



Office of the  
Deputy Prime Minister

Creating sustainable communities

The Building Regulations 2000

APPROVED DOCUMENT J: 2002 Edition:  
GUIDANCE AND SUPPLEMENTARY INFORMATION  
ON THE UK IMPLEMENTATION OF EUROPEAN  
STANDARDS FOR CHIMNEYS AND FLUES

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## Acknowledgements

The British Flue and Chimney Manufacturers Association (BFCMA, the chimney division of the Federation of Environmental Trade Associations, FETA) has been active in recent years in alerting the chimney industry to the many challenges it faces as a result of the harmonisation of chimney standards across Europe.

In 1997, the BFCMA issued a paper written by Christian Pedersen entitled 'Challenges for the UK implementation of European Standards relating to chimneys and flues'. This was subsequently used as a basis for discussions across the fuel, appliance and chimney industry in a forum under the direction of BSI Technical Committee B/506 and known as the 'Challenges Group'. Central to the discussion within this group was the issue of how Building Regulations might deal with the construction of chimneys and the installation of combustion appliances during the changeover period in which European Standards replace British Standards for chimney products and installation practices.

Given the complexities of this process and the introduction of the 2002 edition of the England & Wales Building Regulations Approved Document J (ADJ), the group decided that end users of ADJ would benefit from supplementary guidance on the subject. To facilitate this, the DTLR (formerly DETR) sponsored a project to produce this document and their assistance in this regard is hereby gratefully acknowledged. This second edition has been sponsored by the Office of the Deputy Prime Minister (ODPM), which has superseded DETR/DTLR in this policy area, and contract managed by FaberMaunsell. It brings the guidance up to date with European Standards that have been published or substantially developed at the time of writing. The work itself was principally carried out by GDK Associates Ltd.

Expert contributions and project guidance for this edition were gratefully received from:

British Flue and Chimney Manufacturers Association (BFCMA)  
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HETAS Ltd  
Oil Firing Technical Association (OFTEC)  
Society of British Gas Industries (SBGI)

## Revisions to the advice in this publication

Because European Standards are gradually displacing British Standards, the advice contained in this publication will be subject to small but continual change.

With the general acceptance of the internet as a vehicle for information handling it has been decided to regularly post the latest amendments to the guidance using this medium. Access to these updates can be obtained by logging on to the BFCMA website at: <http://www.feta.co.uk/bfcma>.

# Approved Document J: Guidance and supplementary information on the UK implementation of European Standards for chimneys and flues

## Foreword

Current building regulations in England and Wales lay down goal setting requirements for the safe construction of chimneys and flues and are supported by Approved Document J which provides guidance on meeting the requirements<sup>1</sup>. This, in turn, is supported by a raft of British Standards and other recognised industry documents which have been developed during a period of several decades to lead and reflect good industry practice as applied in England and Wales.

In support of the broader aim of European harmonisation and propelled by the Construction Products Directive, the European Committee for Standardisation (CEN) has established a technical committee (TC 166) to develop a suite of European Standards which will provide a common set of requirements for chimneys across Europe. When European Standards are published, the UK is required to withdraw existing British Standards, or parts thereof, covering the scope of the work and replace them with the equivalent European Standard. However, there is little correlation between the British and European Standards on chimneys because they have been developed on a different basis and with a different system of chimney classification.

It is something of a simplification but to illustrate the problem consider that many British Standards (and Approved Document J for that matter) have been written for specific fuel-burning applications by and for their respective fuel industries, albeit that some product standards cover multifuel applications. In contrast, the proposed suite of European Standards is material specific but includes the different fuel-burning applications. Moreover, European Standards are performance based so that even specifying a particular chimney using the new designation system follows a fundamentally different process that is not readily transferable to British equivalents.

Many of the chimney product standards and test methods being produced by this committee have been mandated by the European Commission as standards which, when published, will provide a means of demonstrating compliance with the Construction Products Regulations<sup>2</sup>. These are termed 'harmonised standards' and they identify the basis for CE marking of products. The published and draft standards for chimneys are presently being adapted to give 'harmonised standards'.

This guidance document is intended to provide a background understanding of the European process of harmonisation in the field of chimney standards, and gives clause-by-clause guidance and supplementary information on how the published and emerging standards can be applied when following the guidelines in the Approved Document.

As the drafting and publication of European Standards for chimneys and flue products is an ongoing process which is likely to take many years, it is anticipated that this document will be updated as and when new European Standards become available. It is envisaged that this service will be made available electronically through the internet in due course (see page 2).

The guidance in this edition is accurate as of August 2004 unless qualified by amendment.

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<sup>1</sup> Approved Document J – Combustion appliances and fuel storage systems: 2002 edition (in support of Part J of Schedule 1 to the Building Regulations for England and Wales 2000 as amended).

<sup>2</sup> The Construction Products Regulations 1991 enacting the Construction Products Directive.

# Part one. General

## 1. Scope

This document is aimed at specifiers, builders' merchants, builders, and manufacturers and installers of chimneys and associated products and appliances, together with enforcers, e.g. building control officers, CORGI inspectors, and training providers. It is intended to provide guidance and supplementary information on the Building Regulations Approved Document J (ADJ) during the transitional period in which there is a move away from the current system of using British Standards for specifying and installing chimneys towards one which is based on European Standards mandated under the European Construction Products Directive (CPD).

The document is presented in two parts:

- Part one provides guidance on the general issues of European standardisation for chimneys, the overall framework of legislation under which this process is taking shape, and outlines the new way of designating chimney products according to the essential performance characteristics.
- Part two considers the implications for British industry by examining the current ADJ in the light of published and draft European Standards for chimneys. Each clause of ADJ has been examined and a comment made where there will be an anticipated change either in fact or in the way in which a provision is referenced.

Attention is drawn to 'How to use Part two in conjunction with the Approved Document' on page 26 concerning the application and use of Part two.

## 2. Introduction

### 2.1 Why change the current system?

The situation in which the chimney industry now finds itself is not unique – in most manufacturing sectors there is a move towards the use of European Standards to specify how products should perform. In essence, such standards provide a vehicle to realise one of the underlying objectives of the EEC, that is to create a single market without barriers to trade.

But do we really need to worry about any of this? Yes, very much so. In the chimney sector, these changes will dramatically alter the way in which chimneys are specified and defined in the UK. A user of Approved Document J or the products listed therein will be faced with the challenge of trying to reconcile existing ways of specifying chimney products (and practices) with those defined and designated in the new European Standards. This document highlights the changes and focuses on the new concepts and different designation system for specifying chimneys according to the European Standards. It is certain that, as European Standards are published and as they replace equivalent British Standards, it will be necessary to make specifications and assumptions on different bases to those used in present UK practice. The new European way of doing things introduces very different terminology and concepts, and is based on performance criteria in which chimney products are 'matched' to their end application in terms of several key factors such as flue gas temperature, corrosion load and so on. Whether as a user of Approved Document J or a purchaser of the products cited therein, a working knowledge of the European system for specifying and installing chimneys will become a prerequisite for all the trades involved in this particular market.

### 2.2 The Construction Products Directive (CPD), and CE marking

As part of the drive to create the single market in Europe, the CPD (Directive 89/106/EEC) was agreed by member states (including the UK) and has the formal title of *Council Directive of 21st December 1988 on the approximation of laws, regulations and administrative provisions of member states relating to construction products*. The publication 'CE Marking under the Construction Products Directive' explains the main features of the CPD and is available free of charge from the Office of the Deputy Prime Minister or its web site. (See Annex E for details.)

## 2.2.1 Standards

In common with other New Approach Directives, the CPD is founded on European technical specifications. In the case of the CPD these include European Standards written by CEN/CENELEC and European Technical Approvals developed by EOTA. The present UK parallels are British Standards and BBA Agrément Certificates or certificates issued by BRE Certification (WIMLAS).

Note that the CPD is not intended to harmonise building regulations in member states – it simply harmonises the standards and ETAs required to specify what is required or acceptable. In due course, regulations may converge through the use of common standards, but this is to be left to an evolutionary process.

The objective of a harmonised standard for a particular product is to address all the regulated performance requirements relevant to the product which apply in any member state in Europe. Harmonised standards (often referred to as hENs) are written under a mandate (or contract) from the Commission to CEN/CENELEC which identifies all the performance requirements which may be required in one or more member states. In this way harmonised standards overcome barriers arising from the present use of different national standards.

A mandate for standards for 'Chimneys, flues and specific products' (M105 as amended by M130) was issued to CEN in 1995 and harmonised standards have now begun to be published in a programme that is likely to continue for several years. In addition, the aspect of resistance to fire is covered by the 'horizontal' Mandate M117, as revised by M134.

## 2.2.2 Annex ZA

In each of the published harmonised European Standards for products the regulated requirements are listed in the so called 'Annex ZA'. Alongside each requirement is shown the clause in the standard in which the requirement is addressed. Some of these clauses may in turn refer to separate European Standards such as test standards.

Each Annex ZA therefore represents a checklist from which the manufacturer can see all the requirements for his product and how they can be met for CE marking. For example, for chimneys, these requirements include aspects such as fire resistance, gas tightness/leakage, flow resistance, strength, and so on.

European Standards might include matters which are not regulated in member states and which are therefore not part of the harmonised standard. These are termed the voluntary or non-harmonised parts of the standard and they are not included in Annex ZA.

## 2.2.3 Attestation of conformity

Before the introduction of harmonised standards under the CPD, another significant barrier to trade arose from the different attestation systems required by member states for the same product, i.e. the degree of involvement of product certification bodies, factory product control (fpc) certification bodies or test bodies in assessing the conformity of the product. Hence this requirement is also 'harmonised' in the standards.

The decision on which attestation system is appropriate for a particular product depends on the implications of the product for health and safety, and on the particular nature and production process for the product itself. The attestation requirements for durability are in line with those for the performance characteristics.

Member States have agreed that chimney products (except for terminals) require third party certification of the manufacturer's factory production control procedures with continuous surveillance. The manufacturers are responsible for commissioning their own initial type tests. For terminals, however, no third party participation is required – manufacturers must keep their own documented fpc system and be responsible for commissioning their own initial type tests.

## 2.2.4 Notified Bodies

To carry out the attestation tasks certain certification and test bodies in the member states are designated as competent by their respective national authorities and then notified to the Commission and other member states. In the UK the national authority for designation and notification under the CPD is the ODPM. One of the main criteria to be met as a prerequisite for designation and notification is UKAS accreditation to relevant standards in the EN 45000 series, or EN ISO/IEC 17025 for test laboratories. Bodies interested in seeking notified status should contact the European Unit, FBE Management Ltd, which processes applications for notifications according to criteria set by the ODPM. (See Annex E for contact details).

Once a harmonised standard is available for CE marking, a manufacturer will be able to approach an appropriate Notified Body for assessment of the product according to the appropriate attestation procedure. For chimney products (other than terminals), this will be a body capable of carrying out fpc certification procedures.

The manufacturer will be free to choose any body in Europe which is notified for chimneys and chimney products. In the UK such bodies will be accredited to EN 45012 'General requirements for bodies operating assessment and certification/registration of quality systems' with additional confirmation from UKAS that the body is competent in the specific area of chimneys. Alternatively, they may be accredited to EN 45011 'General requirements for bodies operating product certification systems' with UKAS confirmation that they are competent to carry out fpc certification procedures under the Directive.

In common with other Directives, under the CPD the Commission has set up a group of Notified Bodies. All CPD Notified Bodies in Europe are automatic members of the group, and the aim is to ensure that the bodies achieve consistency and transparency of procedures.

The group has been organised to include an Advisory Group, which deals with general issues, and 22 sector groups. The sector groups include, for example, SG03 'Chimneys and flues'.

## 2.2.5 CE marking

CE marking is considered to be a 'passport' enabling the product to be placed on the market in any member state. It is not a quality or performance approval mark and the product would still have to satisfy and be installed in accordance with the national building regulations of the member state where it is to be used.

It is the responsibility of the manufacturer to affix the CE marking on the product itself, on a label attached to it, on its packaging, or on the accompanying commercial documents (in that order of preference).

The marking includes information such as the name of the producer, the year of CE marking, the relevant European Standard number, and the certificate number if a certification body is involved in the attestation procedures.

One of the most important aspects of the CE marking is that it includes technical information in the form of declared values related to the regulated performance requirements. Where minimum or maximum values have been set in the standards themselves, these are not repeated in the CE marking.

Similarly, classes of performance may be declared with the CE marking, with the 'key' to the classes appearing in the standard. Hence the information given with the CE marking, together with that in the standard itself, gives all the information required to enable the specifier or regulator to determine whether the product is suitable for a given intended use in the country of destination according to the regulations which exist there. The manufacturer is not required to declare data for which regulations do not exist in his chosen market sector (i.e. country/intended use). In these cases he may declare 'no performance determined' or NPD.

Chimney products should meet the requirements of the relevant national regulations, e.g. the England and Wales Building Regulations 2000 and amendments (see Annex E). ADJ provides guidance on meeting the regulations for combustion appliances and fuel storage systems and the Approved Document to support Regulation 7 gives guidance on materials and workmanship including CE marking.

It should be noted that, at the time of writing this document, CE marking is not compulsory in the UK and three other member states (Ireland, Finland and Sweden). The Approved Document to support Regulation 7 gives alternative ways of demonstrating that products are suitable, one of which is CE marking.

However, given that many British Standards are being replaced by European Standards and that many manufacturers already have established some quality management system (QMS) certification, manufacturers may feel that it makes good commercial sense to choose the CE route. There are also indications that specifiers are likely to look for CE marking on products

### **2.2.6 'Policing' of CE marked products in the UK**

The responsibility for 'policing' CE marked products lies with Trading Standards Officers in England, Wales and Scotland and with Environmental Health Officers In Northern Ireland. However, the specific procedures for this are not yet in place in respect of chimney and flue products. The eventual arrangements are likely to be closely linked to the role of Building Control Bodies. The overall objective will be to comply with the provisions of the Directive within the UK's regulatory framework, and hence to protect consumers and the UK market from the risks of incorrectly marked or unsuitable products.

### **2.2.7 Transitional arrangements and incorporation into national Building Regulations**

The date of availability (DAV) of a standard is the date when the definitive text in the official language versions (German, French and English) is distributed by CEN. CEN members such as BSI must announce the harmonised European Standards within 3 months and publish (transpose) it within 6 months. During the 9 months after the date of availability, the Commission will publish the reference to the standard in the 'C' series of the Official Journal of the European Communities, announcing that, at the end of the 9 month period, manufacturers across Europe will be able to apply CE marking to their products, enabling them to export to any member state of the European Economic Area.

After 9 months, a period of coexistence will then exist, when manufacturers will be free to use the new standards and apply CE marking, or continue to use the old national standards. The length of the period is normally 12 months, but it may depend on the product concerned and is set out in the relevant standards. (Note: further information on arrangements following the date of availability of a harmonised standard and the period of 'coexistence' with national standards is given in the ODPM publication 'CE marking under the Construction Products Directive' – see 'Annex E. Other sources of information', page 24).

These arrangements mean that member states will have to adapt their building regulations and supporting documents so that, within 9 months of the date of availability of a standard, products complying with the new harmonised standards, and hence declaring data in the new way, will be equally acceptable as those complying with present national standards. To some extent member states can anticipate events before the official date of availability, once the overall shape and content of the draft standards begin to emerge. This is one of the intended purposes of this document.

Harmonised European Standards for chimney products will specify performance characteristics and related test methods. These must ultimately be incorporated in the Approved Document(s) together with performance values that are deemed to satisfy the Building Regulations. However, the setting of performance values may take some time as detailed research and consultation is needed to establish the correlation between performance values for products known to satisfy UK Building Regulations and those defined in European Standards. As the standards themselves are taking longer to produce than expected and they will be appearing at varying intervals, it is impractical to continually republish the Approved Documents whenever a new harmonised standard is published. The Approved Documents allow for alternative ways of showing compliance and this document and its successors will provide a bridge for assimilating new standards into practice between Approved Document revision dates. Between full revisions of the ADs, annual amendments and updates will be issued to keep abreast of the introduction of European Standards and approvals.

### **2.2.8 European standardisation terminology**

Relevant terms used in this guidance paper and the European Standards for chimneys and flue products are detailed in Annex C.

## 2.3 British Standards and European Standards

### 2.3.1 New European rationale

The European Standards for chimneys are structured around the performance characteristics of the product and have fundamental differences from principles and terms used in British Standards. In the UK, chimneys and flues are specified primarily according to the type of heating appliance or fuel-burning application, e.g. solid fuel or gas, but there are some products that can be used for multifuel-burning applications. Current UK legislation specifications are linked to ADJ recommendations that are deemed to meet our national legislation, proven safe practice and British Standards which generally specify chimney products in prescriptive terms (e.g. the flue liner must be made from specific types of material) and dimensional specifications which past experience has proven can be independently tested to demonstrate suitability.

When the European technical committee TC 166 'Chimneys' commenced its work, it had to establish a system of classifying chimneys and their components to accommodate a majority of experiences across the European Community and EFTA and embody a clear structure for developing the standards to cover different types of chimneys<sup>3</sup>. Thus European chimney and component standards are being developed on the basis of the material of the liner, i.e.

- clay/ceramic<sup>4</sup>;
- concrete;
- metal; and
- plastics.

The original thrust was to produce a 'product' standard for each material type. In the case of metal chimneys, this is to be accompanied by an 'execution standard' (code of practice) to advise on design, installation and commissioning.

Only certain elements of these European Standards, which are needed to produce harmonised European Standards for chimney products, have been mandated under the Construction Products Directive (CPD) since its scope only covers the placing of products on the market. However, execution standards – along with non-harmonised parts of product standards – are being drafted even though they may not have mandatory requirements and are often described as 'voluntary' standards or parts of standards. There are also supporting standards for general requirements, general test methods and calculations methods, all of which are intended to bring a coordinated approach to cover chimneys.

The proposed execution standards relating to metal chimneys will specify the ways in which chimneys should be designed and/or installed and will affect and replace the equivalent British Standards or part(s) thereof. This will create major challenges for the UK, where there are many unique and proven types of installation practices not used elsewhere in Europe.

### 2.3.2 European terminology for chimneys

European work on chimney standards has brought about the need to redefine chimney concepts and adopt common terminology consistent with the range of product used across the whole Community. Thus a 'chimney' is defined in EN 1443 as 'a structure consisting of a wall or walls enclosing a flue or flues' and a 'flue' is 'the passage for conveying the products of combustion to the outside atmosphere'.

Chimneys are regarded as having a 'liner' which is in contact with the products of combustion, and an 'outer wall' which is the 'external wall ... in contact with ambient or external environment or is within cladding or enclosure'. In a single wall chimney the two functions are combined into one wall.

Both liners and outer walls must meet their respective performance requirements depending upon their application and it follows that a chimney which comprises, for example, a concrete liner and a metal outer wall (perhaps with insulation in between) would be subject to several product requirements.

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<sup>3</sup> The work programme listing all standards at present under development is listed in Annex A, Part 1.

<sup>4</sup> The term 'ceramic' is used to clarify translation into other European languages.

When a chimney is constructed from compatible chimney components supplied or specified from a single manufacturer who takes product responsibility for the whole chimney, e.g. a factory-made chimney, it is called a 'system chimney'. When the chimney is installed or built on-site using a combination of compatible components that may be from different sources, it is called a 'custom-built chimney', e.g. clay or concrete liners surrounded by brickwork.

## 2.4 Consequences of change

### 2.4.1 The consequences of replacing and revising British Standards

When a European Standard is published, BSI is obliged to publish it as a British Standard where it carries the identifier BS EN ... usually within 6 months, and to withdraw conflicting British Standards or parts thereof. (See also section in 2.2.7, and Annex B which details published/proposed ENs and their equivalent British Standards.)

Annex ZA of the harmonised European Standard (hEN) may refer to calculation or other validation methods in the EN for ascertaining the product's performance value as required by regulations in member states. The EN may also include other performance requirements and test procedures that would not be mandatory in terms of enabling the product to have CE marking. Whilst these non-mandatory performance value specifications in the EN are often called 'voluntary', a customer or specifier can specify that the product meets all the relevant performance value specifications for his specific application.

It should be noted that the process of drafting a European Standard requires a spirit of compromise to reach consensus on technical issues. This inevitably leads to some CEN members having to agree to different performance requirements from those given in their national standards.

In many cases the UK delegations involved in the drafting of the European chimney standards have been faced with different concepts in defining performance levels for chimneys and flue products, which might be lower or higher than those currently specified in British Standards.

BSI technical committees and Government bodies have a significant challenge in analysing and researching how and what performance values defined in the European Standards can be adopted into the UK. This is an ongoing process in which the production of this guidance forms part. Although some British Standards covering flues and chimneys are written for multifuel-burning applications, many are written for specific fuel-burning applications, e.g. BS 715 covers metal flues for use with gas appliances. In such cases, minimum performance is specified with the standard relying mostly on material, dimensional and installation specifications which are usually incorporated in the same document or linked to separate standards covering installation requirements for the product.

It is evident therefore that a direct replacement of a BS by an EN (or hEN) is not a straightforward process. The European 'product' standards are structured according to the basic material that the products are made from without focusing on the fuel-burning applications. For example, prEN 1856-2 covers metal flue liners and connecting flue pipe products, which corresponds to four British product standards, but it also affects many flue and heating appliance installation standards.

In some cases, a BS EN may incorporate a national annex giving details on specific requirements applied in the UK (see example in Part 2 – guidance on 1.42).

European execution standards for chimneys and non-harmonised chimney product standards are not mandated by the European Commission and are therefore 'voluntary' in status. Upon their adoption and under CEN rules, BSI will be expected to replace conflicting parts of relevant British Standards. This may cause difficulties in terms of references in ADJ to ways of meeting the requirements.

## 3. The new designation and marking system for chimneys and their components

### 3.1 General

Chimneys are classified in accordance with the following performance characteristics:

- temperature;
- pressure;
- condensate resistance;
- corrosion resistance;
- sootfire resistance and distance to combustibles.

In addition the chimney manufacturer must give information on the following characteristics:

- thermal resistance;
- flow resistance;
- freeze–thaw resistance (where applicable).

Further voluntary information may be given, e.g.

- resistance to fire, external to external.

The chimney designation scheme used as a basis for developing the harmonised products standards, e.g. BS EN 1457, BS EN 1857, is detailed in 'EN 1443:2003: Chimneys. General requirements', which is the extant published document.

*The issue by the Commission of the Mandate M105 as amended by M130 for chimneys, and the horizontal Mandate M117 as revised by M134 for Resistance to Fire (see 2.2.1), has meant that a revision of BS EN 1443:1999 was necessary to accommodate the requirements of the Mandates. The effect of this is to alter the order of parameters, as well as the symbol denoting sootfire resistance capability (see 'sootfire resistance class' below) and the following is the current situation at the time of publication of this document.*

BS EN1443:2003 expresses chimneys in terms of a list of the following performance characteristics:

- Temperature class – 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);
- Pressure class – expressed as '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 for 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;

- 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 class – this is fuel dependant and expressed as 1, 2 or 3;
  - *Corrosion resistance class 1 refers to flue gas from natural gas combustion, and light oil with a sulphur content below 50mg/m<sup>3</sup> (known in the UK as class C2 kerosene to BS 2869:1998);*
  - *Corrosion resistance class 2 means 'light' oil of sulphur content less than 0.2mg/m<sup>3</sup> (in the UK it may be known as 'gas oil', but is correctly class D fuel to BS 2869:1998), and wood combustion;*
  - *Corrosion resistance class 3 means solid fuel and heavy oil class E and higher to BS 2869;*

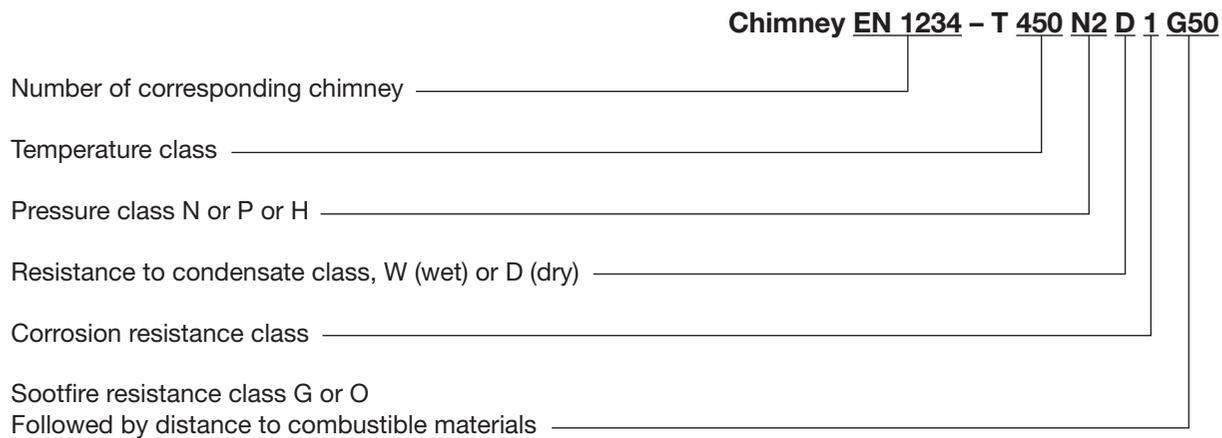
- Sootfire resistance class – expressed as either ‘G’ with sootfire resistance or ‘O’ without, followed by a distance to combustible material ‘xx’ expressed in millimetres (e.g. the distance ‘X’ identified in ADJ clause 1.45(a). A product assigned the designation ‘G’ has been tested at 1000°C for 30 minutes.

In BS EN 1443:2003, the designation for a sootfire resistant product, expressed in the 1999 edition of the standard and the current ADJ as ‘S’, is now expressed as ‘G’. In the case of a chimney, this is followed by xx, which is the distance necessary to satisfy the requirements of the horizontal mandate M117 (or Oxx if not sootfire capable). This requirement, for chimneys internal to a building, and designated sootfire resistant, applies to the risk of fire spreading from internal to external parts of the chimney.

In addition the mandate specifies requirements applicable to the installation of shafts and ducts (i.e. a chimney through a building). This involves the risk of fire spreading from an external source to other parts of the building external to the chimney. BS EN 1443:2003 contains a proposal to evaluate this criteria and declare it in the form EI according to the classification criteria of prEN 13501-2 ‘Fire classification of construction products’.

The designation and marking scheme will place new responsibilities on chimney and appliance manufacturers to declare the operating characteristics of their products so as to facilitate the correct matching of chimneys with appliances within the meaning of the new European designation and marking regime developed by CEN/TC 166.

### Example of chimney designation scheme to BS EN 1443:2003



The above general designation string is further complicated depending upon the product standard in question, e.g. see 3.2, 3.3, and 3.4. 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 to 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.

The higher to lower sequence of characteristics (taken from prEN 12391 for metal system chimneys) is:

T600 > T450 > T400 > T300 > T250 > T200 > T160 > T140 > T120 > T100 > T080

H > P > N (where H = high positive, P = positive, N = negative pressure classes respectively)

G > O (where G is with and O is without sootfire resistance)

W3 > W2 > W1 (where W is for wet operating conditions)

D3 > D2 > D1 (where D is for dry operating conditions)

(For both W and D, 1 is for gas and Kerosene, 2 for light oil and natural wood, and 3 for heavy oil/coal)

W > D under the same corrosion load

In addition to the marking on the product (not all items will be marked), the manufacturers literature will give the designation of the product. Where doubt exists, the manufacturer or supplier should be contacted directly. It should be noted that the ‘BS’ in ‘BS ENxxx’ is dropped in the marking of a product, i.e. only ‘EN’ and the number are cited.

For CE marking purposes the manufacturer must mark the product with all the information prescribed in the Annex ZA in the harmonised product standard. This asks for additional information, for example the thermal resistance of the product, the flow resistance for the flue gas, and where applicable the freeze–thaw resistance. The clauses below (3.2, 3.3 and 3.4) cover only the marking necessary to define the product, and do not cover the additional information required for CE marking.

### 3.2. Clay/ceramic

**Clay/ceramic flue liners** to BS EN 1457:1999 A1:2002 are designated with a:

- description, viz. liner;
- standard number;
- nominal size of flue, quoted in mm;
- type or types\*; there are 22 types each made of a 4 digit code reflecting characteristics annotated according to EN 1443 (\*the word ‘type’ replaced ‘class’ when EN 1457:1999 was amended to become EN 1457:1999 A12002);
- nominal angle of curvature (where applicable).

For example:

Liner – EN 1457 – 300 – A1N2

The required markings are:

- EN 1457;
- manufacturer’s identification and date of manufacture;
- type number or type numbers.

**Clay/ceramic flue blocks** for single wall chimneys to BS EN 1806 are designated with a:

- description, e.g. non-bonded flue block;
- standard number;
- nominal size of flue, quoted in mm;
- type or types; there are 11 types in total reflecting characteristics annotated according to BS EN 1443. For non-bonding blocks a 5 digit code is used (ten types), for bonding blocks a 3 digit code is used (one type);
- thermal resistance – designated as ‘Rxx’ where xx is the value in m<sup>2</sup>K/W multiplied by 100, rounded to the nearest integer;
- nominal angle of block (where applicable);
- declared reference value or outer wall temperature, operating conditions;
- declared reference value or outer wall temperature, sootfire conditions (where applicable).

For example:

Non-bonded flue block – EN 1806 – 200 x 200 – FB1 – R22 – 50 – 130

The required markings are:

- EN 1806;
- manufacturer’s identification;
- date of manufacture or batch identification;
- class;
- declared reference value or outer wall temperature, operating conditions;
- declared reference value or outer wall temperature, soot fire conditions (where applicable).

**Clay/ceramic flue terminals** to BS EN 13502: 2002 are designated with a:

- description, viz. terminal;
- standard number;
- nominal size, quoted in mm;
- nominal height;
- type of restricted terminal.

For example:

Terminal – EN 13502 – 300 – 600 – 2

The required markings are:

- EN 13502;
- manufacturer's identification and date of manufacture;
- nominal size;
- nominal height;
- type of restricted terminal.

**Sootfire resistant system chimneys with clay/ceramic flue liners or blocks – Requirements and test methods** to prEN 13063-1 are designated with a:

- denomination;
- standard number;
- temperature class;
- pressure class;
- resistance to condensate class;
- corrosion resistance class;
- sootfire resistance and distance to combustibles.

For example:

System chimney – EN 13063-1 – T400 – NI – D3 – R65 – G50

The required markings are:

- name or trademark of the manufacturer, engraved or indelibly marked;
- nominal size;
- date of manufacturing or batch number;
- space for installer data and date of installation.

**System chimneys with clay/ceramic flue liners – Requirements and test conditions under wet conditions** to prEN 13063-2 are designated with a:

- denomination;
- standard number;
- temperature class;
- pressure class;
- resistance to condensate class;
- corrosion condensate class;
- soot fire resistance and distance to combustible materials.

For example:

System chimney – EN 13063-2 – T400 – NI – W2 – O 50

The required markings are:

- name or trademark of the manufacturer, engraved or indelibly marked;
- nominal size;
- date of manufacturing or batch number;
- first installer;
- date of installation.

**Air flue system chimneys (\*) with clay/ceramic flue liners – Requirements and test methods** to prEN 13063-3 are designated with a:

- denomination;
- standard number;
- temperature class;
- pressure class;
- resistance to condensate class;
- corrosion resistance class;
- sootfire resistance and distance to combustible materials.

---

\* An 'air flue system chimney' is defined as a chimney with an air duct (combustion air) and a flue duct (flue gas) for room sealed appliances. The system is not in current use in the UK.

For example:

Air flue system chimney – EN 13063-3 – T400 – N1 – D 3 – G 50

The required markings are:

- name or trademark of the manufacturer, engraved or indelibly marked;
- nominal size;
- date of manufacturing or batch number;
- space for installer data and date of installation.

**Outer walls of clay/ceramic for system chimneys** to prEN 13069 are designated with a:

- description, viz. outer wall element;
- standard number;
- temperature class;
- thermal resistance;
- distance to combustible material – designated as the distance of the outer surface of the chimney to combustible material in the form of 'Gyy' where yy is the distance in mm.

For example:

Outer wall element – EN 13069 – T600 – 0.12 – G100

The required markings are:

- EN 13069;
- manufacturer's identification;
- date of manufacture or batch identification;
- type.

### 3.3 Concrete

**Concrete flue liners and fittings** to BS EN 1857 are designated either in a shortened form or, where the abbreviated form does not cover an application, in full.

The abbreviated designation covers:

- temperature;
- pressure;
- sootfire resistance;
- condensate resistance.

and takes the form of a letter (A to L) followed by the number 1 or 2, e.g. D1 designates 300°C, negative pressure, not sootfire resistant for dry conditions as quoted in the standard.

The full designation covers the above parameters but would be expressed in a form similar to BS EN 1443:2003.

For example:

EN 1857 – T300 – N1 – D – 3 – O

A minimum of 20% of components are required to be marked with:

- name or trademark of the manufacturer;
- the manufacturer's batch or date code;
- EN ... (the number of the standard);
- the class or classes or full designation;
- an arrow indicating the direction of gas flow.

It should be noted the concrete products to BS EN 1857 operating under dry conditions are suitable for corrosion resistance class 3.

**Concrete flue blocks and components** to BS EN 1858 are designated in full according to the basic string or using abbreviated classes of the designation system. The abbreviated designation covers:

- temperature;
- pressure;
- sootfire resistance;
- condensate resistance.

and takes the form of a letter (A to L) followed by the number 1 or 2, e.g. A1 designates EN 1858 – 600°C , negative pressure, sootfire resistant, for dry conditions.

The full designation covers the above parameters but would be expressed in a form similar to BS EN 1443.

For example:

EN 1858 – T600 – N1 – D – 3 – G 05

A minimum of 20% of flue blocks or components are required to be marked with:

- name or trademark of the manufacturer;
- the manufacturer's batch or date code;
- EN ... (the number of the standard);
- the abbreviated or full designation;
- an arrow indicating the direction of flue gas flow;
- identification of the flue (in a multi-passage block).

It should be noted that concrete products to BS EN 1858 operating under dry conditions are suitable for corrosion resistance class 3.

**Concrete outer wall elements** to BS EN 12446 are designated according to:

- EN ... (the number of the standard);
- flue gas temperature class;
- sootfire resistance and distance to combustible materials.

A minimum of 20% of flue blocks or components are required to be marked with:

- name or trademark of the manufacturer;
- the manufacturer's batch or date code;
- EN ... (the number of the standard);
- the designation.

### 3.4 Metal

**Single- and multi-wall chimneys with metallic liners** to BS EN 1856-1 have chimney sections and fittings designated according to:

- product description;
- EN ... (the number of the standard);
- temperature level;
- pressure level;
- condensate resistance;
- corrosion resistance, including flue liner material specification (see overleaf for supplementary note re: corrosion resistance requirements for metallic chimneys);
- sootfire resistance, and distance (in mm) to combustible material.

For example:

Single-wall chimney – EN 1856-1 – T400 – P1 – W – Vx – L40045 – G(xx)

Chimney sections, fittings or terminals are marked with:

- product designation;
- name or trademark of the manufacturer;
- manufacturing batch or product reference or manufacturer;
- row indicating direction of flue gases (if applicable).

In addition the manufacturer shall make available a chimney plate providing this information and space for additional information, e.g. installer, date.

**Metal liners and metal connecting flue pipes** to BS EN 1856-2 are designated according to:

- product description;
- EN ... (the number of the standard);
- temperature level;
- pressure level;
- condensate resistance;
- corrosion resistance including material specification (see below for supplementary note re: corrosion resistance requirements for metallic chimneys);
- sootfire resistance.

For example:

Liner or connecting flue, EN 1856-2 – T400 – N2 – D – Vm – L4001 2 – G

Metal flue liners, fittings or terminals are marked with:

- product designation of the liner;
- name or trademark of the manufacturer;
- manufacturing batch or product reference or manufacturer;
- arrow indicating direction of flue gases (if applicable).

In addition the manufacturer shall make available a chimney plate.

**Supplementary note re: corrosion resistance requirements for metallic chimneys**

*BS 4543 and parts of BS 715 will be replaced by BS EN 1856-1 and BS EN 1856-2, when published. BS EN 1856-2 also covers liners and flue pipes currently acting as ‘flues’ for appliances. Part 1 of this document highlights that the preferred European term is ‘chimney’ in preference to the UK conventional term ‘flue’. In any case, the designation of system chimneys, metal liners and connecting flue pipes to BS EN 1856-1 and BS EN 1856-2 should be appropriate for the appliance which will be fitted to the chimney. In this regard, attention is drawn to the need to ensure that all sections and fittings carry the correct designation or marking.*

*As an interim measure, the durability of materials against corrosion is dealt with in BS EN 1856-1 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. The material specification forms part of the overall designation, and appears alongside the ‘V’ letter, e.g. Vm – 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.*

**Example.** Vm – L 40045 represents a liner upon which a manufacturer has made a declaration in respect of corrosion resistance and which is made of 1.4401 stainless steel with a thickness of 0.45mm. Vm – L 40045 itself would appear as the last but one element of the overall designation system for a chimney component to either EN 1856 Part 1 or 2.

**The (UK) material specifications BS 4543 and BS 715 continue to be the ways of meeting Approved Document J in respect of metal chimneys. For the UK, the minimum flue liner material specification acceptable 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. Also see Part 2, Section 1, clause 1.42.**

### 3.5 Plastics

**Plastic flue liners to BS EN 14471** are designated according to:

- EN ... (the number of the standard);
- temperature class;
- pressure (P, H or N1);
- sootfire resistance (only class O);
- condensate resistance (only class W);
- corrosion resistance (class 1 or 2);
- thermal resistance class (Rxx);
- distance to combustible materials (Cyy);
- location (internal, external or both (I, E, B));
- reaction to fire (classes F0 or F1);
- enclosure (L0, L, L1).

For example:

EN 14471 – T120 – P1 – O – W – 1R22 – C50– 1 – F0 – L0I

Chimney sections are marked at least every 1.5m and flexible pipes are marked continuously (once or twice during one corrugation turn). The following information is required to be marked on the product and/or a label:

- name or trademark of the manufacturer;
- manufacturing batch or product reference;
- T class;
- material;
- EN ... (number of standard);
- size.

**Elastomeric seals in flue liners to prEN 14241-1** are designated according to:

- EN ... (the number of the standard);
- temperature class;
- condensate resistance (only class W);
- corrosion resistance (class 1 or 2);
- location (internal and/or external).

For example:

EN 14241-1 – T120 – W – 1I

The following information is required to be marked on the seal and/or a label:

- name or trademark of the manufacturer;
- product name or reference;
- batch or lot number;
- EN ... (number of standard);
- temperature class;
- corrosion class;
- location;
- size.

## Annex A

### European chimney standards published or in preparation (abbreviated titles)

#### 1. General

Title	Number
General requirements	BS EN 1443:2003
General test methods for system chimneys	BS EN 13216-1
Calculation methods – Pt 1: Chimneys serving one appliance	BS EN 13384-1
Calculation methods – Pt 2: Chimneys more than one appliance	BS EN 13384-2
Calculation methods – Pt 3: Methods for the development of diagrams and tables	BS EN 13384-3
Freeze–thaw test method	BS EN 14297

#### 2. Clay/ceramic

Clay/ceramic flue liner components	BS EN 1457:1999 + A1:2002
Clay/ceramic outer walls for system chimneys	prEN 13069
Clay/ceramic flue blocks	BS EN 1806:2000
Clay/ceramic terminals	BS EN 13502:2002
System chimneys: sootfire resistant : wet conditions : air flue systems	prEN 13063-1 BS EN 13063-2 prEN 13063-3

#### 3. Concrete

Concrete flue liner components	BS EN 1857
Concrete flue blocks	BS EN 1858
Concrete outer wall components	BS EN 12446

#### 4. Metal

Pt 1 – System chimney products	BS EN 1856-1
Pt 2 – Flue liners and connected pipes	BS EN 1856-2
Metal chimneys and flue liners – test methods	BS EN 1859:2000
Execution standard (code of practice for installation)	BS EN 12391-1
Metal room-sealed flue/air assemblies for individual room-sealed appliances	prEN xxxx
Metal room-sealed vertical terminals: C6 type appliances	prEN xxxx

#### 5. Plastic

Chimneys – Elastomeric seals for liners – requirements and tests	prEN 14241-1
System chimneys with plastic flue liners	BS EN 14471

**Note 1.** Other items form part of the CEN/TC 166 work programme and await development.

**Note 2.** Full titles of the above standards are given in Annex D.

**Note 3.** Revisions to the ENs listed in 1, 2, 3, 4 and 5 are in course of preparation.

## Annex B

### List of published/proposed ENS and overlapping/affected British Standards

This Annex provides a guide to identify published or proposed EN standards and their equivalent, overlapping or affected British Standards. ('w' denotes British Standard completely or partially withdrawn.)

A – British Standard with text or reference that is directly in conflict with an BS EN and must therefore be withdrawn or amended where such conflict occurs.

B – British Standard that does not conflict with the published BS EN and thus need not be withdrawn or amended. However, an improvement should be made by a new reference to the relevant BS EN.

Number where allocated: prEN or EN	Products covered	BS 41	BS 715	BS 1251	BS 1181 (w)	BS 1289-1	BS 1289-2 (w)	BS 4543	BS 6999	BS 7435	BS 5410-1	BS 5410-2	BS 5440-1	BS 5854	BS 5871-1	BS 5871-2	BS 5871-3	BS 6461	BS 7566	BS 8303	
	<b>GENERAL ▼</b>	Product Standards ▼									Installation Codes of Practice ▼										
<b>BS EN 1443:2003</b>	All chimneys	A	A	A	A	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A
<b>BS EN 13216-1</b>	All syst. chimneys	A	A	A	A	A		A	A	A											
<b>BS EN 13384-1, -2</b>	All chimney materials										A	A	A	A	A	A	A	A	A	A	A
	<b>CLAY/CERAMIC ▼</b>																				
<b>prEN13069</b>	Clay/ceramic outer walls for syst. chimneys										B	B	B	B	B	B	B	B			B
<b>BS EN 1457: A1:2002</b>	Clay/ceramic flue liner components				B						A	B	A	B	B	B	B	A			B
<b>BS EN 1806</b>	Clay/ceramic flue blocks						B				B	B	A	B	B	B	B	B			
<b>BS EN 13502</b>	Clay/ceramic terminals				B	A					A	A	A	B	B	B	B	A			B
<b>prEN 13063</b>	Syst. chimneys clay/ceramic flue liners				B						B	B	B	B	B	B	B	B			B
	<b>CONCRETE ▼</b>																				
<b>BS EN 1857</b>	Concrete flue liner components									A	B	B	A	B	A	A	A	A			B
<b>BS EN 1858</b>	Concrete flue blocks					A					B	B	A	B	A	A	A	A			B
<b>BS EN 12446</b>	Concrete outer wall components					A					B	B	A	B	A	A	A	A			B
	<b>METALS ▼</b>																				
<b>BS EN 12391-1</b>	- Syst. chimneys - Relining - Custom built chimneys										A	B	A	B	A	B	A	A	A	A	B
<b>BS EN 1856-1</b>	- Insulated metal chimneys - Twin/single wall chimneys	A						A			A	B	A	B	A	A	A	A	A		B
<b>BS EN 1856-2</b>	- Flexible liners - Flue pipes - Vitreous enamelled pipes	A	A					A			A	B	A	B	A	A	A	A	A	A	B
<b>BS EN 1859</b>	Metal chimneys Test methods	A	A					A	A												

## Annex C

### Glossary of relevant European terms

**CE mark** – a product must conform with the Requirements of all Directives that apply to it. The information provided by the CE marking enables all the ‘essential requirements’ for the works to be satisfied. The mark is applied to a product after the manufacturer’s declared performance values and attestation of conformity for the product have been assessed according to the relevant harmonised European Standard or European Technical Approval.

**CEN** – is the European Committee for Standardisation. It is separate from the European Commission and consists of the national standards organisations from the European Economic Area. The UK is represented by BSI. CEN organises the work of developing European Standards by creating Technical Committees (TC’s) which are responsible for drafting the relevant standards.

**Construction Products Directive (CPD)** – as part of the drive to create the single market in Europe, the CPD (Directive 89/106/EEC) was adopted by member states including the UK and has the formal title of *Council Directive of 21st December 1988 on the approximation of laws, regulations and administrative provisions of member states relating to construction products.*

A key objective of the CPD is to remove technical barriers to trade by having ‘Harmonised’ European Standards and technical approvals which cover the regulated performance characteristics that a construction product is required to satisfy to enable it to have CE marking.

**European Execution Standard** – can either be an installation specification (i.e. do it this way) or a type of code of practice (i.e. should do it this way). It may also be a design specification or calculation method.

**European Standard (EN)** – is a standard produced by CEN. A draft European Standard is given a ‘prEN’ number up until the time it is published as an ‘EN’. A prEN becomes an EN when it receives at least 71% of the weighted votes from CEN members at the formal vote stage. National Standards Bodies who have voted against adoption of the draft standard as an EN are still obliged to publish the new standard and withdraw conflicting national standards (or parts thereof).

**Harmonised European Standard (hEN)** – is an EN which includes the regulated performance characteristics as set out in the mandate from the European Commission and EFTA to CEN. Annex ZA of the standard identifies these performance characteristics and the clauses in the standard which deal with them. Annex ZA also sets out the attestation procedures needed to verify the performance characteristics and enable the product to be CE marked. It does not set the performance values to be satisfied, e.g. strength or heat resistance, which are set in the national regulations of the member state, except in the case of ‘Threshold values’ below which the product is considered unsuitable for its end use. The standard may define ‘Technical classes’ which are needed to ensure correct use of the product.

**European Technical Approval (ETA)** – is a favourable technical assessment of the fitness for purpose of a product for an intended use, based on fulfilment of the essential requirements for building works for which the product is used. An ETA may be granted to:

- products for which no harmonised standard is being developed under a mandate from the Commission, or
- products which differ significantly from harmonised or national standards, e.g. new, innovative products.

N.B. There is currently no intention for ETAs in the chimney field.

## Annex D

### Bibliography

BS EN 1443:2003	Chimneys. General requirements.
BS EN 1457:1999	Chimneys. Clay/ceramic flue liners. Requirements and test methods. AMD 140 77 2003
BS EN 1806:2000	Chimneys. Clay/ceramic flue blocks for single-wall chimneys. Requirement and test method.
BS EN 1859:2000	Chimneys. Metal chimneys. Test methods.
BS EN 1856-1:2003	Chimneys. Requirements for metal chimneys. System chimney products. AMD 155
BS EN 1856-2:2004	Chimneys. Performance requirements for metal chimneys. Metal liners and connecting flue pipes products.
BS EN 1857:2003	Chimneys. Components. Concrete flue liners.
BS EN 1858:2003	Chimneys. Components. Concrete flue blocks.
BS EN 12391-1:2003	Chimneys. Execution standard for metal chimneys.
BS EN 12446:2003	Chimneys. Components. Concrete outer wall elements.
prEN 13063-1	Chimneys. Clay/ceramic system chimney. Sootfire resistant.
BS EN 13063-2:2005	Chimneys. System chimneys with clay/ceramic flue liners. Requirements and test methods under wet conditions.
prEN 13063-3	Chimneys. Clay/ceramic system chimneys. Air flue systems.
prEN 13069	Chimneys. Clay/ceramic outer walls for system chimneys. Requirements and test methods.
BS EN 13216-1:2004	Chimneys. Test methods for system chimneys. General test methods.
BS EN 13384-1:2002	Chimneys. Thermal and fluid dynamic calculation methods. Chimneys serving one appliance.
BS EN 13384-2:2003	Chimneys. Thermal and fluid dynamic calculation methods. Chimneys serving more than one heating appliance.
BS EN 13384-3:2005	Chimneys. Thermal and fluid dynamic calculation methods. Methods for the development of diagrams and table for chimneys serving one heating appliance.
BS EN 13502:2003	Chimneys. Requirements and test methods for clay/ceramic flue terminals.
prEN 14241-1	Chimneys. Elastomeric seals. Requirements and test methods. Seals in flue liners.
BS EN 14471	Chimneys. System chimneys with plastic flue liners. Requirements and test methods.

**Note:** The above prEN drafts are publicly available when the voting stages have been reached.

## Annex E

### Other sources of information

#### Websites

**[www.safety.odpm.gov.uk/bregs](http://www.safety.odpm.gov.uk/bregs)**

(for Approved Documents, ADJ questions and answers, CE marking publication etc.)

**[www.fbe.co.uk](http://www.fbe.co.uk)**

(for FBE Management Ltd)

**[www.feta.co.uk/bfcma](http://www.feta.co.uk/bfcma)**

(for updates to this guidance)

**[www.thebuildingregs.com](http://www.thebuildingregs.com)**

(for ordering hard copies of Building Regulations Approved Documents)

**[www.bsi-global.com](http://www.bsi-global.com)**

(BSI site for details of British Standards etc.)

**[www.cenorm.be](http://www.cenorm.be)**

(CEN site for details of EN documents, directives, CPD matters etc.)

#### Documents/literature

##### *The Building Regulations 2000, and amendments*

SI 2000/2531

SI 2001/3335

SI 2002/440

##### *Approved Document J – Combustion appliances and fuel storage systems*

ISBN 0 11753 494 3

(The above may be downloaded from the ODPM website.)

ODPM Publications

PO Box 236

Wetherby

L23 7NB

(for CE marking publication, etc.)

Tel: 0870 1226 236

Fax: 0870 1226 237

Email: [odpm@twoten.press.net](mailto:odpm@twoten.press.net)

## Part two. Guidance and supplementary information

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## How to use Part two in conjunction with the Approved Document

It is advisable that this part is read in conjunction with Approved Document J. Where the current clauses of ADJ may be affected by the introduction of European Standards, the following sections reproduce those clauses and give guidance in using published ENs and what is likely to be issued from a knowledge of the development of the prENs. The way clauses of ADJ may be affected is given in italics within a box and is given on a best endeavours basis since many details of the application process are unclear or unestablished. An example of the layout as applied to guidance on clauses 1.47 to 1.50 is given below.

### **Guidance on 1.47 to 1.50**

*Recommendations are given in BS EN 12391-1 for routing, provisions for sweeping, openings for inspection, etc.*

At the time this document was written, a small number of the European Standards referred to were still prENs and relevant comments on such draft standards have also been included in the Guidance box. This has been given to help the reader understand the whole area of activity surrounding the development of European Standards for chimneys and the direction and approach which is likely to be followed in a particular area. However, as this information is subject to change as the prEN standard is developed and before it becomes an EN, it should NOT be used or taken as agreed European policy on chimneys in any respect. Once a prEN receives formal sanction and turns into an EN it can be used and indeed any equivalent British Standard, or part thereof, should be withdrawn within 6 months (see Part 1, clause 2.4.1) and a UK version, with a BS EN number, issued to enact the EN.

Because European Standards are gradually displacing British Standards, the advice contained in this publication will be subject to small, but continual, change.

With the general acceptance of the internet as a vehicle for information handling it has been decided to regularly post the latest amendments to the guidance using this medium. Access to these updates can be obtained by logging on to the BFCMA web site at: <http://www.feta.co.uk/bfcma>.

The guidance information is also expected to be of help to users of the documents supporting the building regulations of Scotland and Northern Ireland in so far as they deal with the installation of combustion appliances, namely:

Scotland – Part F (Combustion appliance installations and storage of liquid and gaseous fuels);

Northern Ireland – Technical Booklet L (Heat Producing Appliances).

# Section 0

## General guidance

### Introduction to the provisions

**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 50kW 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 liquefied petroleum gas (LPG) storage installations with capacities up to 1.1 tonne, although there is no size limit on the application of 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.

#### **Guidance on 0.2**

*The ratings for respective fuels are in line with ranges of ratings for appliances complying with current or proposed European appliance standards. These are detailed in the different sections, as applicable.*

**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 Design Guide Volume B* and practice standards produced by BSI and the Institution of Gas Engineers.

#### **Guidance on 0.3**

*Where the incinerator manufacturer's instructions specify the operating characteristics of the incinerator so as to facilitate the use of the European chimney designation scheme, the appliance can be installed to a chimney with performance characteristics equal to or higher than those for the appliance in question, see BS EN 1443.*

### Explanation of terms used

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

#### **Guidance on 0.4**

*Some of the terms used in the Approved Document J are similar to those in BS EN 1443 but others may be different to reflect situations specific to the UK.*

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.

### Guidance on 0.4, 3

*Balanced flues are also defined only for gas appliances in CR 1749: 2001 as 'type C' appliances. This term also appears in European gas appliance standards.*

7. A **chimney** is a structure consisting of a wall or walls enclosing one or more flues. (See Diagram 0.2.) In the gas industry, the chimney for a gas appliance is commonly called the flue. (Note: The diagram is not reproduced for the purpose of this guidance.)

### Guidance on 0.4, 7

*BS EN 1443 defines a chimney in a similar manner thus: 'structure consisting of a wall or walls enclosing a flue or flues'. It goes on to define:*

**single wall chimney** – chimney where the flue liner is the chimney,

**multi-wall chimney** – chimney consisting of a flue liner and at least one additional wall,

**system chimney** – chimney that is installed using a combination of compatible chimney components obtained or specified from one manufacturing source with product responsibility for the whole chimney;

**custom-built chimney** – chimney that is installed or built on site using a combination of compatible chimney components that may be from one or different sources.

*BS EN 1443 defines a flue as a 'passage for conveying the products of combustion to the outside atmosphere'. European Standards resist the use of 'flue' as any kind of chimney structure. (Also see definition of 'flue'.)*

9. The **designation** system in BS EN1443:1999 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 EN1234 T400 P1 S W 1 R22 C50.

In the foregoing example, EN 1234 stands for the European Standard in question and the remainder of the code gives classes of performance achieved in relation to that standard. For example, T400 indicates a product with a nominal working temperature of 400°C.

Chimney products tested in accordance with European Standards may carry such a designation or a shorter Class to indicate which designation applies. For example, clay ceramic flue liners with the designation EN1457 T600 N2 S D 3 are described as being of Class A1N2.

### Guidance on 0.4, 9

*As a result of the revision of BS EN 1443:1999 to BS EN 1443:2003 the designation string has been refined. The example above would now be expressed as EN 1234 – T400 P1 W 1 G50. For details of the designation system in general – see Part 1, clause 3.1.*

*BS EN 1457:1999 has also been amended slightly (Amendment 1) and the term 'Class' has been replaced by 'Type'. The example quoted in the last sentence of clause 9 expressed in 2003 terms would be 'For example, clay/ceramic flue liners with the designation EN 1457 – T600 N2 D 3 G are described as Type A1N2'. For this category of product, the shortform reference 'A1' embodies several characteristics including a working temperature of T600 and the other characteristics quoted.*

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 0.3(a).) It allows the appliance to operate without interference from down-draughts that may occur in adverse wind conditions and excessive draught. (Note: The diagram is not reproduced for the purpose of this guidance.)

### Guidance on 0.4, 11

*BS EN 13384-1 uses the definition – ‘...device, placed in the combustion products passage of the heating appliance, that is intended to maintain the quality of combustion within certain limits and to keep the combustion stable under certain conditions of updraught and downdraught’.*

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 0.3(b).) It is usual for these to be in the flue pipe or chimney, but they may be located on the appliance. (Note: The diagram is not reproduced for the purpose of this guidance.)

### Guidance on 0.4, 12

*BS EN 13384-1 uses the term ‘draught regulator’, defined as ‘a component which automatically supplies ambient air to the chimney, the connecting flue pipe or the heating appliance’.*

13. **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 but typical types range from single walled metal chimneys suitable for some gas appliances to chimneys with insulation sandwiched between an inner liner and an outer metal wall which are designed for oil or solid fuel use.

### Guidance on 0.4, 13

*Also see comments under ‘chimney’ (0.4, 7). European factory-made chimneys may be constructed from materials other than metal liners or metal outer walls.*

15. 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 (see Section 9 – Compartmentation, and Appendix C – Methods of Measurement).

### Guidance on 0.4, 15

*Also see comments under ‘chimney’ (0.4, 7). European factory-made chimneys may be constructed from materials other than metal liners or metal outer walls.*

19. A **flue** is a passage that conveys the products of combustion from an appliance to the outside air. (See Diagram 0.2.) (Note: The diagram is not reproduced for the purpose of this guidance.)

### Guidance on 0.4, 19

*BS EN 1443 defines a flue as a ‘passage for conveying the products of combustion to the outside atmosphere’. European Standards resist the use of ‘flue’ as any kind of chimney structure. (Also see definition of ‘chimney’, 0.4, 7).*

20. **Flueblock chimney** systems consist of a set of factory-made components, made from precast concrete, clay or other masonry units, which 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.

### Guidance on 0.4, 20

*IN BS EN 1443 the term 'flue block' is defined as a factory made single- or multi-wall chimney component with one or more flues. They may be manufactured of clay/ceramic (to BS EN 1806), or concrete (to BS EN 1858). When assembled they form a chimney. The term 'masonry unit' is unlikely to be compatible and indeed conflicts with terms used in the UK building industry where a single brick or block is described as a 'unit'.*

23. A **flue liner** is the wall of the chimney that is in contact with the products of combustion (see Diagram 0.2.), such as a concrete flue liner, the inner liner of a factory-made chimney system or a flexible liner fitted into an existing chimney. (Note: The diagram is not reproduced for the purpose of this guidance.)

### Guidance on 0.4, 23

*BS EN 1443 defines this as a 'wall of a chimney consisting of components the surface of which is in contact with the products of combustion'.*

25. 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.)

### Guidance on 0.4, 25

*This is not a recognised concept in European chimney standards. EN 1443 defines a 'connecting flue pipe' as a component or components connecting the heating appliance outlet and the chimney. The UK terminology using such pipes alone as a system for flueing would be termed a chimney in European Standards.*

27. The **heat input rate** is the maximum rate of energy flow into a gas appliance that could be provided by the prevailing rate of fuel flow into the appliance, if the fuel were to be burned in an ideal manner, with full oxidation. It is calculated as the rate of fuel flow to the appliance multiplied by either the fuel's gross or net calorific value, depending upon whether or not it is assumed that conditions allow the latent heat due to the condensation of water in combustion products to be included in the heat obtained from the fuel. The gross calorific value includes the latent heat of condensation and the gross heat input rate is thus a larger figure than the net heat input rate. The calculation is entirely theoretical and either heat input rating could be used for any given appliance. However, it is now the norm to express the rating of a gas appliance as a net heat input rate (kW (net)).

### Guidance on 0.4, 27

*BS EN 13384-1 defines energy input in terms of net calorific value and uses this parameter in the thermal and fluid dynamic calculation methods. In the case of gas appliances, see the 'Background Guidance' at the beginning of Section 3.*

31. **Non-combustible material.** This is the highest level of reaction to fire performance. Non-combustible materials comprise:

- a. Any material which when tested to BS 476-11:1982 (1988) does not flame or 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 (1984).

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% 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.)

### **Guidance on 0.4, 31**

*The term 'non-combustible' may be defined otherwise in various European Standards. The horizontal mandate M117 defines the criteria for the resistance to fire of a chimney, and prEN 13501-2 gives the fire classification of construction products and building elements. The Commission decision 96/603/EC lists materials which have been assigned the Reaction to Fire class A1 for non-combustibility.*

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.

### **Guidance on 0.4, 32**

*For further information, see Part 1, clause 2.2.4 of this guidance document.*

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 0.4 (a), (c) and (e).) (Note: The diagram is not reproduced for the purpose of this guidance.)

### **Guidance on 0.4, 33**

*Gas appliances for open flues are defined in CR 1749:2001 as 'type B' appliances. This term also appears in European gas appliance standards.*

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 0.4 (b), (d) and (f).) (Note: The diagram is not reproduced for the purpose of this guidance.)

### **Guidance on 0.4, 38**

*Room-sealed appliances are also defined for gas only in CR 1749:2001 as 'type C' appliances. This term also appears in European gas appliance standards.*

# Section 1

## Provisions which apply generally to combustion installations

### Performance

**1.1** In the Secretary of State's view, requirements J1 to J4 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. enable normal operation of appliances without their causing danger through damage by heat or fire to the fabric of the building;
- d. have been inspected and tested to establish suitability for the purpose intended;
- e. have been labelled to indicate performance capabilities.

#### **Guidance on 1.1**

*The suite of European chimney standards produced by CEN/TC166 deals with the specification, design, testing and installation of chimneys both single and multi-walled. The general thrust of these standards includes provisions for containing the products of combustion and protection against damage by heat and fire.*

*The execution standard for metal chimneys, BS EN 12391-1, gives guidance for the provision of air supplies to appliances and flues, and references the calculation method of BS EN 13384-1 for verifying the correct operation of the chimney. BS EN 12391-1 does not currently cover the ventilation air needed for cooling appliances, although the calculation method in BS EN 13384-1 enables the effect of additional air into a chimney flue to be determined.*

### Air supply for combustion appliances

#### 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 1.1) dependent upon its type and rating. Infiltration through the building fabric may be sufficient but above certain appliance ratings permanent openings are necessary. (See Diagram 1.1.) (Note: The diagram is not reproduced for the purpose of this guidance.)

#### **Guidance on 1.4**

*The infiltration allowance which may be used in the case of certain open flued appliances is based on historical evidence and research work on British housing stock. BS EN 12391-1 requires air supply (and other) data to be obtained and documented. It gives some suggested sources such as the heating appliance and/or chimney manufacturer, architect's drawings or local building rules. In England and Wales, the air supply requirements should be estimated from traditional British sources, e.g. Approved Document J and in the Sections for solid fuel, gas and oil under the heading 'Alternative approach'.*

## Provision of flues

**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 5440-1:2000 for gas-fired systems. However, each solid fuel appliance should have its own flue.

### **Guidance on 1.25**

*BS EN 13384-2 provides a calculation method for chimneys serving more than one appliance but the version currently available requires data not yet generally available for UK installations and the current British Standards referenced above should be used.*

## 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 and by making appropriate provisions for draining, avoiding ledges, crevices, etc.
  - ii. making provisions for the disposal of condensate from condensing appliances.

### **Guidance on 1.26**

*Under the European classification scheme, chimney components should be designated suitable for 'DRY' (designation D) or 'WET' (designation W) operation. The definitions are given in BS EN 1443. A chimney designated 'D' would mean that the flue liner temperature (at the outlet of the chimney) should remain above the water dew point of the flue gas when the appliance is working at its nominal (rated) output, and for some applications also when the appliance is operating at a part-load level. The concept of 'WET' or 'DRY' chimneys is new to the UK and can be determined by the calculation method of BS EN 13384-1. It needs further clarification to enable a suitable chimney design to be specified consistent with UK practice. If by the calculation method of BS EN 13384-1 the flue liner temperature is found to be below the flue gas water dew point then the chimney should have the designation 'W'. Products with the designation 'W' have been tested for their ability to resist liquid condensates. A standard for vertical terminals for C6 appliances is nearing public enquiry status and contains proposals for the ability to prevent ice formation.*

## Construction of masonry chimneys

**1.27** New 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 Sections 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 T450 N2 S D 3, as described in BS EN 1443:1999, such as:
  - i. clay flue liners with rebates or sockets for jointing meeting the requirements for Class A1 N2 or Class A1 NI as described in BS EN 1457:1999; or
  - ii. concrete flue liners independently certified as meeting the requirements for the classification Type A1, Type A2, Type B1 or Type B2 as described in prEN 1857(e18) January 2001; or
  - iii. other products that are independently certified as meeting the criteria in (a);
- b) imperforate clay pipes with sockets for jointing as described in BS 65:1991 (1997).

## Guidance on 1.27

This form of chimney construction is described as a 'custom built chimney' in BS EN 1443, which details the designation system as referred to in Clause 3 of Part 1 of this document.

a. This clause specifies performance levels of flue liners to the designation system of T450, N2, S, D3 in accordance with designation strings defined in BS EN 1443:1999. However, the refined designation string for the same chimney in accordance with BS EN 1443:2003 would be T450 N2 D 3 G which means the liners have the performance characteristics shown in the following table. In order to align with European practice it is recommended that T400 is used as the temperature designation and this would have a consequence on the information and abbreviated designations as shown below.

Designation	Performance characteristic
T400	Is capable of operating at a nominal working temperature of 400°C.
N2	Is designed for operation at a negative pressure (i.e. natural draught) and will not exceed the permitted leakage rate when tested at a pressure of 20 Pascals.
D3	Will withstand dry operating conditions within the flue and has a corrosion resistance to level 3 as defined in the relevant product standard. This is the highest level of corrosion resistance and is defined as being relative to heavy oil or solid fuel-burning applications.
G	Has sootfire resistance and will pass 1000°C sootfire test.

It should be noted that BS EN 1457 defines the basis on which these performance characteristics are proven by testing. They also specify other performance characteristics that are not included in the above paragraph of the Approved Document J.

a. i. BS EN 1457 gives a shortform designation for clay/ceramic liners and Type A1 N2 denotes a designation of T600 suitable for a nominal working temperature of 600°C under negative pressure, with dry conditions corrosion resistance level 3 (D 3) and for sootfire resistance (G). Liners to Type A1N1 have the same performance characteristics with the exception that they have the pressure classification of N1 denoting operation at a negative pressure (i.e. natural draught) and will not exceed the permitted leakage rate when tested at a pressure of 40 Pascals.

In the absence of a UK Notified Body covering testing to this standard, manufacturers may seek to have their liners tested by a recognised independent body that provides a certificate confirming the performance levels on the basis of testing to the procedures specified in the standard. Recognised testing bodies might include BBA, BRE Certification, BSRIA and CERAM.

a. ii. The draft standard quoted, prEN 1857 (Jan. 2001), has progressed to publication as BS EN 1857:2003. This includes a table of abbreviated designations from which the following are drawn.

Type	Nominal working temperature	Pressure class	Sootfire resistant	Condensate resistance
A1	T600	N1	Yes G	Dry
A2	T600	N2	Yes G	Dry
B1	T450	N1	Yes G	Dry
B2	T450	N2	Yes G	Dry

In the absence of a UK Notified Body covering testing to this standard, manufacturers may seek to have their liners tested by a recognised independent body as explained in the guidance on (a)(i). Many manufacturers have their concrete liners certificated by BSRIA or CERAM who test the liners using the test procedures described in BS EN 1857.

continued

### **Guidance on 1.27 continued**

a. iii. *The reference to other products applies to other types of flue liners for use in masonry chimney construction. However, they would need to be independently certified by a recognised body to the performance designation given in (a) being proven by testing using the relevant procedures given in BS EN 1457 or BS EN 1857. It should be noted that as stated in 1.40 of the Approved Document J metal liners should not be used as the primary liner in new masonry chimneys construction.*

*General. The specified performance designation would be applicable for flues serving solid fuel or heavy oil burning appliances, which would also be suitable for use with gas burning appliances. The guidance given in the relevant sections of the Approved Document J should be followed regarding chimney construction including the requirements on flue sizing, distance to combustible and termination heights.*

*Reference is also made to BS 6461, which covers the Installation of Masonry Chimneys and Flues for Domestic Appliances Burning Solid Fuel (Including Wood and Peat). The content of this standard is currently under review and is likely to be changed to take account of this edition of Approved Document J and the European Standards. Work is proceeding on a general European design document (code of practice) that is not specific to any material.*

**1.28** Liners should be installed in accordance with their manufacturer's instructions. Appropriate components should be selected to form the flue without cutting and to keep joints to a minimum. Bends and offsets should only be formed with matching factory-made components. Liners need to be placed with the sockets or rebate ends uppermost to contain moisture and other condensates in the flue. Joints should be sealed with fire cement or, refractory mortar or installed in accordance with their manufacturer's instructions. Spaces between the lining and the surrounding masonry should not be filled with ordinary mortar. In the absence of liner manufacturer's instructions, the space could be filled with a weak insulating concrete such as mixtures of:

- a. one part ordinary Portland cement to 20 parts suitable lightweight expanded clay aggregate, minimally wetted; or
- b. one part ordinary Portland cement to 6 parts Vermiculite; or
- c. one part ordinary Portland cement to 10 parts Perlite.

### **Guidance on 1.28**

*BS EN 1457 allows different styles of rebated, socketed or butt joints and it is important to follow the manufacturer's installation instructions on the jointing material to be used.*

*BS EN 1857 also allows different styles of rebated, socketed or butt joints and again it is important to follow the manufacturer's installation instructions on the jointing material to be used.*

## **Construction of flueblock chimneys**

**1.29** Flueblock chimneys should be constructed of factory-made components suitable for the intended application installed in accordance with 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 T450 N2 S D 3, as described in BS EN 1443:1999, such as:
  - i. clay flue blocks at least meeting the requirements for Class FB1 N2 as described in BS EN 1806:2000;
  - ii. other products that are independently certified as meeting the criteria in (a);
- b. blocks lined in accordance with Paragraph 1.27 and independently certified as suitable for the purpose.

## Guidance on 1.29

a. The designation system of T450, N2, S, D 3 denotes flue blocks having the performance characteristics as explained in the guidance and table for 1.27. In order to align with European practice it is recommended that T400 is used as the temperature designation and this would have a consequence on the information and abbreviated designations below.

BS EN 1806 defines the basis on which these performance characteristics are proven by testing the flue blocks and also specifies other performance characteristics that are not included in the above paragraph of the Approved Document J.

a. i. Class FB1 N2 is the short-form designation for clay flue blocks having performance characteristics of T600 suitable for nominal working temperature of 600°C, S for sootfire resistance and D3.

In the absence of a UK Notified Body covering testing to this standard, manufacturers may seek to have their liners tested by a recognised independent body that provides a certificate conforming the performance levels achieved by testing to the procedures specified in the standard. Recognised testing bodies might include BBA, BRE Certification, BSRIA and CERAM.

a. ii. The reference to other products would include precast concrete flue block systems. BS EN 1858, which was not published at the time the 2002 edition of ADJ was published, prescribes concrete flue blocks. This includes a table of abbreviated designations from which type B2 is drawn as follows to comply with the specification in 1.29.

Type	Temperature	Pressure	Sootfire resistant	Condensate resistance
B2	T450	N2	Yes G	Dry

Many of these systems are currently covered by BBA certification issued prior to this edition of ADJ. In any event, these other products would need to be independently certified by a recognised body with the performance designation given in (a) being proven by testing using the relevant procedures such as given in BS EN 1806, BS EN 1858 or an equivalent standard.

b. This paragraph would apply to systems such as those consisting of a concrete outer block constructed to BS EN 12446 into which a clay, concrete or rigid metal flue liner is placed. The European Standard for system chimneys with clay/ceramic flue liners is nearing completion and will be published as BS EN 13063 Parts 1, 2 and 3. Both these standards will incorporate the test procedures to confirm the performance characteristics for the products.

Many of these systems are currently covered by BBA certification issued prior to the publication of this edition of ADJ. In any event, the principle of independent certification would apply as in (a)(ii) above.

The guidance given in the relevant sections of the Approved Document J should be followed regarding chimney construction including the requirements on flue sizing, distance to combustible and termination heights. There are also flue blocks that are designed solely for use with gas-fired appliances as described in 3.30 of ADJ.

## Connecting fluepipes

1.32 Satisfactory components for constructing connecting fluepipes include:

- a. cast iron fluepipes complying with BS 41:1973 (1998);
- b. mild steel fluepipes complying with BS 1449: Part 1:1991, with a flue wall thickness of at least 3mm;
- c. pipes made from stainless steel as described in BS EN 10088-1:1995 grades 1.4401, 1.4404, 1.4432 or 1.4436 with a flue wall thickness of at least 1mm;
- d. vitreous enamelled steel pipe complying with BS 6999:1989 (1996);

- e. other fluepipes independently certified as having the necessary performance designation for suitable use with the intended appliance.

### **Guidance on 1.32**

*Connecting flue pipes will be covered by BS EN 1856-2 when published and it is highly likely that the material specification and thickness referred to in this paragraph of ADJ will be incorporated as a National Annex for use in the UK. The references to BS 41, BS 1449-1 and BS 6999 are likely to be superseded.*

## **Factory-made chimneys**

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

- a. using component systems independently certified as complying with the relevant sections of BS 4543-1:1990 (1996), BS 4543-2:1990 (1996) and BS 4543-3:1990 (1996) (Part 1 withdrawn April 2000; partially superseded by BS EN 1859: 2000) and installing them in accordance with the relevant recommendations in BS 7566-1:1992 (1998), BS 7566-2:1992 (1998), BS 7566-3:1992 (1998) and BS 7566-4:1992 (1998);
- b. for gas and for oil appliances where flue temperatures will not normally exceed 250°C, using twin wall component systems (and, for gas, single wall component systems) complying with BS 715:1993 and installing them in accordance with BS 5440-1:2000;
- c. using any other chimney system that is independently certified as being suitable for the intended purpose and installed in accordance with the relevant recommendations in BS 7566-1:1992 (1998), BS 7566-2:1992 (1998), BS 7566-3:1992 (1998) and BS 7566-4:1992 (1998) or BS 5440-1:2000, as appropriate to the type of appliance being installed.

### **Guidance on 1.42**

*Now that BS EN 1856-1 is published it is intended to replace BS4543: Parts 2 and 3, and BS 715 in respect of requirements for metal chimneys. prEN 1856-2, when published as a BS EN, will specify the requirements for metal flue liners and connecting flue pipes, such as currently covered in BS 715. Many of these chimney systems are covered by a BSI Kitemark which confirms compliance with the relevant parts of BS 4543 or BS 715.*

*BS EN 1856-1 does, and BS EN 1856-2 (when published) will include a National Annex confirming the type and thickness of materials required to satisfy UK requirements in terms of corrosion and durability based upon the proven specifications given in the current British Standards.*

*See the relevant sections regarding material specifications for connecting flue pipes and double skin flexible flue liners for use with solid fuel or oil burning appliances.*

*In any case, the designation of system chimneys, metal liners, and connecting flue pipes to BS EN 1856-1 and prEN 1856-2 should be appropriate for the appliance which will be fitted to the chimney. In this regard, attention is drawn to the need to ensure that all sections and fittings carry the correct designation or marking.*

*As an interim measure, the durability of materials against corrosion is dealt with in EN 1856-1 by a two-fold approach. The manufacturer may declare the material specification (type and thickness) from which the liner is manufactured. Products upon which a declaration has been made in this manner are designated Vm, e.g. L40045. 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. The material specification forms part of the overall designation, and appears alongside the 'V' letter, e.g. V3 – 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.*

*continued*

### **Guidance on 1.42 continued**

**Example.** *Vm – L 40045 represents a liner upon which a manufacturer has made a declaration in respect of corrosion resistance and which is made of 1.4401 stainless steel with a thickness of 0.45mm. Vm – L 40045 itself would appear as the last but one element of the overall designation system for a chimney component to either EN 1856 Part 1 or 2.*

*The material specifications of BS 4543 and BS 715 continue to apply at this time until a revision of ADJ addresses the acceptability of the V1 to V3 designations.*

**1.45** Factory-made metal chimneys should be kept a suitable distance away from combustible materials. Ways of meeting the requirement for chimneys complying with BS 4543: Parts 2 or 3:1990 (1996) comprise:

- a. locating the chimney not less than distance X from combustible material, where 'X' is defined in BS 4543: Part 1:1990 (1996) as shown in Diagram 1.7. (Note: The diagram is not reproduced for the purpose of this guidance.)
- 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 distance 'X'.

### **Guidance on 1.45**

*The clearance 'X' referred to above should be declared by manufacturers, according to BS EN 1443:2003, as the distance between the outer surface of the chimney and the combustible materials and expressed as 'xx' being the value in whole millimetres.*

*For products to BS EN 1856 this parameter is marked on the product as part of the marking requirements; it is also required to be declared in the manufacturer's literature.*

*Note. Under European terminology 'Factory-made' chimneys mean 'system chimneys'. These may be of masonry or plastic as well as metal. Each product requires a distance 'xx' to be specified (see Part 1, clause 3.1).*

## **Configuration of natural draught flues serving open-flued appliances**

**1.47** 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.

**1.48** 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 45° bends, 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 1.8).) (Note: The diagram is not reproduced for the purpose of this guidance.)

## **Inspection and cleaning openings in flues**

**1.49** 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.

**1.50** 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 combustible fluepipe (such as plastic fluepipe). After the appliance has been installed, it should be possible to sweep the whole flue easily.

#### **Guidance on 1.47 to 1.50**

*Recommendations are given in BS EN 12391-1 for routing, provisions for sweeping, openings for inspection etc. Although this standard is only for metal chimneys, it is intended to produce similar recommendations for chimneys of other materials in future.*

### **Flues discharging at low level near boundaries**

**1.51** 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 Diagrams 3, 4 or 4.2, as relevant. (Note: The diagrams are not reproduced for the purpose of this guidance.)

#### **Guidance on 1.51**

*Some advice on chimney termination is given in BS EN 12391-1, but this does not treat low level discharge as it applies to British housing stock requirements relating to safety near to property boundaries. Existing rules in ADJ for the siting of terminals should be followed.*

### **Condition of combustion installations at completion**

**1.53** Responsibility for achieving compliance with the requirements of Part J rests with the person carrying out the work. That 'person' may be, for example, 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.

**1.54** 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.

**1.55** 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.

#### **Guidance on 1.53 to 1.55**

*BS EN 12391-1 gives a check list to be followed on commissioning metal chimney products.*

## Notice plates for hearths and flues

**1.56** 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 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 1.9 conveying the following information:

- a. the location of the hearth, fireplace (or flue box) or 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.

(Note. The diagram is not reproduced for the purposes of this guidance.)

### **Guidance on 1.56**

*The term 'notice plate for hearths and flues' is referred to as a 'chimney plate' in European Standards for chimneys. In addition to the marking listed above, the installer may include his own identification or name. Where the chimney is manufactured to a European Standard, the chimney plate should also include the designation for the chimney (Part 1, Clause 3). The plate will typically be supplied by the system chimney product manufacturer or liner manufacturer or may be supplied by the installer. See also guidance on 1.57.*

*This form of plate is not applicable to the flues of room-sealed appliances with integral flue/air duct assemblies which are dedicated to the appliance they serve. However, a plate may be required for such an appliance which is fitted on a hearth.*

**1.57** 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.

### **Guidance on 1.57**

*See also guidance on 1.56 and Part 1, clause 3.*

**1.58** 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 as described in Paragraph 0.4 (9), the installer may optionally include this designation on the label as shown in Diagram 1.9. (Note: The diagram is not reproduced for the purposes of this guidance.)

### **Guidance on 1.58**

*See also guidance on 1.56 and Part 1, Clause 3.*

## Section 2

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

**Note:** This section needs to be read in conjunction with Sections 0 and 1

#### Size of flues

**2.4** Flues should be at least the size shown in Table 2.2 relevant to the particular appliance, and not less than the size of the appliance flue outlet or that recommended by the appliance manufacturer.

##### **Guidance on 2.4**

*The meaning of the term 'flue pipe' when applied to solid fuel refers to the pipe connecting the appliance to the chimney. Further guidance on this is given in ADJ Section 0, Clause 25. The European term is 'connecting the flue pipe' as defined in BS EN 1443:2003.*

**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% 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% of the total face area of the fireplace openings; or
- b. more than 120,000mm<sup>2</sup> (0.12m<sup>2</sup>)

##### **Guidance on 2.7**

*See also guidance on 2.8.*

#### 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 a careful assessment of local wind patterns. However, a 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 5854:1980 (1996) can be used as the basis for deciding whether a chimney design will provide sufficient draught.

## Guidance on 2.8

*BS 5854 makes provision for alternative methods of computing satisfactory chimney designs.*

*Attention is drawn to the possible use of BS EN 13384-1 which specifies methods for calculation of the thermal and fluid dynamics for single inlet chimneys. However, it is recommended that current national advice given in this ADJ and appropriate British Standards is followed at present since the BS EN 13384-1 method requires input data not yet available for some UK appliances and makes assumptions that are not appropriate to UK installations. When using any computer-based program, designers should ensure that all inputs are correct and that any default entries, e.g. appliance performance data, chimney construction data and in-built safety factors, are appropriate for the UK and correct for the appliance type and property under consideration.*

## 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 2.1. 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. (Note: Diagram 2.11 is not reproduced for the purposes of this guidance.)

## Guidance on 2.10 and 2.11

*The location of chimney outlets are given in BS EN 12391-1, the execution standard for metal chimneys. However, because of the different requirements across Europe the standard states (clause 4.2.6.12) ‘...the installation shall be in accordance with local regulations’. The basic height of a terminal above the ridge of a pitched roof is 600mm or 2.3m measured horizontally to the sloping roof surface as in the UK but there are differences in the way other distances are specified relative to flat roofs and obstacles. Users of ADJ should continue to adhere to Clause 2.11 and standards recognised under the ‘Alternative approach’ until the UK’s position in respect of BS EN12391-1 is formalised in a national annex.*

## Location and shielding of connecting fluepipes

**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. separation by not less than three-quarters of the outside diameter of ordinary insulated pipes if the insulation is at least 12mm thick and has thermal conductivity not exceeding 0.065W/mK; or
- b. separation by shielding in accordance with Diagram 2.3\*; or
- c. following the guidance in Paragraph 1.45 where the connecting fluepipe is a factory-made chimney.

(\*Note: Diagram 2.3 not reproduced for the purposes of this guidance.)

## Guidance on 2.15

*BS EN 12391-1 makes provision for the determination of the minimum distance between the outer wall of a hot surface and combustible material. In its Annex A1, it defines the maximum permitted temperature of combustible material as 85°C during normal (rated) output operation, but allows 100°C under sootfire conditions. A connecting fluepipe should be installed using whichever is the greater of these two distances.*

## 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 J4 are met (see Paragraphs 1.34 and 1.35). If the existing flue being reused, it should be checked as described in Paragraph 1.36. Ways of meeting the requirements include the use of:

- a. liners whose performance is independently certified as being at least equal to that corresponding to the designation T450 N2 S D3, as described in BS EN 1443:1999, such as:
  - i. factory-made flue lining systems such as a double skin flexible stainless steel lining which is independently certified as suitable for use with solid fuel-burning appliances;
  - ii. a cast in situ concrete flue lining system where the material and installation procedures are independently certified as suitable for use with solid fuel-burning appliances;
  - iii. other systems which are independently certified as suitable for use with solid fuel-burning appliances and meeting the criteria in (a);
- b. liners as described in Paragraph 1.27.

### **Guidance on 2.20 (a), (i), (ii) and (iii)**

*a. Note that BS EN 1443:1999 has been replaced by BS EN 1443:2003 and the designation systems have been refined.*

*The designation of T450, N2, S, D 3 to the 2003 version is thus replaced by T450 N2 D 3 G, which denotes liners having performance characteristics as shown in the following table. In order to align with European practice it is recommended that T400 is used as the temperature designation and this would have a consequence on the designations as shown below.*

<b>Designation</b>	<b>Performance characteristic</b>
T400	<i>Is capable of operating at a nominal working temperature of 400°C.</i>
N2	<i>Is designed for operation at a negative pressure (i.e. natural draught) and will not exceed the permitted leakage rate when tested at a pressure of 20 Pascals.</i>
D3	<i>Will withstand dry operating conditions within the flue and has a corrosion resistance to level 3 as defined in the relevant product standard. This is the highest level of corrosion resistance and is defined as being relative to heavy oil or solid fuel-burning applications.</i>
G	<i>Has sootfire resistance and will pass 1000°C sootfire test.</i>

*continued*

## Guidance on 2.20 (a), (i), (ii) and (iii) continued

i. There is no British Standard covering the requirements and testing for double skin flexible stainless steel liners. Many manufacturers have therefore had their liners tested and certificated for use with solid fuel-burning by for instance the CSTB and TUV who are recognised as independent test bodies. Some liners are also listed in the HETAS official guide to approved solid fuel products and services.

Double skin flexible stainless steel liners will be covered in prEN 1856-2 when it is published and this will include reference to establishing the performance characteristics by testing the liners to the relevant parts of BS EN 1859. However, to address requirements for resistance to corrosion and durability this BS EN is highly likely to include a National Annex specifying the following type of material and thickness required for use in the UK.

Each skin (i.e. wall of the liner) is to be a minimum thickness of 0.1mm (i.e. a minimum 0.2mm thickness for the two skins) using any of the following grades of stainless steel.

<b>BS 1449 designation</b>	<b>EN reference</b>
316 S11	1.4404
316 S13	1.4432
316 S31	1.4471
316 S33	1.4436
904S13 (also known as 904L)	1.4539

ii. There is no British Standard for cast in situ concrete liners. These systems involve the mixing of the lining material on the site where the lining is applied. Some systems are covered by BBA certification that was issued prior to this edition of ADJ. BRE Certification also provide certification confirming the specified performance designation by testing to similar procedures given in BS EN 1857.

The proposed European Standard for cast in situ concrete flue liners has been dropped but an independent UK based assessment scheme has been developed by HETAS using similar test procedures as given in BS EN 1857 to verify the performance characteristics required in (a).

iii. The term 'other systems' would include other lining systems such as those that provide a sealant or protective coating (e.g. ceramic based) to the inside surface of a chimney in order to seal damaged or unsound joints and cracks in the surface of the flue walls. These forms of lining usually involve mixing and applying the material on site.

Other systems for repairing or relining chimneys, including sealant or coatings, would be expected to be independently tested and certified to the performance designation given in (a). The testing may need to be based on the relevant procedures in the appropriate standards, such as BS EN1856-2 and/or BS EN 1857.

It should be noted that many of the cast in situ linings, sealants and coatings have to be applied by trained installers and this is usually specified as a condition of certifications for the system.

## Alternative approach

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

- a. *BS 6461: Installation of chimneys and flues for domestic appliances burning solid fuel (including wood and peat). Code of practice for masonry chimneys and flue pipes. Part 1:1984 (1998);*
- b. *BS 7566: Installation of factory made chimneys to BS 4543 for domestic appliances Parts 1 to 4:1992 (1998); and*
- c. *BS 8303: Installation of domestic heating and cooking appliances burning solid mineral fuels. Parts 1 to 3:1994.*

### **Guidance on alternative approach**

- a. *BS 6461 is currently under review and is likely to be changed to take account of this edition of Approved Document J and the European Standards. It is likely that there will be a European Execution Standard specifically covering masonry chimneys with clay or concrete flue liners.*
- b. *BS 7566 will be replaced by BS EN 12391 and it is intended that the latter will include a National Annex specifying requirements applicable to the UK.*

## Section 3

### Additional provisions for gas-burning appliances with a rated input up to 70kW (net)

**Note:** This Section needs to be read in conjunction with Sections 0 and 1

#### **Background and guidance on 3**

*New appliances are required to comply with the Gas Appliance (Safety) Regulations which implement the European Gas Appliance Directive in the UK. Appliances should be checked to ensure they carry the CE mark and that they are suitable for the gas being supplied. In this context, attention is drawn to the need to establish the basis on which the heat input is quoted. Hitherto, this has been based on the gross calorific value of the fuel, but all installation standards are now being progressively revised so as to align with European appliance standards which are based on net calorific value. The ratio of gross:net heat input is approximately 1.11:1, 1.09:1, and 1.08:1 for appliances burning natural gas, propane and butane respectively. For example, to convert 9kW input natural gas (gross c.v.) to the equivalent net c.v. heat input = 9 (gross)/1.11 = 8.1kW heat input (net).*

*In addition, the heat input limit of national installation standards is changing. European product standards, e.g. EN 26 and EN 625, specify requirements for water heaters and combination gas appliances respectively up to 70kW (net). Recently revised British Standards for installation of flues, ventilation, boilers, water heaters, gas fires, etc., all have revised scopes to extend the range from the previous 60kW (gross) to 70kW (net) to align with these product specifications. In European terms, 70kW (net) has now become the new demarcation point for domestic/non-domestic appliances.*

#### **Gas fires (other than flueless gas fires)**

**3.6** These appliances fall into the main categories shown in Diagram 3.1 and the building provisions for accommodating them safely differ for each type. (Note. The diagram is not reproduced for the purposes of this guidance.)

**3.7** Provided it can be shown to be safe, gas fires may be installed in fireplaces which have flues designed to serve solid fuel appliances. Certain types of gas fire may also be installed in fireplaces which have flues designed specifically for gas appliances. The Gas Appliances (Safety) Regulations 1995 require that particular combinations of appliance, flue box (where required) and flue must be selected from those stated in the manufacturer's instructions as having been shown to be safe by a Notified Body. (See Paragraph 0.4 (32).)

#### **Guidance on 3.6 and 3.7**

*BS 5871 Parts 1 and 2 are unlikely to be affected by any European appliance standard as they refer to uniquely British appliances not often used outside the UK.*

*BS 5871-3:2001, covering the installation of decorative fuel effect (DFE) gas fires manufactured to EN 509 includes any special measures that are needed to reflect appliances designed to this European Standard.*

#### **Air supply to gas fires and other appliances**

**3.10** A way of meeting the requirements would be to follow the general guidance given in Section 1, beginning at Paragraph 1.2, in conjunction with the guidance below.

## Flued decorative fuel effect (DFE) fires

**3.11** Any room or space intended to contain a DFE fire should have permanently open air vents as described in (a) or (b) below, unless the installation is in accordance with Paragraph 3.12:

- a. For a DFE fire in a fireplace recess with a throat, the air vent free area should be at least 10,000mm<sup>2</sup> (100cm<sup>2</sup>);
- b. For a DFE fire in a fireplace with no throat, such as a fire under a canopy, the air vent free area should be sized in accordance with Section 2 of this Approved Document, as if the room were intended to contain a solid fuel fire. (See Table 2.1.) (Note. Table 2.1 is not reproduced for the purposes of this guidance.)

**3.12** Permanently open air vents may not be necessary for DFE fires with ratings not exceeding 7kW (net) that have been independently certified by a Notified Body as having a flue gas clearance rate (without spilling) not exceeding 70m<sup>3</sup>/hour. (See Paragraph 0.4 (32).)

### **Guidance on 3.11 and 3.12**

*It is necessary to consult the manufacturer's instructions to determine the air requirements for specific DFE fires.*

## Flued appliances other than decorative fuel effect fires

**3.13** These appliances include inset live fuel effect (ILFE) fires, radiant convector fires and boilers, in both room-sealed and open-flued variants.

**3.14** A way of meeting the requirement would be to follow the guidance in Diagram 3.2. An example calculation illustrating the use of this guidance is given in Appendix C. (Note. The diagram is not reproduced for the purposes of this guidance.)

## Air supply to flueless appliances

**3.15** For some flueless appliances, it may be necessary to provide permanently open air vents and/or make provision for rapid ventilation as recommended in BS 5440-2:2000 or equivalent, to comply with Part F as well as Part J of the Building Regulations. Some ways of meeting the requirement when installing flueless cookers (including ovens, grills or hotplates), flueless water heaters and flueless space heaters, are given in Diagram 3.3. (Note. The diagram is not reproduced for the purposes of this guidance.)

**3.16** A room containing a gas point intended for use with a flueless appliance (such as a gas point for a cooker or a gas point for a space or water heater, the gas point not being adjacent to a flue) should have the ventilation provision required for the installation of that appliance (calculated on the basis that an appliance with the largest rating consistent with the table to Diagram 3.3 could be installed there).

### **Guidance on 3.10 to 3.16**

*At present there are no equivalent European Standards on the ventilation of gas appliances, other than the reference in BS EN 12391-1, Clause 4.1.5 on the need to 'obtain information on the size and position of apertures for combustion air supply into the room containing the appliance.' At national level, compliance with the provisions of ADJ will ensure the correct air supply is provided to the gas appliances mentioned. BS 5440-2:2000 gives further information.*

*Where there is no British or European product standard for some types of flueless appliance, it may not be appropriate to apply BS 5440-2, but if the appliance bears a CE mark then the appliance manufacturer's instructions should be followed. If the appliance does not bear the CE mark it should not be installed.*

## Size of natural draught flues for open flued appliances

**3.17** Where builders wish to provide (or refurbish) flues for gas appliances but do not intend to supply the appliances, a way of showing compliance would be to size flues in accordance with Table 3.1.

**3.18** If an existing flue is to be used it should be checked in accordance with Paragraph 1.36.

**3.19** For appliances that are CE marked as compliant with the Gas Appliances (Safety) Regulations, flues should be sized in accordance with the manufacturer's installation instructions.

**3.20** Connecting fluepipes should be the same size in terms of diameter and/or equivalent cross-sectional area as the appliance flue outlet. The chimney flue should have at least the same cross-sectional area as that of the appliance flue outlet.

**Table 3.1: Size of flues for gas-fired appliances**

Intended installation	Minimum flue size	
Radiator/convector gas fire	New flue:	
	Circular	125mm diameter
	Rectangular	16,500mm <sup>2</sup> cross sectional area with a minimum dimension of 90mm
	Existing flue:	
	Circular	125mm diameter
	Rectangular	12,000mm <sup>2</sup> cross sectional area with a minimum dimension of 63mm
ILFE fire or DFE fire with a fireplace opening up to 500mm x 550mm	Circular or Rectangular	Minimum flue dimension of 175mm (1)
DFE fire installed in a fireplace with an opening in excess of 500mm x 550mm	Calculate in accordance with Paragraph 2.7 in Section 2	
Note:		
1. Some ILFE and DFE appliances require a circular flue of at least 125mm diameter.		

### Guidance on 3.17 to 3.20 and Table 3.1

*The flue sizes shown in Table 3.1 are considered necessary in the UK based on many years of proven experience and include appliance installations unique to the UK.*

*Table 3.1 is expressed in terms of minimum flue sizes for specific appliance types. The European method will relate specific appliances to a chimney classification based on parameters quoted by the appliance manufacturers. It is intended that future classification should be in accordance with the designation system described in Part 1, Clause 3.1 of this document.*

*In the case of flues for new appliances the minimum performance designations as given in Table 3.2 should be complied with, or the requirements of Paragraphs of 3.28 to 3.35 of ADJ, or the relevant parts of Section 1, met.*

*continued*

**Guidance on 3.17 to 3.20 and Table 3.1 continued**

Expressed in the above terms the chimney specification for the appliances in the table might be:

Installation	Chimney classification
<p>Radiant/convector gas fire</p>	<p><i>New:</i>  lined chimney to the general designation of BS EN 1443:2003 (see note 2 below for consequences of revision dated 2003) – T250 N2 D 1 Oxx, where xx is the distance to combustible materials specified by the manufacturer and is typically 50mm  or  bonding clay flue block chimney BS EN 1806 -90x183-FB6-R22-50 (The size (90x183), thermal resistance (R22) and distance to combustible materials (50) are typical values. The FB6 block carries a T200 temperature classification and is less than the general 250°C temperature requirement in the BS EN 1443:2003 designation given in table below. Thus a fire manufacturer would need to specify that such a block is suitable for a specific fire)  or  non-bonding clay flue block chimney EN 1806 -125x125-FB4-N2-R22-50 (The size (125x125), thermal resistance (R22) and distance to combustible materials (50), are typical values. The FB4 block carries a T300 temperature classification and is greater (better) than the general 250°C temperature requirement in the BS EN 1443:2003 designation given in table below)  or  bonding concrete flue block chimney EN 1858-Type B, i.e. BS EN 1858 – T250 N2 D 1 Oxx, where xx is the distance to combustible materials specified by the manufacturer and is typically 50mm</p> <p><i>Existing:</i>  125mm diameter – circular cross section or as above</p>
<p>LFE fire or DFE fire within a fireplace opening up to 500mm x 550mm</p>	<p>Lined chimney designated EN 1443 – T250 N2 D 1 Oxx, where xx is the distance to combustible materials specified by the manufacturer and is typically 50mm  or  non-bonding clay flue block chimney designated BS EN 1806 – 175x175-FB4-B4-N2-R22-50. (The size (175x175), thermal resistance (R22) and distance to combustible materials (50) are typical values. The FB4 block carries a T300 temperature classification and is greater than (better) the general 250°C temperature requirement in the BS EN 1443:2003 designation given in table below)  or  non-bonding concrete flue block chimney BS EN 1858-T300 N2 D1 Oxx, where xx is the distance to combustible materials specified by the manufacturer and is typically 50mm</p> <p style="text-align: right;"><i>continued</i></p>

## Guidance on 3.17 to 3.20 and Table 3.1 continued

**Note 1.** Any chimney with a higher specification will also be suitable (see Part 1, Clause 3.1).

**Note 2.** The published ADJ uses the letter 'S' in the designation for liners to denote sootfire resistance. This is consistent with BS EN 1443:1999 which was current when ADJ was published. However; it should be noted that the letter 'S' has now been changed to 'G' in the current BS EN 1443:2003. In the short term, the letter 'S' or 'G' may be found in designations, markings etc., until such time as all the various drafts and standards are amended to specify 'G' for sootfire resistance.

The typical default parameters provided by the UK appliance manufacturers for the principal domestic appliance categories are given below. Individual manufacturers may advise other figures for some specific appliances. (See also the Guidance on 3.27 and 3.30.)

Appliance	Temperature class	Pressure class* N – negative P – positive	Resistance to condensate class W – wet D – dry	Corrosion resistance Class 1 – gas	Sootfire resistance G – Yes O – No
<b>Boiler – open flued</b>					
nat. draught	T 250	N 2	D	1	Oxx
fan draught	T 250	P 2**	D	1	Oxx
condensing	T 160	P 2**	W	1	Oxx
<b>Boiler – room-sealed vertical flue</b>					
nat. draught	T 250	N 2	D	1	Oxx
fan draught	T 160	P 2	D	1	Oxx
<b>Gas fire radiant convector</b>	T 250	N 2	D	1	Oxx
ILFE	T 250	N 2	D	1	Oxx
DFE	T 250	N 2	D	1	Oxx
<b>Air heater</b>					
nat. draught	T 250	N 2	D	1	Oxx
fan draught	T 250	P 2**	D	1	Oxx
SE – duct	T 250	N 2	D	1	Oxx

\* Pressure class N2 denotes a maximum permissible leakage rate of 3.0 litres per sec per m<sup>2</sup> when tested at 20 Pascals of negative pressure. Pressure class P2 denotes maximum permissible leakage rate of 0.120 litres per sec per m<sup>2</sup> when tested at 200 Pascals of positive pressure.

\*\* Note. The pressure designation P2 is regarded as the default specification. However, the chimney can often generate an adequate natural draught, so that the appliance can be safely used with chimneys and flue pipes with the negative pressure designation even for many fanned draught gas appliances, including condensing boilers, which may otherwise have positive pressure at the outlet to the flue. The draught generated in a chimney may be calculated according to BS EN 13384-1. If there is any doubt, and/or unless the appliance manufacturer specifies N2, the designation P2 should apply.

## Height of natural draught flues for open-flued appliances

**3.21** Flues should be high enough to ensure sufficient draught to safely clear the products of combustion. The height necessary for this will depend upon the type of appliance, the building height, the type of flue and the number of bends in it, and a careful assessment of local wind patterns. For appliances that are CE-marked as compliant with the Gas Appliances (Safety) Regulations, compliance with the manufacturer's installation instructions will meet the requirements.

**3.22** Where an older appliance that is not CE marked is to be installed, a way of showing compliance if it has manufacturer's installation instructions would be:

- a. for decorative fuel effect fires, to follow the guidance in BS 5871-3:2001; or
- b. for appliances other than decorative fuel effect fires, to follow the calculation procedures in BS 5440-1:2000.

### **Guidance on 3.21**

*A method for calculating chimney sizes and heights is quoted in BS EN 13384-1. However, it is recommended that the current national advice given in this ADJ and appropriate British Standards (e.g. BS 5871-3:2001) is followed at present since the BS EN 13384-1 method requires input data not yet available for some UK appliances and makes assumptions that are not appropriate to UK installations.*

## Outlets from flues

**3.23** Outlets from flues should be so situated externally as to allow the dispersal of products of combustion and, if a balanced flue, the intake of air. A way of meeting this requirement would be to locate flue outlets as shown in Diagram 3.4 and Diagram 3.5. (Note. The diagrams are not reproduced for the purposes of this guidance.)

### **Guidance on Section 3.23**

*The locations of chimney outlets are specified in BS EN 12391-1:2000 for metal chimneys. This requires (clause 4.2.6.12) 'the installation shall be in accordance with local regulations', however, the general (default) advice gives a diagram of outlet locations for all fuels. The basic height of a terminal above the pitch of a roof is 600mm, or 2.3m measured horizontally to the sloping roof surface. BS 5440-1:2000 requires a similar horizontal measurement but uses a distance of 1.5m. Users of Approved Document J should continue to adhere to clause 3.23 and BS 5440-1:2000 until the UK's position in respect of BS EN 12391-1 is formalised in a national annex.*

**3.24** Flue outlets should be protected where flues are at significant risk of blockage. Guidance on meeting this requirement is given below.

**3.25** Flues serving natural draught open-flued appliances should be fitted with outlet terminals if the flue diameter is no greater than 170mm. Suitable terminals include those complying with BS 715:1993, and BS 1289-1:1986. The risk of blockage of flues of more than 170mm diameter should be assessed in the light of local conditions. In areas where nests of squirrels or jackdaws are likely, the fitting of a protective cage designed for solid fuel use and having a mesh size no larger than 25mm (but no smaller than 6mm) may be an acceptable provision if the total free area of its outlet openings is at least twice the cross sectional area of the flue.

## Guidance on 3.24 and 3.25

BS 715 and BS 1289-1 specify materials for metal and concrete terminals respectively. BS 1289-2, covering flue blocks and terminals for clay products, was withdrawn following the publication of BS EN 1806:2000, covering clay flue blocks, and BS EN 13502:2002; covering clay terminals.

BS EN 1856-1 will supersede BS 715 and it specifies the performance requirements for metal chimney components including terminals.

BS 5440-1 gives alternative advice for guards for gas appliances suitable for protection against wildlife. Mesh sizes should be between 6mm and 16mm. The flueing and termination of installations in accordance with BS 5440-1 will ensure conformity with ADJ.

## Provision of flues

3.27 Satisfactory provision of chimneys and fluepipes for gas appliances may be achieved by:

- a. following the guidance on the selection of components and the manner of their installation as given in Paragraphs 3.28 to 3.35 below and the references to Section 1 or (if the intended appliance is new and of known type);
- b.
  - i. using factory-made components that have been independently certified as achieving a performance at least equal to that corresponding to the designation given in Table 3.2 for the intended appliance type when tested to an appropriate European chimney standard (BS EN); and
  - ii. installing these components in accordance with the guidance in Paragraphs 3.28 to 3.35 and Section 1, as relevant, and in accordance with the appliance manufacturer's and component manufacturer's installation instructions.

## Guidance on 3.27

Table 3.2 shows the minimum designation according to BS EN 1443:1999 for the various appliances listed and the performance characteristics are explained below. However, this has been superseded by BS EN 1443:2003 and the designation string has been refined. See Part 1, Clause 3 and Annex A for details of the designation and marking system for chimneys, and a listing of currently available European chimney standards, respectively.

Additionally, since the ADJ was published, the temperature and pressure classifications have been re-assessed so that an up-to-date Table 3.2 for flue liners and flue connecting pipes should be as follows:

Appliance type		Minimum designation (see notes)
Boiler: open-flued	Natural draught Fanned draught Condensing	T250 N2 D1 O T250 P2 D1 O T160 P2 W1 O
Boiler: room-sealed	Natural draught Fanned draught	T250 N2 D1 O T250 P2 D1 O
Gas fire	Radiant convector, ILFE or DFE	T250 N2 D1 O
Air heater	Natural draught Fanned draught Se-duct	T250 N2 D1 O T250 P2 D1 O T450 N2 D1 O

Notes:

1. The designation of chimney products is described in BS EN 1443:2003.
2. These are default designations. Where appliance manufacturer's installation instructions specify a higher designation, this should be complied with.

*continued*

### Guidance on 3.27 continued

The designation parameters above signify the following performance characteristics:

Designation	Performance characteristic
T250 T450	– capable of operating at a nominal working temperature of 250°C. – capable of operating at a nominal working temperature of 450°C.
N2	– designed for operation at a negative pressure (i.e. natural draught) and will not exceed the permitted leakage rate of 3.0 litres per sec per m <sup>2</sup> when tested at a pressure of 20 Pascals.
P2	– designed for operation at a positive pressure (i.e. fanned draught) and will not exceed the permitted leakage rate of 200 litres per sec per m <sup>2</sup> when tested at a pressure of 200 Pascals.
D1	– will withstand dry operating conditions within the flue and has a corrosion resistance to level 1 as defined in the relevant product standard.
W1	– will withstand wet operating conditions within the flue and has a corrosion resistance to level 1 as defined in the relevant-product standard.
O	– not sootfire resistant.

The appliance manufacturer's instructions should always be checked; they may specify a higher designation.

## Connecting fluepipe components

3.28 Satisfactory components for connecting fluepipes include:

- any of the options in Paragraph 1.32; or
- sheet metal fluepipes as described in BS 715:1993; or
- fibre cement pipes as described in BS 7435-1:1991 (1998) or BS 7435-2:1991 (1998); or
- any other material or component that has been independently certified as suitable for this purpose.

### Guidance on 3.28

The performance designation for flues is specified in Table 3.2 according to the intended type of gas-fired appliance.

a. See guidance on 1.32.

b. See guidance on 1.42.

c. Fibre cement is not a material identified by European chimney standards.

d. Other components would be expected to be tested and certified to the required performance designation appropriate to the application.

## Flueblock chimneys

3.30 Chimneys can be constructed from factory-made flueblock systems primarily designed for solid fuel, as described in Paragraphs 1.29 and 1.30 in Section 1. They can also be constructed from factory-made flueblock systems comprising straight blocks, recess units, lintel blocks, offset blocks, transfer blocks and jointing materials complying with:

- BS 1289-1:1986 for concrete flueblocks; or
- BS EN 1806:2000 for clay/ceramic flueblocks with a performance class of at least FB4 N2.

### Guidance on 3.30

The performance designation for flues is specified in Table 3.2 according to intended type of gas-fired appliance. Refer to guidance and information given for Paragraphs 1.29 and 1.30 in Section 1 of the Approved Document J. The additional information given below should be noted regarding the explanation of standards relating to flue blocks solely for use with gas and their performance designations. Guidance on the installation of flue blocks for use with gas-fired appliances is given in BS 5440-1.

a. BS 1289-1 covers the specification for precast concrete gas flue blocks and requires the finished flue blocks to be capable of resisting flue gas temperatures up to 350°C. This could be considered as equating to a working temperature designation of T300. This standard has been replaced by BS EN 1858, which refers to Type B (bonding) blocks that gives similar specifications as in BS 1289-1 and a designation of T250 N2 D 1 Oxx where xx is the distance to combustible material specified by the manufacturer and is typically 50mm. This is an appropriate designation for all gas appliances except those for condensing appliances and SE-duct applications (see guidance under clause 3.27 above). Note the T300 figure for gas fires in Table 3.2 of Approved Document J is now considered unnecessarily high.

b. BS EN 1806 has replaced BS 1289-2 and the shortform designation for clay flue blocks. FB4 N2 describes a flue block that has a designation of T200 suitable for nominal working temperature of 200°C, N2 is designed for operation at a negative pressure (i.e. natural draught) and will not exceed the permitted leakage rate when tested at a pressure of 20 Pascals, 0 is not sootfire resistant and can be used with dry or wet operating conditions.

(The established UK practice of building a chimney as described in BS 1289-1 (concrete blocks) or BS 1289-2 (clay blocks), using flue blocks up to the roof space and metal chimney components through the roof space, is considered to be a custom-built chimney under the new European definitions for chimneys. Such a chimney may now be constructed using bonding or non-bonding flue blocks to BS EN 1858 (concrete) or BS EN 1806 (clay) and the appropriate metal chimney products to BS EN 1856-1.)

**3.31** Flueblock chimneys should be installed with sealed joints in accordance with the flueblock manufacturer's installation instructions. Where bends or offsets are required, these should be formed using matching factory-made components. Flueblocks which are not intended to be bonded into surrounding masonry should be supported and restrained in accordance with the manufacturer's installation instructions.

### Guidance on 3.30 and 3.31

The requirements for clay flue blocks are given in BS EN 1806:2000. This standard draws a distinction between bonding flue blocks (those designed to be built into masonry walls) and non-bonding blocks.

The requirements for concrete flue blocks are given in BS EN 1858. Again, this standard draws a distinction between bonding flue blocks (those designed to be built into masonry walls and designated for concrete as Type B in BS EN 1858) and non-bonding blocks. The requirements for clay blocks for system chimneys are given in prEN 13063-1,-2,-3. (System chimneys are those built from components obtained or specified from one source.)

## Factory-made metal chimneys

**3.32** Chimneys for gas appliances may be constructed using systems described in Paragraphs 1.42 to 1.46 in Section 1. Factory-made metal chimneys should be guarded if they could be at risk of damage or the burn hazard they present to people is not immediately apparent.

### Guidance on 3.32

Details on the factory-made metal chimney systems for relining chimneys and the performance designation for flues is specified in Table 3.2 according to the intended type of gas-fired appliance.

Parts of BS 715 are in conflict with BS EN 1856-1 and consequently the former is being amended.

## Location and shielding of flues

**3.33** Combustible materials in the building fabric should be protected from the heat dissipation from flues so that they are not at risk of catching fire. A way of meeting the requirement would be to follow the guidance in Table 3.3.

**Table 3.3: Protecting buildings from hot flues**

<b>Flue within</b>	<b>Protection measures</b>
Connecting fluepipe	Flues should be at least 25mm from any combustible material (measured from the outer surface of the flue wall, or the outer surface of the inner wall in the case of multi-walled products). Where passing through a combustible wall, floor or roof (other than a compartment wall, floor or roof) this separation can be achieved by a non-combustible sleeve enclosing the fluepipe or chimney with a 25mm airspace to the relevant flue wall. (The airspace could be wholly or partially filled with non-combustible insulating material.)
Factory-made chimney complying with BS 715:1993	
Factory-made chimney complying with BS 4543-1:1990 (1996)* BS 4543-2:1990 (1996) and BS 4543-3:1990 (1996)	Install in accordance with Paragraph 1.45 of this Approved Document.
Masonry chimney	Provide at least 25mm of masonry between flues and any combustible material.
Flueblock chimney	Provide flueblock walls at least 25mm thick.
* BS 4543-1:1990 (1996) withdrawn April 2000; partially superseded by BS EN 1859:2000.	

### **Guidance on 3.33**

*Chimney components in conformity with European Standards will be marked or designated to show the minimum clearance between the outer wall of the item and adjacent combustible material. See Part 1, Clause 3.1 of this document for details. In the case of relined or custom built chimneys, BS EN 12391-1 makes provision for the determination of the minimum distance between the outer wall of a chimney and combustible material. In its Annex A1, it defines the maximum permitted temperature of combustible material as 85°C, and the outer walls as 100°C for fire protection and 68°C for human contact. Sleeves are required when passing through combustible walls but the separation distances are not quoted. Four methods of achieving protection against fire are defined in clause 4.2.6.3 of the standard.*

## Relining of flues in chimneys

**3.36** Lining or relining flues may be building work and, in any case, such work should be carried out so that the objectives of requirements J2 to J4 are met (see Paragraphs 1.34 and 1.35). Existing flues being re-used should be checked as described in Paragraph 1.36. For flue liners serving gas appliances, ways of meeting the requirements include the use of:

- a. liners as described in Paragraph 1.27;
- b. liners as described in Paragraph 2.20;
- c. flexible stainless steel liners independently certified as complying with BS 715:1993;
- d. other systems which have been independently certified as suitable for the purpose.

### **Guidance on 3.36**

*Reference should be made on supplementary information in Section 1, clause 1.42 concerning systems for the relining of chimneys. The minimum performance designation for chimneys for use with new gas-fired appliances is given in Table 3.2. (See also qualifying notes thereto.)*

*b. There is no British Standard for cast in situ concrete liners. These systems involve the mixing of the lining material on the site where the lining is applied. Some systems are covered by BBA certification that was issued prior to this edition of ADJ. BRE Certification also provide certification confirming the specified performance designation by testing to similar procedures given in BS EN 1857. The proposed European Standard for such systems has been dropped. It should be noted that this form of lining is specialist in nature and should only be applied by an installer registered with the company to whom certification has been granted.*

*c. Flexible flue liners are specified in BS EN 1856-2.*

**3.37** Flexible metal flue liners should be installed in one complete length without joints within the chimney. Other than for sealing at the top and the bottom, the space between the chimney and the liner should be left empty unless this is contrary to the manufacturer's instructions. Double-skin flexible flue liners should be installed in accordance with manufacturer's installation instructions. BS 715 liners should be installed in accordance with BS 5440-1:2000.

### **Guidance on 3.37**

*All chimneys constructed to European Standards are required to have flue liners or be constructed of flue blocks. The Approved Document J requirement in respect of flexible liners is a method of dealing with UK flues constructed under former control, to downsize an oversized chimney, and/or to render a chimney fit for use even if the appliance might otherwise not require the chimney to be lined. It should be noted that flexible liners should not be used as a method for the lining of new chimneys which must be lined in accordance with the requirements of ADJ – see Section 1, Clause 1.27.*

## Section 4

### Additional provisions for oil burning appliances with a rated output up to 45kW

**Note:** This section needs to be read in conjunction with Sections 0 and 1

#### Appliances fitted in bathrooms and shower rooms

**4.2** Open flued oil-fired appliances should not be installed in rooms such as bathrooms and bedrooms where there is an increased risk of carbon monoxide poisoning. Where locating combustion appliances in such rooms cannot be avoided, a way of meeting the requirements would be to provide room-sealed appliances.

##### **Guidance on 4.2**

*Pressure jet boilers of the room sealed type are now readily available. At present, there are no requirements from CEN/TC 166 to note concerning balanced flue assemblies.*

#### Air supply to appliances

**4.3** A way of meeting the requirements would be to adopt the general guidance given in Section 1, starting at Paragraph 1.2 and to provide permanently open air vents as shown in Diagram 4.1 in rooms or spaces containing appliances. An example calculation illustrating the use of this guidance is given in Appendix D. Where manufacturers' installation instructions require greater areas of permanently open air vents than those shown in Diagram 4.1, the manufacturers' advice should be followed. (Note: Diagram 4.1 is not reproduced for the purposes of this guidance.)

##### **Guidance on 4.3**

*Attention is drawn to Section 1, clause 1.4.*

#### Outlets from flues and flue heights

**4.6** The outlet from a flue should be so situated externally as to ensure: the correct operation of a natural draught flue; the intake of air if a balanced flue; and dispersal of the products of combustion.

**4.7** A way of meeting the requirement could be to follow the guidance in Diagram 4.2. The separations given in the Table to Diagram 4.2 are minimum values that may have to be increased where there is a risk that local factors such as wind patterns could disrupt the operation of the flue or where a natural draught flue would not be tall enough to clear the products of combustion of an open flued appliance. (Note: Diagram 4.2 is not shown for the purposes of this guidance.)

### **Guidance on 4.6 and 4.7**

*Chimney sizes and heights can be calculated according to BS EN 13384-1 which specifies methods for calculation of the thermal and fluid dynamics for single inlet chimneys. However, this method requires input data not yet available for some UK appliances and makes assumptions that are not appropriate to UK installations. It is recommended that the current national advice given in this ADJ and appropriate British Standards is followed at present.*

*The location of chimney outlets are specified in BS EN 12391-1 for metal chimneys. This requires (clause 4.2.6.12) '...the installation shall be in accordance with local regulations'. However, the general (default) advice gives a diagram of outlet locations irrespective of the fuel used. The basic height of a terminal above the pitch of roof is 600mm but there are differences in the way other distances are specified relative to flat roofs and obstacles when compared with UK practice. Again, users of ADJ should continue to follow the guidance in Diagram 4.2 at present.*

## **Flues for oil-fired appliances: flue gas temperature**

**4.9** Satisfactory provision of chimneys and fluepipes depends upon the flue gas temperature to be expected in normal service and separate guidance is given in this Approved Document according to whether the proposed installation will have a flue gas temperature more than or less than 250°C as measured by a suitable method such as those in OFTEC Standards A 100 or A 101.

### **Guidance on 4.9**

*Attention is drawn to Part 1, Clause 3.1 of this document in terms of BS EN 1443 and its designation system for chimneys in which the character 'T' is used to denote the temperature class of the chimney. This relates to the nominal working temperature (°C) of the chimney.*

**4.10** Flue gas temperatures depend upon appliance types and the age of their design. Older and second hand appliances are likely to produce flue gas temperatures greater than 250°C. Amongst modern appliances, boilers bearing the CE mark, indicating compliance with the Boiler (Efficiency) Regulations (1993), normally have flue gas temperatures not exceeding 250°C. Information for individual appliances should be sought from the manufacturer's installation instructions, from the manufacturers themselves or from OFTEC. Where this is not available, flues should be constructed for an assumed flue gas temperature greater than 250°C.

## **Provisions for flue gas temperatures in excess of 250°C**

**4.11** A way of making satisfactory provision for oil appliances in these cases would be to follow the guidance given in Sections 1 and 2 for connecting fluepipes and masonry or flueblock chimneys or to provide a factory-made metal chimney in accordance with Paragraphs 1.42 to 1.4 (in Section 1 (but not Paragraph 1.42(b))). However, other products may be acceptable if they have been independently certified for this purpose.

### **Guidance on 4.10 and 4.11**

*Where information on flue gas temperatures as detailed in 4.10 is unavailable, and in the case of the appliances detailed in 4.11, chimneys to European Standards (when available) should have a temperature rating of not less than T300.*

## Provisions for flue gas temperatures not exceeding 250°C

4.12 Satisfactory provision of chimneys and fluepipes in these cases may be achieved by:

- a. following the guidance on the selection of components and the manner of their installation as given in Paragraphs 4.13 to 4.20 below and the references to Section 1;
- or (if the intended appliance is new and of known type);
- b.
  - i. using factory-made components that have been independently certified as achieving a performance at least equal to that corresponding to the designation given in Table 4.1 (for the intended appliance type) when tested to an appropriate European Chimney Standard (BS EN); and
  - ii. installing these components in accordance with the guidance in Paragraphs 4.13 to 4.20 and Section 1, as relevant, and in accordance with the appliance manufacturer's and component manufacturer's installation instructions. (Note. Table 4.1 not shown for purposes of this guidance.)

### Guidance on 4.12 and Table 4.1

The table below gives typical parameters for the principal domestic appliance categories, and assumes the appliance is new when installed. Where chimneys have been designated according to published European chimney standards, the designation derived from the table below should be regarded as a minimum unless the individual manufacturer's instructions advise otherwise. Attention is drawn to Part 1, Clause 3.1 of this document in terms of BS EN 1443:2003 and its designation system for chimneys. It should be noted that corrosion resistance Class 1 is acceptable for all the following applications unless (and in exceptional circumstances) the sulphur content of the fuel exceeds 0.2% in which case Class 2 should be used. (Note: UK supplied kerosene has a typical sulphur content of less than 0.01%.)

Table 4.7 shows the minimum designation according to BS EN 1443:1999 for the various appliances listed and the performance characteristics are explained below. However, this has been superseded by BS EN 2003 and the designation string has been refined. See Part 1, Clause 3 and Annex A of this document for details of the designation and marking system for chimneys, and a listing of currently available European chimney standards, respectively.

Additionally, since the ADJ was published, the temperature and pressure classifications have been re-assessed so that an up-to-date Table 3.2 for flue liners and connecting pipes should be as follows:

Appliance type	Minimum designation	Fuel oil
Boiler, including combination boiler – pressure jet burner	T250 N2 D1 O	Class C2
Cooker – pressure jet burner	T250 N2 D1 O	Class C2
Cooker and room heater – vaporising burner	T250 N2 D1 O	Class C2
Cooker and room heater – vaporising burner	T250 N2 D 2 O	Class D
Condensing pressure jet burner appliances	T160 N2 W1 O	Class C2
Condensing vaporising burner appliances	T160 N2 W 2 O	Class D

#### Notes:

1. The designation of chimney products is described in BS EN 1443:2003. The BS EN for the product will specify its full designation and marking requirements.
2. These are default designations. Where appliance manufacturer's installation instructions specify a higher designation, this should be complied with.

*continued*

## Guidance on 4.12 and Table 4.1 continued

The designation parameters above signify the following performance characteristics:

Designation	Performance characteristic
T250	– capable of operating at a nominal working temperature of 250°C.
T160	– capable of operating at a nominal working temperature of 160°C.
N2 *	– designed for operation at a negative pressure (i.e. natural draught) and will not exceed the permitted leakage rate of 3.0 litres per sec per m <sup>2</sup> when tested at a pressure of 20 Pascals.
P2	– designed for operation at a positive pressure (i.e. fanned draught) and will not exceed the permitted leakage rate of 0.120 litres per sec per m <sup>2</sup> when at a pressure of 200 Pascals.
D1	– will withstand dry operating conditions within the flue and has a corrosion resistance to level 1 as defined in the relevant product as standard.
D2	– will withstand dry operating conditions within the flue and has a corrosion resistance to level 2 as defined in the relevant product standard.
W2	– will withstand wet operating conditions within the flue and has a corrosion resistance to level 2 as defined in the relevant product standard.
O	– not sootfire resistant.

\* Pressure class N2 denotes a maximum permissible leakage rate of 3.0 litres per sec per m<sup>2</sup> when tested at 20 Pascals of negative pressure. Pressure class P2 denotes maximum permissible leakage rate of 0.120 litres per sec per m<sup>2</sup> when tested at 200 Pascals of positive pressure.

### Note:

The pressure designation N2 is regarded as the most likely specification to apply in the oil industry for both vaporising and pressure jet appliances. Most pressure jet appliances only generate adequate pressure to overcome flow resistances within the appliance so that the products of combustion entering the chimney will be at a negative pressure with respect to the atmosphere. Thus the appliance can be safely used with chimneys and flue pipes with the negative pressure designation. In the event that an appliance design produces a positive pressure at the outlet of the appliance, it is the manufacturer's responsibility to inform installers that a chimney with a positive pressure designation should be used. If there is any doubt, the more onerous designation P2 should apply.

The appliance manufacturer's instructions should always be checked; they may specify a higher designation.

## Connecting fluepipe components

4.13 Connecting fluepipes can be constructed using the following components:

- any of the options listed in Paragraph 1.32; or
- sheet metal fluepipes as described in BS 715:1993; or
- fibre cement pipes as described in BS 7435-1:1991 (1998) or BS 7435-2:1991 (1998); or
- any other component that has been independently certified as suitable for this purpose.

## Guidance on 4.13

The performance designation for flues is specified in Table 3.2 according to the intended type of gas-fired appliance.

a. See guidance on 1.32.

b. See guidance on 1.42.

c. Fibre cement is not a material identified by European chimney standards.

d. Other components would be expected to be tested and certified to the required performance designation appropriate to the application.

## Flueblock chimneys

**4.15** Chimneys can be constructed from factory-made flueblock systems primarily designed for solid fuel, as described in Paragraphs 1.29 and 1.30 in Section 1. They can also be constructed from factory made flueblock systems comprising straight blocks, recess units, lintel blocks, offset blocks, transfer blocks and jointing materials complying with:

- a. BS 1289-1:1986 for concrete flueblocks; or
- b. BS EN 1806:2000 for clay/ceramic flueblocks with a performance at least equal to the designation given in Table 4.1 for the intended appliance type. (Note: Table 4.1 is not reproduced for the purposes of this guidance.)

### Guidance on 4.15

*The performance designation for flues is specified in Table 4.1 according to intended type of oil-fired appliance. Refer to guidance and information given for Paragraphs 1.29 and 1.30 in Section 1 of ADJ. The additional information given below should be noted regarding the explanation of standards relating to flue blocks and their performance designations. Guidance on the installation of flue blocks for use with oil-fired appliances is given in BS 5410-1. The requirements for clay flue blocks are given in BS EN 1806 in which a distinction is made between bonding flue blocks (those designed to be built into masonry walls) and non-bonding blocks.*

*a. BS 1289-1 covers the specification for precast concrete gas flue blocks and requires the finished flue blocks to be capable of resisting flue gas temperatures up to 350°C. This could be considered as equating to a working temperature designation of T300. This standard has been replaced by BS EN 1858, which refers to Type B (bonding) blocks that gives similar specifications as in BS 1289-1 and a designation of T250 N O D1, which is an appropriate designation for all gas appliances except those for condensing appliances and SE-duct applications (see guidance under Clause 3.27 above). Note the T300 figure for gas fires in Table 3.2 of Approved Document J is now considered unnecessarily high.*

*b. BS EN 1806 has replaced BS 1289-2.*

*The requirement for clay blocks for system chimneys are given in prEN13063-1,-2,-3. These are chimneys built from components obtained or specified from one source. See also guidance on 4.12.*

## Location and shielding of flues

**4.18** A way of protecting the building fabric from the heat dissipation from flues, where flue gas temperatures are not expected to exceed 250°C, would be to follow the guidance in Table 4.2. (Note: Table 4.2 is not reproduced for the purposes of this guidance.)

### Guidance on 4.18

*The chimney components in conformity with European Standards will be marked or designated to show the minimum clearance between the outer wall of the item and adjacent combustible material. See Clause 3.1 of Part 1 for details. In the case of relined or custom built chimneys, BS EN 12391-1 makes provision for the determination of the minimum distance between the outer wall of a chimney and combustible material. In its Annex A1, it defines the maximum permitted temperature of combustible material as 85°C, and the outer walls as 100°C for fire protection and 68°C for human contact. Sleeves are required when passing through combustible walls but the separation distances are not quoted. Four methods of achieving protection against fire are defined in clause 4.2.6.3. of the standard.*

*The reference to EN 1859 in Table 4.3 above recognises a new standard which is dependent on other, as yet unpublished, standards. Pending the publication of these standards, it is recommended that users of ADJ continue to use factory-made chimneys certified to BS 4543.*

## Relining of flues in chimneys

**4.21** Lining or relining flues may be building work and, in any case, such work should be carried out so that the objectives of requirements J2 to J4 are met (see Paragraphs 1.34 and 1.35). For flue liners serving oil appliances, ways of meeting the requirements include the use of:

- a. linings suitable for use if the flue gas temperature can be expected to exceed 250°C such as:
  - i. liners as described in Paragraph 1.27;
  - ii. liners as described in Paragraph 2.20;
  - iii. flexible stainless steel liners independently certified as complying with BS 715:1993;
  - iv. other systems which have been independently certified as suitable for this purpose;
- b. linings suitable for use if the flue gas temperature is unlikely to exceed 250°C such as:
  - i. any of the linings described in (a) above;
  - ii. other systems which have been independently certified as suitable for this purpose;
  - iii. (if the appliance is new and of known type) flue lining systems that have been independently certified as having a performance at least equal to that corresponding to the designation given in Table 4.1 for the intended appliance type. (Note: Table 4.1 is not reproduced for the purposes of this guidance.)

### **Guidance on 4.21**

*Attention is drawn to the guidance on Clauses 1.42 and 2.20. Special care is needed in ensuring liners are of a material, grade and thickness which is acceptable to the UK.*

## Flues for appliances burning Class D oil

**4.23** Flues which may be expected to serve appliances burning Class D oil should be made of materials which are resistant to acids of sulphur.

### **Guidance on 4.23**

*BS EN 1443 details corrosion resistance classes of fuels. Class D fuel falls into corrosion resistance Class 2 (med).*

## Alternative approach

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

*BS 5410-1:1997: Code of practice for oil firing. Installations up to 45kW output capacity for space heating and hot water supply purposes.*

### **Guidance on alternative approach**

*The standards cited under the alternative approach pre-date the availability of draft or published European Standards on these subjects.*

## Section 5

### Provisions for liquid fuel storage and supply

There are no implications arising from the work of CEN/TC 166 with respect to this section.

## Appendices

### Appendix A, B, C, D

There are no implications arising from the work of CEN/TC 166 with respect to these Appendices.

### Appendix E, Methods of checking compliance with requirement J2

The execution standard for metal chimneys, BS EN 12391-1, includes physical checks to confirm the functional ability of chimneys. Three tests are detailed in the informative annex of the prEN and cover a:

- flue flow test;
- smoke test;
- pressure test.

Compliance is shown by meeting one of the tests and unlike Appendix E of ADJ, which applies only to chimneys for natural draught open flued appliances, the EN tests are intended to embrace chimneys for both natural draught and forced draught appliances.

There are some fundamental differences between BS EN 12391-1 and the tests given in Appendix E of ADJ, and supporting British Standards. Accordingly, installers should continue to meet the provisions of ADJ until further notice.