

- b. a cast in situ liner that significantly alters the *flue's* internal dimensions.

Anyone in doubt about whether or not any renovation, refurbishment or repair work involving a *flue* is notifiable 'building work', could consult the building control department of their local authority, or an approved inspector.

### Re-use of existing flues

**1.36** Where it is proposed to bring a *flue* in an existing *chimney* back into use or to re-use a *flue* with a different type or rating of appliance, the *flue* and the *chimney* should be checked and, if necessary, altered to ensure that they satisfy the requirements for the proposed use. A way of checking before and/or after remedial work would be to test the *flue* using the procedures in Appendix E.

**1.37** A way of refurbishing defective *flues* would be to line them using the materials and components described in Sections 2, 3, and 4 dependent upon the type of *combustion appliance* proposed. Before relining *flues*, they should be swept to remove deposits.

**1.38** A *flue* may also need to be lined to reduce the flue area to suit the intended appliance. Oversize *flues* can be unsafe.

**1.39** If a *chimney* has been relined in the past using a metal lining system and the appliance is being replaced, the metal liner should also be replaced unless the metal liner can be proven to be recently installed and can be seen to be in good condition.

### Use of flexible metal flue liners for the relining of chimneys

**1.40** A way of relining a *chimney* would be to use a flexible metal *flue liner*, appropriately designated in accordance with BS EN1856-2:2004 to suit the appliance, fuel and flue gas characteristics. Flexible *flue liners* should be used only to reline a *chimney* and should not be used as the primary liner of a new *chimney*. They can be used to connect gas back boilers to *chimneys* where the appliance is located in a *fireplace recess*.

### Use of plastic fluepipe systems

**1.41** A way of using plastic flue systems and liners would be to use a plastic *flue*, appropriately designated in accordance with BS EN 14471:2005 to suite the appliance, fuel and *flue* characteristics. Plastic fluepipe systems can be acceptable in some cases, for example with condensing boiler installations, where the *fluepipes* are supplied by or specified by the appliance manufacturer as being suitable for purpose.

### Factory-made metal chimneys

**1.42** Ways of meeting the requirements when proposing *factory-made metal chimneys* include:

- a. using component systems appropriately designated in accordance with BS EN1856-1:2003 to suit the appliance and types of fuels to be burnt and installing them in accordance with the relevant recommendations of BS EN 15287-1:2007;
- b. for gas and for oil appliances where flue temperatures will not normally exceed 250°C, using twin-walled component systems (and, for gas, single-walled component systems) appropriately designated in accordance with BS EN1856-1:2003 to suit the appliance and types of fuels to be burnt and installing gas appliances in accordance with BS 5440-1:2008;
- c. using any other *chimney* system that is suitable for the intended purpose and installed in accordance with the relevant recommendations in BS EN 15287-1:2007 or BS 5440-1:2008, as appropriate to the type of appliance being installed.

**1.43** Where a *factory-made metal chimney* passes through a wall, sleeves should be provided to prevent damage to the *flue* or building through thermal expansion. To facilitate the checking of gas-tightness, joints between *chimney* sections should not be concealed within ceiling joist spaces or within the thicknesses of walls without proper access being provided (see paragraph 1.47).

**1.44** When providing a *factory-made metal chimney*, provision should be made to withdraw the appliance without the need to dismantle the *chimney*.

**1.45** *Factory-made metal chimneys* should be kept a suitable distance away from combustible materials. Ways of meeting the requirement for *chimneys* designated to BS EN 1856-1:2003 comprise:

- a. locating the *chimney* not less than distance 'xx' from combustible material, where 'xx' is defined in BS EN 1856-1:2003 as shown in Diagram 13;
- b. where a *chimney* passes through a cupboard, storage space or roof space, providing a guard placed no closer to the outer wall of the *chimney* than the distance in a) above.

**1.46** Where a *factory-made metal chimney* penetrates a *fire compartment* wall or floor, it must not breach the fire separation requirements of Part B. See Approved Document B for more guidance but the requirements may be met by:

- a. using a *factory-made metal chimney* of the appropriate level of *fire resistance* installed in accordance with BS EN 1856-1:2003 Annex NA; or
- b. casing the *chimney* in *non-combustible material* giving at least half the *fire resistance* recommended for the *fire compartment* wall or floor.

# Appendix E: Methods of checking compliance with requirement J2

## (SEE PARAGRAPHS 1.36 AND 1.54)

**E1** This Appendix describes ways of checking the compliance with J2 of existing, relined or new *flues*, and (where included in the work) the *combustion appliance*. It applies only to *natural draught flues* intended for *open-flued appliances*. The procedures described are used only to assess whether the *flue* in the *chimney*, the connecting *fluepipe* (and flue gas passages in the appliance) are free of obstruction and acceptably gas-tight. In addition, appliance performance tests, including flue spillage tests to check for compliance with J2, should be carried out when an appliance is commissioned to check for compliance with Part L and as required by the Gas Safety (Installation and Use) Regulations.

**E2** Tests on *flues* should be carried out at the most appropriate time during the building work. Where possible, for example, smoke tests should be performed when the structure of a *chimney* is visible and before the application of finishes such as plaster or dry lining that could obscure sight of smoke leakage during testing.

## Testing applications

### Tests for existing flues

**E3** *Flues* in existing *chimneys* can be obstructed by nests, debris resulting from deterioration of the structure (e.g. brickwork, flue lining material or pieces of *chimney* pot) and by soot and tar. *Flues* in existing *chimneys* may also leak as a result of holes or cracks appearing in the structure and linings, particularly at joints. The top, exposed part of a *chimney* is particularly prone to decay. A way of checking the state of a *flue* prior to bringing it back into use would be to do the following:

- a. **Sweep the flue.** This is intended to clean the *flue* to demonstrate that it is essentially free from obstructions and to enable better visual inspection and testing of the *flue*. Tar deposits caused by burning wood may be especially hard to dislodge and should be removed. The debris that comes down the *chimney* when sweeping should be examined for excessive quantities of lining or brick that are signs that further repairs are necessary.
- b. **Carry out a visual inspection of the accessible parts to identify:**
  - i. Deterioration in the structure, connections or linings which could affect the flue's gas-tightness and safe performance with the proposed *combustion appliance*. Examine the interior of the *flue* and the exterior of the *chimney* including in the roof-space. The presence of smoke or tar stains on the exterior of a chimney/breast is a sign of leaks that possibly indicate damage;

- ii. Modifications made whilst the *flue* was out of service, such as the fitting of a ventilator terminal, which would be incompatible with using the *flue* with the intended appliance;
  - iii. Correct lining and lining sizes for the proposed new application.
- c. **Perform checks where necessary to demonstrate that the flue is free from restriction:** a visual check may be sufficient where the full length of the *flue* can be seen. In cases of doubt, a way of checking this would be to carry out a coring ball test.
  - d. **Check the gas-tightness of the flue by carrying out a smoke test.**

## New masonry and flueblock chimneys

**E4** Check during construction that liners are installed the right way up, with sockets facing upwards and joints are sealed so that moisture and condensate will be contained in the *chimney*.

**E5** *Flues* in new masonry *chimneys* can be obstructed, particularly at bends, by debris left during construction or by excess mortar falling into the *flue* or by jointing material extruded from between liners and flueblocks. The *flues* should be checked to demonstrate that they have been correctly constructed and are free of restrictions and acceptably gas-tight.

A way of checking the condition of a new *flue* prior to bringing it into use would be to do the following:

- a. Carry out a visual inspection of the accessible parts to check that the lining, liners or flueblocks are of the correct materials and of suitable size for the proposed application.
- b. Perform checks where necessary to demonstrate that the *flue* is free from restriction: a visual check may be sufficient where the full length of the *flue* can be seen. In cases of doubt, a way of checking this would be to carry out a coring ball test or to sweep the *flue*, which may be more effective at removing flexible debris that might not be dislodged by a coring ball.
- c. Check the operation and gas-tightness of the *flue* by carrying out a smoke test.

## New factory-made metal chimneys

**E6** A checklist for the visual inspection of a newly completed *factory-made metal chimney* is given in BS EN 15287-1:2007 and additional checks or particular variants may be included in manufacturers' *installation instructions*. Following inspection, the *chimney* should be subjected to a smoke test.

## Relined flues

**E7** A *flue* which has been relined may be checked to show that it is free from restrictions, such as from surplus material (where that can occur) and that it is acceptably gas-tight by using the same tests as would be applied in the case of a newly built *flue*. However, a *flue* which has been relined with a flexible metal liner in accordance with Paragraph 3.36 of this Approved Document may be assumed to be unobstructed and acceptably gas-tight. (The use of a coring ball or inappropriate sweeps brushes can seriously damage a flexible metal *flue liner*.)

## Appliances

**E8** Where a *combustion appliance* is provided and connected up to the flue system as part of the work, the complete system of appliance and *flue* should be tested for gas-tightness in addition to testing the *flue* separately as above. For gas appliances, an appropriate spillage test procedure is given in BS 5440-1:2008. For oil- and solid-fuel fired appliances, suitable test procedures are given in BS 5410-1:1997 and BS EN 15287-1:2007 Annex O respectively.

## Flue test procedures

### Coring ball test

**E9** This test may be appropriate for proving the minimum diameter of circular *flues*. It may also be used to check for obstructions in square *flues* but will not detect obstructions in the corners. (A purpose-made coring ball or plate may need to be used if the *flue* is rectangular.) It is not applicable to *fluepipes* and should not be used with flexible metal *flue liners*. It should be carried out before smoke testing.

**E10** A heavy ball, with a diameter about 25mm less than that of the *flue*, is lowered on a rope from the *flue outlet* to the bottom of the *flue*. If an obstruction is encountered, the blockage should be removed and the test repeated.

### Smoke testing

**E11** Where an existing *flue* is to be checked with a smoke test, it should first be swept.

**E12** Two smoke testing procedures are described below. Test I confirms the gas-tightness of the whole *flue* and may be used for one serving a solid fuel appliance or if there is any doubt over the condition of a gas or oil *flue*. Test II may be used where the *flue* is to serve a gas-fired appliance. Neither test is a substitute for any spillage or flue draught interference test required when commissioning the appliance. Other smoke testing procedures could be used where these form part of the procedure for the installation of an approved flue or relining system

### Smoke test I

**E13** All doors and windows in the room served by the *flue* should be closed. The *flue* should first be warmed to establish a draught, e.g. with a blow lamp or electric heater. A suitable number of flue testing smoke pellets are placed at the base of the *flue*, such as in the *fireplace recess* or in the appliance if it is fitted, and ignited. When smoke starts to form, the base of the *flue* or fireplace opening should be sealed or the appliance should be closed, so that the smoke can only enter the *flue*. (For example, the recess opening should be closed off with a board or plate, sealed at the edges or, if the pellets are in the appliance, its doors, ashpit covers and vents should be closed.)

**E14** Smoke should be seen to issue freely from the *flue outlet* or terminal. When this is established, the top of the *flue* is sealed. The full length of the *flue* should then be checked, bearing in mind Paragraph E19; there should be no significant leakage. The test should be allowed to continue for at least 5 minutes. The closures at the top and bottom of the *flue* should then be removed.

### Smoke test II

**E15** All doors and windows in the room served by the *flue* should be closed. The *flue* should first be warmed to establish a draught. A suitable flue-testing smoke pellet is ignited at the base of the *flue* or in the intended position of the appliance, so that the smoke is drawn into the *flue* with the rising draught. (If the pellets are placed in a recess at the base of the *flue*, the opening between the room and the recess should be partially closed, such as with a board, but so as to leave an air entry gap of about 25mm at the bottom.)

**E16** Smoke should be seen to issue freely from the *flue outlet* or terminal and not to spill back into the room. There should be no significant leakage of smoke from the length of the *chimney* inside or outside of the building.

**E17** Smoke tests I and II are in line with the recommendations in BS 5440-1:2008.

### Notes in relation to testing

**E18** Where warming of the *flue* is specified, this is intended to establish a draught, but this may take more than 10 minutes in the case of large or cold *flues*.

**E19** Appliances, where fitted, should not be under fire at the time of carrying out the test. During a smoke test, smoke should not emerge from the outlet of any other *flue*, as this indicates leakage between *flues*. When checking for smoke leakage from a *flue*, it should be borne in mind that smoke from a faulty *flue* can emerge some distance away from the original fault. In such cases, the smoke could emerge from such places as barge overhangs in the end of terrace dwellings or from window reveals in cavity walls.

**E20** The purpose of carrying out smoke testing is to check that flue gases will rise freely through the *flue* and to identify whether there are any faults, such as incorrectly sealed joints or damage that would cause the flue gases to escape into the dwelling.

**E21** It should be noted that smoke pellets create a pressure significantly higher than the pressure required in the product standards for *natural draught chimneys* and for *flues* having a gas-tightness *designation* of N1. *Flues* to this *designation* are permitted to have a leakage rate of up to 2 litre/s/m<sup>2</sup> flue wall area. Some smoke leakage may therefore be seen during smoke tests and it can be a matter of expert judgement of whether leakage indicates failure.

**E22** However, wisps of smoke visible on the outside of the *chimney* or near joints between *chimney* sections do not necessarily indicate a fault. If forceful plumes, or large volumes of smoke are seen, this could indicate a major fault such as an incorrectly made connection or joint, or a damaged section of *chimney* that requires investigation and remedial action followed by a repeat of the test.