



SLOVENSKI STANDARD
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Chimneys - Requirements and test methods for clay/ceramic flue terminals

Abgasanlagen - Anforderungen und Prüfverfahren für Keramik-Aufsätze

Conduits de fumée - Terminaux en terre cuite/céramique - Prescriptions et méthodes d'essai

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English version

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This European Standard was approved by CEN on 31 August 2002.

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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.

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

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

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Foreword

This document EN 13502:2002 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of an identical text or by endorsement, at the latest by April 2003, and conflicting national standards shall be withdrawn at the latest by July 2004.

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 directives, see informative annex ZA which is an integral part of this document.

Annex A is normative.

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, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European Standard specifies requirements and test methods for clay/ceramic flue terminals with solid walls, which serve to convey the products of combustion from the flue to the atmosphere by negative pressure. It includes terminals used on domestic and industrial chimneys which are not structurally independent (free standing). This standard specifies the performance requirements for factory made terminals. Marking and inspection are also covered by this standard.

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*.

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 and the following apply.

3.1

nominal size (DN)

numerical designation of size of the base of flue terminals which is a convenient round number equal to or approximately equal to either:

- a) the internal diameter in millimetres of circular flue terminals;
- b) the internal width in millimetres of square or octagonal flue terminals when measured between opposite parallel sides;
- c) the internal width and breadth in millimetres of the cross section of rectangular flue terminals.

3.2

nominal height

numerical designation of the height in millimetres of a flue terminal which is a convenient round number approximately equal to the overall height of the flue terminal including any decoration

3.3

open-topped terminal

terminal designed for fitting directly to the outlet of an open flue system (see Figure 1) or covered terminal with outlets twice the cross-sectional area of the outlet flue. The hydraulic diameter remains constant throughout the height of the terminal

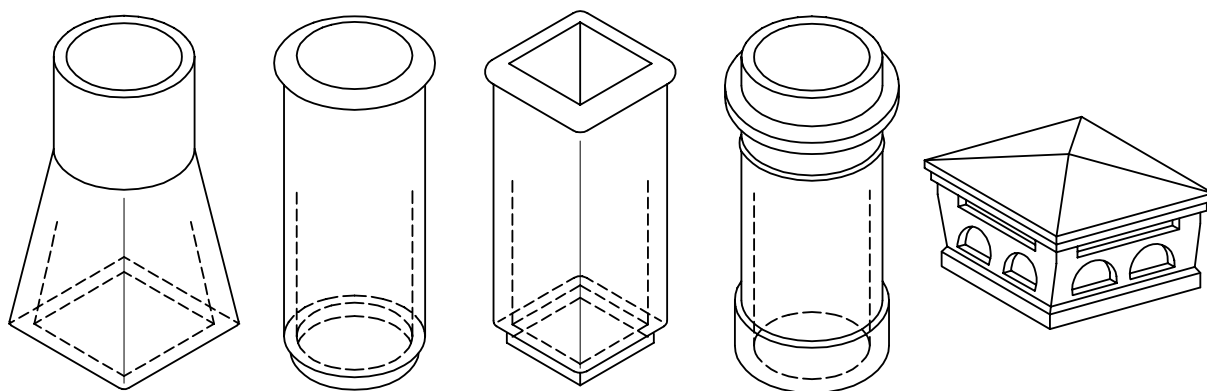


Figure 1 — Examples of open-topped flue terminals

3.4

ridge terminal

restricted terminal designed for fitting at the ridge of a building (see Figure 2).

NOTE Ridge terminals are used only with gas appliances.

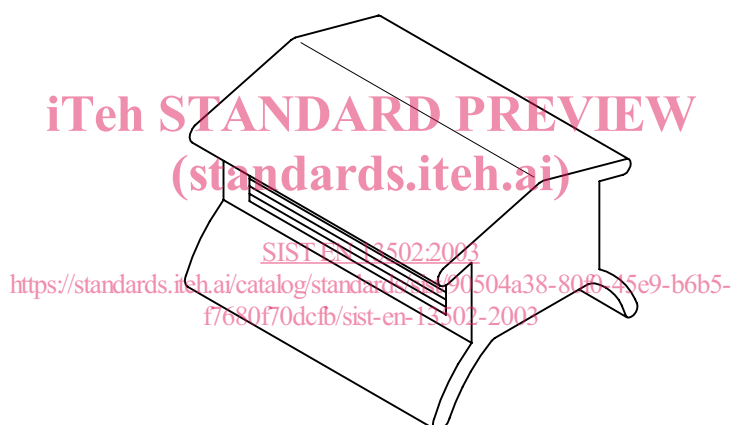


Figure 2 — Example of ridge terminal

3.5

restricted flue terminal

terminal designed with outlets having a total opening area less than twice the cross-sectional area of the outlet flue (see Figure 3)

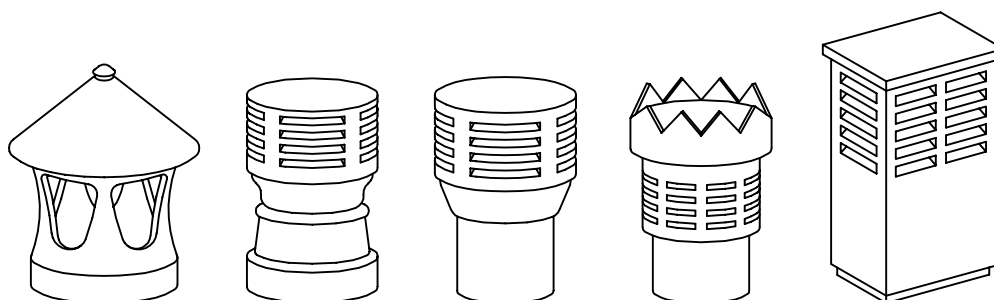


Figure 3 — Examples of restricted flue terminals

4 Product shape

Flue terminals shall be parallel sided or tapered with outlets not specified but adequate to disperse products of combustion and have a base end which shall be either:

- a) circular in cross-section with or without parallel ends; or
- b) square, rectangular or octagonal in cross-section with rounded internal and external corners and with or without parallel ends.

5 Materials

Flue terminals shall be manufactured from suitable clay/ceramic material which when fired meet the performance requirements given in this standard.

Flue terminals shall be unglazed or glazed on the interior and/or exterior. When glazed, they need not be glazed on the jointing surfaces.

6 Tolerances on dimensions

6.1 Size

When tested in accordance with 12.1, the internal diameter of circular flue terminals measured on any diameter shall not deviate by more than $\pm 5\%$ of the manufacturer's stated nominal internal diameter.

The internal length of a side of square, rectangular or octagonal section flue terminals shall not deviate by more than $\pm 5\%$ of the manufacturer's stated nominal internal length of the side.

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6.2 Height

When tested in accordance with 12.2, the height of flue terminals shall not deviate more than -2% $+5\%$ of the manufacturer's stated nominal height.

6.3 Squareness of base end of parallel sided flue terminals

When tested in accordance with 12.3, the permissible deviation from square of the base end of flue terminals shall be not greater than an angle of slope 30 mm/m.

7 Acid resistance

When tested in accordance with 12.4, the mass loss from any test piece shall not exceed 5,0 %.

8 Freeze/ thaw resistance

The manufacturer shall declare the freeze-thaw resistance of his product expressed in terms of lamination, cracking or flaking.

When tested in accordance with 12.5.2 (Spray test), a terminal shall pass the test if significant lamination, cracking or flaking has not occurred.

9 Flow resistance

The manufacturer shall declare the flow resistance of his product expressed as flow resistance factor.

When tested in accordance with 12.6, a flue terminal shall have a flow resistance factor not greater than the manufacturer's declared flow resistance factor value.

10 Aerodynamic behaviour

10.1 General

The smallest dimension of any opening in a restricted flue terminal shall be greater than 10 mm.

10.2 Ridge terminals

When tested in accordance with 12.8 ridge terminals shall have a resistance factor, K, not greater than 15.

10.3 Type 0 restricted flue terminals

Type 0 restricted flue terminals shall not be tested for aerodynamic behaviour.

10.4 Type 1 restricted flue terminals

When tested in accordance with 12.7 with a wind pressure angles between +90° and -45°, Type 1 restricted flue terminals shall have a static pressure not greater than: -

$$\Delta P_R = 0,2 \times V_w^2 \times \text{Pa}$$

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where

ΔP_R is the manufacturer's declared pressure difference in Pascals (Pa) between flue terminal and the test room at an internal flow velocity of 2 m/s

V_w is the wind speed in metres per second (m/s)

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

10.5 Type 2 restricted flue terminals

When tested in accordance with 12.8, Type 2 restricted flue terminals shall have a resistance factor, K, not greater than 5.

11 Evaluation of conformity

11.1 Initial type testing

Type tests for the required characteristics given in Table 1 shall be performed at the beginning of the production. One test shall be carried for each requirement.

11.2 Further type tests

Type tests shall be performed also when a change is made either in material composition, processing technique or to the design or method of manufacture of the flue terminal (see Table 1).

NOTE These tests can be performed more frequently by incorporation into a plan for monitoring the consistency of manufacture.

Table 1 — Factory production control and type tests

Item	Relevant test clauses	
	Factory production control 11.3	Type tests 11.1 and 11.2
Flue terminal	6.1, 6.2 and 6.3	7, 8, 9 and 10
NOTE The tests carried out during FPC are intended to verify that the performance requirements assessed through the initial type testing are maintained.		

11.3 Factory production control

To achieve compliance with this standard the manufacturer shall establish and maintain an effective documented quality system.

Factory production control tests are carried out following manufacture to monitor the quality of product (see Table 1).

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Sampling and testing of any batch shall be completed prior to removal from the factory and shall be in accordance with ISO 2859-1 at an AQL of 10 % and inspection level S2. Isolated batches of units shall be assessed in accordance with tightened inspection procedures, with a maximum batch size of 1 200 (see annex A).

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Batches rejected under the factory production control procedure may be resubmitted once, after removal of units with previously undetected visible defects, under the tightened inspection procedures, in respect only of the defect that caused initial rejection.

12 Test methods

12.1 Internal transverse dimensions

The maximum and minimum diameters or width/breadth as appropriate of clay/ceramic flue terminals shall be those calculated from the tolerances given in 6.1. If direct measurement is to be carried out, take two measurements at the observed maximum and minimum internal transverse dimensions.

For circular section flue terminals, the test also may be carried out using two gauges whose diameters are set at the minimum and maximum diameters. The minimum gauge shall be able to be turned through 360° within the ends of the flue. The maximum gauge shall not be able to enter the flue when tested through a rotation of 360°.

For square, rectangular and octagonal flue terminals, the internal cross-section dimensions shall be measured between the mid-points of opposite sides of the flue terminals.

12.2 Height

The maximum and minimum internal height of a clay/ceramic flue terminal shall be those calculated from the tolerances given in 6.2. If direct measurement is to be carried out, take two measurements at the observed maximum and minimum heights.

The test also may be carried out by using two gauges whose heights are set at the minimum and maximum internal heights. The minimum gauges shall be not able to fit over the internal height of the flue terminal. The maximum gauge shall be able to fit over the internal height of the flue terminal.

12.3 Squareness of base end of parallel sided flue terminals

The test gauge as shown in Figure 4 with one arm set at a slope of 30 mm/m to the other shall be provided with two pairs of supports at (50 ± 5) mm centres. The end support shall be positioned so that there is a recess of (30 ± 5) mm from the inside of the angled arm. The slope of the supports shall be such as to provide a clearance of at least 5 mm under the test gauge. The angled arm shall be of such a length as to span the outside diameter/width of the flue terminal.

Place the gauge on the base of the flue terminal, at the line of the longest external measurement of the flue terminal and where the terminal has parallel sides. Check the slope of the end against that of the gauge.

Dimensions in millimetres

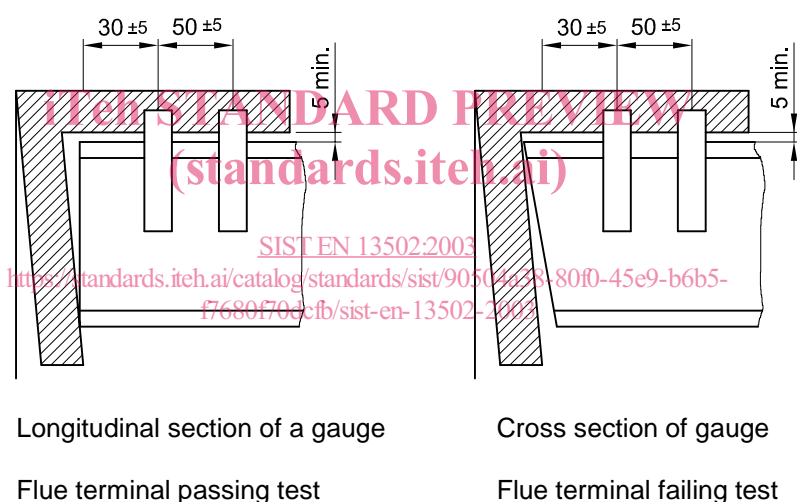


Figure 4 — Test gauge for squareness of ends test

12.4 Acid resistance

12.4.1 Test specimens

The test specimens shall be six freshly broken pieces of flue terminal or the inner wall of a flue terminal with vertical perforations about $[50 \times 10^3] \text{ mm}^3 \pm [10 \times 10^3] \text{ mm}^3$ in volume free from cracks or shattered edges.

The thickness (E) of the test specimen shall be measured first (correct to $\pm 1,0$ mm).

The plan area of test specimen shall equal approximately $\frac{50000}{E} \text{ mm}^2$