

Chimneys — Requirements for metal chimneys

Part 1: System chimney products

ICS 91.060.40

National foreword

This British Standard is the UK implementation of EN 1856-1:2009. It supersedes BS EN 1856-1:2003 which is withdrawn.

BS EN 1856-1:2003 superseded BS 4543-2:1990 and BS 4543-3:1990, and those requirements and recommendations relating to chimneys that were removed from BS 715:1993¹. BS 715:1993 was amended and republished as BS 715:2005 leaving only requirements relating to flue boxes.

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

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

EN 1856-1 is a candidate “harmonized” European standard and fully takes into account the requirements of the European Commission mandate M/105, Chimneys, flues and specific products, given under the EU Construction Products Directive (89/106/EEC), and intended to lead to CE marking. The date of applicability of EN 1856-1 as a “harmonized” European standard, i.e. the date after which this standard may be used for CE marking purposes, is subject to an announcement in the Official Journal of the European Communities.

EN 1856-1 is the subject of transitional arrangements agreed under the European Commission mandate. The Member States have agreed a nominal transition period for the co-existence of EN 1856-1 and their corresponding national standard(s). It is intended that this period will comprise a nominal nine month period during which any required changes to national regulations are to be made, followed by a further nominal twelve month period for the implementation of CE marking. At the end of this co-existence period, the national standard(s) will be withdrawn. In the UK there are no corresponding national standards.

Clauses NA.1 to NA.5 of National annex NA (informative) identify the specifications previously required in BS 4543-2:1990, BS 4543-3:1990 and BS 715:1993 for chimneys. Clause NA.5 identifies the chimney test arrangement and fire-stop recommendations, and Clause NA.6 provides recommendations for chimney ridge terminals under wind load.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

¹ BS EN 1856-2:2004 also partially superseded BS 715:1993

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Foreword

This document (EN 1856-1:2009) 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 December 2009, and conflicting national standards shall be withdrawn at the latest by March 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1856-1:2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive 89/106/EEC.

For relationship with EC Directive 89/106/EEC, see informative Annex ZA, which is an integral part of this document.

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

Introduction

This European Standard has been prepared to be a harmonised standard to provide means of conforming to the essential requirements of the Construction Products Directive and associated EFTA regulations.

The generic word "chimney", when used in this European Standard, refers to systems with metallic liner used to convey the products of combustion from any appliance to the outside atmosphere, and thus includes all other terms of common use in the trade, such as vents, flues, shafts, exhaust systems, ducts, etc.

This European Standard addresses the durability against corrosion by the use of a minimum material specification for the flue liner as well as an interim solution for testing products for durability against corrosion. Three corrosion resistance tests and their requirements have been adopted from existing corrosion testing being undertaken in various member states (see Annex A).

This European Standard describes chimney components, from which system chimneys can be assembled as illustrated in Figure 1.

1 Scope

This European Standard specifies the performance requirements for single and multi-wall system chimney products with rigid metallic liners (chimney sections, chimney fittings and terminals, including supports) with nominal diameter up to and including 1200 mm, used to convey the products of combustion from appliances to the outside atmosphere. It also specifies the requirements for marking, manufacturer's instructions, product information and evaluation of conformity. Metal liners and metal connecting flue pipes not covered here are included in EN 1856-2:2009.

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

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 573-3, *Aluminium and aluminium alloys – Chemical composition and form of wrought products – Part 3: Chemical composition and form of products*

EN 1443:2003, *Chimneys – General requirements*

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

EN 10088-1, *Stainless steels – Part 1: List of stainless steels*

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

EN 14241-1, *Chimneys - Elastomeric seals and elastomeric sealants . Material requirements and test methods - Part 1: Seals in flue liners*

EN 15287 (all parts), *Chimneys – Design, installation and commissioning of chimneys*

EN ISO 3651-2, *Determination of resistance to intergranular corrosion of stainless steels. Part 2: Ferritic, austenitic and ferritic-austenitic (duplex) stainless steels. Corrosion test in media containing sulfuric acid (ISO 3651-2:1998)*

ISO 2859-1, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

appliance outlet

position where the products of combustion exit from the appliance (see Figure 1)

3.2

chimney

structure consisting of a wall or walls enclosing a flue or flues

[EN 1443:2003]

3.2.1

chimney accessory

chimney component not conveying products of combustion

[EN 1443:2003]

3.2.2

chimney component

any part of a chimney

[EN 1443:2003]

3.3

chimney designation

shortened description of a specific chimney type, which clearly distinguishes it from any other types

3.4

chimney fitting

chimney component conveying products of combustion except a chimney section (see Figure 1)

[EN 1443:2003]

3.5

chimney section

straight chimney component conveying products of combustion (see Figure 1)

[EN 1443:2003]

3.6

cladding

additional non-structural outer wall around a chimney for protection against heat transfer or weathering, or for decorative purposes (see Figure 1)

[EN 1443:2003]

3.7

connecting flue pipe

component or components connecting the heating appliance outlet and the chimney (see Figure 1)

[EN 1443:2003]

3.8

corrosion load

combination of condensate and corrosion resistance classes necessary for the different operating conditions and types of fuel

3.9

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

[EN 1443:2003]

3.10

design load (DL)

load which a chimney or its components are designed to be subjected to, under normal operating conditions, when installed as per manufacturer's installation instruction

3.11

dry operating condition

condition when a chimney is designed to operate normally with the temperature of the inner surface of the flue liner above the water dew point

[EN 1443:2003]

3.12

enclosure

barrier that, when built around a chimney, will give additional safety in case of fire and can provide additional heat transfer resistance (see Figure 1)

[EN 1443:2003]

3.13

external installation

part of a chimney, which is located outside the building

3.14

firestops

barrier to prevent the spread of fire

3.15

flexible pipe

metal liner, or metal connecting flue pipe having a single or double skin construction, designed to bend in any direction without permanent deformation

3.16

flue

passage for conveying the products of combustion to the outside atmosphere (see Figure 1)

[EN 1443:2003]

3.17

flue gas

gaseous portion of the products of combustion conveyed in a flue

[EN 1443:2003]

3.18

flue liner

wall of a chimney consisting of components the surface of which is in contact with products of combustion (see Figure 1)

[EN 1443:2003]

3.19

heating appliances

unit generating products of combustion which need to be conveyed to the outside atmosphere (see Figure 1)

[EN 1443:2003]

3.20

insulation

material or air gap between the flue liner and the outer wall, designed to increase thermal resistance of the chimney (see Figure 1)

3.21

internal installation

part of a chimney which is located inside a building

3.22

joint

connection between two components (see Figure 1)

[EN 1443:2003]

3.23

manufacturer instructions

product written information which is provided for use by the buyer or installer

3.24

metal chimney

chimney with its flue liner made of metal, which may have additional surrounding structural elements and accessories, as well as insulation

3.25

metal liner

rigid or flexible flue liner made of metal

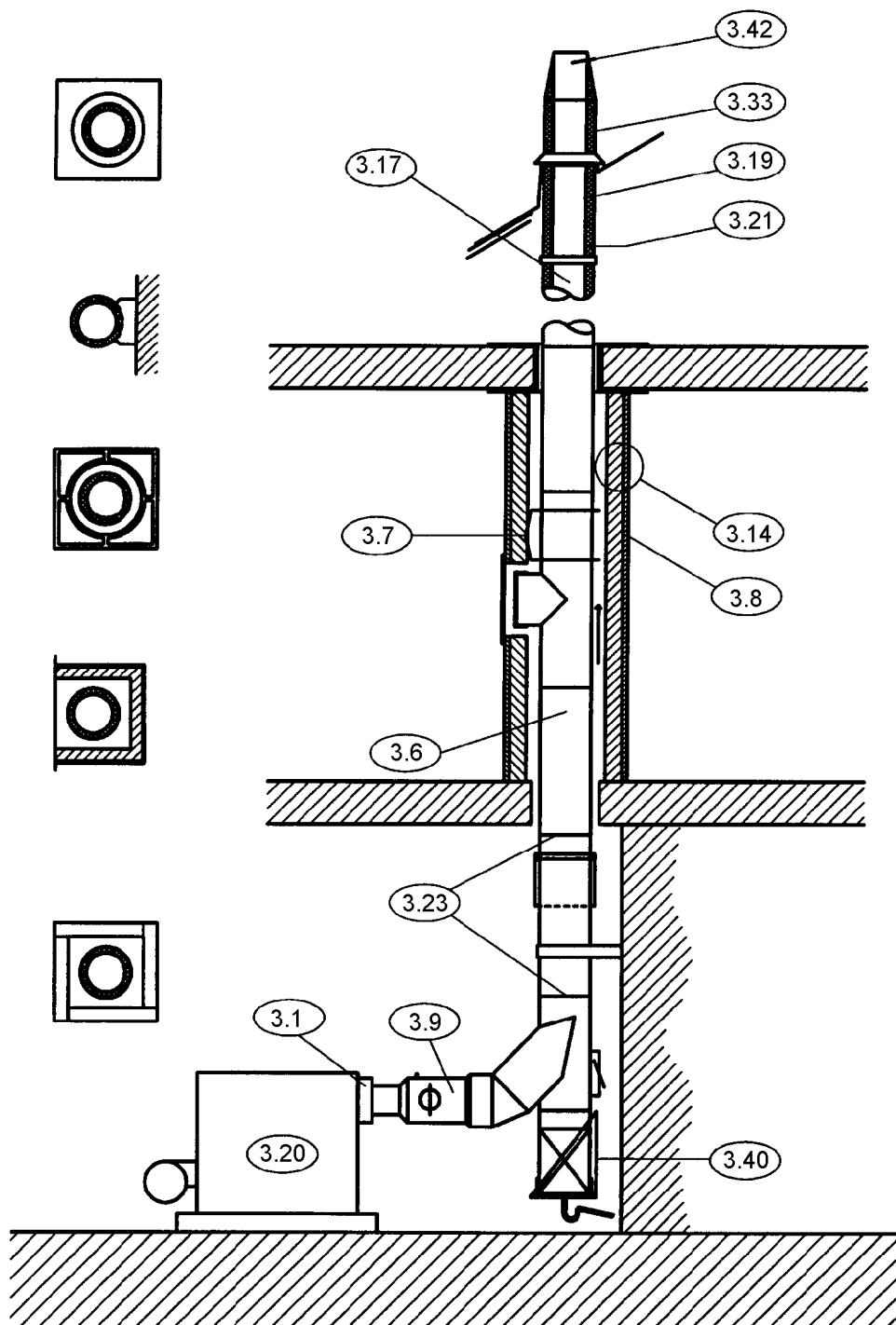


Figure 1 — Terminology - chimney components and chimney accessories

3.26

minimum declared wall thickness

value for the minimum thickness of the liner wall as stated by the manufacturer for the type test

3.27

multi-wall chimney

chimney consisting of a flue liner and at least one additional wall

[EN 1443:2003]

3.28

multi-wall metal chimney

chimney of two walls or more, all made of metal

3.29

negative pressure chimney

chimney designed to operate with the pressure inside the flue less than the pressure outside the flue

[EN 1443:2003]

3.30

nominal size

whole number representing the value of the internal diameter of the flue liner, expressed in millimetres

3.31

non enclosed chimney

chimney which is installed without any enclosure or cladding

3.32

outer wall

external wall of a chimney, the surface of which comes in contact with ambient or the external environment, or is within cladding or enclosure (see Figure 1)

[EN 1443:2003]

3.33

positive pressure chimney

chimney designed to operate with the pressure inside the flue greater than the pressure outside the flue

[EN 1443:2003]

3.34

relining

process of restoring or replacing the flue liner of a chimney

[EN 1443:2003]

3.35

resistance to fire

ability of a chimney to prevent ignition of adjacent combustible material, and to prevent the spread of fire to adjacent areas

3.36

single-wall chimney

chimney where the flue liner is the chimney

[EN 1443:2003]

3.37

sootfire

combustion of the flammable residue deposited on the flue liner

[EN 1443:2003]

3.38

structurally independent chimney

chimney which is not attached to buildings, masts or other support structure

3.39

support

chimney accessory used to fix, or transfer the load of, chimney components to structural elements (building, mast, etc.) (see Figure 1)

3.40

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

[EN 1443:2003]

3.41

terminal

fitting installed at the outlet of a chimney (see Figure 1)

[EN 1443:2003]

3.42

test assembly

complete assembly of all parts necessary to enable the specific performance criteria to be assessed, comprising test chimney, test structures, and measuring equipment (as specified in the test method)

3.43

test chimney

assembly of the chimney components (as specified in the test method), necessary to the assessment of a specific performance criteria of a metal system chimney product

3.44

test structure

assembly of the additional materials (non-chimney components) to enable the test chimney to be assessed for the specific performance criteria

3.45

thermal resistance of a chimney

resistance to heat transfer through the wall or walls of the chimney

[EN 1443:2003]

3.46

wet operating condition

condition when the chimney is designed to operate normally with the temperature of the inner surface of the flue liner at or below the water dew point

[EN 1443:2003]

4 Manufacturer's declaration for type test

The manufacturer shall provide the relevant information from 7.2 and, in addition, shall declare:

- a) the type of metals from which the chimney fittings or sections are made, according to EN 10088-1 and EN 573-3, and the nominal and minimum wall thickness;
- b) the internal diameter of the chimney fittings or sections and the nominal product size;
- c) the minimum wall thickness after manufacture, the installed length, liner external circumference, total mass and design loads of the fitting or section and, if appropriate, the insulation density or mass.

5 Dimensions and tolerances

5.1 The thickness of the material from which the components are made shall be not less than the minimum wall thickness according to 4 a).

5.2 The declared internal diameter of the fitting or section shall be not less than ± 5 mm from the nominal size. The measured internal diameter of the fitting or section shall not be less than the diameter declared by the manufacturer [see 4 b)].

5.3 The external circumference of the liner of the fitting or section shall be within $^{+5}_0$ mm up to 600 mm internal diameter and within $^{+13}_0$ mm over 600 mm internal diameter, of that declared by the manufacturer [see 4 c)].

5.4 The installed length of a fitting or section (measured on an assembly including at least one joint) shall be within ± 5 mm of that declared by the manufacturer [see 4 c)].

5.5 The density of insulation in a fitting or a section shall be within $^{+30}_0$ % of that declared by the manufacturer [see 4 c)].

6 Performance requirements

6.1 General

Unless otherwise stated, performance requirements for fittings shall be the same as those for chimney sections.

6.2 Mechanical resistance and stability

NOTE A NPD value (no performance determined) implies a zero mechanical resistance or stability value.

6.2.1 Compressive strength

6.2.1.1 Chimney sections and fittings

The manufacturer shall declare the relevant design loads.

When tested according to the test method described in EN 1859 a multi-wall chimney section or fitting shall withstand a load of at least three times the manufacturer's declared design load.

When tested according to the test method described in EN 1859, single- and multi-wall chimney sections or fittings where the flue liner is load bearing, shall withstand a load of at least four times the manufacturer's declared design load.

6.2.1.2 Chimney support

The manufacturer shall declare the relevant design loads.

When tested according to the test method described in EN 1859, the maximum displacement of the test chimney at the support shall not be greater than 5 mm, in the direction of the load when the manufacturer's declared design load is applied.

The support shall withstand an intensity of loading of at least three times the manufacturer's declared design load.

6.2.2 Tensile strength

The manufacturer shall declare the relevant design loads.

When a chimney section is tested according to the test method of EN 1859, the chimney section shall withstand a load of at least $1,5 \times$ the manufacturer's declared design load.

6.2.3 Lateral strength

6.2.3.1 Non-vertical installation

When a chimney section, declared by the manufacturer as suitable for non-vertical installation, is tested according to the test method described in EN 1859, the deflection of any part of the test chimney shall not be more than 2 mm/m in distance between supports.

6.2.3.2 Components subject to wind load

When chimney components declared by the manufacturer as suitable for external installation are tested according to the test method of EN 1859, the test chimney shall withstand a minimum load of $1,5 \text{ kN/m}^2$ of projected outer surface area.

6.3 Resistance to fire (internal to external)

The manufacturer shall declare the minimum distance to combustible material and the requirements of 6.6.1 shall be met at the distance declared by the manufacturer.

6.4 Sootfire resistance

When a chimney made of sections and/or fittings designated as sootfire resistant is tested according to the thermal shock test method described in EN 1859, the maximum surface temperature of combustible materials adjacent to the test chimney, at the distance declared, shall not exceed 100°C when related to an ambient temperature of 20°C and shall meet the gas tightness given in 6.5.

The distance declared shall not exceed the criteria for normal operating conditions.

The chimney to be tested shall be the largest diameter in the manufacturer's range, up to and including 200 mm. The distance to combustible material for chimneys larger than that tested shall be increased by a factor. For diameters from 201 to 300 the factor shall be 1 time the distance to combustible material determined for the 200 mm product, for diameters from 301 to 450 the factor shall be 1.5, and those diameters from 451 to 600 shall apply a factor of 2, and above 600 the factor shall be 4.

6.5 Hygiene, health and environment, gas tightness

When a chimney is tested according to the test methods described in EN 1859, the leakage rate shall not be greater than that given in Table 1, both before and after the thermal performance test at normal operating condition and, where appropriate, the resistance to sootfire test (see possible test sequence of EN 1859).

For positive pressure systems a gas tightness test shall also be performed on other diameters than that for thermal testing. It shall be undertaken on the smallest, largest and one diameter in between, using two chimney sections with a joint, not subjected to thermal testing.

Table 1 — Leakage rate

Pressure type	Test pressure Pa	Leakage rate/Flue surface area $\text{l} \cdot \text{s}^{-1} \cdot \text{m}^{-2}$
N1	40	< 2,0
P1	200	< 0,006
P2	200	< 0,120
H1	200 and 5 000	< 0,006
H2	200 and 5 000	< 0,120

6.6 Safety in use

6.6.1 Thermal performance at normal operating conditions

When a chimney made of sections and/or fittings is tested according to the heat stress test method described in EN 1859, the maximum surface temperature of combustible materials adjacent to the test chimney, at the distance declared by the manufacturer, for the designated temperature class, shall not be greater than 85°C, when related to an ambient temperature of 20°C and shall meet the gas tightness given in 6.5.

The chimney to be tested shall be the largest in the manufacturer's range, up to and including 200 mm. The distance to combustible material for chimneys larger than that tested shall be increased by a factor. For diameters from 201 to 300 the factor shall be 1 time the distance to combustible material determined for the 200 mm value; for diameters from 301 to 450 factor shall be 1.5, and those diameters from 451 to 600 shall apply a factor of 2, and above 600 the factor shall be 4.

Where a chimney is designated sootfire resistant the requirement for the thermal performance at normal operating conditions shall be verified both before and after the thermal shock test to check the durability of any thermal insulation in soot fire condition.

In addition, for positive pressure chimneys, and negative pressure chimneys which incorporate a seal or sealant as part of the joint, the elongation of the test chimney measured after subjecting the test chimney to the cycling criteria of EN 1859, shall not exceed 0.005 m, and meet the gas tightness given in 6.5.

6.6.2 Accidental human contact

Where the surface temperature of a chimney, when measured during the thermal tests of 6.4 and 6.6.1, exceeds the values in Table 2 and where accidental human contact is possible, then the manufacturer shall specify that the chimney shall be protected from touching.

Table 2 — Maximum outer wall surface temperatures

Material of outer wall surface	Maximum allowed temperature °C
Metal-bare	70
Metal-painted 50 µm	80
Metal-enamelled 160 µm	78
Metal-plastic covered 400 µm	98
Plastic	93
NOTE The values in Table 2 are based on the criteria in EN ISO 13732-1 relating to a 1 s burn threshold.	

6.6.3 Thermal resistance

The thermal resistance value of the chimney section declared by the manufacturer shall be verified either by testing, according to the test method of EN 1859 (being the reference value), or by calculation using the simplified calculation of EN 1859.

When the value for the thermal resistance is calculated, the thermal conductivity value shall be based on the mean temperature of the insulation depending on the nominal temperature of Table 3 up to 200 °C.

Table 3 — Temperature classes and test temperatures

Temperature class	Nominal working temperature (T) °C	Flue gas test temperature °C
T 080	≤ 80	100
T 100	≤ 100	120
T 120	≤ 120	150
T 140	≤ 140	170
T 160	≤ 160	190
T 200	≤ 200	250
T 250	≤ 250	300
T 300	≤ 300	350
T 400	≤ 400	500
T 450	≤ 450	550
T 600	≤ 600	700

6.6.4 Water vapour diffusion resistance

When a section or fitting designated for wet operating conditions is tested according to the test method described in EN 1859, the outer surface of the section or fitting shall remain dry and the increase in mass of the section or fitting shall not exceed 1,0 % of the insulating material.

Single wall chimney products designated as negative pressure and wet which have a liner with a leakage rate 7 times smaller than the pass mark for the N1 class, or those designated P or H may be judged to be wet designated without undertaking the water vapour diffusion test, provided that the product passes the condensate penetration resistance requirement of 6.6.5.

Multi-wall chimney products which have a liner gas tightness of P1, H1 or H2 may also be wet designated without undertaking the water vapour diffusion test, provided that the product passes the condensate penetration resistance requirement of 6.6.5.

6.6.5 Condensate penetration resistance

When a section or fitting designated for wet operating conditions and not previously subjected to the water vapour diffusion resistance test is tested according to the test method described in EN 1859, the outer surface of the section or fitting shall remain dry and the increase in mass of the section or fitting shall not exceed 1,0 % of the insulating material.

6.6.6 Rainwater penetration resistance

When multi-wall insulated sections or fittings which are subject to rain penetration either externally or internally are tested according to the test method described in EN 1859, the increase in mass of each section or fitting shall not exceed 1,0% of the insulating material.

6.6.7 Flow resistance

6.6.7.1 Chimney sections

The manufacturer shall declare the mean value of roughness for chimney sections, which shall be determined according to the method given in EN 1859 or obtained from data given in EN 13384-1.

6.6.7.2 Chimney fitting

The manufacturer shall declare the coefficient of flow resistance due to a directional and/or cross-sectional and/or mass flow change in the flue for chimney fittings which shall be determined according to the method given in EN 1859 or obtained from data given in EN 13384-1.

6.6.7.3 Terminals

The manufacturer shall declare the coefficient of flow resistance of the terminal which shall be verified according to the test method described in EN 1859 or obtained from data given in EN 13384-1.

6.6.8 Other requirements for terminals

6.6.8.1 Rain protection terminals

Where a rain protection terminal is tested for rain water penetration according to the test method described in EN 1859, the mass of the water collected in the flue liner shall not exceed $5 \times 10^{-2} \text{ mm}^3/\text{s}$ per millimetre of flue liner diameter.

6.6.8.2 Aerodynamic behaviour

When a terminal is tested according to the test method described in EN 1859 the static pressure in the terminal P_{static} shall meet the following formula:

$$P_{static} \leq \Delta P_R - 0,2 \cdot W_L^2 \quad (1)$$

where

ΔP_R is the pressure difference, in Pa, as declared by the manufacturer, between the flue liner and the test room at the internal flow velocity of 1 m/s;

W_L is the wind speed, in m/s.

For negative pressure chimneys the value ΔP_R shall be 2 Pa maximum.

For positive pressure chimneys the value ΔP_R is the actual value that is measured under the conditions given in subclause 6.6.7.3, by the flow velocity of 2 m/s.

6.7 Durability

6.7.1 Durability of the flue liner against corrosion

Durability against corrosion shall be declared either on the basis of:

- a) material type (according to Table 4) and thickness of the flue liner; or
- b) on the basis of the results of at least one of the three test methods described in Annex A.

Products which have a declaration on the basis of material type and thickness shall be designated Vm.

Products passing the test described in clause A.1 shall be designated V1.

Products passing the test described in clause A.2 shall be designated V2.

Products passing the test described in clause A.3 shall be designated V3.

The product designation shall, in any case, include the flue liner material specification, according to 6.7.2.

NOTE The link between Vm, V1, V2 and V3 and the allowed use is dependent on individual member states regulations where they exist.

6.7.2 Flue liner material specification

The complete material specification of the flue liner shall be formed by the letter L followed by five digits. The first two digits shall represent the material type as in Table 4 and the last three digits shall represent the material thickness in multiples of the unit 0,01 mm.

EXAMPLE

L40045 represents a liner made of 1.4401 stainless steel with a thickness of 0,45 mm.

Table 4 — Flue liner material specification (according to EN 10088-1 and EN 573-3)

Material type	Material N°	Symbol
10	EN AW – 4047A	EN AW Al Si 12(A) and Cu <0,1%, Zn<0,15% (cast aluminium)
11	EN AW – 1200A	EN AW-Al 99,0 (A)
13	EN AW-6060	EN AW-Al MgSi
20	1.4301	X5CrNi 18-10
30	1.4307	X2CrNi 18-9
40	1.4401	X5CrNiMo 17-12-2
50	1.4404 ^a	X2CrNiMo 17-12-2
60	1.4432	X2CrNiMo 17-12-3
70	1.4539	X1NiCrMoCu 25-20-5
99 ^b	To be declared	To be declared

^a Equivalent for material N° 1.4404 = 1.4571(symbol X6CrNiMoTi 17-12-2).

^b A material type not currently specified in the Table (and assigned a material number) may be assigned the material type 99 for the purpose of designating the product in accordance with Clause 9. It may be considered as a suitable liner material provided that it has passed the appropriate corrosion test according to its intended designation V1, V2, or V3. The manufacturer shall declare the material specification (see 7.2)

6.7.3 Freeze-thaw resistance

Metal chimney products are considered to satisfy the requirement on freeze-thaw resistance.

6.7.4 Flue liner seals.

Flue liner seals shall be in accordance with EN 14241-1

7 Product information

7.1 Manufacturer's instructions

The manufacturer's instructions shall be available in the language of each country in which the product is sold.

7.2 Minimum information to be included in the manufacturer's documentation and instructions

The manufacturer shall include in his documentation and instructions the following minimum information:

- a) manufacturer identification;
- b) product designation in accordance with Clause 9 and its explanation;
- c) material specification;
- d) wind load resistance
 - 1) limitations of height location of exposed section of the chimney,
 - 2) maximum distances between lateral supports or guides;
- e) compressive strength
 - 1) maximum load,
 - 2) mass and dimensions of chimney components;
- f) minimum distance to combustible materials;
- g) flow resistance factors of fittings and chimney sections;
- h) thermal resistance in $\text{m}^2 \text{K/W}$;
- i) flexural strength
 - 1) maximum offset,
 - 2) maximum suspended load from the sections and fittings;
- j) dangerous substances;
- k) installation drawing typical of the application;
- l) method of jointing the components;
- m) method of installing sections or fittings, supports and accessories including weatherproofing;
- n) instruction on how to complete the data of the chimney plate according to EN 15287.

And where appropriate:

- o) direction of flow;
- p) storage instructions;