Combustion appliances and fuel storage systems

J

APPROVED DOCUMENT

J1 Air supply
J2 Discharge of products of combustion
J3 Warning of release of carbon monoxide
J4 Protection of building
J5 Provision of information
J6 Protection of liquid fuel storage systems
J7 Protection against pollution
**MAIN CHANGES IN THE 2004 EDITION**

**Section 1**
New guidance has been included for access for visual inspection of concealed flues. This should ensure that flues can be properly inspected both when an appliance is first commissioned and subsequently serviced.

**Section 2**
Guidance has been included in support of a new requirement J3 “Warning of release of carbon monoxide” on the provision of carbon monoxide alarms where solid fuel appliances are installed. The provisions for flue outlet clearances relative to adjacent pitched roofs have been clarified in Diagram 17. The guidance on the provision of hearths and wall clearances for solid fuel appliances have been made more flexible to take account of the availability of modern appliances.

**Section 2, 3 & 4**
The guidance for permanent ventilation openings for open flued appliances in very airtight houses (those with a design air permeability less than or equal to 5.0 m³/(h.m²)) have been increased to counteract the decrease in adventitious ventilation relative to older houses. Appendix F gives advice on assessing the air permeability of older houses in relation to this guidance.

**Section 4**
This section now explicitly includes liquid biofuel and blends on mineral oil and liquid biofuel within the scope of combustion installations designed to burn oil.

**Section 5**
The guidance on identifying where secondary containment for oil tanks is necessary has been expanded to include locations in inner protection zone as shown on the Environment Agency’s groundwater sources map.

**Appendix G**
This informative appendix provides and explanation of the European designation system for certain flue and chimney products.

**Main changes made by the 2010 amendments**
This 2010 edition, incorporating the further 2010 amendments reflects the changes made as a result of the Building Regulations 2010 and Building (Approved inspector etc) Regulations 2010. The changes mainly reflect regulation number changes as a result of re-ordering. There have been no amendments to the substantive requirements in Schedule 1 (i.e. Parts A to P) of the Building Regulations. Please note the simplification of the definition of ‘room for residential purposes’ in regulation 2 of the Building Regulations 2010. Please also note that L1(c) has now become regulation 40.

**APPROVED DOCUMENTS**
The following documents have been approved and issued by the First Secretary of State for the purpose of providing practical guidance with respect to the requirements of the Building Regulations 2010.

- **Approved Document A: Structure**
  2004 edition incorporating 2010 amendments

- **Approved Document B (Fire safety) – Volume 1: Dwellinghouses**
  2006 edition incorporating 2010 amendments

- **Approved Document B (Fire safety) – Volume 2: Buildings other than dwellinghouses**
  2006 edition incorporating 2007 and 2010 amendments

- **Approved Document C: Site preparation and resistance to contaminants and moisture**
  2004 edition incorporating 2010 amendments

- **Approved Document D: Toxic substances**

- **Approved Document E: Resistance to the passage of sound**
  2003 edition incorporating 2004 and 2010 amendments

- **Approved Document F: Ventilation**
  2010 edition incorporating further 2010 amendments

- **Approved Document Q: Sanitation, hot water safety and water efficiency**
  2010 edition incorporating further 2010 amendments

- **Approved Document H: Drainage and waste disposal**
  2002 edition incorporating 2010 amendments

- **Approved Document J: Combustion appliances and fuel storage systems**
  2010 edition incorporating further 2010 amendments
### Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What is an Approved Document?</strong></td>
<td></td>
</tr>
<tr>
<td>How to use this Approved Document</td>
<td>3</td>
</tr>
<tr>
<td>Where you can get further help</td>
<td>3</td>
</tr>
<tr>
<td>Responsibility for compliance</td>
<td>4</td>
</tr>
<tr>
<td><strong>The requirements</strong></td>
<td></td>
</tr>
<tr>
<td>Limitation on requirements</td>
<td>5</td>
</tr>
<tr>
<td>Types of building work covered by this Approved Document</td>
<td>5</td>
</tr>
<tr>
<td>Notification of work</td>
<td>6</td>
</tr>
<tr>
<td>Exemptions</td>
<td>6</td>
</tr>
<tr>
<td>Materials and workmanship</td>
<td>7</td>
</tr>
<tr>
<td>Supplementary guidance</td>
<td>7</td>
</tr>
<tr>
<td>Technical Specifications</td>
<td>7</td>
</tr>
<tr>
<td>Independent schemes of certification and accreditation</td>
<td>7</td>
</tr>
<tr>
<td>Interaction with other legislation</td>
<td>8</td>
</tr>
<tr>
<td>Maintenance</td>
<td>8</td>
</tr>
<tr>
<td><strong>The Requirements J1, J2, J3, J4, J5, J6 and J7</strong></td>
<td>9</td>
</tr>
<tr>
<td><strong>Section 0: General guidance</strong></td>
<td>10</td>
</tr>
<tr>
<td>Introduction to the provisions</td>
<td>10</td>
</tr>
<tr>
<td>Explanation of terms used</td>
<td>10</td>
</tr>
<tr>
<td>Measuring the size of flues and ducts</td>
<td>16</td>
</tr>
<tr>
<td><strong>Section 1: Provisions which apply generally to combustion installations</strong></td>
<td>17</td>
</tr>
<tr>
<td>Performance</td>
<td>17</td>
</tr>
<tr>
<td>Air supply for combustion appliances</td>
<td>17</td>
</tr>
<tr>
<td>Permanently open ventilation of rooms</td>
<td>17</td>
</tr>
<tr>
<td>Permanent ventilation of appliance compartments</td>
<td>17</td>
</tr>
<tr>
<td>Ventilation of other rooms or spaces</td>
<td>17</td>
</tr>
<tr>
<td>Permanently open air vents</td>
<td>19</td>
</tr>
<tr>
<td>Provisions complying with both Part F and Part J</td>
<td>20</td>
</tr>
<tr>
<td>Interaction of mechanical extract ventilation and open-flued combustion appliances</td>
<td>21</td>
</tr>
<tr>
<td>Provision of flues</td>
<td>22</td>
</tr>
<tr>
<td>Condensates in flues</td>
<td>22</td>
</tr>
<tr>
<td>Construction of masonry chimneys</td>
<td>22</td>
</tr>
<tr>
<td>Construction of flueblock chimneys</td>
<td>22</td>
</tr>
<tr>
<td>Material change of use</td>
<td>23</td>
</tr>
<tr>
<td>Connecting flue pipes</td>
<td>23</td>
</tr>
<tr>
<td>Repair of flues</td>
<td>23</td>
</tr>
<tr>
<td>Re-Use of existing flues</td>
<td>24</td>
</tr>
<tr>
<td>Use of flexible metal flue liners for the relining of chimneys</td>
<td>24</td>
</tr>
<tr>
<td>Use of plastic fluepipe systems</td>
<td>24</td>
</tr>
<tr>
<td>Factory-made metal chimneys</td>
<td>24</td>
</tr>
<tr>
<td>Concealed flues</td>
<td>25</td>
</tr>
<tr>
<td>Configuration of natural draught flues serving open-flued appliances</td>
<td>26</td>
</tr>
<tr>
<td>Inspection and cleaning openings in flues</td>
<td>27</td>
</tr>
<tr>
<td>Flues discharging at low level near boundaries</td>
<td>27</td>
</tr>
<tr>
<td>Dry lining around fireplace openings</td>
<td>27</td>
</tr>
<tr>
<td>Condition of combustion installations at completion</td>
<td>27</td>
</tr>
<tr>
<td>Notice Plates for hearths and flues</td>
<td>28</td>
</tr>
<tr>
<td>Access to combustion appliances for maintenance</td>
<td>28</td>
</tr>
<tr>
<td><strong>Section 2: Additional provisions for appliances burning solid fuel (including solid biofuel) with a rated output up to 50kW</strong></td>
<td>29</td>
</tr>
<tr>
<td>Air supply to appliances</td>
<td>29</td>
</tr>
<tr>
<td>Size of flues</td>
<td>29</td>
</tr>
<tr>
<td>Height of flues</td>
<td>30</td>
</tr>
<tr>
<td>Outlets from flues</td>
<td>30</td>
</tr>
<tr>
<td>Connecting fluepipes</td>
<td>32</td>
</tr>
<tr>
<td>Location and shielding of connecting fluepipes</td>
<td>32</td>
</tr>
<tr>
<td>Debris collecting space</td>
<td>33</td>
</tr>
<tr>
<td>Masonry and flueblock chimneys</td>
<td>33</td>
</tr>
<tr>
<td>Separation of combustible material from fireplaces and flues</td>
<td>34</td>
</tr>
<tr>
<td>Factory-made metal chimneys</td>
<td>34</td>
</tr>
<tr>
<td>Lining and relining of flues in chimneys</td>
<td>34</td>
</tr>
<tr>
<td>Formation of gathers</td>
<td>35</td>
</tr>
<tr>
<td>Hearths</td>
<td>37</td>
</tr>
<tr>
<td>Fireplace recesses and prefabricated appliance chambers</td>
<td>38</td>
</tr>
<tr>
<td>Fireplace lining components</td>
<td>40</td>
</tr>
<tr>
<td>Walls adjacent to hearths</td>
<td>40</td>
</tr>
<tr>
<td>Alternative approach</td>
<td>40</td>
</tr>
<tr>
<td>Carbon monoxide alarms</td>
<td>41</td>
</tr>
</tbody>
</table>
Section 3: Additional provisions, for gas burning appliances

Gas safety (Installation and Use) Regulations 43
Gas fires (other than flueless gas fires) 45
Flueless gas appliances 45
Air supply to gas fires and other appliances 45
Flued decorative fuel effect (DFE) fires 45
Flued appliances other than decorative effect fires 45
Air supply to flueless appliances 45
Size of natural draught flues for open flued appliances 47
Height of natural draught flues for open flued appliances 48
Outlets from flues 48
Provision of flues 51
Connecting fluepipe components 52
Masonry chimneys 52
Flueblock chimneys 52
Factory-made metal chimneys 52
Location and shielding of flues 52
Relining of flues in chimneys 52
Debris collection space for chimneys 53
Bases for back boilers 53
Hearths 54
Shielding of appliances 54
Alternative approach 55

Section 4: Additional provisions for oil burning appliances

Scope 56
Appliances fitted in bathrooms and shower rooms 56
Air supply to appliances 56
Size of flues (other than balanced flues and flues designed to discharge through or adjacent to walls) 56
Outlets from flues and flue heights 56
Flues for oil-fired appliances: flue gas temperature 59
Provisions for flue gas temperatures in excess of 250°C 59
Provisions for flue gas temperatures not exceeding 250°C 59
Connecting fluepipe components 59

Masonry chimneys 60
Flueblock chimneys 60
Factory-made metal chimneys 60
Location and shielding of flues 60
Relining of flues in chimneys 60
Flues for appliances burning Class D oil 61
Hearths for oil-fired appliances 61
Shielding of oil-fired appliances 61
Alternative approach 61

Section 5: Provisions for liquid fuel storage and supply

Performance 63
Heating oil storage installations 63
Protective measures against fire 63
Oil supply pipe systems: means of automatic isolation 64
Provisions where there is a risk of oil pollution 64
LPG storage installations 64
Tank location and protective measures 65
Location and support of cylinders 65
LPG pipework (Informative) 67

APPENDICES

Appendix A: Checklist for checking and testing of hearths, fireplaces, flues and chimneys 68
Appendix B: Opening areas of large or unusual fireplaces 70
Appendix C: Example calculation of the ventilation requirements of a gas fired appliance 71
Appendix D: Example calculation of the ventilation requirements of an oil fired appliance 72
Appendix E: Methods of checking compliance with requirement J2 73
Appendix F: Assessing air permeability of older dwellings in relation to permanent ventilation requirements 76
Appendix G: European chimney designations 77
Appendix H: Addressees 79
Standards referred to 80
Other publications referred to 82
Index 83
What is an Approved Document?

This document has been approved and issued by the Secretary of State to provide practical guidance on ways of complying with Requirements J1 to J7 and regulations 7 of the Building Regulations 2010 (SI 2010/2214) for England and Wales. The Building Regulations 2010 are referred to throughout the remainder of this Document as ‘the Building Regulations’. Where appropriate the Approved Document also gives guidance on relevant requirements in the Building (Approved Inspectors etc) Regulations 2010 (SI 2010/2215).

The intention of issuing Approved Documents is to provide guidance about compliance with specific aspects of building regulations in some of the more common building situations. They set out what, in ordinary circumstances, may be reasonable provision for compliance with the relevant requirement(s) of building regulations to which they refer.

If guidance in an Approved Document is followed there will be a presumption of compliance with the requirement(s) covered by the guidance. However, this presumption can be overturned, so simply following guidance does not guarantee compliance. For example, if one particular case is unusual in some way, then ‘normal’ guidance may not be applicable. It is also important to note that there may well be other ways of achieving compliance with the requirements. There is therefore no obligation to adopt any particular solution contained in this Approved Document if you would prefer to meet the relevant requirement in some other way. However, persons intending to carry out building work should always check with their Building Control Body, either the local authority or an approved inspector, that their proposals comply with building regulations.

The guidance contained in this Approved Document relates only to the particular requirements of building regulations that the document addresses (see ‘Requirements’ below). However, building work may be subject to more than one requirement of building regulations. In such cases the work will also have to comply with any other applicable requirements of building regulations.

This document is one of a series that has been approved and issued by the Secretary of State for the purpose of providing practical guidance with respect to the requirements of Schedule 1 and Regulation 7 of the Building Regulations 2010 (SI 2010/2215) for England and Wales.

At the back of this document is a list of all the documents that have been approved and issued by the Secretary of State for this purpose.

How to use this Approved Document

In this document the following conventions have been adopted to assist understanding and interpretation:

a. Text shown against a green background are extracts from the Building Regulations or Building (Approved Inspectors etc) Regulations, and set out the legal requirements that relate to compliance with the sanitation, hot water safety and water efficiency requirements of building regulations. It should be remembered however that, as noted above, building works must comply with all the other applicable provisions of building regulations.

b. Key terms are defined in Section 0 and are printed in italic text.

c. Details of technical publications referred to in the text of this Document will be given in footnotes and repeated as end notes. A reference to a publication is likely to be made for one of two main reasons. The publication may contain additional or more comprehensive technical detail, which it would be impractical to include in full in the Document but which is needed to fully explain ways of meeting the requirements; or it is a source of more general information. The reason for the reference will be indicated in each case. The reference will be to a specified edition of the document. The Approved Document may be amended from time to time to include new references or to refer to revised editions where this aids compliance.

Where you can get further help

If you do not understand the technical guidance or other information set out in this Approved Document and the additional detailed technical references to which it directs you, there are a number of routes through which you can seek further assistance:

- The Communities and Local Government website: www.communities.gov.uk
- The Planning Portal website: www.planningportal.gov.uk
- If you are the person undertaking the building work you can seek assistance either from your local authority building control service or from your approved inspector (depending on which building control service you are using, or intend to use, to certify compliance of your work with the requirements of the Building Regulations).
WHAT IS AN APPROVED DOCUMENT?

- Persons registered with a competent person self-certification scheme may be able to get technical advice from their scheme operator.
- If your query is of a highly technical nature you may wish to seek the advice of a specialist, or industry technical body, for the relevant subject.

Responsibility for compliance
It is important to remember that if you are the person (e.g. designer, builder, installer) carrying out building work to which any requirement of building regulations applies you have a responsibility to ensure that the work complies with any such requirement. The building owner may also have a responsibility for ensuring compliance with building regulation requirements and could be served with an enforcement notice in cases of non-compliance.
The requirements

This Approved Document, which takes effect on 1 October 2010, deals with combustion appliances and fuel storage systems in the Building Regulations 2010 (as amended).

Limitation on requirements

In accordance with regulation 8 of the Building Regulations, the requirements in Parts A to D, F to K and N and P (except for paragraphs G2, H2 and J6) of Schedule 1 to the Building Regulations do not require anything to be done except for the purpose of securing reasonable standards of health and safety for persons in or about buildings (and any others who may be affected by buildings or matters connected with buildings).

Paragraph G2 is excluded from regulation 8 as it deals with the conservation of water. Paragraphs H2 and J6 are excluded from regulation 8 because they deal directly with prevention of the contamination of water and of oil pollution. Parts E and M (which deal, respectively, with resistance to the passage of sound and access to and use of buildings) are excluded from regulation 8 because they address the welfare and convenience of building users. Part L is excluded from regulation 8 because it addresses the conservation of fuel and power. All these matters are amongst the purposes, other than health and safety that may be addressed by Building Regulations.

Types of work covered by this Approved Document

Building work

Building work, as defined in regulation 3 of the Building Regulations 2010, includes the erection and extension of a building, the provision or extension of a controlled service or fitting, and the material alteration of a building or a controlled service or fitting. In addition, Building Regulations may apply in cases where the purposes for which or the manner or circumstances in which a building or part of a building is used change in the way that constitutes a material change of use. Under regulation 4 of the Building Regulations 2010 (as amended), building work should be carried out in such a way that, on completion of work,

i. the building complies with the applicable Parts of Schedule 1 to the Building Regulations,

ii. in the case of an extension or material alteration of a building, or the provision, extension or material alteration of a controlled service or fitting, where it did not comply with any such requirement, it is no more unsatisfactory in relation to that requirement than before the work was carried out.

Work described in Part J concerns the provision or extension of controlled services or fittings. Work associated with installations covered in these sections may be subject to other relevant Parts of the Building Regulations.

Material change of use

A material change of use occurs in specified circumstances in which a building or part of a building that was previously used for one purpose will be used in future for another. Where there is a material change of use the Building Regulations set requirements that must be met before the building can be used for its new purpose.

Regulation 5 of the Building Regulations specifies the following circumstances as material changes of use:

- a building is used as a dwelling where previously it was not.
- a building contains a flat where previously it did not.
- a building is used as an hotel or boarding house where previously it was not.
- a building is used as an institution where previously it was not.
- a building is used as a public building where previously it was not.
- a building no longer comes within the exemptions in Schedule 2 to the Building Regulations where previously it did.
- a building which contains at least one dwelling contains a greater or lesser number of dwellings than it did previously.
- a building contains a room for residential purposes where previously it did not.
- a building which contains at least one room for residential purposes contains a greater or lesser number of such rooms than it did previously.
- a building is used as a shop where previously it was not.

Parts J1 to J4 will apply to all the material changes of use mentioned above which means that whenever such changes occur the building must be brought up to the standards required by Parts J1 to J4.

Historic buildings

Buildings included in the schedule of monuments maintained under section 1 of the Ancient Monuments and Archaeological Areas Act 1979 are exempt from compliance with the requirements of the Building Regulations.
There are other classes of buildings where special consideration may be needed in deciding what is adequate provision for compliance with Part J:

a. listed buildings;
b. buildings situated in designated conservation areas;
c. buildings which are of architectural or historic interest and which are referred to as a material consideration in a local authority’s development plan; and
d. buildings of architectural and historical interest within national parks, areas of outstanding or natural beauty and world heritage sites.

It would not normally be considered appropriate to relax the requirements of Part J since they relate to health and safety. However, it may be necessary to seek alternative technical solutions to those set out in this approved document in order to achieve reasonable standards of safety without prejudicing the character of the host building or increasing the risk of long-term deterioration of the building’s fabric or fittings.

In determining what is appropriate in the circumstances, the advice of the local authority’s conservation officer should be sought. The views of the conservation officer are particularly important where building work requires planning permission and/or listed building consent.

**Notification of work**

In almost all cases of new building work it will be necessary to notify a Building Control Body (BCB) in advance of any work starting. There are two exceptions to this: where work is carried out under a self-certification scheme listed in Schedule 3, and where work is listed in Schedule 4 to the Building Regulations as being notifiable.

**Competent person self-certification schemes under Schedule 3**

Under regulation 12(6) of the Building Regulations it is not necessary to notify a BCB in advance of work which is covered by this Approved Document if that work is of a type set out in column 1 of Schedule 3 to the Regulations and is carried out by a person registered with a relevant self-certification (competent persons) scheme as set out in column 2 of that Schedule. In order to join such a scheme a person must demonstrate competence to carry out the type of work the scheme covers, and also the ability to comply with all relevant requirements in the Building Regulations.

There are a number of schemes authorised for the installation of combustion appliances. Details of current schemes including those relating to combustion appliances can be found from www.communities.gov.uk/planningandbuildingregulations/competentpersonsschemes. Full details of the schemes can be found on the individual scheme websites.

Where work is carried out by a person registered with a competent person scheme, regulation 20 of the Building Regulations and regulation 20(1) of the Building (Approved Inspectors etc.) Regulations 2010 require that the occupier of the building be given, within 30 days of the completion of the work, a certificate confirming that the work complies with all applicable Building Regulation requirements. There is also a requirement that the BCB be given a notice that this has been done, or a copy of the certificate, again within 30 days of the completion of the work. These certificates and notices are usually made available through the scheme operator. BCBs are authorised to accept these certificates as evidence of compliance with the requirements of the Building Regulations. However, local authority inspection and enforcement powers remain unaffected, although they are normally used only in response to a complaint that work does not comply.

**Work which is not notifiable under Schedule 4**

Schedule 4 to the Building Regulations sets out types of work where there is no requirement to notify a BCB that work is to be carried out. These types of work are mainly of a minor nature where there is no significant risk to health, safety, water efficiency or energy efficiency. Health, safety, and energy efficiency requirements continue to apply to these types of work; only the need to notify a BCB has been removed.

Where only non-notifiable work as set out in Schedule 4 is carried out, there is no requirement for a certificate confirming that the work complies with Building Regulation requirements to be given to the occupier or the BCB.

In general, all work on a combustion appliance which is not a repair or maintenance will be notifiable work and Schedule 4 will not apply. However, it might be possible to add a control device to the appliance or to alter its electrical connection under the allowance in this schedule. Local authority building control departments can give advice in cases of doubt.

**Exemptions**

Schedule 2 to the Building Regulations sets out a number of classes of buildings which are exempt from all Building Regulations requirements, including those in Part J.
Please note that the Gas Safety (Installation and Use) Regulations apply to buildings exempt under the Building Regulations.

**Materials and workmanship**

Any building work within the meaning of the Building Regulations should, in accordance with regulation 7, be carried out with proper materials and in a workmanlike manner.

You may show that you have complied with regulation 7 in a number of ways. These include the appropriate use of a product bearing CE marking in accordance with the Construction Products Directive (89/106/EEC) as amended by the CE Marking Directive (93/68/EEC) or a product complying with an appropriate technical specification (as defined in those Directives), a British Standard or an alternative national technical specification of any state which is a contracting party to the European Economic Area which in use is equivalent, or a product covered by a national or European certificate issued by a European Technical Approval issuing body, and the conditions of use are in accordance with the terms of the certificate.

You will find further guidance in the Approved Document supporting regulation 7 on materials and workmanship.

**Supplementary guidance**

The Department of Communities and Local Government occasionally issues additional material to aid interpretation of the guidance in Approved Documents. This material may be conveyed in official letters to chief executives of local authorities and Approved Inspectors and/or posted on the websites accessed through: www.communities.gov.uk/planningandbuilding/buildingregulations/.

**Technical Specifications**

Standards and technical approvals are relevant guidance to the extent that they relate to health, safety or water efficiency considerations in the Building Regulations. They may also address other aspects of performance such as service ability, or aspects that, although they relate to health and safety, are not covered by the Building Regulations.

When an Approved Document makes reference to a named standard, the relevant version of the standard is the one listed at the end of the publication. However, if this version of the standard has been revised or updated by the issuing standards body, the new version may be used as a source of guidance provided that it continues to address the relevant requirements Regulations. Where it is proposed to work to the new version instead of the version listed at the end of publication, this should be discussed with BCB in advance of any work starting.

The appropriate use of a product, which complies with a European Technical Approval as defined in the Construction Products Directive, (89/106/EEC) should meet the relevant requirements.

**Independent schemes of certification and accreditation**

Much of the guidance throughout this document is given in terms of performance.

Since the performance of a system, product, component or structure is dependent upon satisfactory site installation, testing and maintenance, independent schemes of certification and accreditation of installers and maintenance firms will provide confidence in the appropriate standard of workmanship being provided.

Confidence that the required level of performance can be achieved will be demonstrated by the use of a system, material, product or structure which is provided under the arrangements of a product conformity certification scheme and an accreditation of installer scheme.

Third party accredited product conformity certification schemes not only provide a means of identifying materials and designs of systems, products and structures which have demonstrated that they reach the requisite performance, but additionally provide confidence that the systems, materials, products and structures actually provided are the same specification or design as that tested or assessed.

Third party accreditation of installers of systems, materials, products and structures provides a means of ensuring that installations have been conducted by knowledgeable contractors to appropriate standards, thereby increasing the reliability of the anticipated performance.

Many certification bodies that approve such schemes are accredited by the United Kingdom Accreditation Service (UKAS).

Building Control Bodies may accept certification of products, components, materials, or structures under such schemes as evidence of compliance with the relevant standard. Similarly Building Control Bodies may accept the certification of installation or maintenance of products, components, materials and structures under such schemes as evidence of compliance with the relevant standard. Nonetheless a Building Control Body will wish to establish in advance of the work, that any such scheme is adequate for the purpose of the Building Regulations.

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Interaction with other legislation

The Workplace (Health, Safety and Welfare) Regulations 1992


The Workplace (Health, Safety and Welfare) Regulations 1992 apply to the common parts of flats and similar buildings if people such as cleaners and caretakers are employed to work in these common parts. Where the requirements of the Building Regulations that are covered by this Part do not apply to dwellings, the provisions may still be required in the situations described above in order to satisfy the Workplace Regulations.

The Clean Air Act 1993

Under the Clean Air Act 1993 local authorities may declare the whole or part of the district of the authority to be a smoke control area. It is an offence to emit smoke from a chimney of a building, from a furnace or from any fixed boiler if located in a designated smoke control area unless an authorised fuel was used. It is also an offence to acquire an ‘unauthorised fuel’ for use within a smoke control area unless it is used in an ‘exempt’ appliance (‘exempted’ from the controls which generally apply in the smoke control area).

Authorised fuels are fuels which are authorised by Statutory Instruments (Regulations) made under the Clean Air Act 1993. These include inherently smokeless fuels such as gas, electricity and anthracite together with specified brands of manufactured solid smokeless fuels. These fuels have passed tests to confirm that they are capable of burning in an open fireplace without producing smoke.

Exempt appliances are appliances (ovens, wood burners, boilers and stoves) which have been exempted by Statutory Instruments (Orders) under the Clean Air Act 1993. These have passed tests to confirm that they are capable of burning an unauthorised or inherently smoky solid fuel without emitting smoke.

More information and details of authorised fuels and exempt appliances can be found on the internet at http://smokecontrol.defra.gov.uk/

Maintenance

The guidance in this Approved Document provides a way of ensuring that combustion appliances can function safely. For combustion appliances to continue to work safely and effectively it is essential that they are adequately and regularly serviced and maintained.
This Approved Document, which takes effect on 1 October 2010, deals with the following Requirements which are contained in the Building Regulations 2010 (as amended by SI 2001/2214).

### Requirement | Limits on application
---|---
**Part J Combustion Appliances and Fuel Storage Systems**

#### Air supply

**J1.** Combustion appliances shall be so installed that there is an adequate supply of air to them for combustion, to prevent overheating and for the efficient working of any flue.

#### Discharge of products of combustion

**J2.** Combustion appliances shall have adequate provision for the discharge of products of combustion to the outside air.

#### Warning of release of carbon monoxide

**J3.** Where a fixed combustion appliance is provided, appropriate provision shall be made to detect and give warning of the release of carbon monoxide.

#### Protection of building

**J4.** Combustion appliances and fluepipes shall be so installed, and fireplaces and chimneys shall be so constructed and installed, as to reduce to a reasonable level the risk of people suffering burns or the building catching fire in consequence of their use.

#### Provision of information

**J5.** Where a hearth, fireplace, flue or chimney is provided or extended, a durable notice containing information on the performance capabilities of the hearth, fireplace, flue or chimney shall be affixed in a suitable place in the building for the purpose of enabling combustion appliances to be safely installed.

#### Protection of liquid fuel storage systems

**J6.** Liquid fuel storage systems and the pipes connecting them to combustion appliances shall be so constructed and separated from buildings and the boundary of the premises as to reduce to a reasonable level the risk of the fuel igniting in the event of fire in adjacent buildings or premises.

#### Protection against pollution

**J7.** Oil storage tanks and the pipes connecting them to combustion appliances shall:

- (a) be so constructed and protected as to reduce to a reasonable level the risk of the oil escaping and causing pollution; and
- (b) have affixed in a prominent position a durable notice containing information on how to respond to an oil escape so as to reduce to a reasonable level the risk of pollution.

Requirements J1 and J2 apply only to fixed combustion appliances (including incinerators).

Requirement J3 applies only to fixed combustion appliances located in dwellings.

Requirement J6 applies only to:

- (a) fixed oil storage tanks with capacities greater than 90 litres and connecting pipes; and
- (b) fixed liquefied petroleum gas storage installations with capacities greater than 150 litres and connecting pipes, which are located outside the building and which serve fixed combustion appliances (including incinerators) in the building.

Requirement J7 applies only to fixed oil storage tanks with capacities of 3500 litres or less, and connecting pipes, which:

- (a) are located outside the building; and
- (b) serve fixed combustion appliances (including incinerators) in a building used wholly or mainly as a private dwelling, but does not apply to buried systems.

Particular reference should be made to:

- **Approved Document B** for guidance on compartmentation of buildings for fire safety purposes and for appropriate degrees of fire resistance for compartment boundaries.

- **Approved Document F** for guidance on ventilation for health, and provision of extract ventilation using open flued combustion appliances.

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Section 0: General guidance

Introduction to the provisions

0.1 This Approved Document gives guidance on how to satisfy the requirements of Part J. Although Part J applies to the accommodation of any combustion installation and liquid fuel storage system within the Limits on Application, the guidance in this Approved Document has been prepared mainly with domestic installations in mind, such as those comprising space and water heating systems and cookers and their flues, and their attendant oil and liquefied petroleum gas (LPG) fuel storage systems. Part J does not include specific provisions relating to the storage of solid fuel (including solid biofuel) but the relevant guidance in Approved Document B should be followed.

0.2 The guidance applies to combustion installations having power ratings and fuel storage capacities up to the limits shown in a) to c) below. Guidance which applies generally is given in this section and Section 1. More specific guidance is then given in:

a. Section 2 for solid fuel installations of up to 45kW rated output;
b. Section 3 for gas installations of up to 70kW net (77.7kW gross) rated input;
c. Section 4 for oil installations of up to 45kW rated heat output.

Section 5 gives guidance on requirement J5 for heating oil storage installations with capacities up to 3500 litres and LPG storage installations with capacities up to 1.1 tonne, although there is no size limit on the application of requirement J5. Section 5 also gives guidance on requirement J6, which is limited to installations where the capacity of the oil storage tank is 3500 litres or less, serving buildings used wholly or mainly as private dwellings.

0.3 For installations subject to the requirements of part J but outside the scope of this Approved Document, such as incinerators or installations with higher ratings than those mentioned above, specialist guidance may be necessary. However, some larger installations may be shown to comply by adopting the relevant recommendations to be found in the CIBSE Guide B and practice standards produced by BSI and IGEM.

Explanation of terms used

0.4 The following definitions have been adopted solely for the purposes of providing clarity in this Approved Document.

1. An appliance compartment is an enclosure specifically constructed or adapted to accommodate one or more combustion appliances.

2. A balanced compartment is a method of installing an open-flued appliance into a compartment which is sealed from the remainder of the building and whose ventilation is so arranged in conjunction with the appliance flue as to achieve a balanced flue effect.

3. A balanced flue appliance is a type of room-sealed appliance which draws its combustion air from a point outside the building adjacent to the point at which the combustion products are discharged, the inlet and outlet being so disposed that wind effects are substantially balanced. Balanced flues may run vertically, but in the most common configuration they discharge horizontally through the external wall against which the appliance is situated.

4. The boundary is the boundary of the land or buildings belonging to and under the control of the building owner. Depending upon the paragraphs of this Approved Document to which it applies, it may be drawn only around the perimeter of the land in question or extended to the centreline of adjacent routes or waterways as shown in Diagram 1.

5. A Building Control Body is a body that carries out checks for compliance with the Building Regulations on plans of building work and on the building work itself. The Building Control Body may be either the local authority or an Approved Inspector. For further details, see the manual to the Building Regulations.

6. The capacity of an oil tank is its nominal capacity as stated by the manufacturer. It is usually 95 per cent of the volume of liquid required to fill it to the brim.
7. A **chimney** is a structure consisting of a wall or walls enclosing one or more flues (see Diagram 2). In the gas industry, the chimney for a gas appliance is commonly called the flue.

8. A **combustion appliance** (or **appliance**) is an apparatus where fuel is burned to generate heat for space heating, water heating, cooking or other similar purpose. The appliance does not include systems to deliver fuel to it or for the distribution of heat. Typical combustion appliances are boilers, warm air heaters, water heaters, fires, stoves and cookers.

9. The **designation** system in BS EN 1443:2003 expresses the performance characteristics of a chimney or its components, as assessed in accordance with an appropriate European product standard, by means of a code such as EN 1234 – T400 N1 D1 Gxx. Further information is given in Appendix G.

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**Diagram 2  Chimneys and flues**

- Flue liner
- Flue
- Soot door
- Debris collection space
- Chimney
- Sleeve
- Fluepipe
- Possible positions for access
- Appliance flue outlet
- Appliance
10. A **draught break** is an opening formed by a factory-made component into any part of the flue serving an open-flued appliance. Such openings may be provided to allow dilution air to be drawn into a flue or to lessen the effects of down-draught on combustion in the appliance.

11. A **draught diverter** is a form of draught break intended to prevent conditions in the main length of flue from interfering with the combustion performance of an open-flued appliance (see Diagram 3(a)). It allows the appliance to operate without interference from down-draughts that may occur in adverse wind conditions and excessive draught.

![Diagram 3 Draught diverter and draught stabiliser](image)

12. A **draught stabiliser** is a factory-made counter-balanced flap device admitting air to the flue, from the same space as the combustion air, to prevent excessive variations in the draught (see Diagram 3(b)). It is usual for these to be in the fluepipe or chimney, but they may be located on the appliance.

13. **Equivalent area** is defined in BS EN 13141-1:2004 as the area of a sharp-edged circular orifice which would pass the same air flow rate at the same applied pressure difference as the product or device being tested. The equivalent area of a simple ventilator will be less than the geometrical free area and for complex products may be significantly less.

14. **Factory-made metal chimneys** (also known as system chimneys) are prefabricated chimneys that are commonly manufactured as sets of components for assembly on site (although they can be supplied as one unit), having the performance appropriate for the intended appliance. They are available in various materials and types ranging from single-walled metal chimneys suitable for some gas appliances to twin-walled chimneys with insulation sandwiched between an inner liner and an outer metal wall which are designed for oil or solid fuel use.

15. In a **fanned draught** installation, the proper discharge of the flue gases depends upon the operation of a fan, which may be separately installed in the flue or may be an integral part of the combustion appliance. Fans in combustion appliances either may extract flue gases from the combustion chamber or may cause the flue gases to be displaced from the combustion chamber if the fan is supplying it with air for combustion. Appliances with fans providing the combustion air (including most oil-fired and many gas-fired boilers) are also commonly referred to as forced draught appliances (see Diagram 4). Flues in fanned draught installations run horizontally or vertically and can be at higher or lower pressures than their surroundings, dependent upon the location of the fan.

16. A **fire compartment** is a building or part of a building comprising one or more rooms, spaces or storeys constructed to prevent the spread of fire to or from another part of the same building or an adjoining building. (A roof-space above the top storey of a fire compartment is included in that fire compartment.) A **separated part** of a building is a form of compartmentation in which part of a building is separated from another part of the same building by a compartment wall. Such walls run the full height of the part and are in one vertical plane. Further information on this is given in Approved Document B Vol 2 (see Section 8 Compartmentation and Appendix C Methods of Measurement).

17. A **fireplace recess** is a structural opening (sometimes called a builder's opening) formed in a wall or in a chimney breast, from which a chimney leads and which has a hearth at its base. Simple structural openings (Diagram 5(a)) are suitable for closed appliances such as stoves, cookers or boilers, but gathers (Diagram 5(b)) are necessary for accommodating open fires. Fireplace recesses are often lined with firebacks to accommodate inset open fires (Diagram 5(c)). Lining components and decorative treatments fitted around openings reduce the opening area. It is the finished fireplace opening area which determines the size of flue required for an open fire in such a recess.

18. The **fire resistance** of a component or construction is a measure of its ability to withstand the effects of fire in one or more ways for a stated period of time. Guidance on determination of performance in terms of fire resistance is given in Approved Document B (Fire Safety).
19. A **fire wall** is a means of shielding a fuel tank from the thermal radiation from a fire. For LPG tanks, it also ensures that gas accidentally leaking from the tank or fittings must travel by a longer path and therefore disperse safely, before reaching a hazard such as an opening in a building, a boundary or other potential ignition source.

20. A **flue** is a passage that conveys the products of combustion from an appliance to the outside air (see Diagram 2).

21. **Flueblock chimney** systems consist of a set of factory-made components, made from precast concrete, clay or other masonry units, that are designed for assembly on site to provide a complete chimney having the performance appropriate for the intended appliance. There are two types of common systems, one being solely for use with gas-burning appliances and the other, often called chimney block systems, being primarily designed for solid fuel-burning appliances.

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### Diagram 4  Types of installation

<table>
<thead>
<tr>
<th>Open flued</th>
<th>Room sealed</th>
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</thead>
<tbody>
<tr>
<td>Natural draught flue</td>
<td></td>
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<tr>
<td>Fanned flue</td>
<td></td>
</tr>
<tr>
<td>Fanned or forced draught burner</td>
<td></td>
</tr>
<tr>
<td>Flueless</td>
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</tbody>
</table>

**Note – For gas appliances only:**

- CEN TR1749 classifies gas appliances according to their method of evacuating the products of combustion:
  - Type A – Flueless appliances
  - Type B – Open flued
  - Type C – Room sealed

The letters A, B and C are further qualified by numbers to identify the existence and mode of use of fans and draught diverters, as applicable (e.g. B1, for an open-flued natural draught appliance with draught diverter).
22. A **flue box** is a factory made unit, usually made of metal, which is similar to a prefabricated appliance chamber except that it is designed to accommodate a gas burning appliance in conjunction with a factory-made chimney.

23. A **flueless appliance** is one which is designed to be used without connection to a flue. Its products of combustion mix with the surrounding room air and are eventually transported to the outside as stale air leaves the room (see Diagram 4(g)).

24. A **flue liner** is the wall of the chimney that is in contact with the products of combustion (see Diagram 2), such as a concrete flue liner, the inner liner of a factory-made chimney system or a flexible liner fitted into an existing chimney.

25. A **flue outlet** is the point at which the products of combustion are discharged from the flue to the outside atmosphere, such as the top of a chimney pot or flue terminal.

26. A **fluepipe** is a pipe, either single walled (bare or insulated) or double walled, which connects a combustion appliance to a flue in a chimney. For clarity, when used in this way, it may be called a connecting fluepipe. Fluepipe is also used to describe the tubular components from which some factory made chimneys for gas and oil appliances are made or from which plastic flue systems are made.

27. A **hearth** is a base intended to safely isolate a combustion appliance from people, combustible parts of the building fabric and soft furnishings. The exposed surface of the hearth provides a region around the appliance which can be kept clear of anything at risk of fire. The body of the hearth may be thin insulating board, a substantial thickness of material such as concrete or some intermediate provision dependent upon the weight and downward heat emission characteristics of the appliance(s) upon it (see Diagram 6).

28. The **heat input rate** is the maximum rate of energy flow into an appliance. It is calculated as the rate of fuel flow to the appliance multiplied by either the fuel's gross or net calorific value.

**Note:** Traditionally, the UK has used Gross values, most European standards use Net values. Thus for gas appliances it is now the norm to express this rating as a net value (kW (net)).

29. **Installation instructions** are those instructions produced by manufacturers to enable installers to correctly install and test appliances and flues and to commission them into service.

30. In a **natural draught** flue, the combustion products flow into the flue as a result of the draught produced due to the difference between the temperature of the gases within...
the flue and the temperature of the ambient air. Taller flues produce a greater draught at their base. Except for those balanced flue appliances which are designed to discharge directly through the wall adjacent to the appliance, a satisfactory natural draught requires an essentially vertical run of flue (see Diagram 4 (a) and (b)).

31. **Non-combustible material.** This is the highest level of reaction to fire performance. Non-combustible materials include:
   a. any material which when tested to BS 476-11:1982 (2007) does not flame nor cause any rise in temperature on either the centre (specimen) or furnace thermocouples; and
   b. products classified as non-combustible in tests following the procedures in BS 476-4:1970 (2007);
   c. any material classified as class A1 in accordance with BS EN 13501-1:2002 Fire classification of construction products and building elements. Classification using data from reaction to fire tests.

Typical examples of such materials to be found in buildings include totally inorganic materials such as concrete, fired clay, ceramics, metals, plaster and masonry containing not more than 1 per cent by weight or volume of organic material. (Use in buildings of combustible metals such as magnesium–aluminium alloys should be assessed in each individual case.)

More detailed information is given in Approved Document B (Fire Safety).

32. A **Notified Body**, for the purposes of the Gas Appliances (Safety) Regulations (1995), means:
   a. a body which is approved by the Secretary of State for Trade and Industry as being competent to carry out the required Attestation procedures for gas appliances and whose name and identification number has been notified by him/her to the Commission of the European Community and to other member States in accordance with the Gas Appliances (Safety) Regulations (1995);
   b. a body which has been similarly approved for the purposes of the Gas Appliances Directive by another member State and whose name and identification number has been notified to the Commission and to other member States pursuant to the Gas Appliances Directive.

33. An **open-flued appliance** is one which draws its combustion air from the room or space within which it is installed and which requires a flue to discharge its products of combustion to the outside air (see Diagram 4 (a), (c) and (e)).

34. A **prefabricated appliance chamber** is a set of factory-made precast concrete components designed to provide a fireplace recess to accommodate an appliance such as a stove, and incorporates a gather when used with an open fire. The chamber is normally positioned against a wall and may be designed to support a chimney. The chamber and chimney are often enclosed to create a false chimney breast (see also ‘flue box’).

35. The **rated heat input** (sometimes shortened to rated input) for a gas appliance is the maximum heat input rate at which it can be operated, as declared on the appliance data plate. (See also heat input rate.)

36. The **rated heat output** for an oil appliance is the maximum declared energy output rate (kW) as declared on the appliance data plate.
37. The **rated heat output** for a solid fuel appliance is the manufacturer’s declared nominal energy output rate (kW) for the appliance. This may be different for different fuels.

38. A **room-sealed appliance** means an appliance whose combustion system is sealed from the room in which the appliance is located and which obtains air for combustion from a ventilated uninhabited space within the building or directly from the open air outside the building and which vents the products of combustion directly to open air outside the building (see Diagram 4 (b), (d) and (f)).

39. **Solid biofuel** means, for the purpose of this Approved Document, a solid fuel derived from plants and trees. It can include logs, wood chips, wood pellets and other processed plant material.

40. A **throat** is a contracted part of the flue between a fireplace recess and its chimney (see Diagram 22). Throats are usually formed from prefabricated components as shown in Diagram 29.

**Measuring the size of flues and ducts**

0.5 The size a flue or duct (area, diameter etc) should be measured at right angles to the direction in which gases flow. Where offset components are used, they should not reduce the flue area to less than the minimum required for the combustion appliance (see Diagram 7).
Section 1: Provisions which apply generally to combustion installations

Performance

1.1 In the Secretary of State's view requirements J1 to J5 will be met if the building provisions for the safe accommodation of combustion appliances:
   a. enable the admission of sufficient air for:
      i. the proper combustion of fuel and the operation of flues; and
      ii. the cooling of appliances where necessary;
   b. enable normal operation of appliances without the products of combustion becoming a hazard to health.
   c. incorporate an appropriate means of warning of a release of Carbon Monoxide for fixed appliances that burn solid fuels;
   d. enable normal operation of appliances without their causing danger through damage by heat or fire to the fabric of the building;
   e. have been inspected and tested to establish suitability for the purpose intended;
   f. have been labelled to indicate performance capabilities.

Note: Whilst, for the purposes of requirement J2A, it is considered appropriate to require carbon monoxide alarms only with solid fuel appliances, such alarms can still reduce the risk of poisoning from other types of appliance.

Air supply for combustion appliances

1.2 Combustion appliances require ventilation to supply them with air for combustion. Ventilation is also required to ensure the proper operation of flues or, in the case of flueless appliances, to ensure that the products of combustion are safely dispersed to the outside air. Installation of room-sealed appliances or those with a directly connected ducted external air supply will minimise ventilation energy losses from the room and the risk of cold draughts. In some cases, combustion appliances may also require air for cooling control systems and/or to ensure that casings remain safe to touch (see Diagram 8). General guidance on where it may be necessary to install air vents for these purposes is given below.

1.3 Air vent sizes, which are dependent upon the type of fuel burned, are given in Sections 2, 3 and 4 and are for one combustion appliance only. The air supply provisions will usually need to be increased where a room contains more than one appliance (such as a kitchen containing an open-flued boiler and an open-flued cooker).

Permanently open ventilation of rooms

1.4 A room containing an open-flued appliance may need permanently open air vents. An open-flued appliance must receive a certain amount of air from outside (‘combustion air’ in Diagram 8) dependent upon its type and rating. Infiltration through the building fabric may be sufficient but for certain appliance ratings and forms of construction, permanent openings are necessary (see Diagram 8).

Permanent ventilation of appliance compartments

1.5 Appliance compartments that enclose open-flued combustion appliances should be provided with vents large enough to admit all of the air required by the appliance for combustion and proper flue operation, whether the compartment draws its air from a room or directly from outside (see Diagram 8 (b) and (c)).

1.6 Where appliances require cooling air, appliance compartments should be large enough to enable air to circulate and high- and low-level vents should be provided (see Diagram 8 (d), (e), (f) and (g)).

1.7 Where appliances are to be installed within balanced compartments (see paragraph 0.4(2)), special provisions will be necessary and the appliance and ventilation system manufacturer’s instructions should be followed.

Ventilation of other rooms or spaces

1.8 If an appliance is room-sealed but takes its combustion air from another space in the building (such as the roof void) or if a flue has a permanent opening to another space in the building (such as where it feeds a secondary flue in the roof void), that space should have ventilation openings directly to outside. Where the roof-space is to be used as a source of air for a combustion installation serving a dwelling, the dwelling roof ventilation provisions suggested in Approved Document C would normally be satisfactory.

1.9 Where flued appliances are supplied with combustion air through air vents which open into adjoining rooms or spaces, the adjoining rooms or spaces should have air vent openings of at least the same size direct to the outside. Air vents for flueless appliances, however, should open directly to the outside air.
Diagram 8 **General air supply to a combustion appliance**  
(for sizes see Sections 2, 3 and 4)

<table>
<thead>
<tr>
<th>Air for combustion and operation of the flue</th>
<th>Open flued</th>
<th>Room sealed</th>
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<tbody>
<tr>
<td>Infiltration air</td>
<td><img src="saltfirestoves.com" alt="Diagram" /></td>
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<tr>
<td>Permanently open air vents</td>
<td><img src="saltfirestoves.com" alt="Diagram" /></td>
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<tr>
<td>(a) Appliance in room</td>
<td><img src="saltfirestoves.com" alt="Diagram" /></td>
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<tr>
<td>(b) Appliance in appliance compartment with internal vent</td>
<td><img src="saltfirestoves.com" alt="Diagram" /></td>
<td></td>
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<tr>
<td>(c) Appliance in appliance compartment with external vent</td>
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<table>
<thead>
<tr>
<th>Where cooling air is needed</th>
<th>Open flued</th>
<th>Room sealed</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d)</td>
<td><img src="saltfirestoves.com" alt="Diagram" /></td>
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<td>(e)</td>
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<td>(f)</td>
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<td>(g)</td>
<td><img src="saltfirestoves.com" alt="Diagram" /></td>
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<table>
<thead>
<tr>
<th>FLUELESS</th>
<th>Open flued</th>
<th>Room sealed</th>
</tr>
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<tbody>
<tr>
<td>Air for combustion and to carry away its products</td>
<td><img src="saltfirestoves.com" alt="Diagram" /></td>
<td><img src="saltfirestoves.com" alt="Diagram" /></td>
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Permanently open air vents

1.10 Permanently open air vents should be non-adjustable, sized to admit sufficient air for the purpose intended and positioned where they are unlikely to become blocked. Ventilators should be installed so that building occupants are not provoked into sealing them against draughts or noise. Ventilation openings should not be made in fire-resisting walls other than external walls (although they should not penetrate those parts of external walls shielding LPG tanks). Air vents should not be located within a fireplace recess except on the basis of specialist advice.

1.11 A way of meeting the requirement would be to size permanently open air vents so that their equivalent area is sufficient for the appliance(s) to be installed (taking account where necessary of obstructions such as grilles and anti-vermin mesh), and to site them:

a. outside fireplace recesses and beyond the hearths of open fires so that dust or ash will not be disturbed by draughts; and

b. in a location unlikely to cause discomfort from cold draughts.

1.12 Where ventilation is to be provided via a single proprietary assembly, for example when it is proposed to use a proprietary ventilator with integral grilles to bridge a cavity wall, the equivalent area of the ventilator should be taken as that declared by the manufacturer having been measured by the method in BS EN 13141-1:2004.

1.13 Where two or more components are to be used to provide a non-proprietary assembly, the assembly should be kept as simple and smooth as possible. The assembly should be taken to have an equivalent area equal to that of the component with the smallest equivalent area in the assembly.

1.14 The equivalent area stated in the ventilator manufacturer’s literature or marked on the air vent should be used whenever it is available, as this can differ considerably from the free area measured at one end of the air vent. When this is not available the equivalent area of a simple ventilator with no internal baffles can be taken as the total unobstructed cross-sectional area, measured in the plane where this area is at a minimum and at right angles to the direction of air flow. For an airbrick, grille or louvre with apertures no smaller than 5mm, it will be the aggregate free area of the individual apertures as shown Diagram 9.
1.15 Grilles or meshes protecting air vents from the entry of animals or birds should have aperture dimensions no smaller than 5mm.

1.16 Discomfort from cold draughts can be avoided by supplying air directly to appliances, locating vents close to appliances (for example by using floor vents), by drawing air from intermediate spaces such as hallways or by ensuring good mixing of incoming cold air by placing external air vents close to ceilings (see Diagrams 10 and 11). In noisy areas it may be necessary to install noise-attenuated ventilators to limit the entry of noise into the building. Transfer or connecting ventilation should be at low level to reduce the transfer of smoke in the event of a fire and otherwise meet the guidance given in Approved Document B.

1.17 Buildings may have air-tight membranes in their floors to isolate them from the ground below. Ventilation ducts or vents installed to supply air to combustion appliances should not penetrate these membranes in a way that will render them ineffective. Such membranes (including radon-proof membranes) are described in BRE Report BR 414 (2001) and BRE Report BR 211 (2007), which give guidance when service penetrations are necessary.

Provisions complying with both Part F and Part J

1.18 Rooms or spaces intended to contain open-flued combustion appliances may need permanent ventilation to comply with Part J and adjustable ventilation to comply with Part F. Permanently open air vents for combustion appliances can be accepted in place of some or all of the adjustable background ventilation for health, dependent upon opening area and location. However adjustable vents installed to meet the requirements of Part F cannot be used as substitutes for the ventilation openings needed to comply with Part J unless they are fixed permanently open.

1.19 Rooms or spaces intended to contain flueless appliances may need: permanent ventilation and purge ventilation (such as openable windows) to comply with Part J; and adjustable ventilation and rapid ventilation to comply with Part F. Permanent ventilation provisions to comply with Part J may be acceptable in place of adjustable ventilation provisions for Part F subject to the limitations described in Paragraph 1.18. Openable elements installed for the rapid ventilation of rooms and other provisions made for the rapid ventilation of kitchens, in order to comply with Part F, may be acceptable in place of openable elements for the rapid ventilation of rooms or spaces containing flueless appliances.

Diagram 10 Location of permanent air vent openings, some examples
Interaction of mechanical extract ventilation and open-flued combustion appliances

1.20 Extract fans lower the pressure in a building, which can cause the spillage of combustion products from open-flued appliances. This can occur even if the appliance and the fan are in different rooms. Ceiling fans produce air currents and hence local depressurisation, which can also cause the spillage of flue gases from open-flued appliances or from solid fuel open fires. In buildings where it is intended to install open-flued combustion appliances and extract fans, the combustion appliances should be able to operate safely whether or not the fans are running. A way of showing compliance in these circumstances would be to follow the installation guidance below, and to show by tests that combustion appliances operate safely whether or not fans are running.

a. For gas appliances: where a kitchen contains an open-flued appliance, the extract rate of the kitchen extract fan should not exceed 20 litres/second (72 m³/hour).

b. For oil appliances: where a room contains an open-flued appliance the extract rate should be limited to 40 litres/second for an appliance with a pressure jet burner and 20 litres/second for an appliance with a vapourising burner.

c. For solid fuel appliances: avoid installing extract ventilation in the same room. An open-flued appliance in a kitchen may satisfy the requirements of Part F through passive stack ventilation. Refer to Approved Document F. If mechanical extraction is unavoidable then seek specialist advice to ensure safe operation of the appliance.

d. For commercial and industrial installations, specialist advice may be necessary regarding the possible need for the interlocking of gas heaters and any mechanical ventilation systems.

e. When fans are used to extract radon from below a building follow the guidance in BRE Good Building Guide GBG 25.

1.21 A suitable test would be to check for spillage when appliances are subjected to the greatest possible depressurisation. A prerequisite for this condition is that all external doors, windows and other adjustable ventilators to outside are closed. The depressurisation at the appliance will depend on the particular combination of fans in operation (fans in the room containing the appliance and fans elsewhere in the building) and the pattern of open internal doors, hatches etc. which is established at the time of the test (when fans should be on their maximum useable setting), and the specific combination causing the greatest depressurisation at the appliance depends upon the circumstances in each case. Several tests (which should include a test with the door leading into the room of installation closed and all fans in that room switched on) may therefore be necessary to demonstrate the safe operation of the appliance with reasonable certainty. The effect of ceiling fans should be checked during the tests.

1.22 The presence of some fans may be obvious, such as those on view in kitchens, but others may be less obvious: fans installed in domestic appliances such as tumble dryers and fans fitted to other open-flued combustion appliances can also contribute to depressurisation. In addition, fans may also be provided to draw radon gas from the ground below a building (see Paragraph 1.17).
1.23 The appliance manufacturer's installation instructions may describe a suitable spillage test for gas appliances but the procedure in BS 5440-1:2008 can be used. For oil-fired appliances the effects of fans can be checked and, where spillage or flue draught interference is identified, it may be necessary to add additional ventilation to the room or space. A flue draught interference test for oil-fired appliances is described in OFTEC Technical Books 2, 4 and 5.

Provision of flues

1.24 Appliances other than flueless appliances should incorporate or be connected to suitable flues which discharge to the outside air.

1.25 This Approved Document provides guidance on how to meet the requirements in terms of constructing a flue or chimney, where each flue serves one appliance only. Flues designed to serve more than one appliance can meet the requirements by following the guidance in BS 5410-1:1997 for oil- and BS 5440-1:2008 for gas-fired systems. However, each solid fuel appliance should have its own flue.

Condensates in flues

1.26 Chimneys and flues should provide satisfactory control of water condensation. Ways of providing satisfactory control include:

a. for chimneys that do not serve condensing appliances, by insulating flues so that flue gases do not condense in normal operation

b. for chimneys that do serve condensing appliances:

i. by using lining components that are impervious to condensates and suitably resistant to corrosion (BS EN 1443:2003 ‘W’ designation) and by making appropriate provisions for draining, avoiding ledges, crevices, etc

ii. making provisions for the disposal of condensate from condensing appliances.

Construction of masonry chimneys

1.27 New masonry chimneys should be constructed with flue liners and masonry suitable for the intended application. Ways of meeting the requirement would be to use bricks, medium-weight concrete blocks or stone (with wall thicknesses as given in Section 2, 3 or 4 according to the intended fuel) with suitable mortar joints for the masonry and suitably supported and caulked liners. Liners suitable for solid fuel appliances (and generally suitable for other fuels) could be:

a. liners whose performance is at least equal to that corresponding to the designation T400 N2 D 3 G, as described in BS EN 1443:2003, such as:

b. other products that meet the criteria in a).

Construction of flueblock chimneys

1.29 Flueblock chimneys should be constructed of factory-made components suitable for the intended application installed in accordance with the manufacturer's instructions. Ways of meeting the requirement for solid fuel appliances (and generally suitable for other fuels) include using:

a. flueblocks whose performance is at least equal to that corresponding to the designation T400 N2 D 3 G, as described in BS EN 1443:2003, such as:

i. clay flue liners with rebates or sockets for jointing meeting the requirements for Class A1 N2 or Class A1 N1 as described in BS EN 1457:2009; or

ii. concrete flue liners meeting the requirements for the classification Type A1, Type A2, Type B1 or Type B2 as described in BS EN 1857:2003; or

iii. other products that meet the criteria in a).
Material change of use

1.31 Where a building is to be altered for different use (e.g. it is being converted into flats) the fire resistance of walls of existing masonry chimneys may need to be improved as shown in Diagram 12.

Connecting fluepipes

1.32 Satisfactory components for constructing connecting fluepipes include:
   a. cast iron fluepipes complying with BS 41:1973 (1998)
   b. metal flue pipes appropriately designated in accordance with BS EN1856-2:2004 to suit the appliance and types of fuels to be burnt – refer to detailed guidance in Sections 2, 3 and 4.
   d. other fluepipes having the necessary performance designation for use with the intended appliance.

1.33 Fluepipes with spigot and socket joints should be fitted with the socket facing upwards to contain moisture and other condensates in the flue. Joints should be made gas-tight. A satisfactory way of achieving this would be to use proprietary jointing accessories or, where appropriate, by packing joints with non-combustible rope and fire cement.

Repair of flues

1.34 It is important to the health and safety of building occupants that renovations, refurbishments or repairs to flue liners should result in flues that comply with the requirements of J2 to J5. The test procedures referred to in paragraph 1.55 and in Appendix E can be used to check this.

1.35 Flues are controlled services as defined in Regulation 2 of the Building Regulations, that is to say they are services in relation to which Part J of Schedule 1 imposes requirements. If renovation, refurbishment or repair amounts to or involves the provision of a new or replacement flue liner, it is ‘building work’ within the meaning of Regulation 3 of the Building Regulations. ‘Building work’ and must not be undertaken without prior notification to the local authority. Examples of work that would need to be notified include:
   a. relining work comprising the creation of new flue walls by the insertion of new linings such as rigid or flexible prefabricated components

Diagram 12 Material change of use: fire protection of chimneys passing through other dwellings
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.
Concealed flues

1.47 Where a flue is routed within a void, appropriate means of access at strategic locations should be provided to allow the following aspects to be visually checked and confirmed. This is necessary both when an appliance is first installed and subsequently when the appliance is serviced:

- the flue is continuous throughout its length
- all joints appear correctly assembled and are appropriately sealed
- the flue is adequately supported throughout its length
- any required gradient of fall back to the boiler (required to recover the condensate produced as part of the combustion process) and any other required drain points have been provided.

Means of access for flues needs to be sufficiently sized and positioned to allow a visual inspection to be undertaken of the flue, particularly at any joints in the flue. It is not intended that the means of access should be sized to allow full physical access to the flue system. Diagram 14 shows an acceptable approach for a flue in an ceiling void.

Flues should not pass through another dwelling since access for inspection may not always be available to that dwelling and chimney system running through it. Flues may pass through communal areas including purpose-designed ducts where inspection access is provided. Any ‘means of access’ should not impair any fire, thermal or acoustic requirements of the Building Regulations. Refer to the relevant guidance in Approved Documents B, L and E. Where necessary, inspection panels or hatches should be fitted with resilient seals and provide the similar standards of fire, thermal and acoustic isolation to the surrounding structure.

Access hatches should be at least 300mm x 300mm or larger where necessary to allow sufficient access to the void to look along the length of the flue. Diagram 14 shows an acceptable approach to providing access to a horizontal flue located within a ceiling void.
Configuration of natural draught flues serving open-flued appliances

1.48 Flue systems should offer least resistance to the passage of flue gases by minimising changes in direction or horizontal length. A way of meeting the requirement would be to build flues so that they are straight and vertical except for the connections to combustion appliances with rear outlets where the horizontal section should not exceed 150mm. Where bends are essential, they should be angled at no more than 45° to the vertical.

1.49 Provisions should be made to enable flues to be swept and inspected. A way of making reasonable provision would be to limit the number of changes of direction between the combustion appliance outlet and the flue outlet to not more than four (each up to 45°), with not more than two of these being between an intended point of access for sweeping and either another point of access for sweeping or the flue outlet. (90° factory-made bends, elbows or Tee pieces in fluepipes may be treated as being equal to two 45° bends (see Diagram 15)).
Inspection and cleaning openings in flues

1.50 A flue should not have openings into more than one room or space except for the purposes of:
   a. inspection or cleaning; or
   b. fitting an explosion door, draught break, draught stabiliser or draught diverter.

1.51 Openings for inspection and cleaning should be formed using purpose factory-made components compatible with the flue system, having an access cover that has the same level of gas-tightness as the flue system and an equal level of thermal insulation. Openings for cleaning the flue should allow easy passage of the sweeping brush. Covers should also be non-combustible except where fitted to a combustible fluepipe (such as a plastic fluepipe). After the appliance has been installed, it should be possible to sweep the whole flue.

Dry lining around fireplace openings

1.53 Where a decorative treatment, such as a fireplace surround, masonry cladding or dry lining, is provided around a fireplace opening, any gaps that could allow flue gases to escape from the fireplace opening into the void behind the decorative treatment should be sealed to prevent such leakage. The sealing material should be capable of remaining in place despite any relative movement between the decorative treatment and the fireplace recess.

Flues discharging at low level near boundaries

1.52 Flues discharging at low level near boundaries should do so at positions where the building owner will always be able to ensure safe flue gas dispersal. A way of achieving this where owners of adjacent land could build up to the boundary would be to adopt the suggestions in Diagram 34 or 41, as relevant.

Condition of combustion installations at completion

1.54 Responsibility for achieving compliance with the requirements of Part J rests with the person carrying out the work. That 'person' may be, e.g., a specialist firm directly engaged by a private client or it may be a developer or main contractor who has carried out work subject to Part J or engaged a sub-contractor to carry it out. In order to document the steps taken to achieve compliance with the requirements, a report should be drawn up showing that materials and components appropriate to the intended application have been used and that flues have passed appropriate tests. A suggested checklist for such a report is given at Appendix A and guidance on testing is given at Appendix E. Other forms of report may be acceptable. Specialist firms should provide the report to the client, developer or main contractor, who may be asked for documentation by the Building Control Body.
1.55 *Flues* should be checked at completion to show that they are free from obstructions, satisfactorily gas-tight and constructed with materials and components of sizes which suit the intended application. Where the building work includes the installation of a *combustion appliance*, tests should cover *fluepipes* and [the gas-tightness of] joints between *fluepipes* and *combustion appliance* outlets. A spillage test to check for compliance with J2 should be carried out with the appliance under fire, as part of the process of commissioning to check for compliance with Part L, and (in relevant cases) as required by the Gas Safety (Installation and Use) Regulations.

1.56 *Hearths* should be constructed with materials and components of sizes to suit the intended application and should show the area where combustible materials should not intrude.

### Notice plates for hearths and flues (Requirement J5)

1.57 Where a *hearth*, *fireplace* (including a *flue box*), *flue* or *chimney* is provided or extended (including cases where a *flue* is provided as part of the refurbishment work), information essential to the correct application and use of these facilities should be permanently posted in the building. A way of meeting this requirement would be to provide a notice plate as shown in Diagram 16 conveying the following information:

- a. the location of the *hearth*, *fireplace* (or *flue box*) or the location of the beginning of the *flue*;
- b. the category of the *flue* and generic types of appliances that can be safely accommodated;
- c. the type and size of the *flue* (or its liner if it has been relined) and the manufacturer’s name;
- d. the installation date.

1.58 Notice plates should be robust, indelibly marked and securely fixed in an unobtrusive but obvious position within the building such as:

- a. next to the electricity consumer unit; or
- b. next to the *chimney* or *hearth* described; or
- c. next to the water supply stop-cock.

1.59 For *chimney* products whose performance characteristics have been assessed in accordance with a European Standard (EN) and which are supplied or marked with a *designation*, the installer may optionally include this *designation* on the label as shown in Diagram 16.

### Access to combustion appliances for maintenance

1.60 There should be a permanent means of safe access to appliances for maintenance. Roof space installations of gas-fired appliances should comply with the requirements of BS 6798:2009.

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**Diagram 16** Example notice plate for hearths and flues

<table>
<thead>
<tr>
<th><strong>Essential information</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Property address: 20 Main Street, New Town</td>
</tr>
<tr>
<td>The hearth and chimney installed in the: lounge</td>
</tr>
<tr>
<td>are suitable for: decorative fuel effect gas fire</td>
</tr>
<tr>
<td>Chimney liner: double skin stainless steel flexible, 200mm diameter</td>
</tr>
<tr>
<td>Suitable for condensing appliance: no</td>
</tr>
<tr>
<td>Installed on: date</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Optional additional information</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Other information (optional): Designation of stainless steel liner stated by manufacturer to be T450 N2 S D 3</td>
</tr>
<tr>
<td>e.g. installer’s name, product trade names, installation and maintenance advice, European chimney product designations, warnings on performance limitations of imitation elements, e.g. false hearths.</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Type of appliance</th>
<th>Type and amount of ventilation (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open appliance, such as an open fire with no throat, e.g. a fire under a canopy as in Diagram 23.</td>
<td>Permanently open air vent(s) with a total equivalent area of at least 50% of the cross sectional area of the flue.</td>
</tr>
<tr>
<td>Open appliance, such as an open fire with a throat as in Diagrams 22 and 29.</td>
<td>Permanently open air vent(s) with a total equivalent area of at least 50% of the throat opening area. (2)</td>
</tr>
<tr>
<td>Other appliance, such as a stove, cooker or boiler, with a flue draught stabiliser.</td>
<td>Permanently open vents as below: If design air permeability &gt;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)</td>
</tr>
<tr>
<td>Other appliance, such as a stove, cooker or boiler, with no flue draught stabiliser.</td>
<td>Permanently open vents as below: If design air permeability &gt;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)</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Nominal fire size (fireplace opening size)</th>
<th>500mm</th>
<th>450mm</th>
<th>400mm</th>
<th>350mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total equivalent area of permanently open air vents</td>
<td>20,500mm²</td>
<td>18,500mm²</td>
<td>16,500mm²</td>
<td>14,500mm²</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Table 2 Size of flues in chimneys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation (1)</td>
</tr>
<tr>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Fireplace with an opening of up to 500mm x 550mm</td>
</tr>
<tr>
<td>Fireplace with an opening in excess of 500mm x 550mm or a fireplace exposed on two or more sides</td>
</tr>
<tr>
<td>Closed appliance of up to 20kW rated output which:</td>
</tr>
<tr>
<td>a) burns smokeless or low-volatiles fuel (2) or</td>
</tr>
<tr>
<td>b) is an appliance which meets the requirements of the Clean Air Act when burning an appropriate bituminous coal (3) or</td>
</tr>
<tr>
<td>c) is an appliance which meets the requirements of the Clean Air Act when burning wood (3)</td>
</tr>
<tr>
<td>Pellet burner or pellet boiler which meets the requirements of the Clean Air Act (3)</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>Other closed appliance of up to 30kW rated output burning any fuel</td>
</tr>
<tr>
<td>Closed appliance of above 30kW and up to 50kW rated output burning any fuel</td>
</tr>
</tbody>
</table>

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.
Advisory note J

Combustion appliances and fuel storage systems

Additional provisions for appliances burning solid fuel with a rated output up to 50kW

Diagram 17: Flue outlet positions for solid fuel appliances

<table>
<thead>
<tr>
<th>Point where flue passes through weather surface (Notes 1, 2)</th>
<th>Clearances to flue outlet</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> At or within 600mm of the ridge</td>
<td>At least 600mm above the ridge</td>
</tr>
<tr>
<td><strong>B</strong> Elsewhere on a roof (whether pitched or flat)</td>
<td>At least 2300mm horizontally from the nearest point on the weather surface and:</td>
</tr>
<tr>
<td></td>
<td>a) at least 1000mm above the highest point of intersection of the chimney and the weather surface; or</td>
</tr>
<tr>
<td></td>
<td>b) at least as high as the ridge.</td>
</tr>
<tr>
<td><strong>C</strong> Below (on a pitched roof) or within 2300mm horizontally to an openable rooflight, dormer window or other opening (Note 3)</td>
<td>At least 1000mm above the top of the opening.</td>
</tr>
<tr>
<td><strong>D</strong> Within 2300mm of an adjoining or adjacent building, whether or not beyond the boundary (Note 3)</td>
<td>At least 600mm above any part of the adjacent building within 2300mm.</td>
</tr>
</tbody>
</table>

Notes

1) The weather surface is the building external surface, such as its roof, tiles or external walls.
2) A flat roof has a pitch less than 10°.
3) The clearances given for A or B, as appropriate, will also apply.
4) A vertical flue fixed to an outside wall should be treated as equivalent to an inside flue emerging at the nearest edge of the roof.
2.12 A way of meeting the requirements where flues discharge on or in close proximity to roofs with surfaces which are readily ignitable, such as where roofs are covered in thatch or shingles, would be to increase the clearances to flue outlets to those shown in Diagram 18.

**Note:** Thatched roofs can sometimes be vulnerable to spontaneous combustion caused by heat transferred from flues building up in thick layers of thatch in contact with the chimney. To reduce the risk it is recommended that rigid twin-walled insulated metal flue liners be used within a ventilated (top and bottom) masonry chimney void provided they are adequately supported and not in direct contact with the masonry. Non-metallic chimneys and cast in-situ flue liners can also be used provided the heat transfer to the thatch is assessed in relation to the depth of thatch and risk of spontaneous combustion.

Spark arrestors are not generally recommended as they can be difficult to maintain and may increase the risk of flue blockage and flue fires.

Further information and recommendations are contained in Hetas Information Paper 1/007 Chimneys in Thatched Properties.

**Connecting fluepipes**

2.13 For connecting fluepipes a way of meeting the requirements would be to follow the general guidance in Paragraphs 1.32 and 1.33.

**Location and shielding of connecting fluepipes**

2.14 Connecting fluepipes should be used only to connect appliances to their chimneys. They should not pass through any roof space, partition, internal wall or floor, except to pass directly into...
a chimney through either a wall of the chimney or a floor supporting the chimney. Connecting fluepipes should also be guarded if they could be at risk of damage or if the burn hazard they present to people is not immediately apparent.

2.15 Connecting fluepipes should be located so as to avoid igniting combustible material. Ways of meeting the requirement include minimising horizontal and sloping runs and:

a. following the guidance in Paragraph 1.45 where the connecting fluepipe is a factory-made metal chimney whose performance is at least equal to designation T400 N2 D3 G according to BS EN 1856-1:2003 or BS EN 1856-2:2004, and installed to BS EN 15827-1; or

b. separation by shielding in accordance with Diagram 19.

Debris collection space

2.16 Where a chimney cannot be cleaned through the appliance, a debris collecting space which is accessible for emptying and suitably sized opening(s) for cleaning should be provided at appropriate locations in the chimney.

Masonry and flueblock chimneys

2.17 Masonry chimneys should be built in accordance with Paragraphs 1.27 and 1.28. Flueblock chimneys should be built in accordance with Paragraphs 1.29 and 1.30. The minimum chimney thickness and distance to combustibles (x×mm) should be no less than the manufacturer’s product declaration (Gxx) based on testing to BS EN 1858:2008 (concrete flue blocks) or BS EN 1806:2006 (clay/ceramic flueblocks). Other masonry chimney products should exceed the minimum thickness indicated in Diagram 20.
Separation of combustible material from fireplaces and masonry flues

2.18 Combustible material should not be located where it could be ignited by the heat dissipating through the walls of fireplaces or masonry flues. A way of meeting the requirement would be to follow the guidance in Diagram 21 so that combustible material is at least:

a. 200mm from the inside surface of a flue or fireplace recess; or
b. at least xmm from a flue product with designated separation distance (Gxx); or

c. 40mm from the outer surface of a masonry chimney or fireplace recess unless it is a floorboard, skirting board, dado or picture rail, mantel-shelf or architrave. Metal fixings in contact with combustible materials should be at least 50mm from the inside surface of a flue.

Factory-made metal chimneys

2.19 A way of meeting the requirements would be to comply with Paragraphs 1.42 to 1.46 in Section 1 (but not Paragraph 1.42(b)). The appropriate designation is given in Table 3.

Lining and relining of flues in chimneys

2.20 Lining or relining flues may be building work and, in any case, such work should be carried out so that the objectives of J2 to J5 are met (see Paragraphs 1.34 and 1.35). Existing flues being re-used should be checked as described in Paragraph 1.36. Ways of meeting the requirements include the use of:

a. liners whose performance is at least equal to that corresponding to the designation T400 N2 D3 G, as described in BS EN 1443:2003, such as:

i. factory-made flue lining systems manufactured to BS EN 1856-1:2003 or BS EN 1856-2:2004.

ii. a cast in-situ flue relining system where the material and installation procedures are suitable for use with solid fuel burning appliances and meeting the relevant requirements of BS EN 1857:2003 + A1:2008.

iii. other systems which are suitable for use with solid fuel-burning appliances and meeting the criteria in (a).

b. liners as described in Paragraph 1.27.
Diagram 21  **Minimum separation distances from combustible material in or near a chimney**

![Diagram](https://saltfirestoves.com)

**Table 3  Minimum performance designations for chimney and fluepipe components for use with new solid fuel fired appliances**

<table>
<thead>
<tr>
<th>Appliance type</th>
<th>Minimum designation</th>
<th>Fuel type</th>
</tr>
</thead>
<tbody>
<tr>
<td>All solid fuel appliances</td>
<td>Masonry or flueblock flue with liner to T400 N2 D3 Gxx</td>
<td>Coal, Smokeless Fuel, Peat, wood and other biomass</td>
</tr>
<tr>
<td></td>
<td>Clay flue blocks FB1N2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clay/ceramic liners B1N2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Concrete liners B2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Factory made metal chimneys to T400 N2 D3 Gxx</td>
<td></td>
</tr>
</tbody>
</table>

See paragraph 1.27–1.29 and 1.42

**Formation of gathers**

2.21 To minimise resistance to the proper working of flues, tapered gathers should be provided in fireplaces for open fires. Ways of achieving these gathers include:

a. using prefabricated gather components built into a *fireplace recess*, as shown in Diagram 22(a); or

b. corbelling of masonry as shown in Diagram 22(b); or

c. using a suitable canopy, as shown in Diagram 23; or

d. using a *prefabricated appliance chamber* incorporating a gather.
Diagram 22 Construction of fireplace gathers

(a) 
Front elevation
Flue
Prefabricated gather unit
Gather unit may be built in at time of construction of recess or retro-fitted into rectangular recess

Side elevation
Chimney may be supported by gather unit or by separate load-bearing lintel
Front of gather shaped to form throat – may be separate

(b) 
Chimney may be supported on load-bearing lintel
Gather formed with corbelled brickwork
Smooth finish to gather at an angle of not more than 45° to the vertical
Throat forming front lintel

Diagram 23 Canopy for an open solid fuel fire

Front view
Side view
Canopy
Angle not more than 45°
Canopy
Angle not more than 45°
Firebed
Hearths

2.22 Hearths should be constructed of suitably robust materials and to appropriate dimensions such that, in normal use, they prevent combustion appliances setting fire to the building fabric and furnishings, and they limit the risk of people being accidentally burnt. A way of making provision would be to adopt the guidance in Paragraphs 2.23 to 2.28 and to provide a hearth appropriate to the temperatures the appliance can create around it. The hearth should be able to accommodate the weight of the appliance and its chimney if the chimney is not independently supported.

2.23 Appliances should stand wholly above:

a. hearths made of non-combustible board/sheet material or tiles at least 12mm thick, if the appliance is not to stand in an appliance recess and has been tested to an applicable appliance standard to verify that it cannot cause the temperature of the upper surface of the hearth to exceed 100°C; or

b. constructional hearths in accordance with the paragraphs below.

2.24 Constructional hearths should:

a. have plan dimensions as shown in Diagram 24; and

b. be made of solid, non-combustible material, such as concrete or masonry, at least 125mm thick, including the thickness of any non-combustible floor and/or decorative surface.

2.25 Combustible material should not be placed beneath constructional hearths unless there is an air-space of at least 50mm between the underside of the hearth and the combustible material, or the combustible material is at least 250mm below the top of the hearth (see Diagram 25).
2.26 An appliance should be located on a hearth so that it is surrounded by a surface free of combustible material as shown in Diagram 26. This surface may be part of the surface of the hearth provided in accordance with Paragraph 2.23, or it may be the surface of a superimposed hearth laid wholly or partly upon a constructional hearth. The boundary of this surface should be visually apparent to provide a warning to the building occupants and to discourage combustible floor finishes such as carpet from being laid too close to the appliance. A way of achieving this would be to provide a change in level.

2.27 Dimensions shown in Diagram 26 may be reduced to manufacturer's recommendations for appliances with surface temperatures not exceeding 85°C when in normal operation and where there is no risk of spillage of fuel or ash.

2.28 Combustible material placed on or beside a constructional hearth should not extend under a superimposed hearth by more than 25mm or to closer than 150mm measured horizontally to the appliance.

2.29 Some ways of making these provisions are shown in Diagram 27.

Fireplace recesses and prefabricated appliance chambers

2.30 Fireplaces for open fires need to be constructed such that they adequately protect the building fabric from catching fire. A way of achieving the requirements would be to build:

a. fireplace recesses from masonry or concrete as shown in Diagram 28; or

b. prefabricated factory-made appliance chambers using components that are made of insulating concrete having a density of between 1200 and 1700 kg/m³ and with the minimum thickness as shown in Table 4. Components should be supplied as sets for assembly and jointing in accordance with the manufacturer's instructions.
Diagram 27  *Ways of providing hearths*

(a) Appliance that cannot cause hearth temperature to exceed 100°C

(b) Any appliance standing directly on a constructional hearth

(c) Any appliance in a fireplace recess with a superimposed hearth
Combustion appliances and fuel storage systems

Approved Document J

Diagram 28  Fireplacerecesses

(a) Solid wall

![Diagram of solid wall with dimensions]

(b) Cavity wall

![Diagram of cavity wall with dimensions]

(c) Back to back (within the same dwelling)

Table 4  Prefabricated appliance chambers: minimum thickness

<table>
<thead>
<tr>
<th>Component</th>
<th>Minimum thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>50</td>
</tr>
<tr>
<td>Side section, forming wall on either side of chamber</td>
<td>75</td>
</tr>
<tr>
<td>Back section, forming rear of chamber</td>
<td>100</td>
</tr>
<tr>
<td>Top slab, lintel or gather, forming top of chamber</td>
<td>100</td>
</tr>
</tbody>
</table>

Fireplace lining components

2.31 A fireplace recess may require protection from heat if it is to provide a durable setting for certain appliances such as inset open fires. Suitable protection would be fireplace lining components as shown in Diagram 29 or lining the recess with suitable firebricks.

Walls adjacent to hearths

2.32 Walls that are not part of a fireplace recess or a prefabricated appliance chamber but are adjacent to hearths or appliances also need to protect the building from catching fire. A way of achieving the requirement is shown in Diagram 30. Thinner material could be used provided it gives the same overall level of protection as the solid non-combustible material.

2.33 Clearances shown in Diagram 30 may be reduced to manufacturer’s recommendations for appliances with surface temperatures not exceeding 85°C when in normal operation.

Alternative approach

The requirements may also be met by adopting the relevant recommendations in the publications listed below to achieve a level of performance equivalent to that obtained by following the guidance in this Approved Document:

a. BS EN 15287-1:2007 Chimneys. Design, installation and commissioning of chimneys. Chimneys for non-room-sealed heating appliances; and

b. BS 8303:1994 Installation of domestic heating and cooking appliances burning solid mineral fuels. Parts 1 to 3.
Carbon monoxide alarms

2.34 Where a new or replacement fixed solid fuel appliance is installed in a dwelling, a carbon monoxide alarm should be provided in the room where the appliance is located.

2.35 Carbon monoxide alarms should comply with BS EN 50291:2001 and be powered by a battery designed to operate for the working life of the alarm. The alarm should incorporate a warning device to alert users when the working life of the alarm is due to pass. Mains-powered BS EN 50291 Type A carbon monoxide alarms with fixed wiring (not plug-in types) may be used as alternative applications provided they are fitted with a sensor failure warning device.

2.36 The carbon monoxide alarm should be located in the same room as the appliance:
   a. on the ceiling at least 300mm from any wall or, if it is located on a wall, as high up as possible (above any doors and windows) but not within 150mm of the ceiling; and
   b. between 1m and 3m horizontally from the appliance.

Note: Further guidance on the installation of carbon monoxide alarms is available in BS EN 50292:2002 and from manufacturers’ instructions. Provision of an alarm should not be regarded as a substitute for correct installation and regular servicing.

Diagram 29 Open fireplaces: throat and fireplace components
ADDENDUM PROVISIONS FOR APPLIANCES BURNING SOLID FUEL WITH A RATED OUTPUT UP TO 50kW

Diagram 30 Wall adjacent to hearths

<table>
<thead>
<tr>
<th>Location of hearth or appliance</th>
<th>Solid, non-combustible material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where the hearth abuts a wall and the appliance is not more than 50mm from the wall</td>
<td>Thickness (T)</td>
</tr>
<tr>
<td></td>
<td>200mm</td>
</tr>
<tr>
<td></td>
<td>Height (H)</td>
</tr>
<tr>
<td></td>
<td>At least 300mm above the appliance and 1.2m above the hearth</td>
</tr>
<tr>
<td>Where the hearth abuts a wall and the appliance is more than 50mm but not more than 300mm from the wall</td>
<td>75mm</td>
</tr>
<tr>
<td></td>
<td>At least 300mm above the appliance and 1.2m above the hearth</td>
</tr>
<tr>
<td>Where the hearth does not abut a wall and is no more than 150mm from the wall (see Note 1)</td>
<td>75mm</td>
</tr>
<tr>
<td></td>
<td>At least 1.2m above the hearth</td>
</tr>
</tbody>
</table>

Note: 1. There is no requirement for protection of the wall where X is more than 150mm.
### Appendix A: Checklist for checking and testing of hearths, fireplaces, flues and chimneys

**EXAMPLES: SEE PARAGRAPH 1.55**

**Hearth, fireplace, flues and chimneys**

The checklist can help you to ensure hearths, fireplaces, flues and chimneys are satisfactory. If you have been directly engaged, copies should also be offered to the client and to the Building Control Body to show what you have done to comply with the requirements of Part J. If you are a subcontractor, a copy should be offered to the main contractor.

<table>
<thead>
<tr>
<th>1. Building address, where work has been carried out</th>
<th>Example: Fireplace in lounge</th>
<th>Example: Gas fire in rear addition bedroom</th>
<th>Example: Small boiler room</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Identification of hearth, fireplace, chimney or flue</td>
<td>Example: Fireplace in lounge</td>
<td>Example: Gas fire in rear addition bedroom</td>
<td>Example: Small boiler room</td>
</tr>
<tr>
<td>3. Firing capability: solid fuel/gas/oil/all.</td>
<td>All</td>
<td>Gas only</td>
<td>Oil only</td>
</tr>
<tr>
<td>4. Intended type of appliance. State type or make. If open fire give finished fireplace opening dimensions.</td>
<td>Open fire 480 W x 560 H (mm)</td>
<td>Radiant/convector fire 6kw input</td>
<td>Oil fire boiler 18kw output (pressure jet)</td>
</tr>
<tr>
<td>5. Ventilation provisions for the appliance: State type and area of permanently open air vents.</td>
<td>2 through wall ventilators each</td>
<td>Not fitted</td>
<td>Vents to outside:</td>
</tr>
<tr>
<td></td>
<td>10,000mm² (100cm²)</td>
<td></td>
<td>Top 9,900mm²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bottom 19,800mm²</td>
</tr>
</tbody>
</table>
| 6. Chimney or flue construction
  a) State the type and make and whether new or existing. | New. Brick with clay liners | Existing masonry | S.S. prefab to BS 4543-2 |
| | 200mm Ø | 125mm Ø (H=3.3m) | 127mm Ø |
|  b) Internal flue size (and equivalent height, where calculated – natural draught gas appliances only). | Sockets uppermost | Not applicable | Not applicable |
|  c) If clay or concrete flue liners used confirm they are correctly jointed with socket end uppermost and state joining materials used. | Jointed by fire cement | Not applicable | Not applicable |
|  d) If an existing chimney has been refurbished with a new liner, type or make of liner fitted. | Not applicable | Flexible metal liner | Not applicable |
|  e) Details of flue outlet terminal and diagram reference. | Smith Ltd Louved pot 125mm Ø QC1 terminal Maker’s recommended terminal | As Diagram 17, AD J As BS 5440:1:2008 |
| | 200mm Ø | | As Diagram 41, AD J |
|  f) Number and angle of bends. | 2 x 45˚ | 2 x 45˚ | 1 x 90˚ Tee |
|  g) Provision for cleaning and recommended frequency. | Sweep annually via fireplace opening | Annual service by Gas Safe Register engineer | Sweep annually via base of Tee and via appliance |
| 7. Hearth, form of construction. New or existing? | New: Tiles on concrete floor. 125mm thick. As Diagram 25 AD J | New: Solid floor Min 125mm concrete above DPM. As Diagram 42, ADJ |
| 8. Inspection and testing after completion
  Test carried out by: | Inspected and tested by | Tested by J Smith, GasSafe Reg no. 1234 | Tested by J Smith, The Oil Heating Co. |
| | J Smith, Smith Building Co. | | |
| Flue inspection | visual sweeping | not possible, bends | Not possible, bends |
| | coring ball | OK | Not applicable |
| | smoke | Not applicable | OK |
| | Appliance (where included) spillage | Not included | OK |

I/We the undersigned confirm that the above details are correct. In my opinion, these works comply with the relevant requirements in Part J of Schedule 1 to the Building Regulations.

Print name and title .............................................................................................................................................................. Profession ...........................................................

Capacity …(e.g. “Proprietor of Smith’s Flues”, Authorising Engineer for Brown plc)................................................................. Tel no. …...........................

Address ....................................................................................................................................................................................... Postcode …...........................................

Signed …………………………………………………………………………………………………………………………………………… Date ……………………………………………

Registered membership of …(e.g. GasSafe, OFTEC, HETAS, NACE, NACS) ……………………………………………………………………………………………………………………………………………………………
### Hearth, fireplace, flues and chimneys

The checklist can help you to ensure that hearths, fireplaces, flues and chimneys are satisfactory. If you have been directly engaged, copies should also be offered to the client and to the Building Control Body to show what you have done to comply with the requirements of Part J. If you are a sub-contractor, a copy should be offered to the main contractor.

<table>
<thead>
<tr>
<th>1. Building address, where work has been carried out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Identification of hearth, fireplace, chimney or flue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Firing capability: solid fuel/gas/oil/all.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Intended type of appliance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>State type or make. If open fire give finished fireplace opening dimensions.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Ventilation provisions for the appliance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>State type and area of permanently open air vents.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. Chimney or flue construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) State the type and make and whether new or existing.</td>
</tr>
<tr>
<td>b) Internal flue size (and equivalent height, where calculated – natural draught gas appliances only).</td>
</tr>
<tr>
<td>c) If clay or concrete flue liners used confirm they are correctly jointed with socket end uppermost and state joining materials used.</td>
</tr>
<tr>
<td>d) If an existing chimney has been refurbished with a new liner, type or make of liner fitted.</td>
</tr>
<tr>
<td>e) Details of flue outlet terminal and diagram reference.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outlet detail:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complies with:</td>
</tr>
</tbody>
</table>

| f) Number and angle of bends. |
| g) Provision for cleaning and recommended frequency. |
|                                             |
|                                             |

<table>
<thead>
<tr>
<th>7. Hearth, form of construction. New or existing?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. Inspection and testing after completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test carried out by:</td>
</tr>
<tr>
<td>Test (Appendix E in AD J) and results</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flue inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>visual sweeping</td>
</tr>
<tr>
<td>coring ball smoke</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appliance (where included) spillage</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>I/We the undersigned confirm that the above details are correct. In my opinion, these works comply with the relevant requirements in Part J of Schedule 1 to the Building Regulations.</th>
</tr>
</thead>
</table>

| Print name and title ................................................................. | Profession ...................................................... |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capacity ... (e.g. “Proprietor of Smith’s Flues”, Authorising Engineer for Brown plc) ................................................................. | Tel no. ................................................. |
| Address ......................................................................................... | Postcode ................................................ |
| Signed ........................................................................................ | Date ..................................................... |
| Registered membership of ... (e.g. GasSafe, OFTEC, HETAS, NACE, NACS) ........................................................................... |
Appendix B: Opening areas of large or unusual fireplaces

(SEE PARAGRAPH 2.7)

B1 The opening area of a fireplace should be calculated from the following formula:

\[
\text{Fireplace opening area (mm\(^2\))} = \left( \frac{\text{Total horizontal length of fireplace opening}}{L (\text{mm})} \right) \times \left( \frac{\text{Height of fireplace opening}}{H (\text{mm})} \right)
\]

B2 Examples of L and H for large and unusual fireplace openings are shown in Diagram 45.

Diagram 45 Large or unusual fireplace openings. (Note: for use with this Appendix, measure L, H and W in mm)
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 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.)

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. 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.

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/m² 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.
### Appendix F: Assessing air permeability of older dwellings in relation to permanent ventilation requirements

**F1** The minimum requirements for permanent ventilation for certain appliances depend on a knowledge of the air-tightness of the dwelling where they are to be installed. Dwellings built after 2008 are likely to have evidence of the air-tightness either through an individual air permeability test certificate or through representative testing of the same design of dwelling on the same housing development.

**F2** Older houses are unlikely to have been tested but are unlikely to achieve an air permeability of less than 5.0 m³/(h.m²) at 50 Pa unless the building fabric has been substantially upgraded. That would include all or most of the following measures:

- Full double (or triple) glazing
- Effective closures on trickle vents and other controllable ventilation devices
- All external doors with integral draught seals and letter box seals
- Internal and external sealing around external doors and window frames
- Filled cavity or solid walls
- Impermeable overlay and edge sealing of suspended ground floors
- Careful sealing at junctions between building elements such as between walls and floors or ceilings
- Careful sealing around loft hatch
- Careful sealing around chimney or flue penetrations
- Careful sealing around internal soil pipe
- Careful sealing around domestic water and heating pipes passing into externally ventilated spaces
- Careful sealing of all service penetrations in the building fabric (electricity, gas, water, drainage, phone, TV aerial, etc.)
- Internal warning pipe for WC
- All cable channels for light switches and power sockets sealed
- All cable entry for lighting and ceiling roses sealed. Recessed lighting should not penetrate ceilings separating loft spaces.

**F3** Failure to implement even a few of these measures will typically mean that the overall air permeability will probably exceed 5.0 m³/(h.m²) at 50 Pa. However, individual rooms in some older houses with solid walls and solid floors can be inherently air-tight when fitted with modern glazing. The situation may therefore need to be assessed with respect both to the overall dwelling and to the individual room where the appliance is to be fitted. If in doubt then assume that the air permeability is lower than 5.0 m³/(h.m²) at 50 Pa and fit the appropriate permanent ventilation or seek specialist advice.

Further information on sources of air leakage can be found in GPG224 *Improving airtightness in dwellings*.
Appendix G: European chimney designations

G1 This informative appendix provides a summary of the European chimney designation scheme. The essence of the scheme is a series of code letters based on the general chimney designation scheme of BS EN 1443:2003, an example of which and their explanation is given below.

Designation

G2 The designation of a chimney consists of:

- Chimney EN 1234 – T 450 N2 D 1 G50
- Number of corresponding chimney standard
- Temperature class
- Pressure class N or P or H
- Resistance to condensate class, W (wet) or D (dry)
- Corrosion resistance class Sootfire resistance class G or O followed by distance to combustible materials

G3 European chimney standards have been developed based on the material of the flue liner e.g. clay/ceramic, concrete, metal, and plastic. Some material based standards have adopted a different shortened designation e.g. for clay flue liners a designation Liner – EN 1457-300-A1-N2 means it is suitable for a chimney with the designation T600 N2 D 3 G, with a nominal size of 300mm.

G4 The designation of the corrosion resistance class of a metal chimney product is dealt with in BS EN 1856-1 and BS EN 1856-2 by a two-fold approach. A minimum material specification and thickness is allowed which is dependent on that which is permitted in member states regulations, where these exist. Products upon which a declaration has been made in this manner are designated Vm. The alternative approach involves the choice of one of three corrosion resistance tests. Products meeting the tests carry the designation V1, V2 or V3, as appropriate allow the product to be designated with the Corrosion resistance class 1, 2, or 3 respectively. The material specification still forms part of the overall designation, and appears alongside the ‘V’ letter, e.g. Vx-L40045. The material specification for the liner (or connecting pipe) is formed by the letter ‘L’ followed by five digits. The first two digits represent the material type and the last three digits represent the material thickness in multiples of 0.01mm.

G5 For the UK, guidance on the minimum material specification appropriate for the various applications in terms of corrosion resistance (solid fuel, gas and oil) is given in the UK National Annex to BS EN 1856-1 and -2.

For further examples of shortened designation refer to the specific product standards.

G6 In selecting an appliance for a given chimney designation, the appliance, irrespective of the fuel used, is required to generate combustion products with characteristics equal or less than those designated for the chimney. When selecting a chimney suitable for a given appliance, any chimney with performance characteristics equal to or higher than those appropriate for the appliance may be used.

Temperature classes

G7 Temperature classes are set out in Table G1 and expressed as “T” followed by a number which is less than or equal to the nominal working temperature, i.e., the average flue gas temperature obtained during the nominal/ rated output test (usually the maximum operating level);

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Nominal working temperature °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>T 080</td>
<td>≤ 80</td>
</tr>
<tr>
<td>T 100</td>
<td>≤ 100</td>
</tr>
<tr>
<td>T 120</td>
<td>≤ 120</td>
</tr>
<tr>
<td>T 140</td>
<td>≤ 140</td>
</tr>
<tr>
<td>T 160</td>
<td>≤ 160</td>
</tr>
<tr>
<td>T 200</td>
<td>≤ 200</td>
</tr>
<tr>
<td>T 250</td>
<td>≤ 250</td>
</tr>
<tr>
<td>T 300</td>
<td>≤ 300</td>
</tr>
<tr>
<td>T 400</td>
<td>≤ 400</td>
</tr>
<tr>
<td>T 450</td>
<td>≤ 450</td>
</tr>
<tr>
<td>T 600</td>
<td>≤ 600</td>
</tr>
</tbody>
</table>

Pressure classes

G8 Pressure classes are set out in Table G2 and expressed as either ‘N’, ‘P’ or ‘H’ followed by either ‘1’ or ‘2’. N relates in general to natural draught chimneys i.e. operating under negative pressure where the value 1 or 2 allows for a different class of product; metal chimneys to BS EN 1856-1 have the class N1. In the UK the value N2 will be assigned as a minimum to masonry chimneys. P and H relate to chimneys which operate under positive pressure e.g. for fan assisted applications and diesel generators respectively. The pressure designation depends on the gas tightness it achieves, the lower number being the more onerous, the higher allowed leakage for positive pressure application being intended to external installations.
Table G2 Pressure classes

<table>
<thead>
<tr>
<th>Pressure class</th>
<th>Test pressure Pa</th>
<th>Gas tightness – Maximum leakage rate L/s/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>40</td>
<td>2.0</td>
</tr>
<tr>
<td>N2</td>
<td>20</td>
<td>3.0</td>
</tr>
<tr>
<td>P1</td>
<td>200</td>
<td>0.006</td>
</tr>
<tr>
<td>P2</td>
<td>200</td>
<td>0.120</td>
</tr>
<tr>
<td>H1</td>
<td>5000</td>
<td>0.006</td>
</tr>
<tr>
<td>H2</td>
<td>5000</td>
<td>0.120</td>
</tr>
</tbody>
</table>

Sootfire resistance classes

G11 Sootfire resistance class – expressed as either ‘G’ with sootfire resistance, or ‘O’ without. A product assigned the designation ‘G’ has been tested at 1000°C for 30 minutes.

Distance to combustible material

G12 The designation of the minimum distance from the outer surface of the chimney to combustible material is given as xx expressed in millimetres (e.g. the distance ‘x-x’ identified in paragraph 1.45 and diagram 13).

Condensate resistance classes

G9 Condensate resistance class – expressed as either ‘W’ for wet or ‘D’ for dry operations. A product designated ‘W’, able to contain condensates within the flue, is aimed at condensing appliances. A product designated ‘D’ would usually have flue gas temperatures high enough to avoid condensate formation.

Corrosion resistance classes

G10 Corrosion resistance classes are set out in Table G3 – this is fuel dependant and expressed as 1, 2 or 3.

Table G3 Corrosion resistance classes (from BS EN 1443-2003)

<table>
<thead>
<tr>
<th>Corrosion resistance class</th>
<th>1 Possible fuel types</th>
<th>2 Possible fuel types</th>
<th>3 Possible fuel types</th>
</tr>
</thead>
</table>
| gas                        | Gas: sulphur-content ≤ 50 mg/m³  
Natural gas L + H          | Gas: Natural gas L + H  
Oil: sulphur-content ≤ 0.2 mass %  
Kerosene: sulphur-content > 0.2 mass %  
Sootfire content ≥ 50 mg/m³ | Gas: Natural gas L + H  
Oil: sulphur-content > 0.2 mass %  
Kerosene: sulphur-content > 0.2 mass %  
Sootfire content ≥ 50 mg/m³ |
| liquid                     | Kerosene: sulphur-content ≤ 50 mg/m³       | Oil: sulphur-content ≤ 0.2 mass %  
Kerosene: sulphur-content ≤ 50 mg/m³ | Oil: sulphur-content > 0.2 mass %  
Kerosene: sulphur-content > 50 mg/m³ |
| wood                       | Wood in open fire places | Wood in open fire places  
Wood in closed stoves        | Coal |
| coal                       |                         |                       |Peat  |
| peat                       |                         |                       |
Index

A

Access

Appliances 1.60
Flues 1.47, 1.49, Diagram 14

Accreditation page 7

Air permeability assessment

Appendix E

Air supply 1.2–1.4, Diagram 8
Flueless appliances 1.19
Gas appliances 3.10, 3.15–3.16, Diagram 32
Oil appliances 4.3, Diagram 40
Solid fuel appliances 2.1–2.3, Table 1

See also Air vents

Air-tight membranes

1.17

Air vents 1.3–1.4

Equivalent area 1.12–1.14
Gas appliances Diagram 32
Grilles and meshes 1.15
Location 1.11, 1.16, Diagram 10
Noise 1.16
Oil appliances Diagram 40
Permanently open 1.10–1.17
Solid floors Diagram 11
Solid fuel appliances 2.1–2.3

Appliance compartments

Definition 0.4

Gas appliances Diagram 32
Oil appliances Diagram 40
Ventilation 1.5–1.7

Approved Document J

Purpose page 3
Types of work covered page 5

Architectural interest page 6

B

Back boilers 3.39, Diagram 36

Balanced compartments

Definition 0.4
Ventilation 1.7

Balanced flues

Definition 0.4

Flue outlets 3.23, Diagram 34

Bathrooms

Gas appliances 3.5
Oil appliances 4.2

Bedrooms

Gas appliances 3.5
Oil appliances 4.2

Biofuel

Liquid 4.1, 5.2, Table 8
Solid 0.4, page 8, Table 3, Table G3

Boundaries Diagram 1

Definition 0.4

Flue outlets 1.52, 2.33, Diagram 34

LPG storage installations 5.15, Diagram 43

Oil storage installations Table 10

British Standards page 80–81

BS 41:1973 (1998) 1.32

BS 715 3.37

BS 1251:1987 29

BS 2869:1998 5.2

BS 5410-1:1997 1.25, 5.2, 5.6, page 61, Appendix E8, BS 5440 page 55

BS 5440-1:2008 1.23, 1.25, 1.42, 3.22, 3.37, Appendix E8

BS 5440-2:2009 3.15

BS 5482-1:2005 5.14

BS 5546:2000 page 55

BS 5864:2004 page 55

BS 5871:2005 page 55, 3.22, Diagram 31

BS 6172:2004 page 55

BS 6173:2001 page 55

BS 6798:2009 1.60, page 55

BS 6999:1989 (1996) 1.32

BS 8131:1997 5.22

BS 8303:1994 2.33

BS EN 1443:2003 1.26, 1.27, 2.20, 4.23, Appendix G1, Table G3

BS EN 1457:2009 1.27

BS EN 1806:2006 1.29, 2.17, 3.30, 4.15

BS EN 1856-1:2003 1.42, 1.45, 1.46, 2.20, 3.36, Appendix G4, Appendix G4–G5


BS EN 1858:2003 2.17, 3.30, 4.15, 4.21

BS EN 13141-1:2004 1.12

BS EN 13384-1:2005 2.8

BS EN 14213:2003 5.2

BS EN 14471:2005 1.41

BS EN 15287-1:2007 1.42, 2.33, Appendix E8

BS EN 15827-1:2007 4.22

BS EN 50291:2001 2.35

BS EN 50292:2002 2.36

Building Control Body (BCB)

Definition 0.4

Notification of work page 6

Building Regulations page 9

C

Capacity

Definition 0.4

Carbon monoxide alarms 1.1, 2.33, 2.34–2.36

CE marking page 7, 3.19, 3.42

Certification

Competent person self-certification schemes page 6

Product certification schemes page 7

Change of appliance type 1.36–1.39

Change of use page 5, 1.31, Diagram 12

Chimneys

Checklist Appendix A

Condensate resistance 1.26, Appendix G9

Corrosion resistance Table G3, Appendix G4–G5, Appendix G10

Definition 0.4

European designations Appendix G

Fire prevention 2.18, Diagram 21, Appendix G11–12

Gas appliances 3.27, 3.29–3.32

Debris collection space 3.38

Fire prevention 3.33–3.34, Table 7

Minimum performance designations Table 6

Oil appliances 4.9–4.12, 4.14–4.22

Fire prevention 4.18–4.19, Table 9

Minimum performance designations Table 8

Pressure classes Table G2, Appendix G8

Solid fuel appliances 2.17, 2.19–2.20, Table 3

Debris collection space 2.16

Fire prevention 2.18, Diagram 21

Minimum performance designations Table 3

Wall thickness 2.17, Diagram 20

Sootfire resistance Appendix G11

Structure Diagram 2

Temperature classes Table G1, Appendix G7

See also Factory-made metal chimneys; Flueblock chimneys; Flues; Masonry chimneys

Clean Air Act 1993 page 8

Combustion appliances

Definition 0.4

Combustion products

Gas-tightness tests Appendix E8

Spillage into room 1.20–1.23, Appendix E8

Competent person self-certification schemes page 6

Compliance with requirements page 3

Checking Appendix E

Independent certification and accreditation schemes page 7

Responsibility for page 4, 1.54

Self-certification page 6

Condensates in flues 1.26

Condensing appliances

Flue liners 1.26, 1.41

Flue outlets 3.23, 4.7

Conservation areas page 6

Control of Pollution (Oil Storage) (England) Regulations 2001 5.7–5.12

Coring ball test Appendix E9–10

D

Debris collection space 2.16, 3.38

Decorative fuel effect (DFE) fires Diagram 31, 3.11–3.12

Flues 3.22

Heaths Diagram 37

Depressurisation 1.20–1.23

Designation system

Chimneys Appendix G

Definition 0.4

Draught break

Definition 0.4

Draught diverter Diagram 3

Definition 0.4

Draught stabiliser Diagram 3

Definition 0.4

Dry lining around fireplace 1.53

Ducts

Size measurement 0.5, Diagram 7

E

Equivalent area 1.12–1.14

Definition 0.4

European chimney designations Appendix G

European Technical Approval page 7

Exemptions page 6–7

F

Factory-made metal chimneys 1.42–1.46, Table 3

Checking Appendix E6

Definition 0.4

Gas appliances 3.32

Guarding 1.45, 3.32, 3.35, 4.20

Oil appliances 4.17

Solid fuel appliances 2.19

Fanned draught Diagram 4

Definition 0.4

Fire compartments

Definition 0.4

Flues penetrating 1.46, 3.34, 4.19

Fireplace canopies Diagram 23

Fireplace gatherings 2.21, Diagram 22, Diagram 23

Fireplace linings 2.31, Diagram 29

Approved Document J

Combustion appliances and fuel storage systems

83
INDEX

O

Oil appliances 4.1–4.29
Air supply 4.3, Diagram 40, Appendix D
 Burning Class D oil 4.23
Combustion product spillage 1.20, 1.23
Flue gas temperatures 4.9–4.12
Flues
Chimney construction 4.13–4.17
Flue liners 4.21–4.22
Flue outlets 4.6–4.8, Diagram 41
Location and shielding 4.18–4.20, Table 9
 Provision 4.9–4.12, Table 8
 Size 4.4–4.5
Hearts 4.24–4.27, Diagram 42
Shielding 4.25–4.27
 Standards approach page 61
Oil storage installations 5.1–5.12
Fire protection 5.4–5.5, Table 10
Heating 5.2–5.3
Provision 4.9–4.12, Table 8
Size 4.4–4.5
Hearths 4.24–4.27, Diagram 42
P

Performance requirements 1.1
Plastic fluepipes 1.41
Prefabricated appliance chambers 2.30, Table 4
Definition 0.4
Product certification schemes page 7
Publications (excluding BSI and European Standards) page 82
 Above Ground Oil Storage Tanks (CLG PPG2, 2004) 5.7
 Bulk LPG Storage at Fixed Installations (UKLPG Code of Practice, 2009) 5.14
Good Building Guide (BRE GBG 25) 1.20
Installation, decommissioning and removal of underground storage tanks (CLG PPG27, 2002) 5.7
Protective measures for housing on gas contaminated land (BR 414, 2001) 1.17
Radon: guidance on protective measures for new buildings (BR 211, 2007) 1.17
Safety in the installation and use of gas systems and appliances (HSE) 3.3
R

Radiant convector gas fires 3.13–3.14,
Diagram 31
Radon gas extraction 1.20
Rated heat input
Definition 0.4
Rated heat output
Definition 0.4
Roof space installations 1.60
Room-sealed appliances Diagram 4
Air supply 1.8, Diagram 8
Definition 0.4
Gas appliances Diagram 32
S

Self-certification schemes page 6
Shower rooms 3.5, 4.1
Smoke spillage 1.55
Smoke testing Appendix E11–22
Solid biofuel
Definition 0.4
Solid floors Diagram 11
Solid fuel appliances 2.1–2.35
Air supply 2.1–2.3, Table 1
Carbon monoxide alarms 2.34–2.36
Chimney wall thickness 2.17, Diagram 20
Combustion product spillage 1.20
Debris collection space 2.16
Fireplace gathers 2.21, Diagram 22, Diagram 23
Fireplace linings 2.31, Diagram 29
Fireplace recesses 2.30, Diagram 28
Fire prevention 2.18, 2.32–2.33, Table 3, Diagram 21, Diagram 30
Flues
Connecting fluepipes 2.13–2.15
Flue outlets 2.10–2.12, Diagram 21–22
Height of flues 2.8–2.9
Size of flues 2.4–2.7
Hearts 2.22–2.29, Diagram 24–27
Prefabricated appliance chambers 2.30, Table 4
Spillage tests 1.55
Standards
T

Technical specifications page 7
Thatched roofs 2.12
Throat Diagram 29
Definition 0.4
V

Ventilation
Air permeability assessment
Appendix F
Appliance compartments 1.5–1.7
Flueless appliances 1.19, 3.15–3.16, Diagram 8, Diagram 33
Gas appliances 3.15–3.16, Diagram 33, Appendix C
Oil appliances Appendix D
Room 1.4, 1.8–1.9, 1.18–1.19, 1.20–1.23
See also Air supply; Air vents
Ventilator free areas Diagram 9
W

Workmanship page 7
Workplace (Health, Safety and Welfare) Regulations 1992 page 8