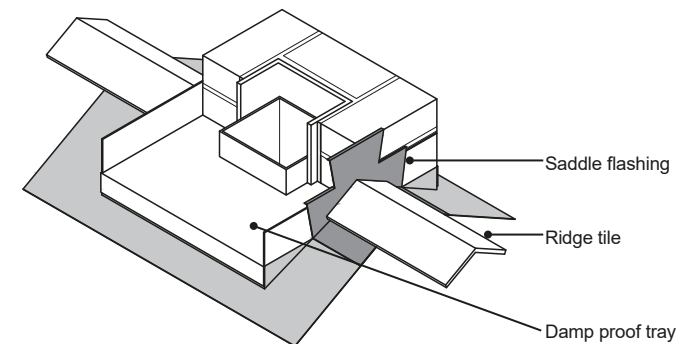
A high level tray may be required to prevent the entry of water at high level where a chimney rises through a pitched roof; suitable for new build or remedial work, this minimises disturbance to surrounding construction in remedial work.

The material used is lead sheet to BS EN 12588 Lead and lead alloys. Rolled lead sheet for building purposes. Code 4 as standard. Standard sizes are 800mm x 800mm, 900mm x 900mm, 950mm x 950mm, to suit either a 195mm square or 195mm diameter circular flue.

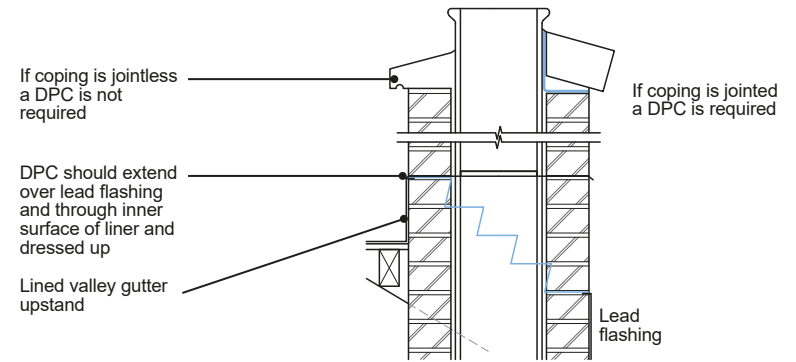
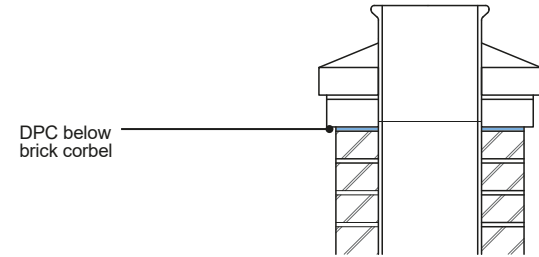
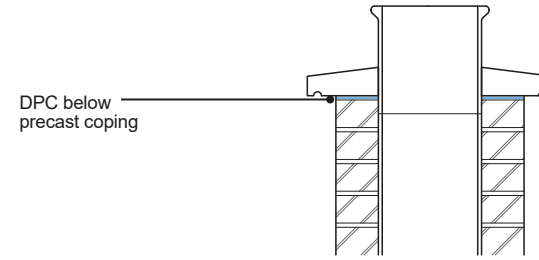
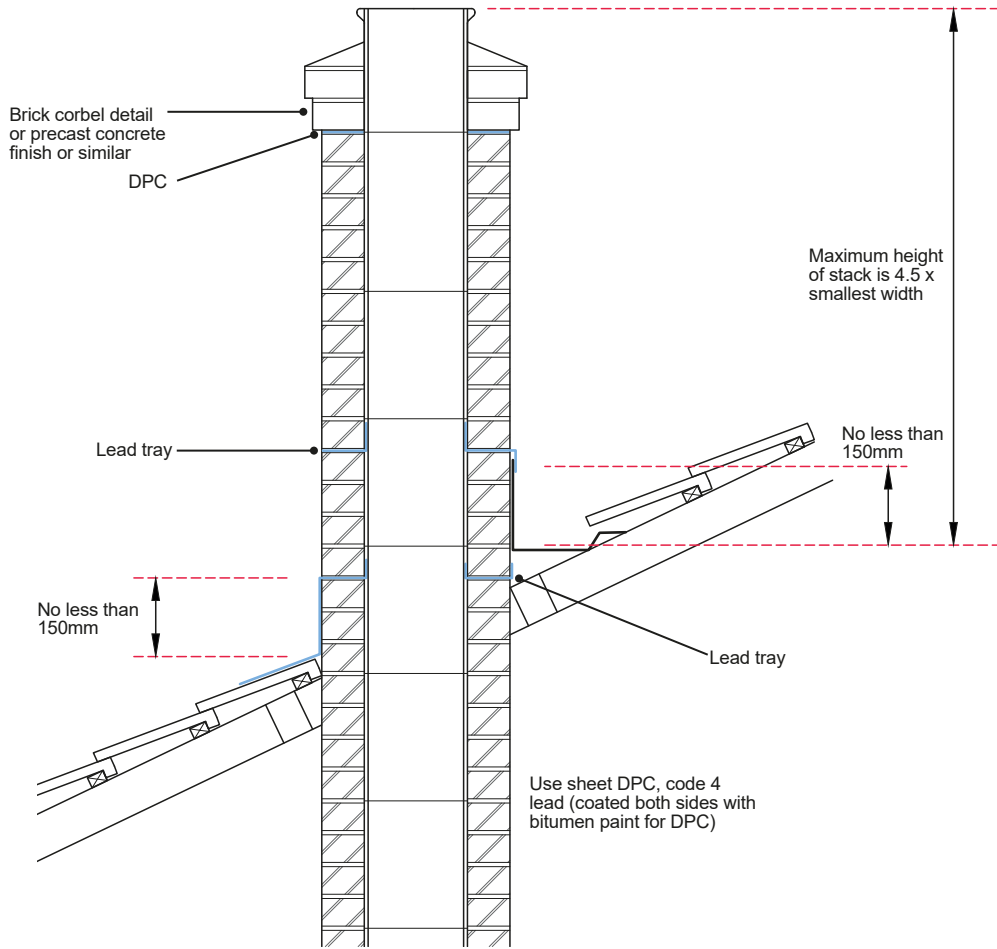
Typical flashings to chimneys



Flashing to chimneys at ridge



Typical chimney details



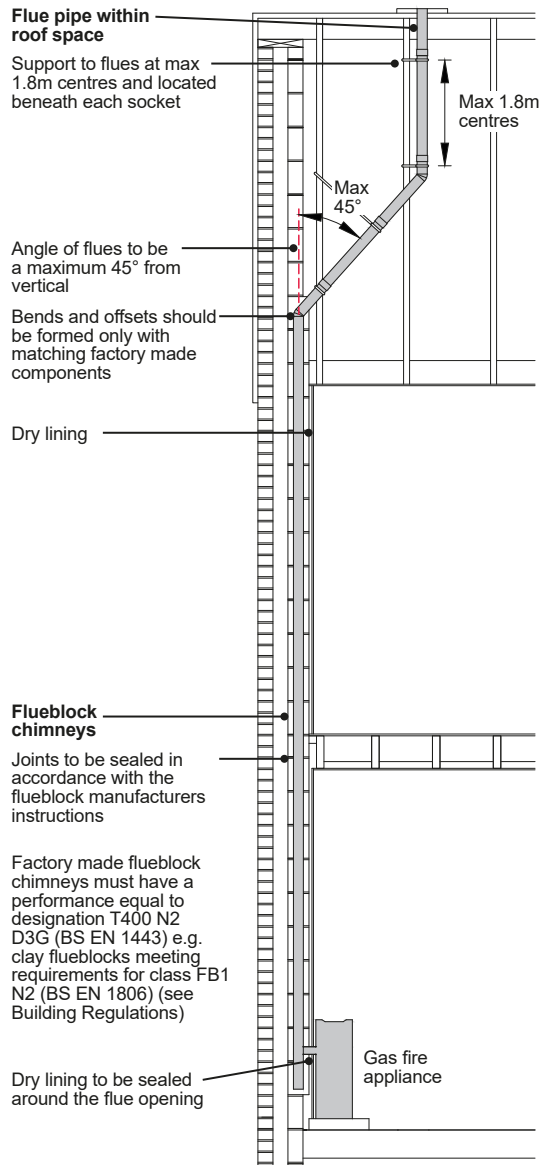
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Chimneys and Flues

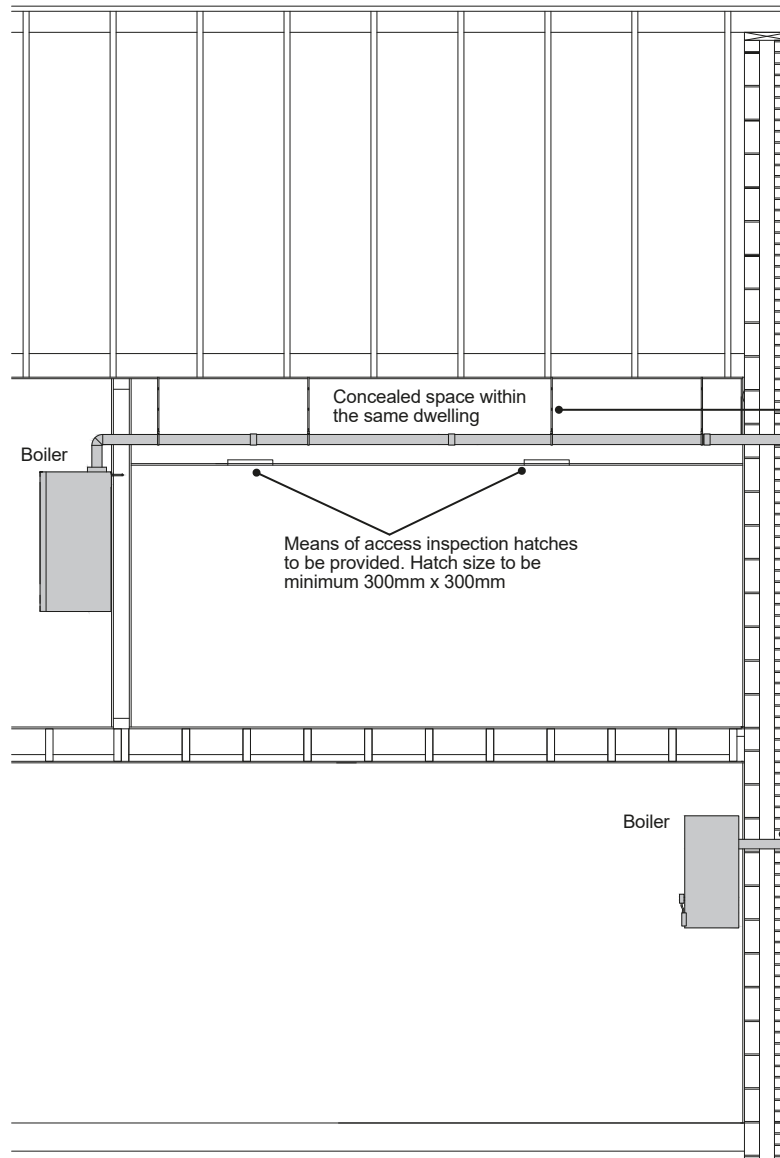
13.2

Gas Flue Outlets

Flue block chimneys in masonry cavity walls and flues for gas appliances



Flue block chimneys in masonry cavity walls



Flues for gas appliances

Flues

Ensure that all gas flues terminate to the open air, i.e. flueblocks must terminate at an appropriate ridge vent or similar even where no appliance is fitted prior to the sale/occupancy of the property.

To demonstrate that flues comply with Building Regulations, reports showing that flues have passed appropriate tests are to be made available to the Warranty Surveyor upon request.

A suggested checklist for these reports is provided in Approved Document J (England and Wales).

Special blocks are made to accommodate gas fire flues, which tend to be slightly thicker than normal units. When used in external cavity walls care should be taken not to reduce the clear cavity width below 50mm.

A notice plate containing safety information about any hearths and flues should be securely fixed in an unobtrusive but obvious position within the home.

Guidance in the relevant Building Regulations must be followed for the siting of flues in close proximity to combustible materials; including floors, roof and also external walls of timber frame construction.

Balance flue

Where the flue passes through the external envelope, the flue should be suitably sealed to prevent water ingress.

For flues through timber frame, please refer the 'Chimneys and Flues - Gas Flue Outlets - Weather Protection and Differential Movement' section for further information.

Provision of guarding

The minimum distance from the flue outlet to the boundary must meet the Building Regulations

Concealed flues

Where a flue is routed within a void, appropriate means of access should be provided to allow visual inspection of the flue.

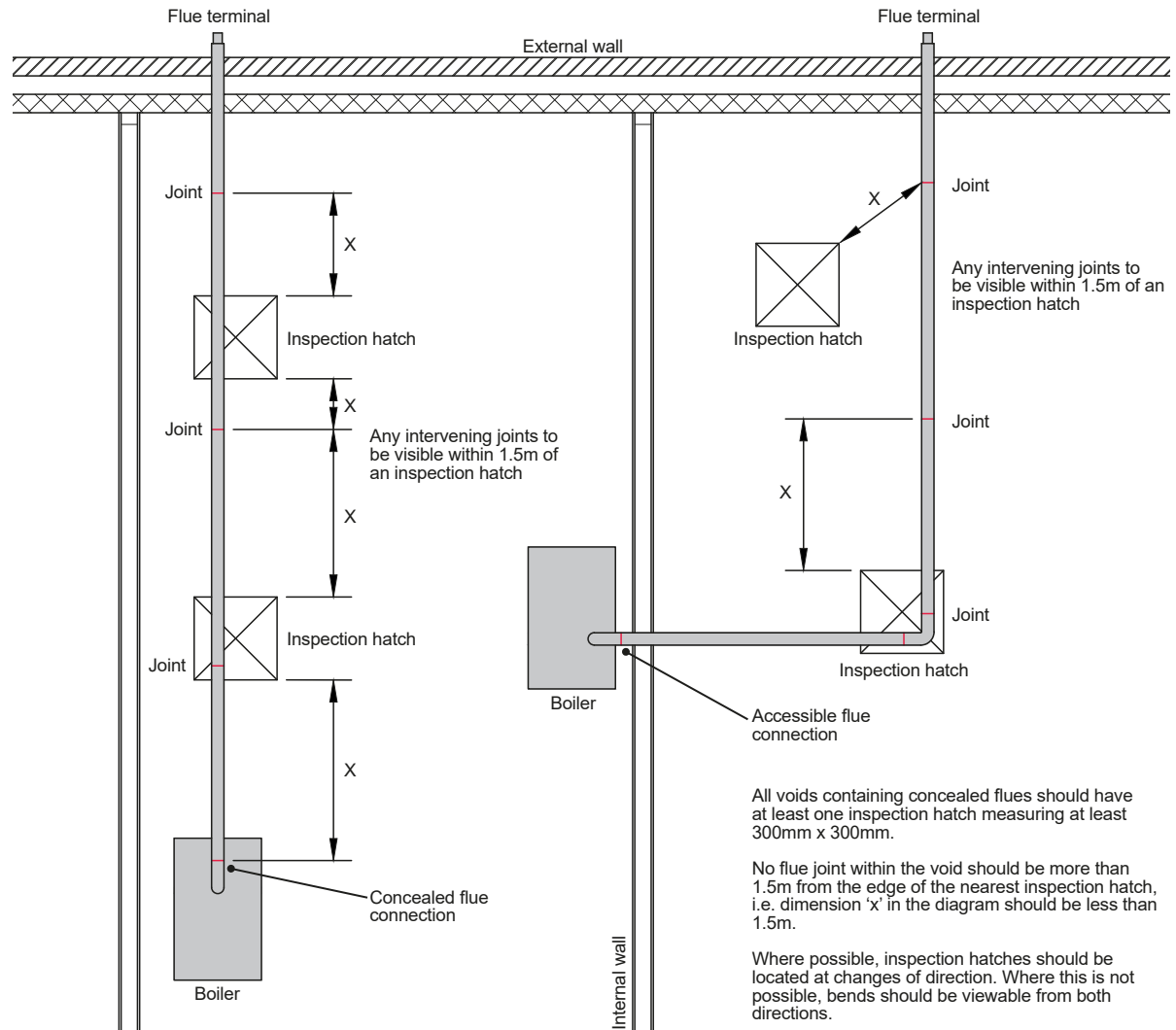
Means of access should be:

- Sufficiently sized and positioned to allow visual inspection to be undertaken of the flue.
- The access hatch should be at least 300mm x 300mm or larger where necessary, to allow sufficient access to the void to look along the length of flue.

Means of access should not:

- Pass through another dwelling since access for inspection may not always be available to that dwelling and flue system running through it (flues may pass through communal areas including purpose-designed ducts where inspection access is provided).
- Impair any fire, thermal or acoustic requirements of the relevant Building Regulations.

Example locations of access panels for concealed flues



Minimum separation distances for terminals in mm (England and Wales)

Location		Balance flue		Open Flue		
		Natural draught	Fanned draught	Natural draught	Fanned draught	
A	Below an opening (1)	Appliance rated head input (net)		300	(3)	300
		0-7kW	300			
		>7-14kW	600			
		>14-32kW	1500			
		>32kW	2000			
B	Above an opening (1)	0-32kW	300	300	(3)	300
		>32kW	600			
C	Horizontally to an opening (1)	0-7kW	300	300	(3)	300
		>7-14kW	400			
		>14kW	600			
D	Below gutters, soil pipes or drainpipes	300		75	(3)	75
E	Below eaves	300		200	(3)	200
F	Below balcony or car port roof	600		200	(3)	200
G	From a vertical drainpipe or soil pipe	300		150(4)	(3)	150
H	From an internal or external corner or to a boundary alongside the terminal (2)	600		300	(3)	200
I	Above ground, roof or balcony level	300		300	(3)	300
J	From a surface or a boundary facing the terminal (2)	600		600	(3)	600
K	From a terminal facing the terminal	600		1200	(3)	1200
L	From an opening in the car port into the building	1200		1200	(3)	1200
M	Vertically from a terminal on the same wall	1200		1500	(3)	1500
N	Horizontally from a terminal on the same wall	300		300	(3)	300
P	From a structure on the roof	N/A		N/A	1500mm if a ridge terminal. For any other terminal, as given in BS5440-1:2008	N/A
Q	Above the highest point of intersection with the roof	N/A		Site in accordance with manufacturers instructions	Site in accordance with BS 5440-1:2008	150

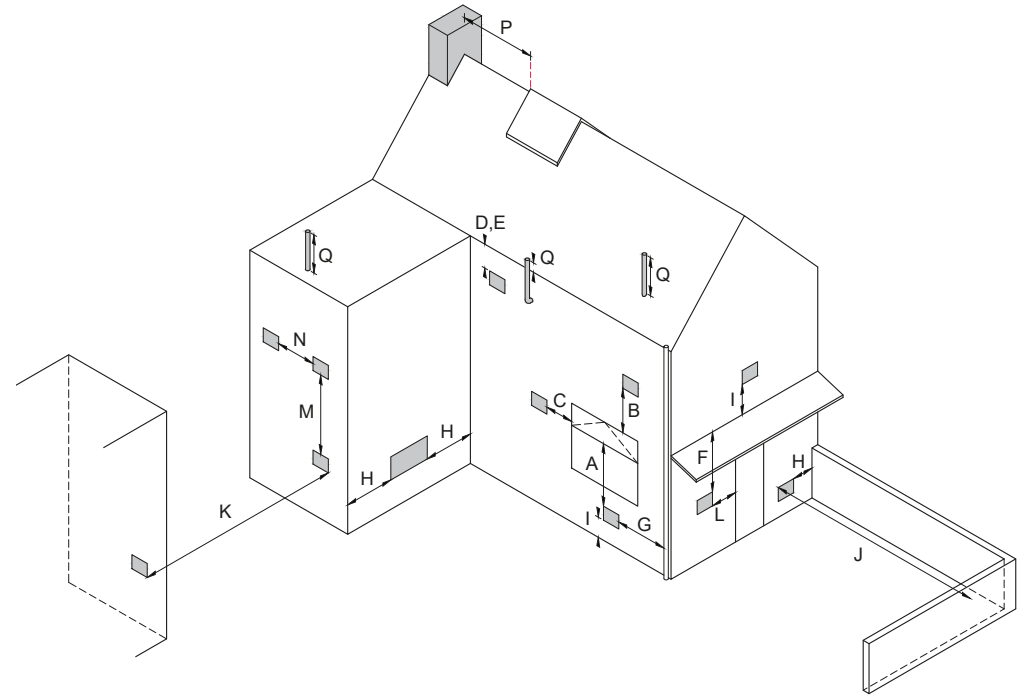
Notes:

1. An opening here means an openable element, such as an openable window, or a fixed opening such as an air vent. However, in addition, the outlet should not be nearer than 150mm (fanned draught) or 300mm (natural draught) to an opening into the building fabric formed for then purpose of accommodating a built-in element, such as a window frame.
2. Boundary as defined in paragraph 0.4 (4) of Approved document J. Smaller separations to the boundary may be acceptable for appliances that have been shown to operate safely with such separations from surfaces adjacent to or opposite the flue outlet.
3. Should not be used.
4. This dimension may be reduced to 75mm for appliances of up to 5kW input (net).
5. N/A means not applicable.

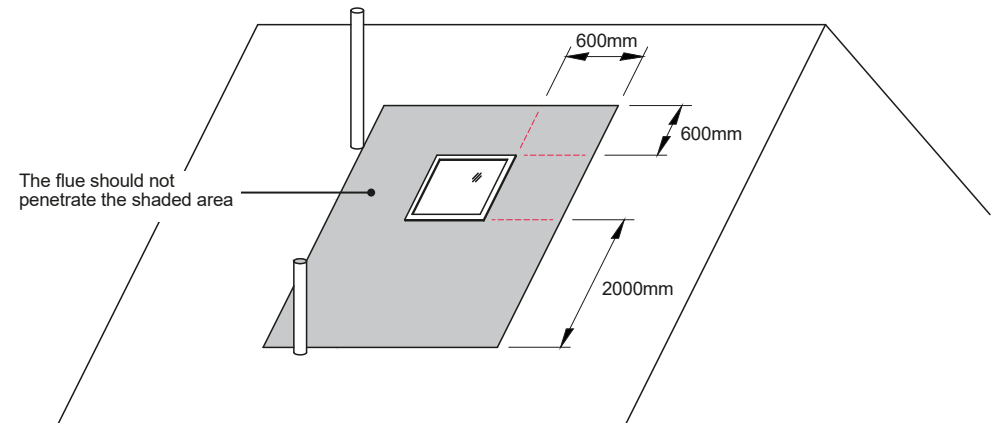
Location of outlets from flues serving gas appliances (reproduced from Approved Document J Building Regulations England and Wales). Requirements may differ in Scotland please refer to the Scottish Building Regulations for further information.

Location of flue outlets

Flues serving gas appliances should be located as shown in the images below, and the table to the left.



Location of outlets near roof windows or opening, on pitched or flat roofs, from flues serving gas appliances



Reproduced from Approved Document J Building Regulations England and Wales

Guarding to flues

A flue outlet should be protected if persons could come into contact with it or if it could be damaged. If a flue outlet is in a vulnerable position, such as where the flue discharges within reach from the ground or a balcony, veranda or window, it should be designed to prevent the entry of any matter that could obstruct the flow of flue gases.

External weather tightness

- Where flues pass through the external wall construction (external weather proof envelope), they must be suitably sealed to protect against water ingress.
- A proprietary cavity tray may be required to be inserted over the flue if the flue opening in the external wall is formed after the external wall is completed.

Lead work

Lead sheet used for roofs, flashings and weatherings should, in terms of suitability, be in accordance with this Technical Manual, or be in accordance with BS EN 12588 or a UKAS (or European equivalent) valid third-party accreditation which demonstrates adequacy and durability for use (see 'Appendix C - Materials, Products, and Building Systems').

External masonry

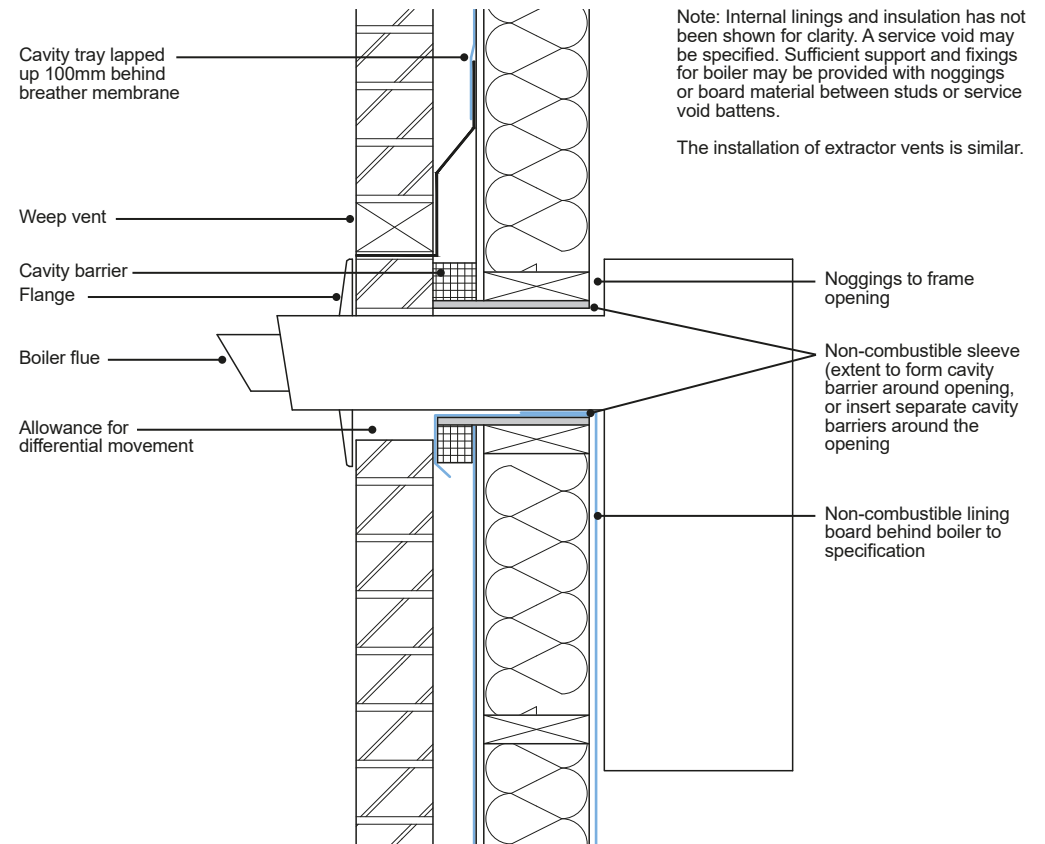
For further guidance on masonry construction refer to the 'External Walls' section.

Differential settlement

Allowance should be made within the structure for differential settlement around flues, as well as ensuring the water tightness of the external envelope is maintained.

- Where core drilling is used to create an opening in the external masonry cladding to timber frame or metal frame buildings; it should be ensured that suitable allowance is made for differential settlement within the external masonry.
- The core drill hole created in masonry cladding, will have to be elongated downwards to allow for the timber frame shrinking and the flue pipe moving with it.
- Care should be taken to ensure that the depth of the external flange is suitable to maintain weather tightness at the time of construction and once differential settlement has occurred.
- Cavity trays should be provided where appropriate.

Differential movement at flue outlets in timber framed walls



13.

Chimneys and Flues

13.3 False Chimney Stacks

Provision of information

A full set of design drawings and specifications shall be made available to the Warranty Provider and all other interested parties prior to the associated works starting on site. This may include:

1. Third party certification for the proposed GRP chimney system.
2. Full fixing specification for the proposed GRP chimney system.
3. Design details of supporting roof structure, including but not limited to:
 - a) Details of proposed truss layout and design.
 - b) Details of proposed bracing.
 - c) Details of any cut-roof sections, including specification of materials relating to the structure in accordance with Eurocode 5.
 - d) Details of any supporting structural beams or lintels within the roof.
4. Details of proposed roofing felt, including manufacturers third party certificate.
5. Details of proposed roof coverings including manufacturers specified fixing schedule for proposed external environment.
6. Details of proposed flashings, trays, soakers, etc.

The Warranty surveyor, at their discretion, may also request supporting information that demonstrates suitability for use of any materials or systems contained within the above.

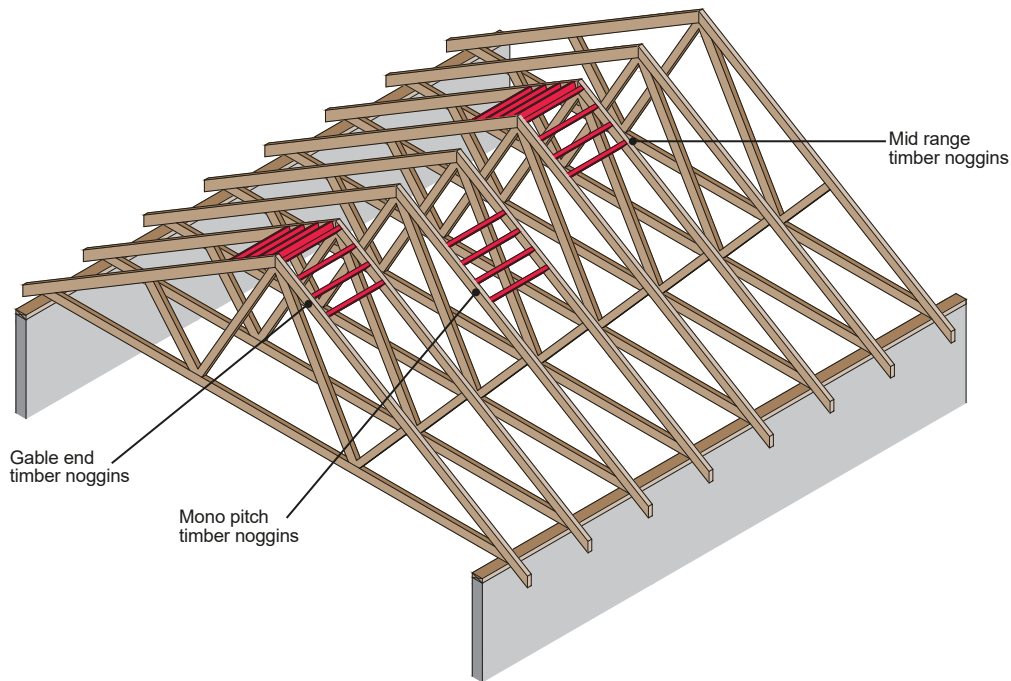
Construction

Glass fibre chimney products must have third party product conformity to be acceptable for use. 'Appendix C - Suitability of Products and Systems' provides guidance on what is required for assessment, and is subject to the following conditions:

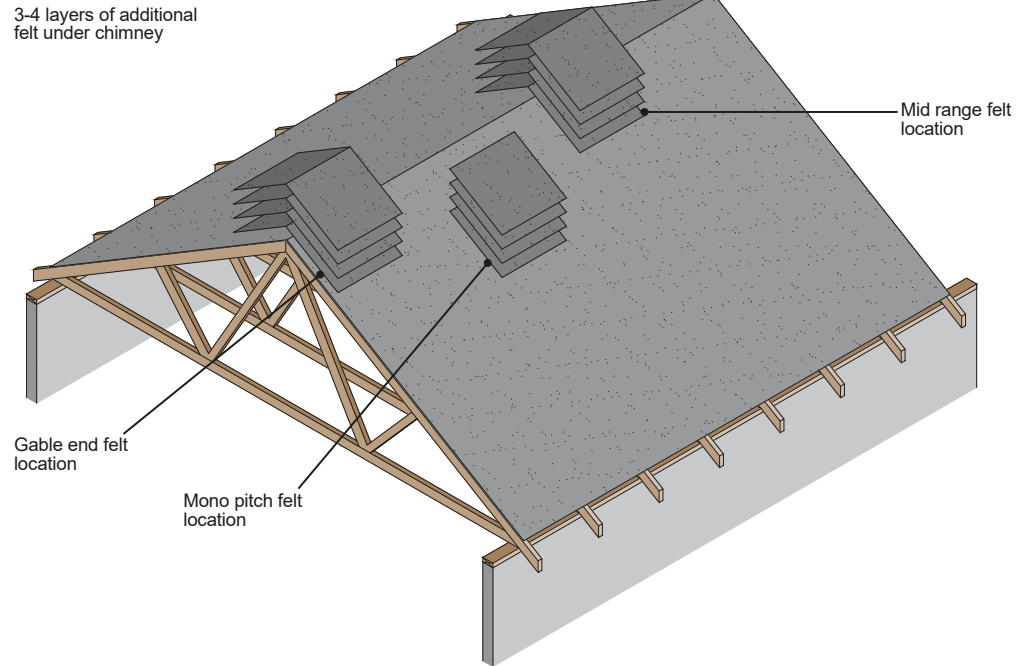
- Where a product is used within 5km of the coastal shoreline anywhere in the UK, any metal fixings used in the products.
- False chimney stacks must have a service life no less than 25 years as a non-structural component.
- A full fixing instruction document must be made available to contractors on site to follow and be available to the Warranty Surveyor on request at the initial site visit.

The developer/builder must demonstrate they will follow the fixing/installation procedure details as this forms the basis of the independent testing approval. Any deviation from the approved installation procedure may result in a potential defect.

Chimney noggin support location

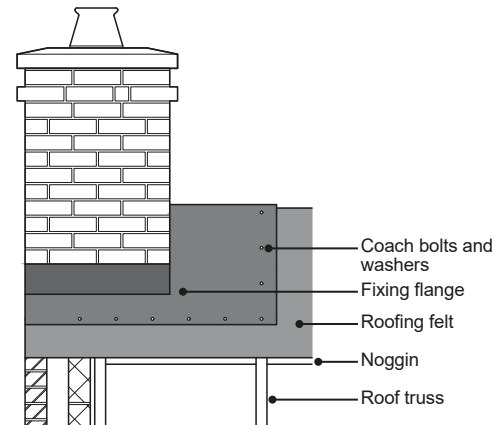


Additional roof felt location

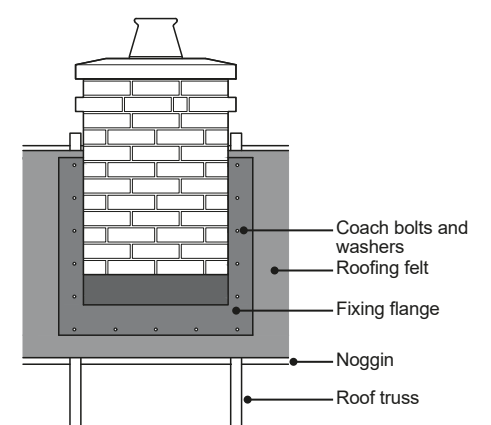


Installation location

Traditional masonry gable end installation



Mono pitch installation



For further guidance on roof structures and coverings, please refer to our section on 'Roofs'

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