



SLOVENSKI STANDARD

SIST EN 12446:2003

01-september-2003

Dimniki – Sestavni deli – Betonski elementi (nosilnega) plašča dimnika

Chimneys - Components - Concrete outer wall elements

Abgasanlagen - Bauteile - Außenschalen aus Beton

Conduits de fumée - Composants - Enveloppes externes en béton

Ta slovenski standard je istoveten z: **EN 12446:2003**

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ICS:

91.060.40	Dimniki, jaški, kanali	Chimneys, shafts, ducts
91.100.30	Beton in betonski izdelki	Concrete and concrete products

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EUROPEAN STANDARD

EN 12446

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2003

ICS 91.060.40

English version

Chimneys - Components - Concrete outer wall elementsConduits de fumée - Composants - Enveloppes externes
en béton

Abgasanlagen - Bauteile - Außenschalen aus Beton

This European Standard was approved by CEN on 2 January 2003.

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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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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EN 12446:2003 (E)**Foreword**

This document (EN 12446:2003) 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of an identical text or by endorsement, at the latest by October 2003, and conflicting national standards shall be withdrawn at the latest by January 2005.

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 EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

This standard is one of a series of co-ordinated standards dealing with specification, design, testing and installation of chimneys, both single and multi wall.

The co-ordinated package of standards is further divided by material of construction and this European Standard is one of a series of specifications and execution documents dealing with design and installation of concrete chimney products and systems.

The standards in this series for concrete chimney products and systems are:

EN 1857: Chimneys - Components - Concrete flue liners

EN 1858: Chimneys - Components - Concrete flue blocks
<https://standards.iteh.ai/catalog/standards/sist/e71fb710-4acf-4c18-8da7-e99fc13994a/sist-en-12446-2003>

EN 12446: Chimneys - Components - Concrete outer wall elements

No existing European Standard is superseded by the publication of this standard.

Annexes A and B are normative.

This document contains 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, Slovak Republic, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the material, dimensional and performance requirements for factory made concrete outer wall elements for chimneys including fittings.

The standard covers elements having up to four passages designated to accommodate a combination of flue liners and or air ducts.

This European Standard also relates to storey-height and reinforced outer wall elements.

NOTE 1 Classes in this standard are not derived from conditions referred to in article 3.2 of Directive 89/106/EC and should only be considered as technical classes in the sense of Commission Guidance Paper E "Levels and classes in the Construction Products Directive".

NOTE 2 Any reference to the term 'outer wall element' implies both the outer wall elements and their fittings, except where otherwise indicated.

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 206-1:2000, *Concrete – Part 1: Specification, performance, production and conformity*.

prEN 14297, *Chimneys - Freeze-thaw resistance test method* 6:2003

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EN 1443:1999, *Chimneys — General requirements* 94a/sist-en-12446-2003

EN 1857:2003, *Chimneys — Components — Concrete flue liners*.

EN 1858:2003, *Chimneys — Components — Concrete flue blocks*.

EN 10088-2, *Stainless steel — Part 2: Technical delivery conditions for sheet/plate and strip for general purposes*.

EN 10218-2, *Steel wire and wire products — General — Part 2: Wire dimensions and tolerances*.

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 European Standard the terms and definitions given in EN 1443:1999 apply, as well as the following:

3.1 chimney fitting

chimney component, except a chimney section, conveying products of combustion

3.2 concrete

material formed by mixing cement, aggregate and water and with or without the incorporation of admixtures, additions, glass fibres or steel fibres which develops its properties by hydration of the cement

[EN 206-1:2000]

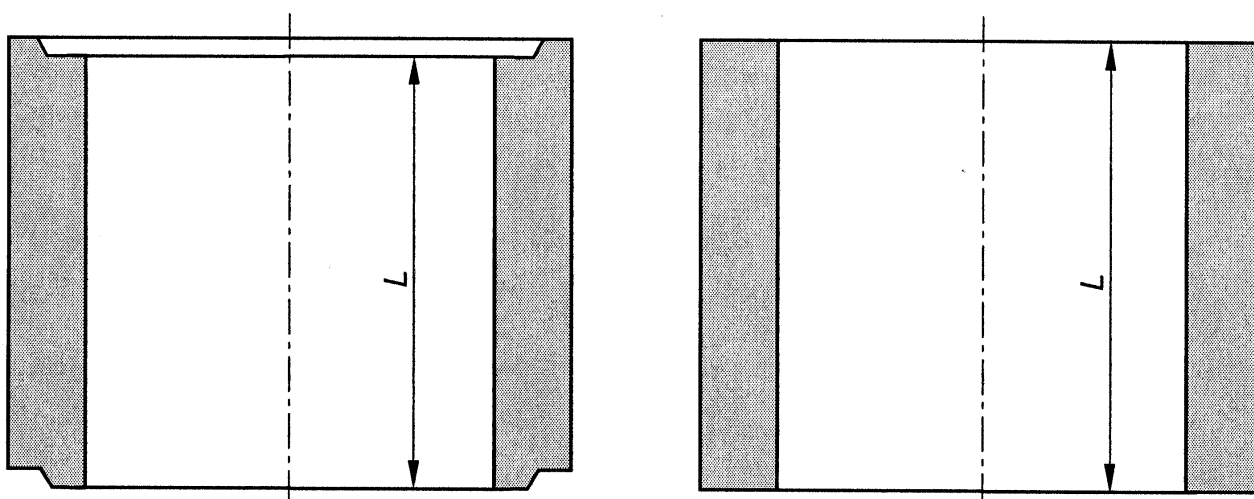
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- 3.3**
outer wall element
chimney component that surrounds a flue liner to form the outer wall of a chimney
- 3.4**
hollow wall outer wall element
outer wall element having vertical cavities; cavities can pass through both ends
- 3.5**
manufacturer's declared internal transverse dimensions
internal dimensions of the outer wall element measured perpendicular to the longitudinal axis
- 3.6**
manufacturer's declared length
internal length of the outer wall element. Examples of measurement are shown in Figure 1
- 3.7**
manufacturer's declared structural height
maximum safe constructional height of the outer wall elements as declared by the manufacturer
- 3.8**
manufacturer's declared overall wall thickness
dimensions at its thinnest point, between the inside face and the outside face of the outer wall element, not measured at any joint feature, e.g. spigot/socket end
- 3.9**
reinforced outer wall element
outer wall element having steel reinforcement to assist handling
- 3.10**
solid wall outer wall element
outer wall element without cavities in the thickness of its walls
- 3.11**
straight outer wall element
outer wall element having the ends perpendicular to the axis of the flue
- 3.12**
storey-height outer wall element
factory made outer wall element having an overall length relating to the floor to floor height of a building
- 3.13**
pre-cast concrete
concrete that is cast and cured in a place other than its final location of use
- 3.14**
resistance to fire of outer wall elements
ability of the outer wall elements and fittings to be resistant to soot fire

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Key

L Internal length

Figure 1 — Internal length
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4 Materials and designation of outer wall elements

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4.1 Materials

Outer wall elements shall be pre-cast concrete. Materials shall be identified for factory production control purposes.

NOTE 1 Additions can include glass or steel fibres.

NOTE 2 Attention is drawn to Commission decision 96/603/EC, as amended, in which non-combustible masonry units containing not more than 1 % by mass or volume (whichever is the more onerous) of homogeneously distributed organic materials are classified as reaction to fire class A1 without testing.

4.2 Designations and classes

Outer wall elements shall be designated according to their intended nominal working temperature and their resistance to sootfire, as in clause 9.

Designation classes for outer wall elements for temperature and resistance to fire shall be according to clause 9.

5 Reinforcement

5.1 Where an outer wall element is reinforced the reinforcement shall have a maximum diameter of 8 mm and a minimum concrete cover of 20 mm on all sides.

5.2 In outer wall elements having a bulk density of less than 2 000 kg/m³, when measured according to A.10 of EN 1857:2003, any reinforcement shall be protected against corrosion by one of the following means :

a) use of stainless steel according to EN 10088-2;

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b) by completely covering any mild steel reinforcement according to EN 10218-2 with a coating (e.g. Portland cement CEM 1 or CEM 2 mixed with water to form a slurry, or epoxy resin).

6 Surface treatment

6.1 Any surface treatment of the outer wall element, e.g. coatings, shall be factory applied prior to testing.

6.2 Any external surface treatment of the outer wall element, e.g. render, shall be applied as described by the product manufacturer, prior to testing.

7 Form, dimensions and tolerances**7.1 Form**

Outer wall elements covered by this standard shall be manufactured in one of the following forms:

- a) with a single passage to accommodate a flue liner;
- b) up to four passages to accommodate a combination of up to four flue liners and/or ducts for ventilation air.

7.2 Dimensions

Outer wall elements shall have a wall thickness not less than 20 mm.

7.3 Tolerances

Tolerances on manufacturer's declared dimensions, including taper, shall be:

a) Declared internal transverse dimensions

below 300 mm	: ± 3 mm
300 mm and above	: ± 1,5 %

b) Declared length

below 300 mm	: ± 5 mm
300 mm to 700 mm	: ± 7 mm
above 700 mm	: ± 10 mm

c) Declared overall wall thickness

below 10 mm	: + 2 mm
	: - 1 mm
10 mm to 40 mm	: + 5 mm – 1,5 mm
above 40 mm	: + 12 % - 5 %
	:

7.4 Squareness of ends

When testing in accordance with either procedure described in A.3 of EN 1857:2003 the permissible deviation from squareness of ends of concrete outer wall elements shall not be greater than 10 mm at 'G' for the first procedure. With the second procedure the deviation shall not be more than 5 mm at 'G' for elements up to 400 mm at 8 mm at 'G' for elements greater than 400 mm in length (height).

8 Performance

8.1 Heat stress resistance

8.1.1 When outer wall elements, including those designated soot fire resistant, are tested as described in A.1 at the test temperature appropriate to the designation given in Table 2, it shall subsequently meet either of the following requirements:

- the change in gas tightness measured before and after the test in accordance with A.5 of EN 1858:2003 shall be no greater than 25 %;
- the change in ultimate compressive strength measured before and after the heat stress test in accordance with A.1 shall be no greater than 35 %;
- when an outer wall element is multi-flued with an equal wall thickness, the heat stress test shall be carried out on the flue with the highest temperature designation.

8.1.2 Bends or fittings, made of the same material mix and by the same method of manufacture as the tested straight outer wall element shall be deemed to comply with the requirement in 8.1.1.

8.1.3 Outer wall elements, made of a different material mix or using a different method of manufacture from those described in 8.1.2, shall be checked for heat stress resistance by testing a special straight test sample in accordance with 8.1.1. This straight test sample shall be made using the same material mix and manufacturing method as the outer wall elements.

8.1.4 If a bend or fitting is available in the range of products, the test assembly shall include a combination of the fitting equivalent to the size being tested. The outer wall element shall be installed according to the manufacturer's instructions.

8.1.5 The maximum temperature measured on the surface of adjacent combustible materials shall not exceed 85 °C when related to an ambient temperature of 20 °C. The manufacturer shall declare the distance to the combustible partition and whether the gap between the outer wall element and the adjacent combustible partition is opened or closed. The above mentioned distance shall be determined by testing to the heat stress of A.1 at a temperature given in Table 1 appropriate to the product designation.

This requirement is declared fulfilled when outer wall elements, where combustibles are at least 50 mm from the outer wall and the space ventilated are tested in a free standing assembly at the test temperatures given in Table A.1 and the temperature of the outer wall does not exceed 100 °C at an ambient temperature of 20 °C.

8.2 Heat shock resistance

8.2.1 Following the heat stress resistance test required in 8.1, when an outer wall element designated as soot fire resistant is tested as described in A.1.4.4 to a flue gas temperature of 1 000°C for a period of 30 min +/- 1 the element shall subsequently meet either of the following requirements:

- the change in gas tightness measured before and after the test in accordance with A.5 of EN 1858:2003 shall be no greater than 25 %;
- the change in ultimate compressive strength measured before and after the heat stress test in accordance with A.1 shall be no greater than 35 %.

When an outer wall element is multi-flued with an equal wall thickness, the heat shock test shall be carried out on the flue with the highest temperature designation.

NOTE The test of A.1.4.4 is the method used to assess the sootfire resistance.

8.2.2 Bends or fittings, made of the same material mix and by the same method of manufacture as the tested straight outer wall element shall be deemed to comply with the requirement in 8.2.1.

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8.2.3 Outer wall elements, made of a different material mix or using a different method of manufacture from those described in 8.2.2, shall be checked for heat shock resistance by testing a special straight test sample in accordance with 8.2.1. This straight test sample shall be made using the same material mix and manufacturing method as the outer wall elements.

8.2.4 The maximum temperature measured on the surface of adjacent combustible materials shall not exceed 100 °C when related to an ambient temperature of 20 °C when test assembly is tested at the test temperature of 1 000 °C over a period of 30 min. The manufacturer shall declare the distance to the combustible partition and whether the gap between the outer wall element and the adjacent combustible partition is opened or closed. This distance shall not exceed the distance obtained in 8.1.5.

This requirement is declared fulfilled when outer wall elements, where combustibles are at least 50 mm from the outer wall and the space ventilated are tested in a free standing assembly at the test temperature of 1 000 °C over a period of 30 min and the temperature of the outer wall does not exceed 140 °C at an ambient temperature of 20 °C.

Table 1 — Heat stress test temperature

Temperature group	Temperature of flue gas °C
T 600	700 ⁺⁵⁰ ₀
T 450	550 ⁺⁵⁰ ₀
T 400	500 ⁺⁵⁰ ₀
T 300	350 ⁺³⁵ ₀
T 250	300 ⁺³⁰ ₀
T 200	250 ⁺²⁵ ₀
T 160	190 ⁺¹⁹ ₀
T 140	170 ⁺¹⁷ ₀
T 120	150 ⁺¹⁵ ₀
T 100	120 ⁺¹² ₀
T 080	100 ⁺¹⁰ ₀

8.3 Thermal resistance

Thermal resistance shall be measured according to the method given in A.4 of EN 1858:2003 or calculated according to the method given in annex C of EN 1858:2003 and the value obtained declared.

8.4 Compressive strength

8.4.1 The manufacturer shall declare the structural height. When tested as described in A.8 of EN 1857:2003 straight outer wall elements shall withstand an intensity of loading equivalent to four times the manufacturer's declared structural height.

8.4.2 Outer wall element bends and fittings made of the same material mix and by the same method of manufacture as the tested straight elements shall be deemed to conform to 8.4.1.

8.4.3 Outer wall elements made from a different material mix, or using a different method of manufacture from those described in 8.4.2, shall be checked for compressive strength by testing a special straight test sample in accordance with 8.4.1. This special straight test sample shall be made using the same material mix and manufacturing method as the bend or fitting.