

# Chimneys — Execution standard for metal chimneys —

## Part 1: Chimneys for non-roomsealed heating appliances

The European Standard EN 12391-1:2003 has the status of a  
British Standard

ICS 91.060.40

# National foreword

This British Standard is the official English language version of EN 12391-1:2003.

The UK participation in its preparation was entrusted by Technical Committee B/506, Chimneys, to Subcommittee B/506/5, Chimneys and their components having inner linings of metal, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Attention is drawn to UK National Annex NA attached to this standard, which reproduces verbatim Approved Document J: Combustion appliances and fuel storage systems (2002 edition) to The Building Regulations 2000, Clause 2.10, Clause 2.11 and Clause 2.12, and Diagram 2.1 and Diagram 2.2.

## Additional information

Equivalent chimney installation guidance for metal chimneys for non-room-sealed appliances in the UK is given in supporting documents to building regulations appropriate to that legislative area of the UK. In England and Wales this is the Approved Document J: Combustion appliances and fuel storage systems (2002 edition) to The Building Regulations 2000. In Scotland this is Technical Standards to the Building Standards (Scotland) Regulations 1990 (as amended) Part F: Combustion Appliance Installations and Storage of Liquid and Gaseous Fuels (the Building Standards (Scotland) Regulations will be replaced by the Building (Scotland) Regulations in 2004). In Northern Ireland this is the Technical Booklet L: Heat producing appliances and Liquid Petroleum Gas Installations (1991) to The Building Regulations (Northern Ireland) 2000.

Further guidance is provided in the relevant clauses of the British Standards listed below. At the time of publication of this national foreword, it is intended that these British Standards will be amended (except in the case of BS 5440-1, which is to be partly amended and partly withdrawn, and the BS 7566 series of standards, which are intended to be withdrawn) to remove any conflicting clauses as required by CEN agreements.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 13 July 2004

## Amendments issued since publication

| Amd. No. | Date | Comments |
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BS 5410-1, *Code of practice for oil firing — Part 1: Installations up to 45 kW output capacity for space heating and hot water supply purposes.*

BS 5410-2, *Code of practice for oil firing — Part 2: Installations of 45 kW and above output capacity for space heating, hot water and steam supply services.*

BS 5440-1, *Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases) — Part 1: Specification for installation and maintenance of flues.*

BS 5854, *Code of practice for flues and flue structures in buildings.*

BS 5871-1, *Specification for the installation of gas fires, convector heaters, fire/back boilers and decorative fuel effect gas appliances — Part 1: Gas fires, convector heaters, fire/back boilers and heating stoves (1st, 2nd and 3rd family gases).*

BS 5871-2, *Specification for the installation of gas fires, convector heaters, fire/back boilers and decorative fuel effect gas appliances — Part 2: Inset live fuel effect gas fires of heat input not exceeding 15 kW, and fire/back boilers (2nd and 3rd family gases).*

BS 5871-3, *Specification for the installation of gas fires, convector heaters, fire/back boilers and decorative fuel effect gas appliances — Part 3: Decorative fuel effect gas appliances of heat input not exceeding 20 kW (2nd and 3rd family gases).*

BS 7566 (all parts), *Installation of factory-made chimneys to BS 4543 for domestic appliances.*

### **Cross-references**

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

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### **Summary of pages**

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 77 and a back cover.

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English version

## Chimneys - Execution standard for metal chimneys - Part 1: Chimneys for non-roomsealed heating appliances

Conduits de fumée - Norme de mise en oeuvre pour  
conduits de fumée métalliques - Partie 1: Conduits de  
fumée pour chaudières non étanches

Abgasanlagen - Ausführungsbestimmungen für  
Metallabgasanlagen - Teil 1: Abgasanlagen für  
raumluftabhängige Feuerstätten

This European Standard was approved by CEN on 3 November 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
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## Foreword

This document (EN 12391-1:2003) has been prepared by Technical Committee CEN/TC 166 "Chimneys", the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

This European Standard is one of a series of standards as listed below.

*Chimneys – Execution standard for metal chimneys – Part 1: Chimneys for non-roomsealed heating appliances.*

*Chimneys – Execution standard for metal chimneys – Part 2: Chimneys for roomsealed heating appliances.*

The annexes A, B, C, F, G, H, I, J, K, L and M are informative, the annexes D and E are normative.

This document includes a bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This European Standard specifies the method of specifying the design criteria and the installation method for building custom-built chimneys with rigid metal liners, for relining a chimney with rigid or flexible metal liners and for single wall system chimneys or multi-wall system chimneys with rigid metallic liners, used to convey the products of combustion from heating appliances to the outside atmosphere. It also gives information on commissioning, cleaning and maintenance of an installed chimney.

This standard does not cover the design, installation, commissioning, cleaning and maintenance of chimneys designated H (high positive pressure chimney) and chimneys for roomsealed appliances.

This standard also specifies limitations for supporting a chimney, and the maximum unsupported chimney height for system chimneys and custom-built chimneys within or against a building, and for supporting by a mast or other structures than a building.

This European Standard does not apply to structurally independent (free-standing or self-supporting) chimneys.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 1443, *Chimneys – General requirements*.

EN 1806, *Chimneys – Clay/ceramic flue blocks for single wall chimneys - Requirements and test methods*.

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

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

EN 1858, *Chimneys – Components – Concrete flue blocks*.

EN 1859, *Chimneys – Metal chimneys – Test methods*.

EN 13084-1, *Free-standing industrial chimneys – Part 1: General requirements*.

ENV 1993-3-2, *Eurocode 3: Design of steel structures – Part 3-2: Towers, masts and chimneys – Chimneys*.

EN 12446, *Chimneys – Components – Concrete outer wall elements*.

prEN 13069, *Chimneys – Clay/ceramic outer walls for system chimneys – Requirements and test methods*.

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

EN 13501-2:2003, *Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services*.

EN 61024-1-2, *Protection of structures against lightning – Part 1-2: General principles – Guide B – Design, installation, maintenance and inspection of lightning protection systems (IEC 61024-1-2:1998)*.

### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1443, EN 1856-1, prEN1856-2 and EN 1859 together with the following apply.

Examples of chimney construction identifying individual component terminology and definitions are given in Figures 1, 2 and 3.

#### 3.1

##### **heating appliance adapter**

component which connects the connecting flue pipe or the chimney to a heating appliance

#### 3.2

##### **chimney adapter**

component which connects a chimney to a connecting flue pipe or an heating appliance

#### 3.3

##### **fire compartment**

part of the building being isolated to provide resistance to fire

#### 3.4

##### **flashing**

component or site fabricated materials used for weatherproofing the penetration of the roof by the chimney

#### 3.5

##### **storm collar**

component attached and sealed to the outer wall of the chimney immediately above the flashing in order to prevent the entry of rain into the building

#### 3.6

##### **fire stop**

component intended to provide resistance to fire spread between rooms or compartments

#### 3.7

##### **fire stop spacer**

component intended to locate a chimney at the correct distance from combustible material, when penetrating a wall or a floor, which separates compartments, and to provide resistance to the spread of fire between rooms or fire compartments

#### 3.8

##### **sleeve**

component which provides an aperture through a wall, ceiling or floor through which the chimney passes

#### 3.9

##### **back ventilation**

ventilation in the space between flue liner and the outer wall of the chimney or an enclosure

#### 3.10

##### **draught regulator**

balanced hinged flap in a flue opening to allow airflow into the chimney to control draught at the boiler outlet

#### 3.11

##### **ventilating air flap**

automatically operated flap used to introduce ventilation air for the purpose of drying the chimney

NOTE This can be a draught regulator.

#### 3.12

##### **damper**

device used to close or partially close the flue

**3.13**

**explosion relief**

device that protects the chimney against overpressure arising from deflagration or explosion in the flue

**3.14**

**expansion component**

component used to accommodate thermal movement

**3.15**

**silencer**

component installed to provide noise attenuation

**3.16**

**access component**

component installed in the chimney or in the connecting flue pipe to provide access to the flue for the purpose of inspection or cleaning

**3.17**

**test point**

component that provides access for gas sampling and measuring

**3.18**

**closure component**

any component used to shut off an opening in the chimney, e.g. base plug, tee piece plug

**3.19**

**common header**

horizontal or inclined common connecting flue pipe to which more than one heating appliance is connected

**3.20**

**condensate drain**

component to facilitate the disposal of condensate

**3.21**

**rigid liner**

straight metal liner that cannot bend without permanent deformation

**3.22**

**rain cap**

part of the chimney that protects against the entry of rain. This may be a part of a terminal

**3.23**

**rain seal**

part of the chimney that stops the entry of rain into the insulation space

**3.24**

**centralising spacer**

component to centralise the liner

**3.25**

**T-piece**

chimney fitting which allows an appliance, connecting flue pipe or accessory to be connected to the chimney flue at an angle

**3.26**

**elbow**

chimney fitting which provides a change of direction of the flue

**3.27**

**infill insulation**

insulation which is poured into the gap between the liner and the outer wall of the chimney

**3.28**

**preformed insulation**

insulation prefabricated to fit the insulation space

**3.29**

**air gap insulation**

closed air space between the liner and the outer wall

**3.30**

**flexible liner**

metal tube having a single or multi-skin construction that is able to bend in any direction without permanent deformation

**3.31**

**back ventilation air inlet**

opening in the outer wall of a chimney used for the intake of room air for back ventilation

**3.32**

**back ventilation air outlet**

opening in the outer wall of a chimney or at the top of the chimney to exhaust the back ventilation air

**3.33**

**seal**

device that joins two elements in such a way as to prevent leakage

**3.34**

**sealant**

material which, applied in an unformed state to a joint, seals it by adhering to appropriate surfaces within the joint

- a.) double wall insulated metal chimney in a solid block shaft
- b.) internal or external insulated metal chimney without enclosure
- c.) double wall insulated metal chimney in a cavity block
- d.) double wall insulated metal chimney in an enclosure as a part of the building structure
- e.) double wall insulated metal chimney in a specified material

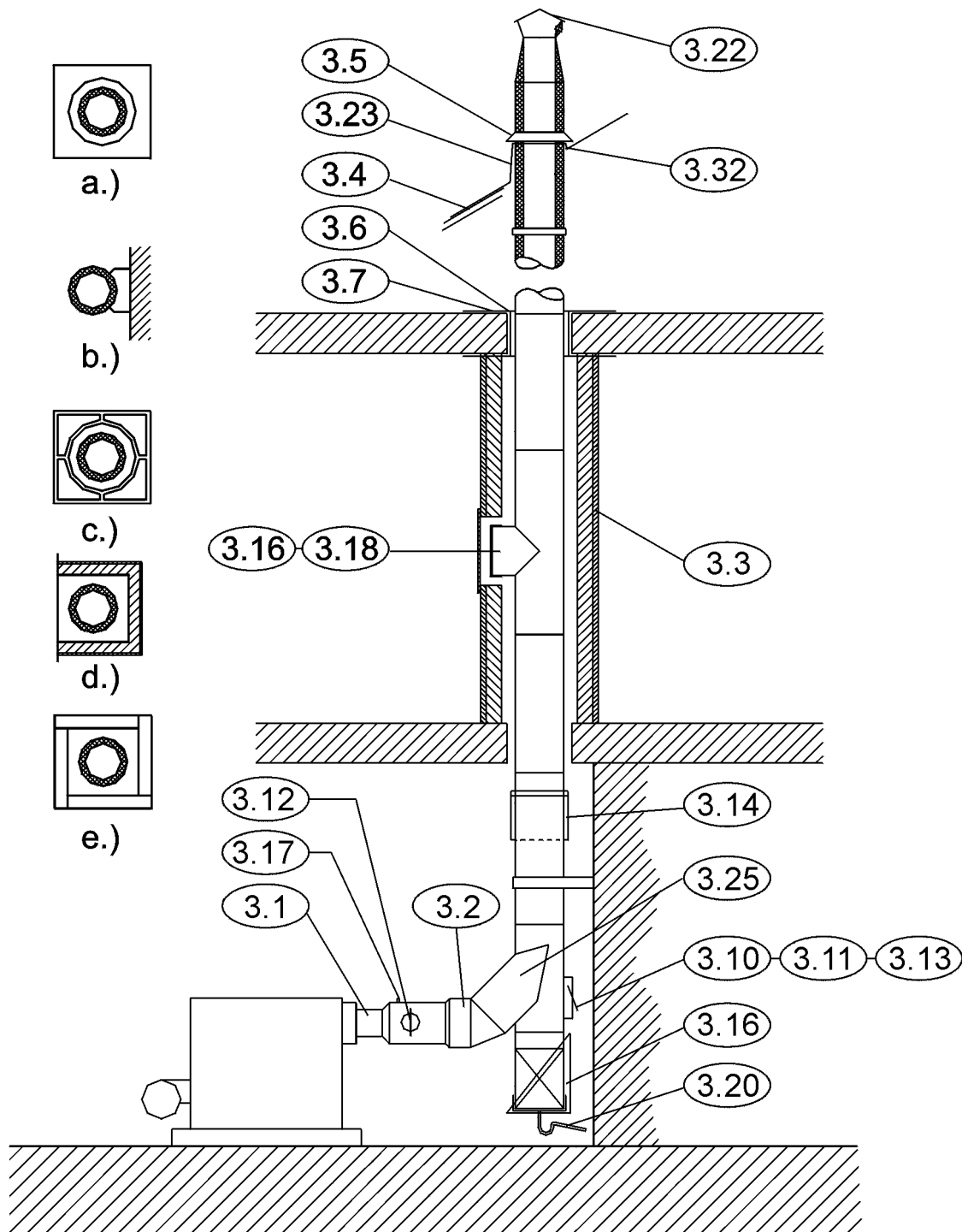


Figure 1 — Terminology for a system chimney

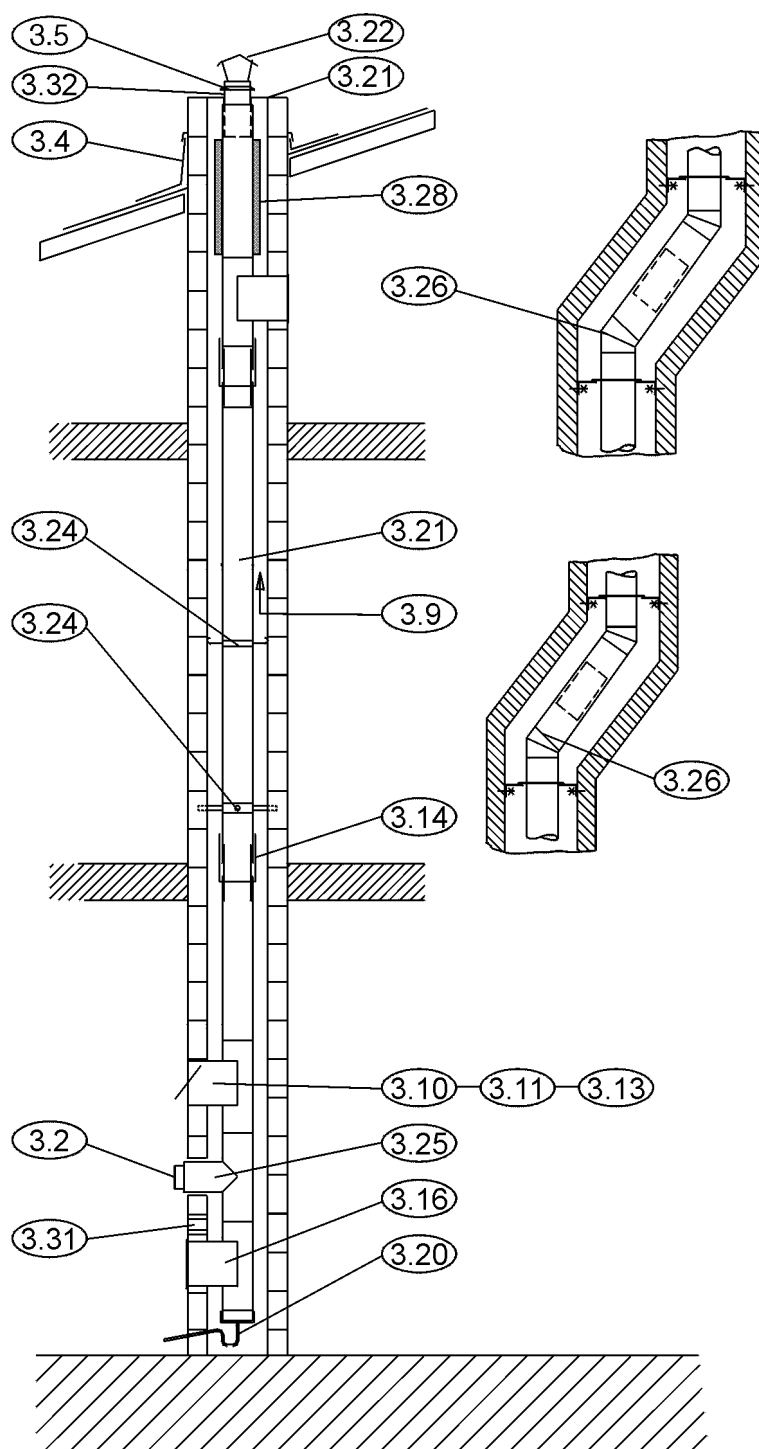


Figure 2 — Terminology for a relined chimney

- a.) double wall insulated metal chimney in a solid block shaft
- b.) internal or external insulated metal chimney without enclosure
- c.) double wall insulated metal chimney in a cavity block
- d.) double wall insulated metal chimney in an enclosure as a part of the building structure
- e.) double wall insulated metal chimney in a specified material

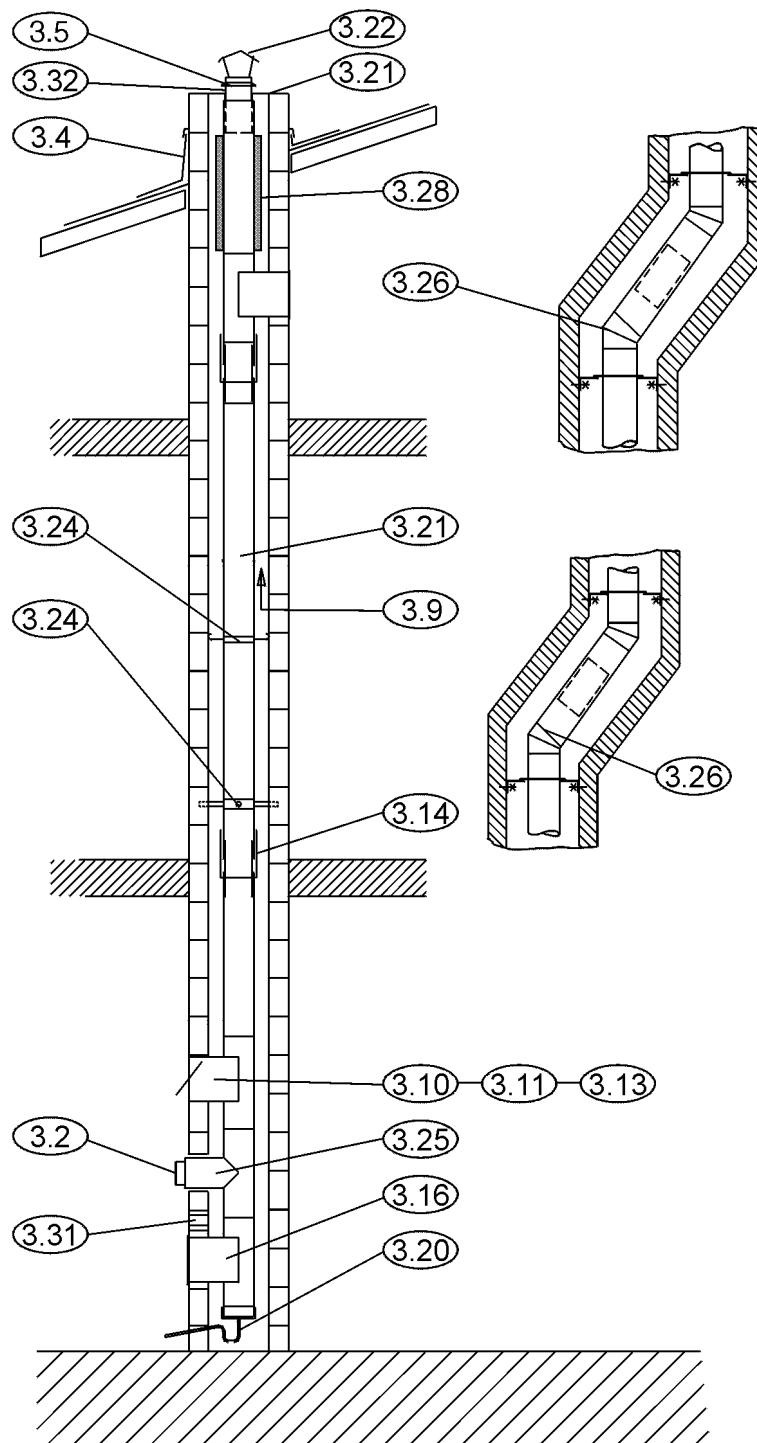


Figure 3 — Technology for a custom-built chimney

## 4 Design criteria

### 4.1 Data requirements

#### 4.1.1 Sources of data and information

The data and information specified in 4.1.2 to 4.1.6 shall be obtained and documented as appropriate.

NOTE The sources may be:

- heating appliance manufacturers catalogues and literature;
- chimney manufacturers literature including installation instructions;
- architects drawings or plans and/or site surveys;
- annex A of this document;
- local building rules.

A possible source of typical or average data is EN 13384-1.

#### 4.1.2 Heating appliance information

The following information for the heating appliance(s) shall be obtained from the documentation of the heating appliance manufacturer or if not available the source of the data shall be documented in the design:

For selecting the chimney type (required designation):

- kind/type of appliance/burner;
- kind of fuel;
- maximum (nominal) flue gas temperature;
- maximum allowable condensate back flow rate (from the chimney).

For calculation (sizing):

- kind/type of appliance/burner;
- kind of fuel;
- minimum and maximum flue gas mass flow (or burning rate and CO<sub>2</sub>-content or heat input and CO<sub>2</sub>-content or heat output, boiler efficiency and CO<sub>2</sub>-content);
- minimum flue gas temperature for nominal and minimum heat output/input;
- minimum draught (for N) or maximum differential pressure (for P);
- CO<sub>2</sub>-content;
- size/shape of flue gas outlet.

For appliance/connecting flue pipe/chimney adapter design/choice:

- size/shape of flue gas outlet;
- position/height of flue gas outlet.

#### 4.1.3 Building construction and chimney route information

In order to allow the chimney route to be determined the relevant details of the building or support structure shall be obtained (see Figure 4).

If the chimney is to be supported by the building structure, the construction of the building and the materials used shall be capable of supporting the loads imposed upon it by the chimney. The fixings shall be compatible with the materials of construction of the building. This shall be checked before installing the chimney.

The following list of information shall be supplied where appropriate (see Figure 4):

- height from ground to ceiling (structural or finished) H1;
- height from intermediary floor to ceiling (structural or finished) H2;
- height of ridge H3;
- pitch of roof  $\gamma$ ;
- depth and thickness of joist timbers and distances between centres T1;
- depth and thickness of joist timbers and distances between centres T2;
- depth and thickness of roof timbers and distance centres T3;
- the horizontal distance between the centre line of the chimney above roof level and the gable end of the building L1;
- the horizontal distance between the centre line of the chimney above roof level and the ridge of the roof L2;
- distance through loft measured at centre line of the chimney C1;
- height from the ground to the centre line of chimney inlet C2;
- height from the ground to the bottom of the liner C3;
- total chimney height from the ground to the chimney outlet C4;
- height from the ground to the centre of each opening C5;
- height from the ground to the lower bend of each offset where the centre line of the liner changes the direction C6;
- vertical distance between the lower and upper bends of each offset where the centre line of the liner changes the direction C7;
- horizontal distance between the vertical centre lines of each offset C8;
- horizontal distance 1 from the centre of appliance-outlet to the centre of the chimney F1;
- horizontal distance 2 from the centre of appliance-outlet to the centre of the chimney F2;
- height from ground to the centre of appliance outlet F3:
  - materials of each floor;
  - materials of each ceiling;
  - roof finish;

- existing chimney details, e.g. for relining, including:
  - internal dimensions throughout its length D;
  - designation of existing chimney;
  - construction materials to determine thermal performance and fire rating;
  - condition and nature of inner flue surface of the existing chimney;
- structural details;
- distance of chimney outlet position to adjacent buildings, obstructions and other building openings, e.g. windows/ skylights etc.

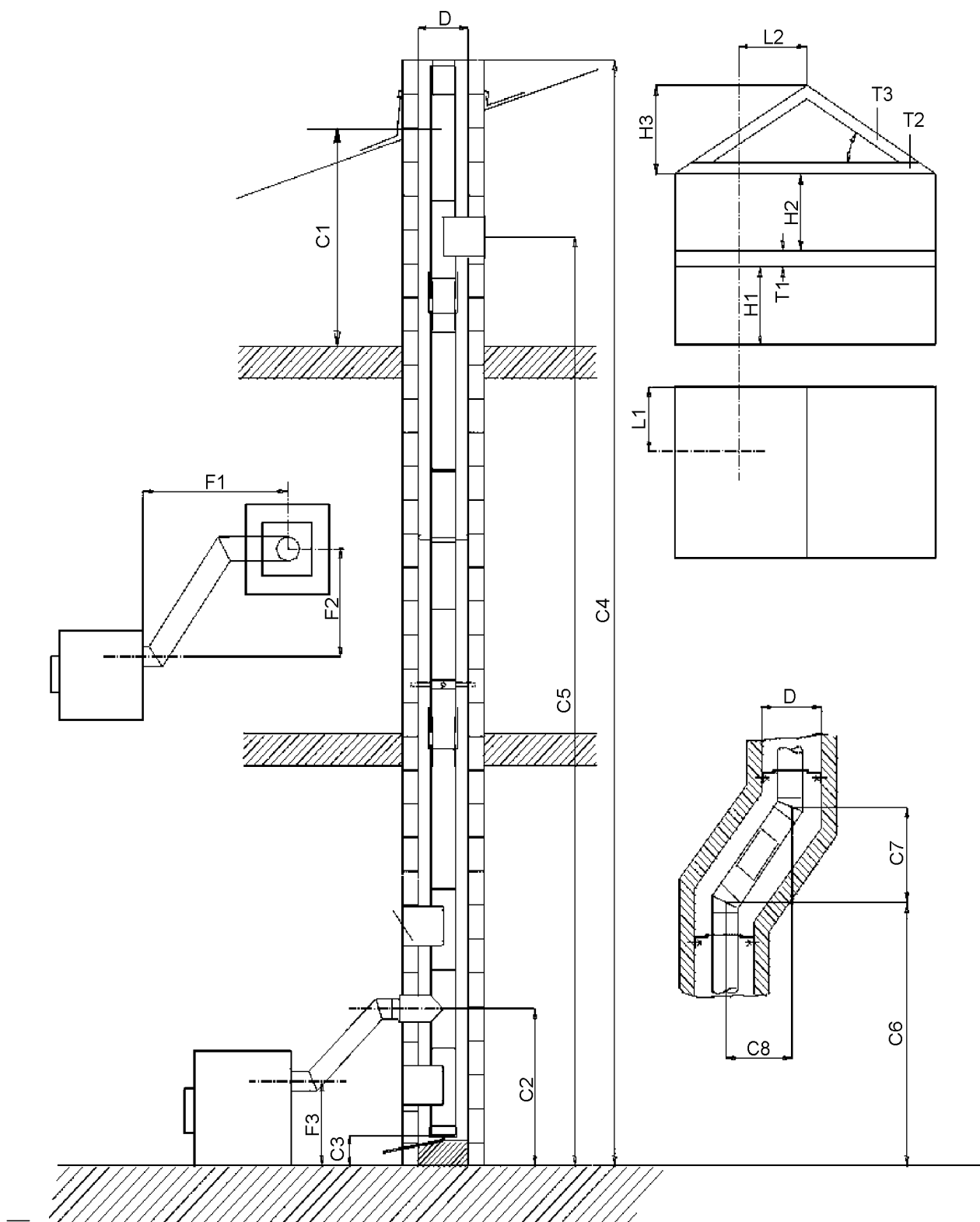


Figure 4 — Example of typical building structure designed to assist exchange of information

#### 4.1.4 Local conditions

Environmental and topographical particulars of the site shall be obtained as required in EN 13384-1.

#### 4.1.5 Combustion air supply

Information on the size and position of apertures for combustion air supply into the room containing the appliance shall be obtained (possible sources of data are given in 4.1.1).

#### 4.1.6 Chimney product specification

The following information about the chimney product specification shall be obtained (see also 4.1.1):

- identification and designation of the system chimney or the components for custom built chimneys or relining;
- design load or maximum allowed chimney height to be supported by lengths, fittings and supports;
- weights of components;
- manufacturers installation instruction.

Additional information may be required for chimney sizing. Refer to EN 13384-1.

### 4.2 Design requirements

#### 4.2.1 General

The design of the chimney installation shall be fully detailed and documented. The design shall enable a chimney product manufacturer's standard components to be used in carrying out the installation without modification.

#### 4.2.2 Designation

The chimney products shall be chosen so that the finished chimney shall have a designation in accordance with EN 1443 (see annex B).

The chimney and connecting flue pipe shall have designation classes appropriate to the appliance details (see 4.1.2) and the building structure details (see 4.1.3).

Each designation parameter shall be of a class at least equal to that required or shall be of a higher class according to the following sequence:

- T600 > T450 > T400 > T300 > T250 > T200 > T160 > T140 > T120 > T100 > T080;
- H > P > N;
- D3 > D2 > D1;
- W2 > W1;
- G > O;
- xx (low) > xx (high).

where

T is the temperature class;

H is the high positive pressure class;

P is the positive pressure class;

N is the negative pressure class;

O is without soot fire resistance;

G is with soot fire resistance;

xx is the distance to combustibles;

and for corrosion class:

W is wet operating conditions;

D is dry operating conditions;

1 is for gas;

2 is for light oil / natural wood;

3 is for heavy oil / solid fuel.

#### **4.2.3 Determination of designation of the chimney and connecting flue pipe**

##### **4.2.3.1 System chimney**

The designation of the system chimney product shall be according to EN 1856-1 (see annex C in this document). The installed chimney shall be assigned a chimney designation according to EN 1443 (see annex D in this document).

##### **4.2.3.2 Relined and custom-built chimney**

The designation of a relined or custom-built chimney shall be determined according to the calculations of annex E.

##### **4.2.3.3 Connecting flue pipe**

The designation of the connecting flue pipe shall be in accordance either with prEN 1856-2. Chimney components complying with EN 1856-1 can also be used.

##### **4.2.3.4 Supplementary components or materials**

Supplementary components or materials shall have performance characteristics appropriate to the designation of the chimney components, which affect them e.g. insulation operating temperatures.

#### **4.2.4 Materials of construction**

##### **4.2.4.1 General**

Supplementary materials not supplied with the chimney products should be fit for purpose, e.g. in terms of corrosion, temperature, strength, e.g. fixings, screws or additional supports.

##### **4.2.4.2 System chimneys**

System chimneys shall be in accordance with EN 1856-1.

#### 4.2.4.3 Relined chimneys

##### 4.2.4.3.1 Flue Liners

Flue liners for relining shall be made from rigid or flexible metal chimney liners in accordance with the requirements of prEN 1856-2.

NOTE System chimney products in accordance with the requirements of EN 1856-1 may also be used as liners.

##### 4.2.4.3.2 Insulation

Insulation between the new liner and the outer wall shall be either rigid (e.g. Table F.1) or be loose material or be an air gap.

Insulation materials including loose infill insulation shall be approved to be fit for the purpose.

NOTE 1 Care should be taken when using loose infill to prevent the risk of flue blockage arising from the escape of the insulation.

NOTE 2 Loose infill with binders should not prevent free movement of the liner.

NOTE 3 To determine the effect of a closed air gap see Table F.5 for thermal resistance values.

NOTE 4 To determine the effect of an open air gap an external heat transfer coefficient of  $8 \text{ W/m}^2\text{K}$  should be used in the calculation for heat transfer (see EN 13384-1). Any additional insulation outside of the airgap is excluded in the calculation.

##### 4.2.4.3.3 Outer wall

The existing chimney is the outer wall of the relined chimney. The existing chimney shall be checked that it is fit for its intended use.

##### 4.2.4.3.4 Seals and sealants

Only those seals and sealants specified by the chimney product manufacturers shall be used.

#### 4.2.4.4 Custom-built chimneys

##### 4.2.4.4.1 Liners

Liners for custom-built chimneys shall be made from rigid metal chimney liners complying with the requirements of prEN 1856-2.

NOTE System chimney products complying with the requirements of EN 1856-1 may also be used as liners.

##### 4.2.4.4.2 Insulation

Insulation between the new liner and the outer wall shall be either rigid (e.g. Table F.1) or loose fill material or be an air gap.

Insulation materials including loose infill insulation shall be fit for purpose.

NOTE 1 Care should be taken when using loose infill without binders to prevent the risk of flue blockage arising from the escape of the insulation.

NOTE 2 Loose infill with binders should not prevent free movement of the liner.

NOTE 3 To determine the effect of a closed air gap see Table C.5 for thermal resistance values.

NOTE 4 To determine the effect of an open air gap an external heat transfer coefficient of  $8 \text{ W/m}^2\text{K}$  should be used in the calculation for heat transfer (see EN 13384-1). Any additional insulation outside of the airgap is excluded in the calculation.

#### **4.2.4.4.3 Outer wall**

Outer wall components of custom-built chimneys shall comply with EN 12446, EN 1806, EN 1858, prEN 13069 or as specified in annex F, Table F.4.

#### **4.2.4.4.4 Seals and sealants**

Only those seals and sealants specified by the chimney product manufacturers shall be used.

#### **4.2.4.5 Connecting flue pipe and adapters**

The material of the connecting flue pipe and adapters shall comply with prEN 1856-2. Chimney components complying with EN 1856-1 can also be used. Flexible liners complying with prEN 1856-2 can also be used where permitted and in accordance with national regulations.

#### **4.2.4.6 Additional materials**

All fixings e.g. screws, nuts, bolts, plugs, washers shall be such that the assembly is non-combustible and they shall have a corrosion resistance at least equal to that of the external surface of the chimney.

#### **4.2.5 Flue size**

The flue for the chimney and the connecting flue pipe shall be sized in accordance with thermal and fluid dynamic calculation methods.

NOTE 1 EN 13384-1 describes a calculation method for chimneys serving one appliance.

NOTE 2 EN 13384-2 describes a calculation method for chimneys serving more than one appliances.

#### **4.2.6 Chimney route**

##### **4.2.6.1 General**

The chimney route should be the shortest, most direct route between the heating appliance outlet and the chimney terminal and should be straight and vertical wherever possible, with the termination being as near to the highest part of the building (e.g. ridge) as practicable to ensure adequate draft and dispersion of flue gas.

The chimney route selected should enable the chimney manufacturers standard components to be used in carrying out the installation.

##### **4.2.6.2 Connecting flue pipe**

A connecting flue pipe designated suitable for wet operating conditions, shall be inclined to allow condensate to be drained.

NOTE 1 It is recommended that it should be inclined at least 3° to the horizontal.

The connecting flue pipe shall not pass through a ceiling or into another fire compartment.

Where it is necessary for a connecting flue pipe to pass through a wall within a fire compartment or through a wall to the outside atmosphere, a sleeve shall be used to allow free movement and assure minimum distance to combustible materials.

NOTE 2 It is recommended that the connecting flue pipe should be as short as possible and the angle of entry into the chimney should not exceed 45°.

NOTE 3 For natural draught installations with a draught diverter a vertical run of flue directly above the draught diverter sufficient to prevent spillage from the appliance should be provided unless otherwise stated in the appliance manufacturers installation instructions.

The appliance manufacturer's installation instructions shall be followed for any specific requirements.

#### 4.2.6.3 Resistance to fire

A chimney installation shall achieve the resistance to fire (external to external) required for the specific parts of the building through which it passes. The required resistance to fire shall be classified in terms of EI (Integrity and insulation) according to EN 13501-2:2003, 7.5.10.4. This may be achieved by one of the following:

- a chimney itself with the required resistance to fire;
- a chimney built into a shaft with the necessary resistance to fire (e.g. non-combustible enclosure);
- a chimney and its enclosure which together fulfil the necessary resistance to fire.

#### 4.2.6.4 Distance to combustible material

##### 4.2.6.4.1 System chimneys

The minimum distance to combustible materials for a system chimney shall be declared by the manufacturer in accordance with EN 1856-1.

A system chimney which passes through a combustible wall shall be sleeved and/or shielded to maintain the appropriate distance to combustible material or in the case of cavity wall construction to contain any infill. Any sleeve or shield opening to the outside shall be weatherproofed.

##### 4.2.6.4.2 Relined and custom-built chimneys

The minimum distance to combustible materials for a relined chimney and a custom-built chimney shall be determined in accordance with the calculation of E.2.

**NOTE** Formula E.1 covers the case of non-ventilated spaces between the chimney and combustible material and gives the maximum allowed flue gas temperature for a given distance.

Formula E.3 covers the cases of ventilated spaces between the chimney and combustible material and gives the maximum allowed flue gas temperature for a gap of 4 cm.

A custom-built chimney which passes through a combustible wall shall be sleeved and/or shielded to maintain the appropriate distance to combustible material or in the case of cavity wall construction to contain any infill. Any sleeve or shield opening to the outside shall be weatherproofed.

##### 4.2.6.4.3 Connecting flue pipe

**NOTE 1** Connecting flue pipes are considered normally to be single wall uninsulated ventilated.

Connecting flue pipes in temperature classes T100 to T160 shall be at a minimum distance of 40 mm from combustible materials, when installed in natural ventilated conditions or at a distance as calculated in formula E.1 of E.2.

**NOTE 2** Connecting flue pipes in temperature class T080 do not require a minimum distance to combustible materials. However, direct contact is not recommended.

Naturally ventilated connecting flue pipes with a temperature class equal to or higher than T200 or which are soot-fire resistant, shall be installed at a minimum distance to combustible materials of at least three times their nominal diameter.

**NOTE 3** This minimum distance may be reduced to 1,5 times the nominal diameter, if a radiation shield creating an air gap, made from non combustible material, is installed between the connecting flue pipe and the adjacent combustible materials.

**NOTE 4** An insulated connecting flue pipe for which a distance to combustible material has been determined (e.g. by test, i.e. a chimney product to EN 1856-1) may be installed at the specified distance to combustible material.