Section 2: Additional provisions for appliances burning solid fuel (including solid biofuel) with a rated output up to 50kW

Air supply to appliances

2.1 A way of meeting the requirement would be to adopt the general guidance given in Section 1, beginning at Paragraph 1.2, in conjunction with the guidance below.

2.2 Any room or space containing an appliance should have a permanent air vent opening of at least the size shown in Table 1. For appliances designed to burn a range of different solid fuels the air supply should be designed to accommodate burning the fuel that produces the highest heating output.

2.3 Some manufacturers may specify even larger areas of permanently open air vents or omit to specify a *rated output* (for example in the case of a cooker). In these cases, manufacturers' *installation instructions* should be followed subject to any minimum ventilation provisions of this Approved Document.

Size of flues

2.4 *Fluepipes* should have the same diameter or equivalent cross-sectional area as that of the appliance *flue outlet* and should not be smaller than the size recommended by the appliance manufacturer.

2.5 *Flues* should be at least the size shown in Table 2 relevant to the particular appliance, and not less than the size of the appliance *flue outlet* or that recommended by the appliance manufacturer.

Table 1 **Air supply to solid fuel appliances**

Type of appliance	Type and amount of ventilation (1)
Open appliance, such as an open fire with no throat, e.g. a fire under a canopy as in Diagram 23.	Permanently open air vent(s) with a total equivalent area of at least 50% of the cross sectional area of the flue.
Open appliance, such as an open fire with a throat as in Diagrams 22 and 29.	Permanently open air vent(s) with a total equivalent area of at least 50% of the throat opening area. (2)

Other appliance, such as a stove, cooker or boiler, with a flue draught stabiliser.	Permanently open vents as below:
	If design air permeability >5.0m³/(h.m²) then
	300mm²/kW for first 5kW of appliance rated output
	850mm²/kW for balance of appliance rated output
	If design air permeability ≤5.0m³/(h.m²) then
	850mm²/kW of appliance rated output (4)

Other appliance, such as a stove, cooker or boiler, with no flue draught stabiliser.	Permanently open vents as below:
	If design air permeability >5.0m³/(h.m²) then
	550mm²/kW of appliance rated output above 5kW
	If design air permeability ≤5.0m³/(h.m²) then
	550mm² per kW of appliance rated output (4)

Notes:

1. Equivalent area is as measured according to the method in BS EN 13141-1:2004 or estimated according to paragraph 1.14. Divide the area given in mm² by 100 to find the corresponding area in cm²
2. For simple open fires as depicted in Diagram 29, the requirement can be met with room ventilation areas as follows:

Nominal fire size (fireplace opening size)	500mm	450mm	400mm	350mm
Total equivalent area of permanently open air vents	20,500mm²	18,500mm²	16,500mm²	14,500mm²

3. Example: an appliance with a flue draught stabiliser and a rated output of 7kW would require an equivalent area of: [5 x 300] + [2 x 850] = 3200mm²
4. It is unlikely that a dwelling constructed prior to 2008 will have an air permeability of less than 5.0m³/(h.m²) at 50 Pa unless extensive measures have been taken to improve air-tightness. See Appendix F.

2.6 For multi-fuel appliances, the *flue* should be sized to accommodate burning the fuel that requires the largest *flue*.

Table 2 **Size of flues in chimneys**

Installation (1)	Minimum flue size
Fireplace with an opening of up to 500mm x 550mm	200mm diameter or rectangular/square flues having the same cross-sectional area and a minimum dimension not less than 175mm
Fireplace with an opening in excess of 500mm x 550mm or a fireplace exposed on two or more sides	See paragraph 2.7. If rectangular/square flues are used the minimum dimension should be not less than 200mm
Closed appliance of up to 20kW rated output which: a) burns smokeless or low-volatiles fuel (2) or b) is an appliance which meets the requirements of the Clean Air Act when burning an appropriate bituminous coal (3) or c) is an appliance which meets the requirements of the Clean Air Act when burning wood (3)	125mm diameter or rectangular/square flues having the same cross-sectional area and a minimum dimension not less than 100mm for straight flues or 125mm for flues with bends or offsets
Pellet burner or pellet boiler which meets the requirements of the Clean Air Act (3)	125mm diameter This may be reduced to no less than 100mm when permitted by the appliance manufacturer and supported by calculation according to BS EN 13384-1:2002. This calculation can be applied to an individual installation or manufacturers can provide precalculated designs.
Other closed appliance of up to 30kW rated output burning any fuel	150mm diameter or rectangular/square flues having the same cross-sectional area and a minimum dimension not less than 125mm
Closed appliance of above 30kW and up to 50kW rated output burning any fuel	175mm diameter or rectangular/square flues having the same cross-sectional area and a minimum dimension not less than 150mm

Notes:

1. Closed appliances include cookers, stoves, room heaters and boilers.
2. Fuels such as bituminous coal, untreated wood or compressed paper are not smokeless or low-volatiles fuels.
3. These appliances are known as 'exempted fireplaces'.

2.7 For fireplaces with openings larger than 500mm x 550mm or fireplaces exposed on two or more sides (such as a fireplace under a canopy or open on both sides of a central *chimney* breast) a way of showing compliance would be to provide a *flue* with a cross-sectional area equal to 15 per cent of the total face area of the fireplace opening(s) (see Appendix B). However, specialist advice should be sought when proposing to construct *flues* having an area of:

a. more than 15 per cent of the total face area of the fireplace openings; or

b. more than 120,000mm² (0.12m²).

Height of flues

2.8 *Flues* should be high enough to ensure sufficient draught to clear the products of combustion. The height necessary for this will depend upon the type of the appliance, the height of the building, the type of *flue* and the number of bends in it, and an assessment of local wind patterns. However, a minimum flue height of 4.5m could be satisfactory if the guidance in Paragraphs 2.10 to 2.12 is adopted. As an alternative approach, the calculation procedure within BS EN 13384-1:2005 can be used as the basis for deciding whether a *chimney* design will provide sufficient draught.

2.9 The height of a *flue* serving an open fire is measured vertically from the highest point at which air can enter the fireplace to the level at which the *flue* discharges into the outside air. The highest point of air entry into the fireplace could be the top of the fireplace opening or, for a fire under a canopy, the bottom of the canopy. The height of a *flue* serving a closed appliance is measured vertically from the appliance outlet.

Outlets from flues

2.10 The outlet from a *flue* should be above the roof of the building in a position where the products of combustion can discharge freely and will not present a fire hazard, whatever the wind conditions.

2.11 *Flue outlet* positions which can meet the requirements in common circumstances are shown in Diagram 17. The *chimney* heights and/or separations shown may need to be increased in particular cases where wind exposure, surrounding tall buildings, high trees or high ground could have adverse effects on flue draught.