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BSI Standards Publication

# Code of practice for the installation of solid fuel heating and cooking appliances in small craft

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# Foreword

## Publishing information

This British Standard was published by BSI on 28 February 2010 and comes into effect on 28 February 2011. It was prepared by panel RHE/28/-/1, *Solid fuel appliances for small craft* on behalf of Technical Committee RHE/28, *Domestic solid fuel appliances*. A list of organizations represented on this committee can be obtained on request to its secretary.

*NOTE Panel RHE/28/-/1 was constituted to include expertise from the boat industry and boat users, and representation from Technical Committee GME/33, Small craft.*

## Use of this document

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

The figures in this British Standard are only illustrative of different installation methods. These are not intended to be implemented without first checking all the parameters specific to a particular installation.

## Information about this document

In developing this British Standard, the responsible panel acknowledges that it is not always possible to install some appliances in a very limited space (e.g. in traditional narrowboat boatman's back cabins) strictly in accordance with this standard. However, in such instances, installers are encouraged to follow the recommendations of this standard to the most practicable degree.

In such installations, users have to be made aware that the level of safety, particularly the safety margin against damage of the surrounding structure due to over-firing, might be lower than for those which comply fully with this code of practice. End users have to be made aware that extra vigilance has to be exercised during the operation of the appliance.

## Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

*Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.*

## Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard cannot confer immunity from legal obligations.**

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# 1 Scope

This code of practice covers the design, installation and operation of solid fuel heating and cooking appliances (hereafter referred to as appliances) which are suitable for fitting into small craft from 2.5 m to 24 m in length. These appliances can burn either natural or manufactured solid mineral fuels, or natural or manufactured wood logs.

This code of practice gives guidance on appliance selection, design considerations, installation requirements, inspection and testing, and preparing instructions for the end user of the appliance. Guidance is also provided on the necessary safety information to be provided to the end user concerning the maintenance and safe use of these appliances.

This code of practice only applies to freestanding appliances with closable doors, with and without legs.

This code of practice does not apply to the installation of appliances with a firebox volume of less than 0.01 $m^3$ and a grate size smaller than 0.05 $m^2$, and where the dimensional recommendations of the installation cannot be met (e.g. in traditional narrowboat boatman's back cabins).

*NOTE The basic principles in this code of practice can be used in installation of appliances outwith its scope.*

Warnings on the provisions necessary for appliances with boilers are given in Annex D, but this code of practice does not cover the installation details of hot water systems.

This code of practice does not cover open fires, inset appliances, or portable or other open appliances such as barbecues.

# 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 41, *Specification for cast iron spigot and socket flue or smoke pipes and fittings*

BS 6999, *Specification for vitreous-enamelled low-carbon-steel flue pipes, other components and accessories for solid-fuel-burning appliances with a rated output of 45 kW*

BS EN 1443:2003, *Chimneys – General requirements*

BS EN 1856-1, *Chimneys – Requirements for metal chimneys – Part 1: System chimney products*

BS EN 1856-2, *Chimneys – Requirements for metal chimneys – Part 2: Metal liners and connecting flue pipes*

BS EN 10296-1, *Welded circular steel tubes for mechanical and general engineering purposes – Technical delivery conditions – Part 1: Non-alloy and alloy steel tubes*

BS EN 10297-1, *Seamless circular steel tubes for mechanical and general engineering purposes – Technical delivery conditions – Part 1: Non-alloy and alloy steel tubes*

BS EN 12815, *Residential cookers fired by solid fuel – Requirements and test methods*




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BS EN 13240, *Roomheaters fired by solid fuel – Requirements and test methods*

BS EN 13384-1, *Chimneys – Thermal and fluid dynamic calculation methods – Part 1: Chimneys serving one appliance*

BS EN 10088-1:2005, *Stainless steels – Part 1: List of stainless steels*

# 3 Terms and definitions

**3.1 smokeless fuel**
solid mineral fuel of low smoke emission

*NOTE Smokeless fuel can occur in the natural state or be manufactured.*

**3.2 bituminous coal**
general term descriptive of coal, corresponding to black coals with a high percentage of volatile matter and carbon content of 80% to 93% (dry basis) that burn with a smoky yellow flame

**3.3 boiler**
vessel forming part of an appliance in which water is heated

**3.4 chimney cap**
cover placed over the chimney when appliance is not being used

**3.5 chimney**
tubular assembly that conveys the flue gasses into the atmosphere above the connecting flue pipe

*NOTE An example of a chimney is shown in Figure 1.*

**3.6 chimney terminal**
prefabricated chimney fitting which connects to the outlet end of the chimney and is designed to prevent ingress of moisture into the insulating annulus of the chimney section

*NOTE An example of a chimney terminal is shown in Figure 1.*

**3.7 competent person**
person with a combination of sufficient: skill, knowledge, practical experience and training commensurate with performing the activity concerned

**3.8 connecting flue pipe**
component or components that convey the flue gasses from the flue outlet to the chimney

*NOTE An example of a connecting flue pipe is shown in Figure 1.*

**3.9 cooker**
appliance primarily designed for cooking, incorporating one or more externally heated ovens and hotplates, heated from a fire by conduction or by circulating flue gases or both, which can also be fitted with a boiler

## 3.10 Design categories

*NOTE The design categories applicable to new recreational craft up to 24 m long are set out in the Recreational Craft Directive [1].*




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**3.10.1 category A (ocean)**
craft designed for extended voyages where conditions may exceed wind force 8 and significant wave heights of 4 m and above might be experienced, but excluding abnormal conditions

**3.10.2 category B (offshore waters)**
craft designed for offshore voyages when conditions up to and including wind force 8 and significant wave heights up to and including 4 m might be experienced

**3.10.3 category C (inshore water)**
craft designed for voyages on coastal waters, large bays, estuaries, lakes and rivers when conditions up to and including wind force 6 and significant wave heights up to and including 2 m might be experienced

**3.10.4 category D (sheltered waters)**
craft designed for voyages on sheltered coastal waters, small bays, small lakes, rivers and canals when conditions up to and including wind force 4 and significant wave heights up to and including 0.3 m might be experienced, with occasional waves of 0.5 m maximum height

**3.11 dry appliance**
appliance that contains no boiler for the heating of water

**3.12 efficiency**
total heat output from an appliance expressed as a percentage of the total heat content of the fuel consumed during the test period

*NOTE Efficiencies can be defined as "net" or "gross" depending on the lower or higher heating value respectively of the fuel.*

**3.13 fiddle rail**
rail or batten around the edge of an appliance to prevent objects falling off during motion of the craft

**3.14 fireguard**
protective screen or grid placed around an appliance to prevent persons from accidentally touching the appliance or objects falling onto the appliance

**3.15 flue**
passage contained within connecting flue pipe and chimney to convey gases from the appliance to the atmosphere

**3.16 flue outlet**
position where the products of combustion exit the appliance

*NOTE An example of a flue outlet is shown in Figure 1.*

**3.17 freestanding appliance**
appliance designed to operate without being built into a fireplace recess, but which does require fixing to prevent movement

**3.18 gross efficiency**
total heat output from an appliance expressed as a percentage of the total heat content of the fuel consumed during the test period, where the heat content of the fuel is given by the gross calorific value

**3.19 hotplate**
plate(s) provided on a cooker mainly for boiling, simmering or frying




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**3.20 hearth**
base of non-combustible material upon which an appliance stands

**3.21 inset appliance**
appliance that is designed to be built into a fireplace recess

**3.22 nominal output**
total heat output of the appliance quoted by the manufacturer and achieved under defined test conditions when burning the specified test fuel

**3.23 over-fire**
firing the appliance beyond its design capacity, caused by opening the air controls wider than stipulated in the manufacturer's operating instructions or by leaving the appliance door or ash pit cover open

**3.24 petroleum coke**
black solid residue, obtained mainly by cracking and carbonizing of petroleum derived feedstocks; consists mainly of carbon (90% to 95%) and has a low ash content

**3.25 rain cap**
assembly to minimize water entering the flue and to minimize the effect of contrary winds or downdrafts, but not obstruct the emission of flue gases

**3.26 rear flue outlet**
outlet positioned at the back (rear) of an appliance, through which exhaust gases (products of combustion) exit the appliance

**3.27 roomheater**
**stove**
appliance with a fully enclosed fire with firedoors that are usually glazed, that distributes heat by radiation and convection, and may sometimes be fitted with a boiler for heating water

**3.28 seasoned wood**
wood with a maximum moisture content of 20% by mass

**3.29 solid fuel**
fuel in solid form that includes coal, manufactured fuel, wood and peat

**3.30 solid fuel heating and cooking appliance**
**appliance**
appliance that provides heat by burning solid fuel, with means of removing products of combustion

**3.31 surrounding structure**
bulkhead, partition or sides of hull or cabin , and other fixtures in the vicinity of the appliance

**3.32 top flue outlet**
outlet positioned on the top surface of an appliance, through which exhaust gases (products of combustion) exit the appliance

**3.33 upstand**
small lip or raised projection normally fitted at the front, but may additionally be fitted around the sides, of the horizontal surface of a hearth and is designed to prevent either hot ash or fuel falling off the hearth; it may be tiled or be decorative, and may serve as a marking to indicate the approach to a hot appliance




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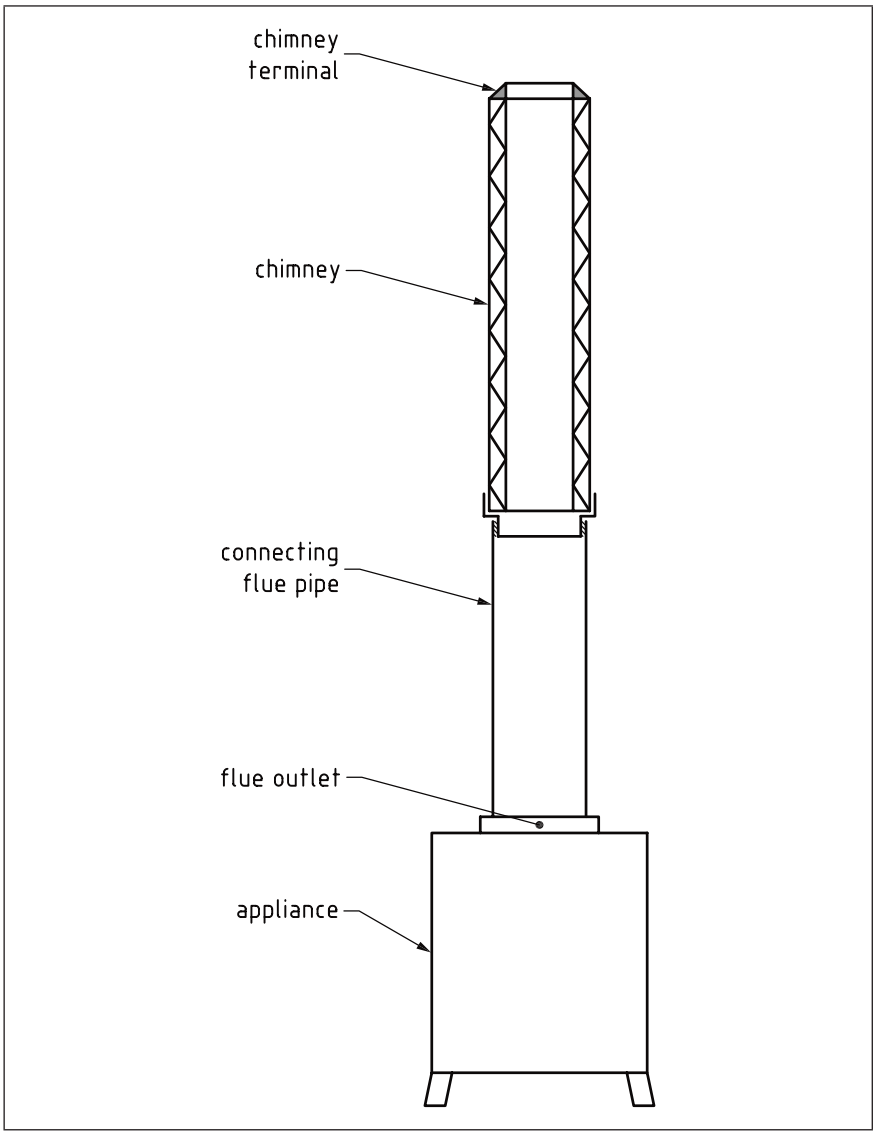
Figure 1 **Schematic diagram of a typical appliance installation**




# 4 Appliance selection

## 4.1 Design and suitability

Consideration should be given to the size and construction of the space into which the appliance is to be installed, the appliance's claimed heat output, and the appliance's required frequency of attention. Manufacturer's leaflets and technical specifications should be consulted to verify the necessary information.

The selected appliance should be of a freestanding type only and be suitable in respect of design, construction, installation and safety for use on boats in accordance with manufacturer's instructions for installation on boats or with this code of practice.

*NOTE 1 Appliances that conform to the construction and performance requirements of BS EN 13240 or BS EN 12815 would be suitable in respect of design, construction, installation and safety for use on boats.*

The appliance should be fitted or provided with means by which it can be securely fixed to the hearth or the structure of the craft when in its final position (see also Clause **6** for further detail on hearths).

The appliance should be fitted with doors that can be securely fastened in their closed position but are capable of being opened to at least 90° for tending the fire.

The selected appliance should be fitted with a socket capable of allowing a suitably gas tight connection to be made between the appliance and the connecting flue pipe or suitable adaptor.

*NOTE 2 A top flue outlet connection is preferable, for optimal flow of flue gases and ease of installation, and to make cleaning of the flue easier.*

Suitable operating tools should be provided with the appliance, especially for operation and manipulation of hot components, e.g. de-ashing, refuelling. A suitable heat protective glove is considered a tool.

Consideration should be given to the internal flue diameter when selecting the appliance relevant to the intended fuel type use, as recommended in **8.2**.

## 4.2 Heat output and efficiency

It is not easy to ensure the distribution of heat in narrow or long spaces, and the shape of the space to be heated and the positioning of the heating appliance should be carefully considered before deciding to use a single appliance, even if apparently of large enough heat output. In initial selection of an appliance an allowance of not less than the following should be taken:

a) for spaces up to about 28 $m^3$ capacity, use 0.10 kW/$m^3$;

b) for spaces from 28 $m^3$ up to about 57 $m^3$ capacity, use 0.09 kW/$m^3$;

c) for spaces from 57 $m^3$ up to about 85 $m^3$ capacity, use 0.08 kW/$m^3$.

*NOTE 1 For a 14 m (45 ft) narrowboat cabin the calculation would be as follows:*

*Occupied volume = 2 × 2 × 13 metres = 52 $m^3$. Therefore, based on a factor of 0.09 kW/$m^3$, the required heat output would be 4.7 kW.*

*NOTE 2 The precise value varies not only with capacity, but also according to the insulation and exposure of the craft and the temperature requirements. If the appliance is installed into a smaller space than the largest it can serve, it will, of course, burn less fuel and require less frequent refuelling. However it is important not to select an appliance with an output which is grossly too large or grossly too small for the space which it has to heat.*

The heat output and efficiency of an appliance will depend upon the conditions under which it is used, and it should be noted that steady burning and avoidance of over-firing will provide the best service and reliability. For appliances with a firebox volume greater than 0.01 $m^3$ and grate area greater than 0.05 $m^2$, in order to be energy efficient and reduce $CO_2$ emissions, the selected appliance should meet the minimum gross efficiency of 65% for stoves and 60% for cookers when tested to BS EN 13240 or BS EN 12815 respectively.

*NOTE 3 A list of appliances meeting these minimum recommended efficiencies is published by HETAS Ltd and is available for viewing on their web site at www.hetas.co.uk.*

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### 4.3 Cookers

For craft intended for use on rough waters, an appliance with griddle plates, hot plates or boiling rings should be fitted with a fiddle rail constructed of metal. It should be of sufficient robustness and height to retain the cooking utensils in the event of the craft experiencing significant waves or wash.

## 5 Installation – General requirements

### 5.1 Siting appliance

Appliances should not be sited where they may cause obstruction, particularly to passages and escape routes. They should not be positioned where they could create a fire hazard or damage surrounding materials or fold-away furnishings such as beds and tables, whether these are folded away or in position for use.

*NOTE 1 It is advisable to avoid a location near to a stepped entrance.*

There should be no free-hanging combustible material, such as curtains or blinds (whether in their extended or folded-back positions), capable of coming within the safe distance specified by the manufacturer or, if no distance is specified, within 600 mm of the appliance and any uninsulated connecting flue pipe.

The appliance should be located so as to provide the best possible heat distribution throughout the space it is intended to heat.

*NOTE 2 The layout of the space to be heated will affect the location of the appliance, but a central location within the space may give a more even heat distribution and thus be preferable.*

### 5.2 Competent person

The appliance, connecting flue pipe and chimney should be installed by, or under the responsibility of, a competent person.

### 5.3 Securing appliance

To prevent its movement the appliance should be securely fastened either to the hearth or to the structure of the craft. Fixings should be of adequate strength to prevent appliance movement. The manufacturer's appropriate recommendations for fixing should be followed.

*NOTE 1 Movement of the appliance can occur for a variety of reasons such as vigorous operation of the de-ashing mechanism, thermal expansion and contraction, and movement of the craft, particularly caused by waves, wash and collisions.*

*NOTE 2 Suitable methods to secure the base of the appliance to the hearth include using adequately sized non-combustible fixings.*

## 6 Hearth

Hearths should be designed and constructed of suitable robust and non-combustible materials, which can support the weight of the appliance. They should be of appropriate dimensions such that, in normal use, they prevent appliances setting fire to the craft's fabric




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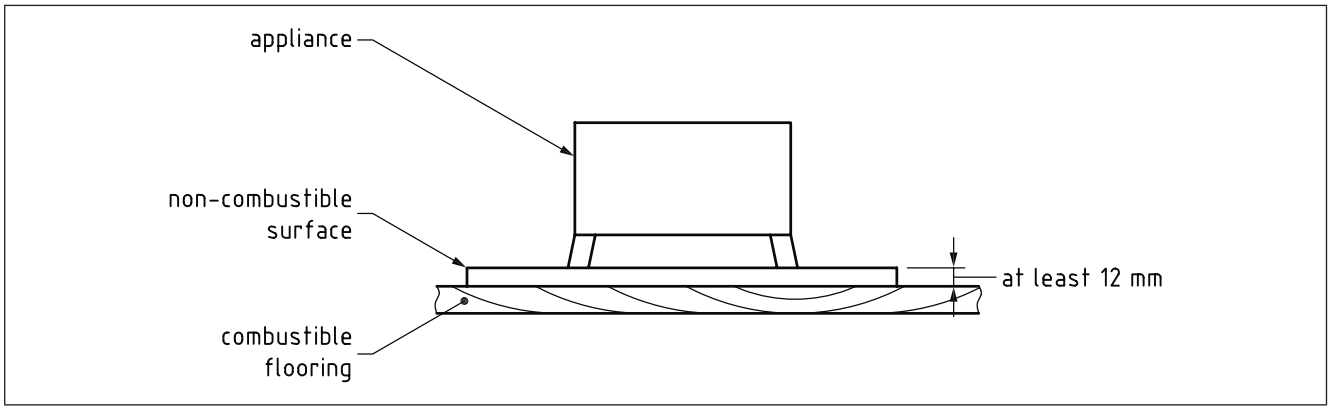
and furnishings, and limit the risk of people coming into contact with the appliance. The size of the hearth should be such that the proximity of the appliance to its edges will prevent damage to, or ignition of, other parts of the craft, e.g. floor coverings such as carpets, rugs and wood laminates.

The non-combustible hearth should be permanently fixed to prevent movement. The hearth should be designed to accept and transfer into the structure, without deflection or cracking, the thermal stresses and static loads imposed during use and the dynamic loads encountered during transport and use.

The required hearth design and/or construction is dependent on the performance of the appliance and should be installed as follows.

a) For appliances tested according to BS EN 13240 for roomheaters/stoves and BS EN 12815 for cookers, which have been shown to give maximum hearth temperatures on the exposed surface not exceeding 100 °C (and documented as such in the manufacturer's instructions), the hearth should be of non-combustible board/sheet material and/or tiles with a combined thickness of at least 12 mm (see Figure 2) when placed on combustible material. Alternatively, the hearth should comprise the non-combustible hull structure (such as metal or concrete: see Figure 4b).

Figure 2 **Example of a hearth for an appliance where the exposed surface of the hearth does not exceed 100 °C**




b) For other appliances, a non-combustible hearth should be provided, made of: solid material, e.g. concrete or masonry; or material of lightweight construction, but suitable for the weight of the appliance, e.g. vermiculite or calcium silicate boards suitably protected on their surface, if necessary, to maintain their integrity. The hearth should be at least 125 mm thick, including the thickness of any non-combustible floor and/or decorative surface. Combustible material should not be located beneath such hearths unless there is an air space of at least 50 mm between the underside of the hearth and the combustible material (see Figure 3). The hearth may be less than 125 mm if placed upon or comprising the non-combustible hull structure (such as metal or concrete; see Figure 4).

Figure 3 **Example of hearth construction suitable for an appliance where combustible material is underneath the hearth and the exposed surface of the hearth might exceed 100 °C**

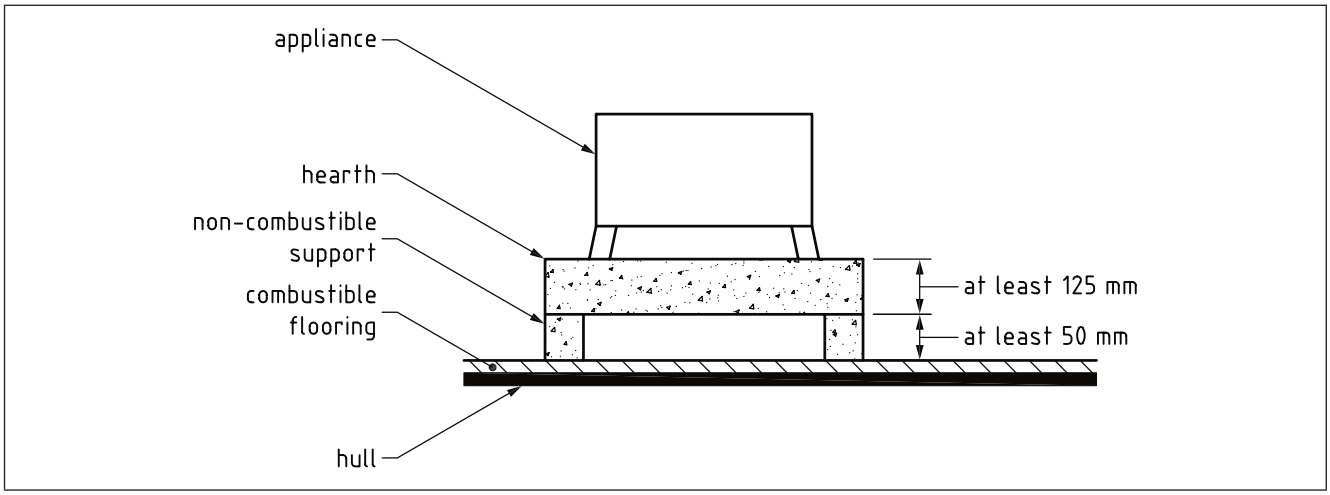
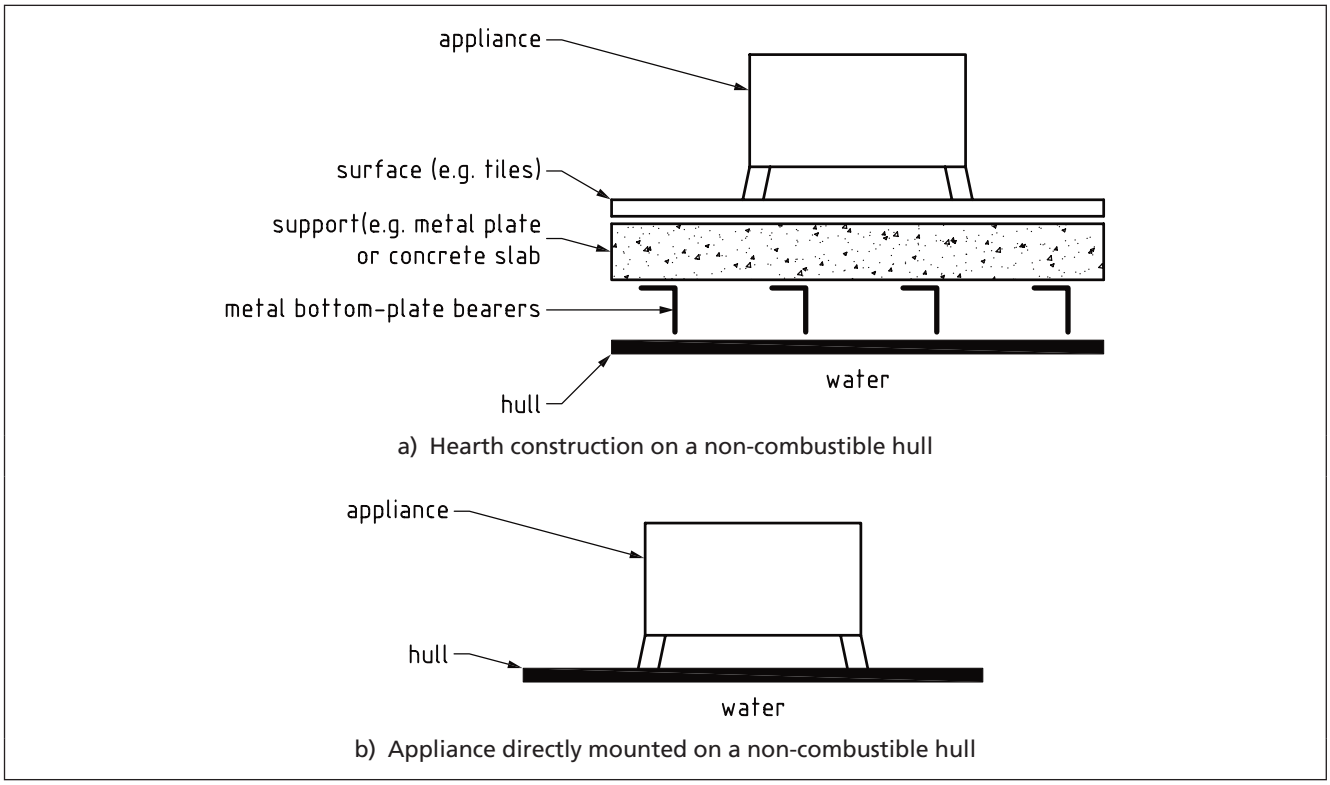



Figure 4 **Further example of hearth construction suitable for an appliance**




a) Hearth construction on a non-combustible hull

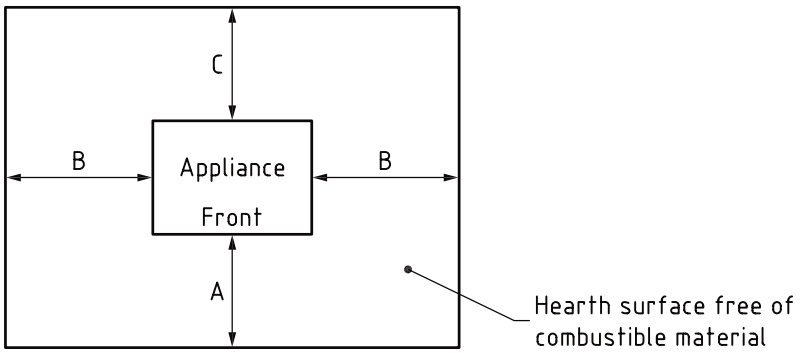
b) Appliance directly mounted on a non-combustible hull

The hearth should be so designed and located as to ensure that it stays dry; otherwise the non-combustible material used may lose its insulating properties.

An appliance should be located on the hearth so that it is surrounded by a surface free of combustible material, i.e. the hearth should extend beyond the extremities of the appliance body.

For appliances installed with their backs and sides substantially parallel to the surrounding structure, or up to a maximum of 30° from parallel, then the dimensions shown in Figure 5 should be followed.

Figure 5 **Non-combustible hearth surface surrounding an appliance installed substantially parallel to the surrounding structure**



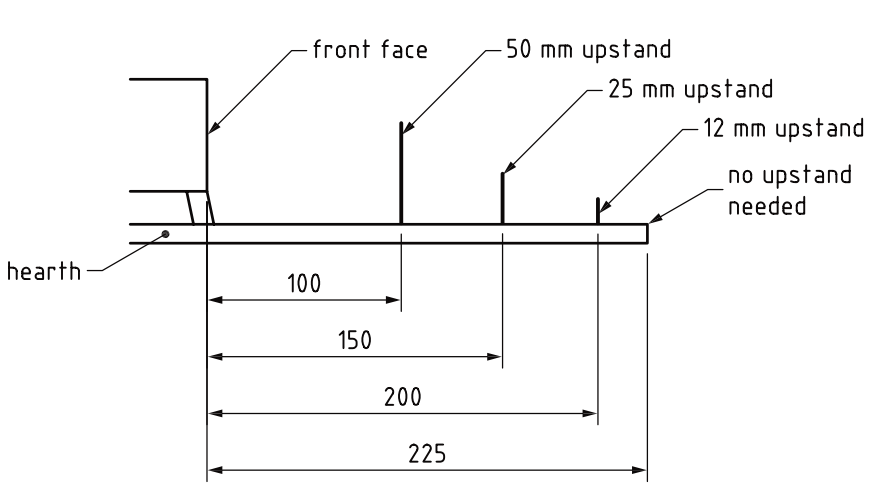

See Table 1 for dimensions A, B and C.

Four alternative sets of values for dimensions A, B and C should be followed, depending on the height of any non-combustible upstand surrounding the hearth, as given in Table 1 and illustrated in Figure 6. Dimensions B and C may be less than given in Table 1, provided that protection to prevent combustion of adjacent combustible material is provided according to Clause **7**, at the sides and rear of the appliance, in which case the hearth should extend to, and be contiguous with, the form of protection provided.

Table 1 **Dimensions for non-combustible hearth surface where appliance sides and rear are substantially parallel to the surrounding structure (and applicable up to 30°)**

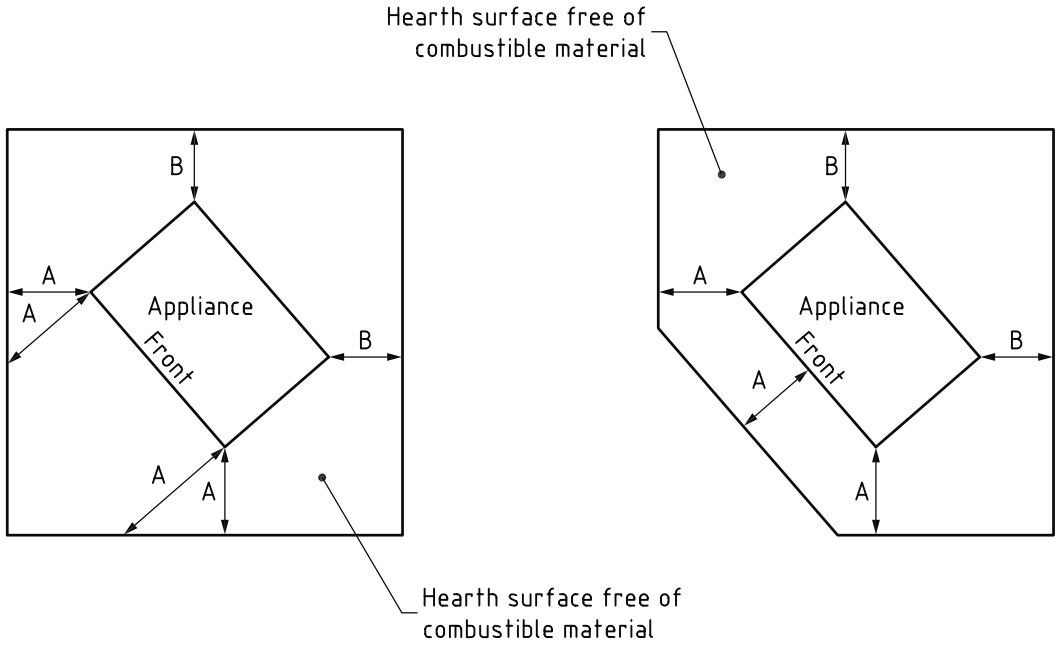
| **Upstand height** | **Minimum dimension A** | **Dimension B, sides** | **Dimension C, rear** |
|---|---|---|---|
| mm | mm | mm | mm |
| 0 | 225 | 150 | 150 |
| 12 | 200 | 150 | 150 |
| 25 | 150 | 150 | 150 |
| 50 | 100 | 150 | 150 |

Figure 6 **Comparison of minimum upstand height and minimum distance from appliance**



For appliances installed at an angle to the surrounding structure, and applicable where the smaller angle is greater than 30°, then the dimensions shown in Figure 7 should be followed.

Figure 7 **Non-combustible hearth surface surrounding an appliance installed at an angle to surrounding structure**




See Table 2 for dimensions A, B and C

Alternative values for dimensions A and B should be followed, depending on the height of the non-combustible upstand as given in Table 2 and illustrated in Figure 6. Dimension B may be reduced provided protection to prevent combustion of adjacent combustible material is provided according to Clause **7**, at the sides and rear of the appliance, in which case the hearth should extend to, and be contiguous with, the form of protection provided.

Table 2 **Dimensions for non-combustible hearth surface where appliance is installed at an angle to the surrounding structure (and applicable where the smaller angle is greater than 30°)**

| Upstand height | Minimum dimension A, front and/or front corners | Dimension B, rear corners |
|---|---|---|
| mm | mm | mm |
| 0 | 225 | 150 |
| 12 | 200 | 150 |
| 25 | 150 | 150 |
| 50 | 100 | 150 |

The edges of the hearth should be delineated to provide a warning to the craft user and to discourage combustible floor finishes such as carpet or laminate wood from being laid too close to the appliance. A change of level may be used to provide delineation.

*NOTE 1 Some appliances may have a tray attached, either fixed or fold-down, that can act as the hearth in front (in part or in total) when de-ashing or refuelling. In these circumstances, the manufacturer's recommendations may be followed regarding clearance in front of the appliance.*

*NOTE 2 All figures in this clause are for illustrative purposes only and are not drawn to scale.*

# 7 Separation of the appliance from combustible material in surrounding structure

## 7.1 General precautions

Care should be taken to prevent combustible materials in the surrounding structure of the craft being damaged or ignited when they are subjected to radiated, convected and conducted heat from the appliance. Any combustible material in the vicinity of an appliance, whether exposed or covered, e.g. by tiles, should be protected to ensure that its surface temperature does not exceed 65 °C above ambient temperature.

For appliances tested according to BS EN 13240 or BS EN 12815 (with or without the manufacturer's heat shields) the installation arrangements and clearances of combustible materials from the sides and rear should either:

a) follow the manufacturer's installation instructions; or

b) for appliances with a declared distance from combustibles of 700 mm or less to the rear and sides, as determined by the temperature safety tests described in BS EN 13240 or BS EN 12815, follow either of the installation examples A or B described in **7.2** and **7.3** respectively, and shown in Figures 8 to 11 inclusive.

For all other appliances, verification of the safe distances from combustible surfaces, using the proposed installation arrangement, should be made by following the temperature safety test procedures described in BS EN 13240 or BS EN 12815, as appropriate.

## 7.2 Installation example A

Non-combustible insulation board should be affixed to the structure to the sides and rear of the appliance, with an air gap maintained to separate the board from the structure. The air gap may be left open or be closed by non-combustible material at top and sides. The board should extend to at least the extremities of the hearth horizontally and to at least 200 mm above the top surface of the appliance.

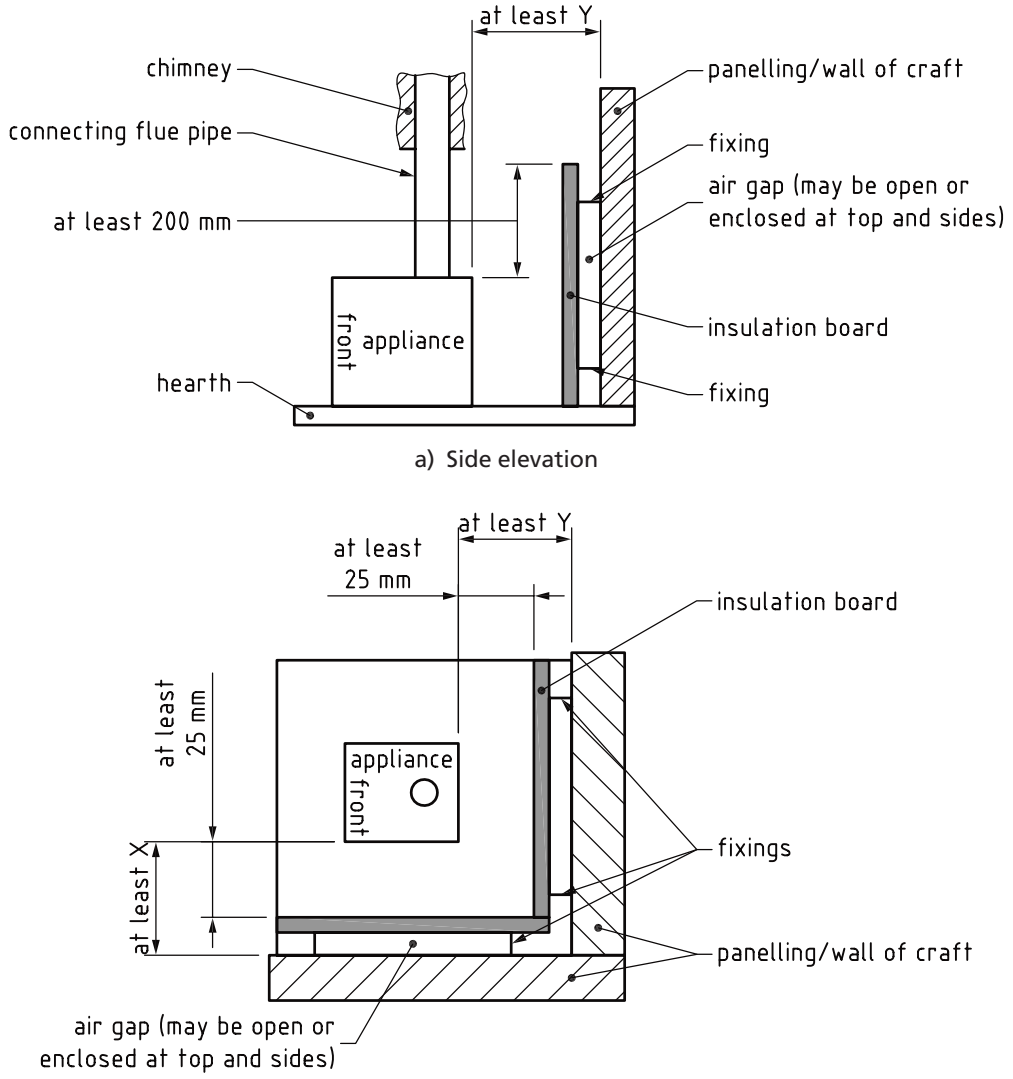
*NOTE 1 Examples of suitable non-combustible insulation board include those made from calcium silicate, gypsum and vermiculite, but care ought to be taken to ensure that the board does not contain reinforcements made of combustible material.*

Attachment of the insulation board to the structure should be at the corners of the board, using non-combustible fixings and with non-combustible spacers to maintain the gap between the board and the structure.

*NOTE 2 Examples of suitable non-combustible spacers include off-cuts of insulation board or ceramic tiles.*

Figure 8 shows the appliance installed with its sides and rear substantially parallel to the surrounding structure (and applicable up to 30°). The minimum distances from the outer surfaces of the combustible material to the rear and side of the appliance, the minimum thickness of the insulation board and the minimum dimension of the air gap depend on the thermal conductivity of the insulation board, and are given in Table 3.

Figure 8 **Example of suitable installation of surrounds to protect combustible material – Appliance installed substantially parallel to surrounding structure**



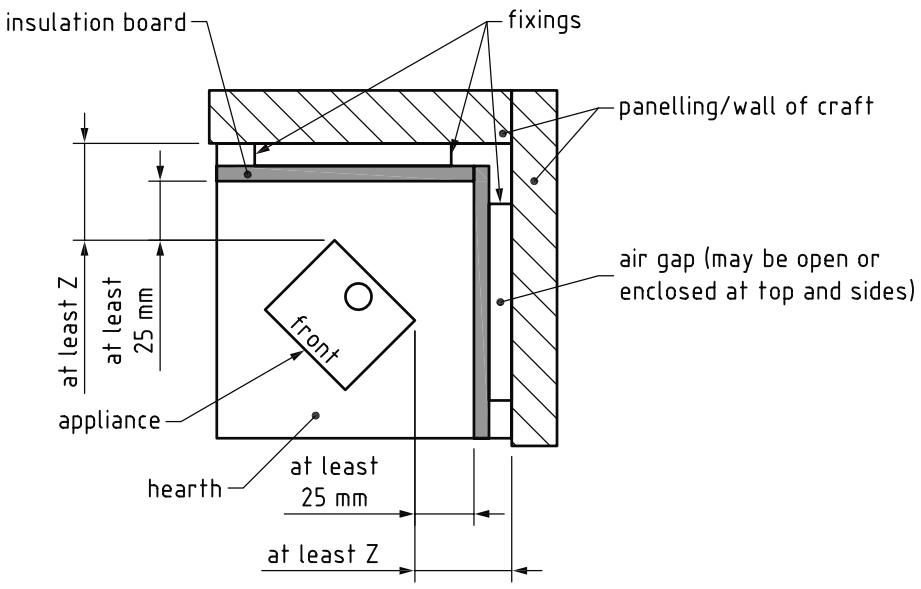

See Table 3 for distances X and Y.

Table 3 **Alternative dimensions and conductivity of insulation board for the installation arrangement of Figure 8**

| Insulation board | | Minimum air gap | Minimum distances between appliance body and combustible surrounding structure | |
|---|---|---|---|---|
| | | | mm | |
| **Thermal conductivity** | **Minimum thickness** | | | |
| W/m·K | mm | mm | **Sides (denoted X in Figure 8)** | **Rear (denoted Y in Figure 8)** |
| No more than 0.286 | 6 | 34 | 110 | 120 |
| No more than 0.18 | 25 | 20 | 110 | 120 |
| No more than 0.06 | 25 | 10 | 70 | 80 |

Figure 9 shows an installation where the appliance is at angle to the surrounding structure and applicable where the smaller angle is greater than 30°. The minimum distances from the outer surface of the combustible material to the corners of the main body of the appliance, the minimum thickness of the insulation board and the minimum dimension of the air gap depend on the thermal conductivity of the insulation board and are given in Table 4.

Figure 9 **Example of suitable installation of surrounds to protect combustible material – Appliance installed at an angle to surrounding structure**




See Table 4 for distance Z and width of air gap.

Table 4 **Alternative dimensions and conductivity of insulation board for the installation arrangement of Figure 9**

| Insulation board | | Minimum air gap | Minimum distances between appliance body and combustible surrounding structure |
|---|---|---|---|
| Thermal conductivity | Minimum thickness | | mm |
| W/m·K | mm | mm | Sides and rear (denoted Z in Figure 9) |
| No more than 0.286 | 6 | 34 | 70 |
| No more than 0.18 | 25 | 20 | 70 |
| No more than 0.06 | 25 | 10 | 65 |

For either of the installation examples shown in Figure 8 and Figure 9, there should be a minimum clearance of 25 mm between the outer surface of the insulation board and any part of the appliance body.

*NOTE 1 It is permissible to affix ceramic tiles, heat resistant paint or other non-combustible decoration to the outer surface of the insulation board, provided that the minimum distance between the body of the appliance and the insulation board is maintained, and the performance of the insulation board is not compromised.*

*NOTE 2 All figures in this clause are for illustrative purposes only and are not drawn to scale.*

## 7.3 Installation example B

Shields of sheet metal, preferably at least 1.5 mm (16 gauge) thick, should be affixed to the structure to the sides and rear of the appliance using non-combustible fixings and with non-combustible spacers to maintain a minimum horizontal gap of 25 mm between the shield and wall. It is permissible to use thinner shields, provided it is adequately supported so that the installed structure retains its original shape and spacing, does not warp, bend or otherwise lose rigidity when knocked or exposed to high temperatures.

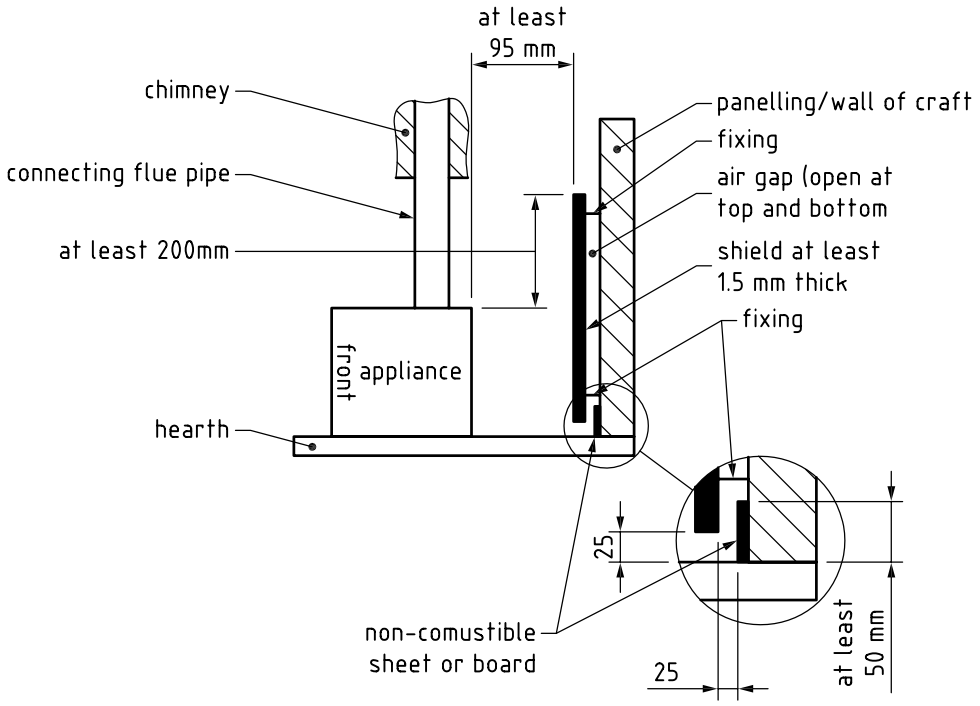
The shields should extend to at least the extremities of the hearth horizontally and to at least 200 mm above the top surface of the appliance. There should be no protrusions from the structure of the craft above the shields, such as shelves, to hinder the flow of convection air.

There should be a minimum vertical gap of 25 mm between the surface of the hearth and the base of the shields. Insulation board or other non-combustible material, e.g. metal sheet, should be affixed to the structure to a height of at least 50 mm at hearth level, using either an adhesive which does not ignite, emit fumes or lose adhesive qualities at temperatures up to 150 °C, or other non-combustible fixings at the corners of the material. The horizontal gap between the shields and the protective non-combustible material should be a minimum of 25 mm.

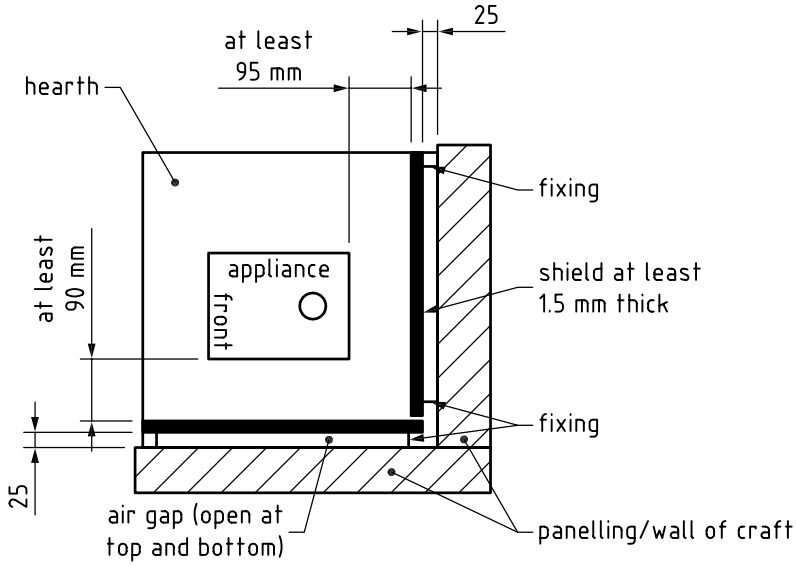
Figure 10 shows an installation where the appliance is installed with its sides and rear substantially parallel to the surrounding structure (and applicable up to 30°). The distance from the outer surface of the shields to the rear of the appliance should be at least 95 mm, and the distance from the outer surface of the shields to the side surface of the appliance should be at least 90 mm.

Figure 10 **Example of suitable installation of surrounds to protect combustible material with appliance installed substantially parallel to surrounding structure**

Dimensions in millimetres



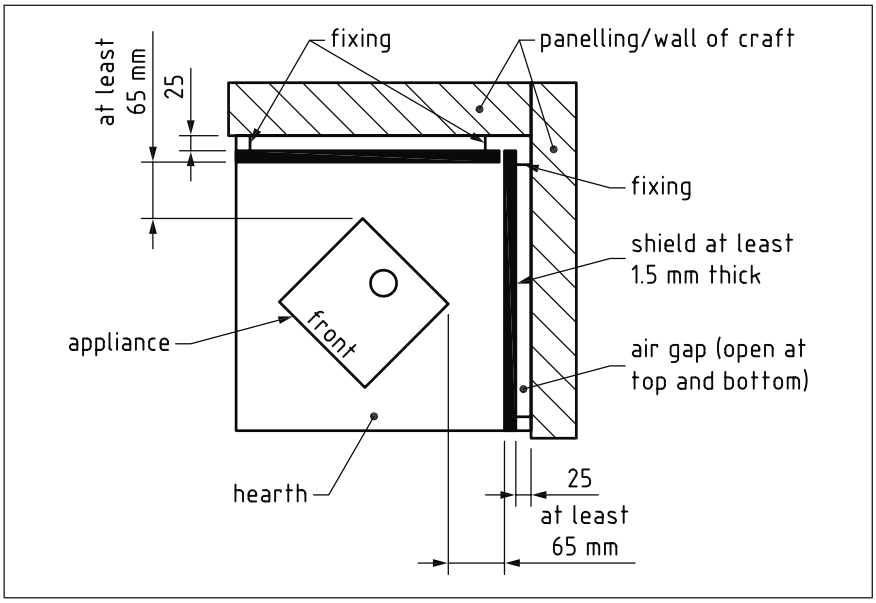

a) Side elevation




b) Plan view

Figure 11 shows an installation where the appliance is at angle to the surrounding structure and applicable where the smaller angle is greater than 30°. The distances from the outer surface of the shields to the corners of the main body of the appliance should be at least 65 mm.

Figure 11 **Example of suitable installation of surrounds to protect combustible material with appliance at an angle to surrounding structure**




*NOTE 1 It is permissible to affix ceramic tiles, heat resistant paint or other non-combustible decoration to the outer surface of the shield, provided that the minimum distance between the body of the appliance and the shield is maintained.*

*NOTE 2 All figures in this clause are for illustrative purposes only and are not drawn to scale.*

# 8 Chimney arrangements

## 8.1 General

In order to function safely and efficiently, the appliance should be connected to a chimney as described in **8.2**, and the chimney should be installed to pass through the cabin roof in accordance with **8.3** and **8.4**. Provision should also be provided for sweeping and inspection as detailed in **8.5**.

The flue should preferably be straight and vertical, but if this is not possible the flue should have no more than two changes of direction, and no part of the flue should exceed 30° from the vertical. The flue should preferably be connected to the top flue outlet of the appliance for optimal flow of flue gases and ease of installation, and to make cleaning of the flue easier. However, if a rear flue is used, there should be no bend in the flue system other than that required after the flue outlet to achieve a substantially straight and vertical flue.

To avoid the risk of blockage or undue restriction of the flue, no damper should be fitted to the chimney, the connecting flue pipe or the appliance flue outlet unless incorporated within the appliance by the manufacturer in conformity with BS EN 13240 or BS EN 12815.

The minimum vertical height measured from the appliance flue outlet to the top of the chimney should be at least 2.0 m when the craft is moored and the appliance is in use.

In craft that might be used in situations other than sheltered waters (Category D of the Recreational Craft Directive [1]), the chimney should be securely bracketed both within and outside the cabin to ensure its stability.

## 8.2 Chimney type and size of flue

The chimney should conform to BS EN 1856-1 and BS EN 1856-2 and at least meet designation T400 N2 D3 G(xx) of BS EN 1443:2003.

*NOTE In the designation of BS EN 1443:2003, "xx" is the minimum distance from combustible materials in millimetres.*

The chimney should be installed in accordance with the manufacturer's installation instructions, bearing in mind any additional information given in this code of practice.

Alternatively, where the above chimney type is not available, a chimney specifically to suit the design of the craft should be constructed and installed according to the following.

a) The internal skin should be at least 1 mm thick stainless steel as described in BS EN 10088-1:2005; grades 1.4401, 1.4404, 1.4432 or 1.4436.

b) The outer casing should be steel, have a suitable strength for everyday wear and tear, be weather resistant, and the annulus between the two should be at least 12 mm and be filled with insulation with a thermal conductivity no greater than 0.065 W/m·K.

c) The construction should prevent the ingress of water into the annulus.

d) The chimney should be adequately supported and prevent the weight being taken on the appliance.

e) The chimney should be separated from any combustible material by a distance equal to at least three-quarters of the outside diameter of the chimney.

The minimum flue internal diameter should either:

1) be calculated in accordance with the requirements of BS EN 13384-1; or

2) be taken from Table 5 for the intended fuel.

Further, the cross-sectional area of the flue should not be less than the minimum cross-sectional area of the flue outlet of the appliance.

Table 5 **Flue size guidance**

| **Minimum flue size (nominal internal diameter)** | **Fuel type** | **Maximum appliance output** |
|---|---|---|
| mm | | kW |
| 100 | Seasoned wood and/or smokeless fuel | 4 |
| 125 | Bituminous coal | 7 |
| | Seasoned wood and/or smokeless fuel | 6 |
| 150 | Bituminous coal | 9 |
| | Seasoned wood and/or smokeless fuel | 8 |
| Flues of intermediate size should conform to the recommendations for the next smallest size. | | |

## 8.3 Connection to the appliance

### 8.3.1 Chimney connection to appliance

Whenever possible the chimney should be connected directly to the flue outlet of the appliance using an appropriate adaptor, in order to maximize the flue draught and hence reduce the risk of fume emissions into the cabin.

*NOTE This will also reduce the fire risk in the cabin because of the lower external temperature and help reduce the risk of burns on possible human contact with any connecting flue pipe.*

Where a short length of uninsulated connecting flue pipe is used to connect the appliance to the chimney, **8.3.2** should be followed.

### 8.3.2 Use of connecting flue pipe

A connecting flue pipe should be used only to connect the appliance to the chimney and should not pass through any deckhead (roof), headlining (ceiling), bulkhead (wall) or partition into another part of the craft, or to the outside.

Connecting flue pipes should be of one of the following materials or types:

a) cast iron, conforming to BS 41;

b) stainless steel as described in BS EN 10088-1:2005; grades 1.4401, 1.4404, 1.4432 or 1.4436 with a wall thickness of at least 1 mm;

c) vitreous enamelled steel, conforming to BS 6999;

d) low carbon steel conforming to either BS EN 10296-1 (welded) or BS EN 10297-1 (seamless), with a wall thickness of at least 3 mm;

e) other materials independently certified as having the necessary performance designation as being suitable for use with solid fuel appliances.

Flue pipes with spigot and socket joints should be fitted with the socket facing upwards to contain moisture and other condensates in the flue.

Joints between both the appliance and the connecting flue pipe, and the connecting flue pipe and the chimney should be made suitably gas-tight. Where no instructions are available, a satisfactory gas-tight joint may be achieved by packing joints with non-combustible glass or ceramic rope.

*NOTE If required, rope may be finished with a suitable high-temperature sealant effective to 1 000 °C.*

The connecting flue pipe should be as short as practicable and should preferably be less than 1 m. The connecting flue pipe should connect to the chimney system either:

1) at a level below the cabin headlining in accordance with the manufacturer's instructions where tested to BS EN 1856-2; or

2) at least 150 mm vertically below any combustible cabin headlining.

### 8.3.3 Location and shielding of connecting flue pipes

Where a connecting flue pipe is used , it should be located so as to avoid igniting combustible material. Means of meeting the requirement include:

a) separation by shielding in accordance with the recommendations of Clause **7**, Figure 9 and Table 4 or Figure 11;

b) separation by not less than three times the outside diameter of uninsulated pipes; or

c) following the guidance given by the manufacturer where the connecting flue pipe is factory-made.

## 8.4 Chimney installation

### 8.4.1 Fitting

A chimney and any associated connecting flue pipe, as detailed in **8.2** and **8.3**, should be installed. The flue should be taken through the roof to the outside. Examples of suitable arrangements are shown in Figure 12, Figure 13 and Figure 14.

To ensure adequate draw, a chimney for use when the craft is moored should be a minimum length of 600 mm above roof level. A chimney for use when the craft is underway may be shorter, but the outlet should be not less than 150 mm above roof level.

### 8.4.2 Passing through the roof

Where the chimney passes through the roof of the cabin, there should be no joint within the roof space.

The weight of the chimney should be taken by fixing the chimney to the roof of the craft such that no weight is taken by the connecting flue pipe or appliance, as shown in Figure 13 and Figure 14. If the roof is not strong enough to take all the weight of the chimney, then the chimney should also be bracketed to the cabin structure.

The material present where the chimney passes through the roof, including the roof and headlining material, should be non-combustible and any combustible materials should be at least the distance:

a) to the manufacturer's instructions, e.g. *xx* as described in BS EN 1443:2003; or

b) not less than 3/4 of the outside diameter of the chimney.

### 8.4.3 Roof sealing

The chimney should be sealed where it passes through a roof to give watertight protection.




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Figure 12 **Examples of suitable chimney arrangements**

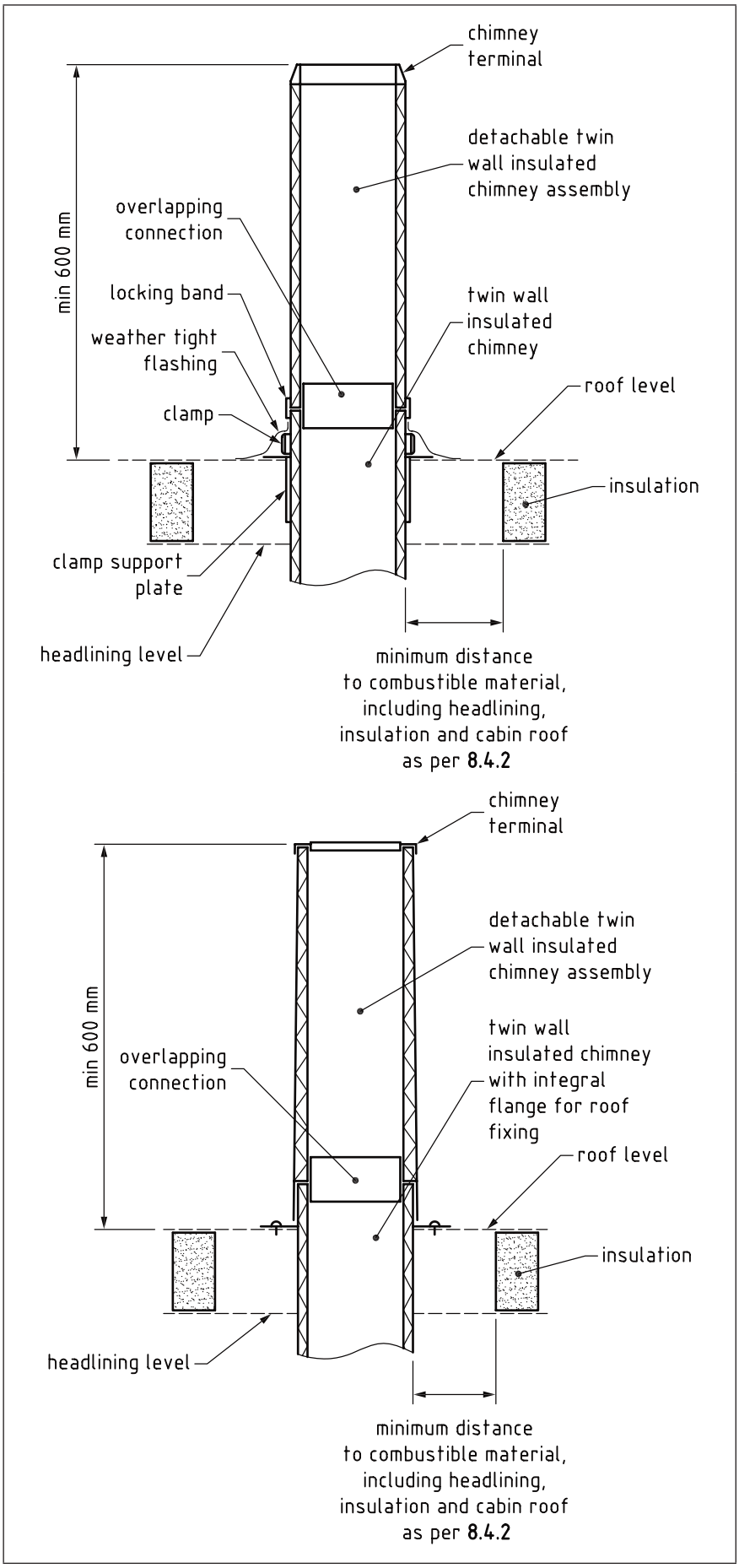


Figure 13 **Examples of chimney arrangements where it passes through the roof**

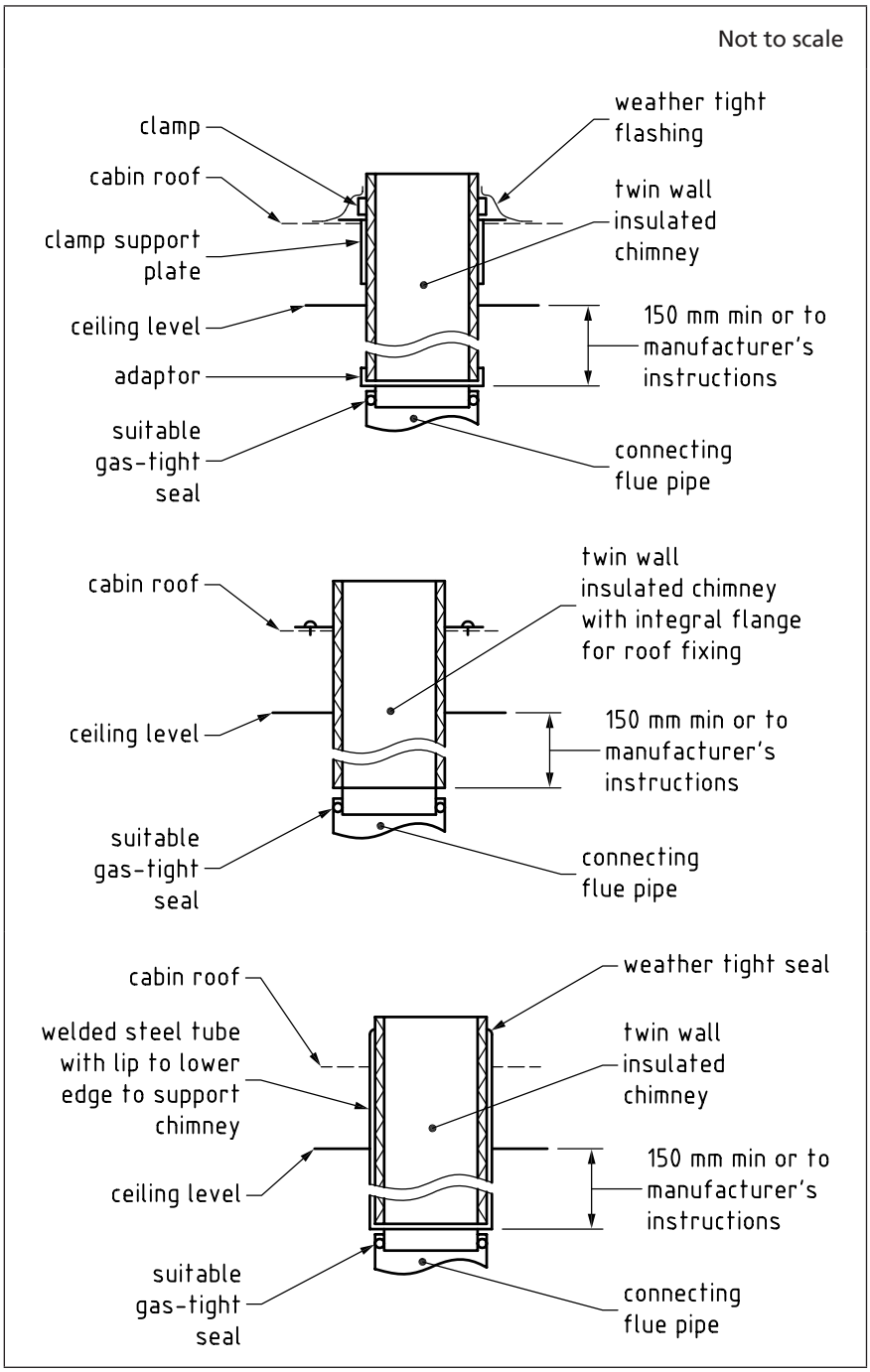
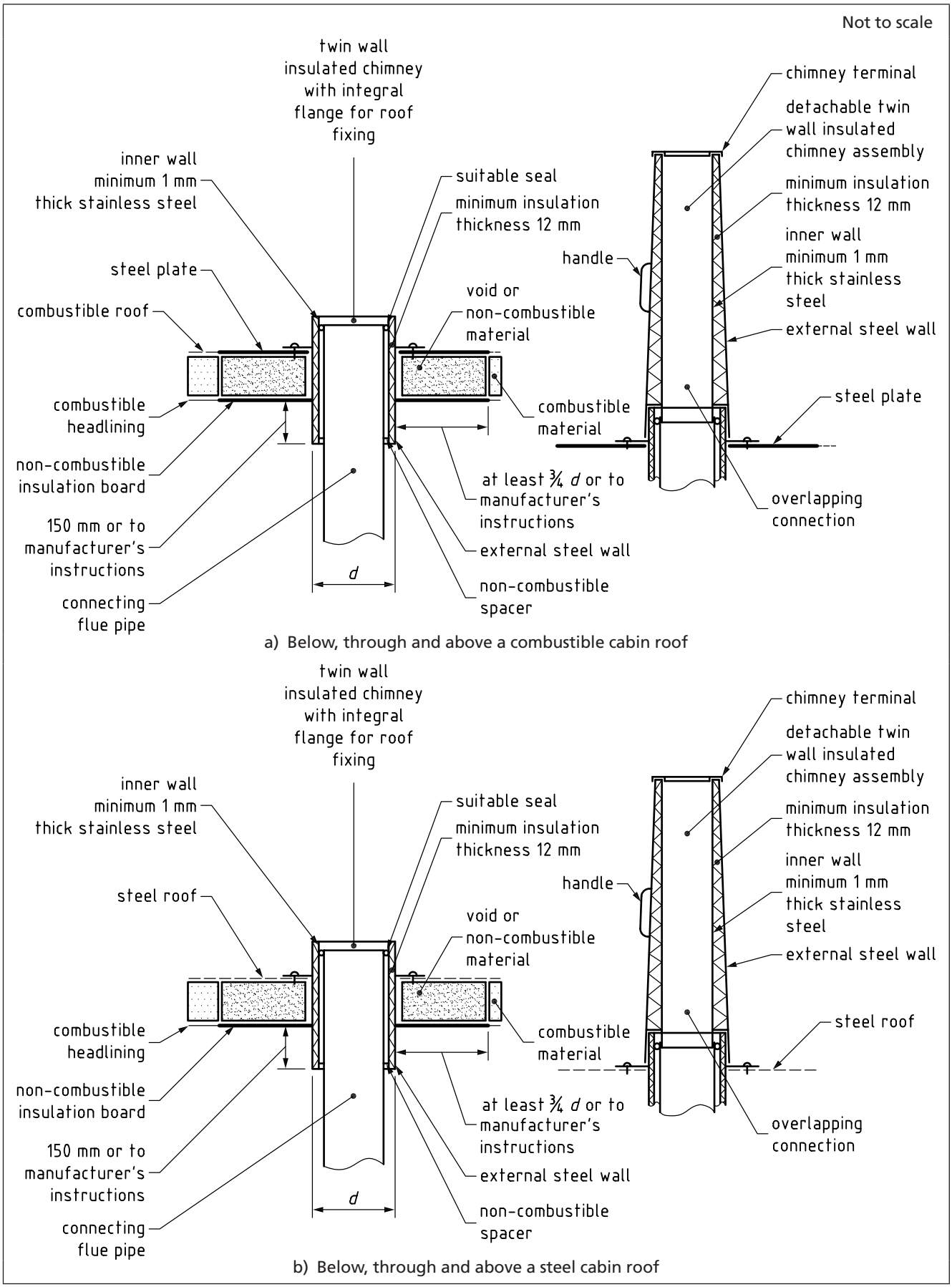


Figure 14 **Examples of chimney arrangements where it passes through the roof**




*NOTE All figures in this clause are for illustrative purposes only and are not drawn to scale.*

### 8.4.4 Chimney outlet

To ensure adequate draw, the chimney outlet when the craft is moored should be a minimum height of 600 mm above roof level. A chimney for use when the craft is underway may be shorter, but the outlet should be not less than 150 mm above roof level. This height is measured on the shorter side of a chimney when passing through a sloping roof.

Where specified, a section of the chimney assembly should be removable to allow the clearance for passing under any bridge, tunnel or area of restricted height.

If the chimney assembly above cabin level exceeds 1.5 m in height, it should be secured with wire guys or stays.

A chimney terminal should be fitted to protect the insulation from water ingress.

If fitted, a rain cap should have an open area no less than the minimum cross sectional area of the flue.

A chimney cap may be supplied for use when the appliance is unlit.

*NOTE If a chimney cap is supplied then it may be painted a bright colour which is different from the rest of the chimney system to ensure it is evident that the appliance ought not be lit.*

## 8.5 Access for inspection and cleaning

Provision should be made to enable the connecting flue pipe and chimney to be inspected internally and externally throughout their entire length, and to be swept effectively.

It is recommended that provision be made to enable the flue to be swept from the top of the chimney so that the deposits fall directly into the appliance and can be conveniently cleared from there. If the deposits do not fall directly into the appliance or cannot be cleared from the appliance, alternative arrangements for sweeping and cleaning should be considered, such as the provision of a debris collection space along with an openable cleaning door that is of the same thermal conductivity and such that, when closed, has the same air tightness as the rest of the system.

# 9 Combustion and ventilation air

All accommodation spaces in the vessel containing an appliance should be ventilated from outside, through ventilators with fixed minimum openings, to provide sufficient air for breathing and combustion, and to prevent hazards from leaked combustion products. Ventilation systems should be designed to avoid draughts and water ingress, even in adverse weather conditions, and should be large enough to allow sufficient air for all combustion appliances and for occupants of the ventilated space.

The minimum effective free area of total fixed ventilation should be 4000 $mm^2$ or the area given by the equation in Annex A, whichever is the larger.

*NOTE 1 The area of fixed ventilation given by the equation in Annex A is the minimum needed to secure efficient distribution of fresh air. It does not include the normal adjustable ventilation provided by windows or roof-lights.*

A ventilation opening may be protected by a grille or screen, which is easily accessible for cleaning purposes. Such grilles or screens should have apertures of not less than 4 mm. Fine mesh should not be used, as it is liable to become blocked.

The ventilation area should be divided as equally as practicable between high and low level, with the upper ventilators as high as practicable, and lower ones as low as practicable and positioned so that they cannot be inadvertently obstructed. Ventilators should be positioned as closely as possible to the appliance, but at least 300 mm away from the chimney outlet and any other exhaust or flue outlets.

*NOTE 2 An effective means of providing high and low ventilation may be by the use of mushroom ventilators, or other roof vents with fixed openings, and low levelled ventilators covered by fixed louvered grilles.*

The area of fixed ventilation should be calculated for, and applied to, any part of the vessel containing an appliance normally divided as a separate compartment, or that can be temporarily divided (except by curtaining). (See Annex A.)

*NOTE 3 Seagoing craft may have closeable ventilation. Further detail is given in Annex A.*

# 10 Commissioning

## 10.1 General

An appliance/chimney installation should be tested by a competent person before final handover to the user or client to ensure that it is safe, fit for use and capable of providing the expected performance and service, in accordance with the method stated below.

The tests and checks given in **10.2**, **10.3** and **10.4** should be carried out before the appliance is lit for the first time.

## 10.2 Physical checks

The competent person should check that:

a) the installation is in accordance with the design, including material specifications, flue length and diameter;

b) the manufacturer's installation instructions have been followed;

c) there is no damage to any components;

d) joints between the appliance and chimney and within the chimney system are secure and in good condition;

e) the separation of components from combustible materials conforms to this code of practice;

f) the appliance and chimney can be fully cleaned, once the installation is complete; and

g) components for weatherproofing are installed correctly.

## 10.3 Smoke test for chimney soundness

It should be ensured that the chimney is complete and any removable/hinged section is in the operating position and secured in place according to the user instructions.

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Before commencing the test, the flue should be warmed for at least 10 min by a gas blow-lamp or similar placed on the grate, ensuring that the ashpit cover and any air inlet into the stove are closed, but that the fire doors are left open to provide oxygen to the stove. Any cleaning or inspection opening in the flue should be closed and sealed.

Once the flue is warm, a smoke pellet should be lit and placed on the grate, the fire doors closed and any additional air entry opening into the stove sealed off. When the smoke reaches the top of the flue, the chimney should be capped and sealed using an inflatable bladder, closed cell sponge bung, plastic bag and tape or other similar method.

The whole length of the connecting flue pipe and chimney should be examined for smoke leakage from joints.

If smoke leakage is evident, checks should be made to ensure the correct fitting of components before a further test is carried out to confirm the leakage has been corrected.

*NOTE If this test is done without warming the flue, the cold flue might not seal because thermal expansion might have been taken into account in design or construction.*

## 10.4 Smoke evacuation test

After completing the smoke test for chimney soundness, while the flue is still warm (if carried out at any other time the flue should be warmed for ten minutes first) this test should be carried out to ensure all the smoke is drawn up the flue to atmosphere.

All doors, windows and closable vents in the cabin should be closed and any extraction fans within the cabin should be switched on.

A smoke pellet, with a burn time of approximately 60 s or more should be lit and placed on the appliance grate. The fire and ashpit doors of the appliance should be closed and any additional air entry controls into the appliance fully opened.

Smoke should be checked for entering the cabin and, after 30 s, a check should be made that smoke is issuing from the chimney outlet and from no other point outside the cabin.

If any smoke is emitted into the cabin from any point on the installation, the appliance should not be allowed to be lit until the fault has been corrected and the test repeated and passed.

*NOTE It is advised that the tests and checks in **10.2**, **10.3** and **10.4** are documented and provided to the end user.*

## 10.5 Lighting the appliance

The appliance should then be lit for the first time by the competent person, given gradual initial firing according to the manufacturer's instructions (if any), and then run at nominal output for 30 min before being turned to a low output setting for 30 min to ensure the stove enamel has been "cured" prior to the first use by the end user.




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### 10.6 Handover

At handover all user instructions should be given to the user and an explanation of the appliance operation and safety issues should be given.

At handover an explanation of the correct removal, re-location, and any sealing of the removable/hinged section of the chimney should be given and all safety issues explained.

**Annex A (normative)**

# Ventilation requirements

The effective area of fixed ventilation *V,* in square millimetres, for accommodation spaces containing combustion appliances should be calculated from the following equation:

$$V = 2200U + 650P + 550H + 440F$$

where:

- *U* is the *input* rating of all unflued appliances, in kilowatts
- *P* is the number of persons for which the accommodation space is designed
- *H* is the nominal *output* rating of open-flued solid fuel appliances, in kilowatts
- *F* is the *input* rating for all other open-flued combustion appliances, in kilowatts

*NOTE Room-sealed appliances are excluded from this calculation.*

For craft used on inshore and sheltered waters (Categories C and D of the Recreational Craft Directive [1]), ventilation should be supplied by at least two, equally sized (to the extent practicable), fixed openings in each accommodation space with at least one as high as practicable and at least one as low as practicable. This may be achieved using ducting.

For craft used on the ocean or offshore (Categories A and B of the Recreational Craft Directive [1]), and where severe weather conditions could be encountered, the ventilation openings, described above, may be closeable. If closeable ventilators are fitted, a warning should be permanently attached on or near to the appliance as follows:

"WARNING: Open ventilators before use"

Where outside air is conveyed through an external air vent (vent no 1) into a room and thereafter through one internal wall or partition air vent (vent no 2), both vents should be sized according to the normal calculation method. Where there is more than one internal vent, the free area of each internal vent should be increased by at least 50% over that required for vent no 1.

Series ventilation systems for appliances and accommodation areas should not pass through petrol engine spaces.

Where ventilation air is ducted to a space from an outside source, the free area of the duct should be maintained throughout its length, the duct should be securely fixed and accessible for inspection and it should not have forms that can trap liquids.

Ventilators that have variable settings should be included in the calculations at their minimum rating.

Mechanical ventilation systems should not be included as part of the fixed ventilation, as they can be turned off, or fail unsafe in the event of a problem or power failure.




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# Annex B (normative) Information to be provided to the installer

Appliances suitable for installation in small craft should be supplied with instructions for the appliance installer that detail small craft installation methods and, if assembled on site, the appliance assembly method.

The responsibility to provide such details rests with the appliance manufacturer, or the supplier if the manufacturer has not provided suitable instructions.

The installation and any assembly instructions may be in one document together with operating, maintenance and safety instructions provided they are in a separate section.

In addition, information should be provided to the effect that the appliances should be installed by a competent person with previous relevant experience of installation of appliances in small craft.
A warning should be included that if the appliance is not installed to the recommendations a boat fire or carbon monoxide poisoning might result; however, any installation does not guarantee against such occurrences in all circumstances.

Instructions for the appliance installer should include at least the following.

a) "There should be no combustible fixtures, fittings or furniture other than the floor and its covering within within 600 mm of the front of the appliance."

   *NOTE The manufacturer may recommend other separation distances if justified by measurement of the temperatures generated.*

b) "End users should be strongly recommended to fit a smoke alarm and be guided to fit a carbon monoxide alarm in accordance with the advice in **C.5**."

Instructions should be written in the language of the country in which the appliance is to be sold and include reference to the manufacturer's/supplier's name and/or identification symbol, and the trade name of the appliance.

# Annex C (normative) Information to be provided to the appliance user

## C.1 General

Builders or suppliers of new craft, and appliance installers in existing craft, should provide necessary and sufficient information for safe operation and maintenance of the appliance with due consideration for the environment, including:

a) operating instructions for the appliance, including adequate ventilation;

b) instructions for appliance maintenance;

c) instructions for safe storage of fuel;

d) general safety advice; and

e) advice on the fitting of suitable alarms.

Information should be written in the language of the country in which the appliance is to be sold and include reference to the manufacturer's/supplier's name and/or identification symbol, and the trade name of the appliance.

At least the information specified in **C.2** to **C.6** should be supplied by the appliance manufacturer, supplier and/or installer. The information should be contained within, or referred to and provided with, the owner's manual for a new craft.

## C.2 Operating instructions for the appliance

The following warnings should be prominent within the operating instructions:

"**WARNING**

**Never**

- Leave the craft unattended, or travel through tunnels, when the solid fuel appliance is in use without checking that the appliance has not been over-fuelled and ensuring that the controls are appropriately set to prevent over-firing
- Refuel the appliance when retiring for the night without checking that the appliance has not been over-fuelled and ensuring that the controls are appropriately set to prevent over-firing
- Operate the appliance with any door or lid open, except for refuelling and removal of ashes, as this may over-fire the appliance, with consequential damage to the appliance and danger of boat fire
- Block or restrict the ventilators to the cabin
- Fill any petrol tank on or near the craft when a solid fuel appliance is in use"

Information should also include at least the following operating details.

a) Means for safe and efficient operation of the appliance, including the lighting procedure, the maximum fuel filling height in the firebox and removal of hot ash.

b) The operation of all adjusting devices and controls, including seasonal use and under adverse weather conditions.

c) Recommended fuels.

d) The method of refuelling and de-ashing, and typical refuelling intervals at nominal heat output for the various recommended fuels.

e) Ventilation requirements, including for simultaneous operation with other heating and cooking appliances (where applicable).

f) Advice on the need for regular maintenance by a competent person.

## C.3 Instructions for appliance maintenance

Information should include at least the following maintenance details.

a) Appliance and flue sweeping, including that the appliance and flue should be swept at least at six-monthly intervals, or more frequently where fouling of the flue is experienced, and that chemical cleaners should not be used as a substitute for sweeping.




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b) Flue inspection, including that the flue installation should be inspected at least once a year, throughout its length, for dents, external damage, internal and external corrosion, or obstruction. Further, that any damaged item should be replaced.

c) Examination of refractory lining material and seals, e.g. fire bricks and door seals, including examination at least annually and replacement if not in good condition.

d) Method of cleaning the appliance, including the appliance air controls.

e) Prompt repair or replacement when any defect is revealed in the appliance or flue assembly.

f) Replacement parts should be only those recommended by the original product manufacturer, or compatible with the original part in compliance with BS 8511.

g) Cabin ventilation checking, to see that it is in good condition, is not become blocked and is free from detritus, e.g. any grilles partially blocked by insects and fluff.

## C.4 Instructions for safe storage of fuel

Information should include at least the following fuel storage details.

a) Recommendations for fuel storage, including that all solid fuel should be stored dry and away from sources of heat; wood logs should be stowed under cover with adequate ventilation provided.

b) Under no circumstances should fuel be placed on the hearth, or near other sources of heat, e.g. for drying of wood logs.

c) Solid fuel should not be stored within 600 mm of the appliance unless separated by a non-combustible partition.

d) Flammable liquids, gas bottles, aerosols, etc. should be stored in a separate area well-away from the appliance and not within the accommodation area.

## C.5 General safety advice

In addition to the "warnings" in **C.1**, information should include at least the following advice.

a) "Use only the recommended fuels. Typically these would be either well-seasoned wood logs or smokeless fuels approved by the appliance manufacturer. Never use petroleum coke, barbecue fuel or waste materials. Never use liquid fuels."

b) "Always follow the appliance operating instructions."

c) "When first fired from cold, the appliance should be operated at a low heat, so that it is brought gradually up to temperature to avoid possible damage."

d) "Before lighting, ensure chimney is fully erected and not capped"

e) "The stove can be hot. Never touch the appliance with bare hands. Never touch the controls with bare hands unless the manufacturer's instructions declare that it is safe to do so – if in doubt, always use insulating gloves or the operating tools provided."

f) "Dispose of hot ash safely."




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g) "Do not place or hang any combustible material, such as towels or clothing, on the hearth or the above appliance."

h) "Ensure that any combustible items, such as soft furnishings, curtains, furniture, pictures, calendars, posters and ornaments, are at a minimum 600 mm safe distance from the appliance and cannot fall, slide or swing nearer to the appliance or flue pipe."

*NOTE The appliance manufacturer may recommend another separation distance if justified by measurement of the temperatures generated.*

i) "Any signs of heat damage of combustible material, e.g. charring, singeing or seepage of liquid (lignin), or of suspicious smells in the vicinity of the appliance or flue pipe, should be investigated immediately. The appliance should not be used until the cause is identified and rectified."

j) "Oil or gas lamps should not be located above the appliance, or within 600 mm of the appliance or in any position where fuel spillage from the lamp, either when in position or if dislodged, could hit any surface of the stove."

k) "Do not use the appliance if the any part of the casing, flue pipe or door glass is cracked, the flue or door seals are leaking, the internal firebricks are in poor condition, if it has missing parts or it has been modified."

l) "Never carry out any unauthorized modification of the appliance."

m) "Consider a fireguard manufactured to BS 8423."

n) "For appliances with back boilers, do not light the appliance if there is any possibility that any part of the water system is empty or frozen."

o) "Fume emission into the cabin is dangerous and could lead to carbon monoxide poisoning. If fume emission persists, the following immediate actions should be taken:

1) Open doors and windows to ventilate the cabin.

2) Let the fire out, or eject and safely dispose of fuel from the appliance.

3) Check the flue for blockage and clean if required.

4) Do not attempt to relight the fire until the cause of the fume emission has been identified and corrected. If necessary seek advice from a competent person."

p) "If there is a chimney fire, the following immediate actions should be taken:

1) Reduce the appliance-burning rate by closing all air controls (if safe to do so).

2) Move furniture and rugs away from the appliance and remove any nearby ornaments (if safe to do so).

3) Place a fireguard or spark guard in front of the appliance (if safe to do so).

4) If necessary:

i) raise the alarm; vacate the craft if possible and let occupants of any adjacent craft or buildings know;




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ii) call the Fire Brigade; and

iii) determine best means for the Fire Brigade to gain access to the craft and wait for their arrival well-away from the craft."

### C.6 Advice on the fitting of suitable alarms

Information should include at least the following advice regarding alarms.

a) "At least one suitable and effective smoke alarm should be fitted in a suitable location. Alarms should be mounted on the deckhead or headlining, at least 300 mm from the cabin sides and within 5 m of each protected area of the vessel. On some craft, this may mean installing more than one alarm, and it is recommended to choose units that can be linked together. The smoke alarm should be capable of waking any occupants sleeping aboard the craft. The alarm should be tested with this in mind before the final fixing is made. The smoke alarm should be of the optical or photoelectrical type since this is particularly sensitive to dense smoke such as produced from a smouldering fire. The smoke alarm should be fitted with an extra-long life battery and have a hush button to allow for temporary deactivation. It should be tested as part of a boater's normal boarding routine."

*NOTE Practical advice can be found in BS 5839-6, which includes permanently moored craft used solely as residential premises, and BS EN 14604, which includes provision for devices suitable for leisure accommodation vehicles that are subject to additional vibration and temperature cycle testing.*

b) "Consideration should be given to the fitting of a carbon monoxide alarm suitable for marine use and certified to BS EN 50291."

## Annex D (normative) Additional information to be supplied with appliances with boilers

*NOTE This standard applies to the installation of appliances with water heating systems, but NOT the installation of the hot water circuit.*

For appliances with boilers, warnings are given on the provision of hot water systems as follows.

a) "Installations should always be carried out by a competent person."

b) "Installations should only be open vented systems, either gravity or pumped. Pressurized systems should not be used."

c) "BS EN 12828 and BS EN 14336 specify requirements and give recommendations on good practice involved in the general planning, designing, installation and commissioning of forced circulation hot water central heating systems, and should be used where appropriate."

d) "A safety valve should be installed in the water circuit as close as practicable to the appliance and in a position where it would vent safely."

e) "A feed and expansion tank, manufactured to BS 4215 and designed to withstand the 500-hour boil test without leaking or collapsing, should be installed as high as possible, in the highest part of the circuit and as near as possible to the boiler."

f) "A means of dissipating heat, e.g. a radiator fed by gravity, should be provided so that heat can be dissipated in cases where the pump fails or is not switched on and the appliance continues to produce heat."

g) "The water in the central heating system should contain suitable antifreeze to give frost protection. After a period of inactivity, on no account should the appliance be lit until it is ensured that there is free flow of water through the central heating and hot water systems."

# Bibliography

## Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 5839-6, *Fire detection and fire alarm systems for buildings – Part 6: Code of practice for the design, installation and maintenance of fire detection and fire alarm systems in dwellings*

BS 8423, *Fireguards for fires and heating appliances for domestic use – Specification*

BS EN 14604, *Smoke alarm devices*

BS EN 50291, *Electrical apparatus for the detection of carbon monoxide in domestic premises – Test methods and performance requirements*

BS EN 12828, *Heating systems in buildings – Design for water-based heating systems*

BS EN 14336, *Heating systems in buildings – Installation and commissioning of water based heating systems*

## Other publications

[1] EUROPEAN COMMUNITY Recreational Craft (RC) Directive 94/25/EC amended by Directive 2003/44/EC (europa.eu.int)

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