
Dimovodne naprave – Sistemski dimniki s keramičnimi tuljavami – 2. del: Zahteve in preskusne metode za obratovanje v vlažnih pogojih

Chimneys - System chimneys with clay/ceramic flue liners - Part 2: Requirements and test methods under wet conditions

Abgasanlagen - System-Abgasanlagen mit Keramik-Innenrohren - Teil 2: Anforderungen und Prüfungen für feuchte Betriebsweise

Conduits de cheminées - Conduits de cheminées résistant aux feux de cheminées a paroi intérieure en terre cuite/céramique - Partie 2: Exigences et méthodes d'essai en conditions humides

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**Chimneys - System chimneys with clay/ceramic flue liners - Part
2: Requirements and test methods under wet conditions**

Conduits de cheminées - Conduits de cheminées résistant
aux feux de cheminées à paroi intérieure en terre
cuite/céramique - Partie 2: Exigences et méthodes d'essai
en conditions humides

Abgasanlagen - System-Abgasanlagen mit Keramik-
Innenrohren - Teil 2: Anforderungen und Prüfungen für
feuchte Betriebsweise

This European Standard was approved by CEN on 1 April 2005 and includes Amendment 1 approved by CEN on 14 June 2007.

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 CEN 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 CEN 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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Foreword

This document (EN 13063-2:2005+A1:2007) has been prepared by Technical Committee CEN/TC 166 “Chimneys”, the secretariat of which is held by UNI.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2008 and conflicting national standards shall be withdrawn at the latest by April 2009.

This document includes Amendment 1 approved by CEN on 2007-06-14.

This document supersedes EN 13063-2:2005.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 and A1.

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 document is part 2 of a series of standards for system chimneys with clay/ceramic flue liners.

Part 1 is for chimneys with sootfire resistance and part 3 is for system air flue chimneys.

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 United Kingdom.

EN 13063-2:2005+A1:2007 (E)**1 Scope**

This European Standard specifies the requirements and test methods for multiwall system chimneys working under wet conditions (in the following expressed as “wet chimney”) with pressure type N1, N2 or P1 according to EN 1443 and a working temperature below or equal T600 according to ^{A1}EN 13063-1:2005+A1 ^{A1}, in which the products of combustion are conveyed to the atmosphere through clay/ceramic flue liners. Marking and inspection are also covered by this document.

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

The wet chimney may comprise the following appropriate components:

- clay/ceramic flue liners;
- insulation layer;
- outer walls;
- acid resistant mortar for jointing flue liners or elastomeric sealant;
- mortar for jointing outer walls;
- terminal;
- chimney base;
- condensate collector;
- condensate outlet;
- cladding;
- opening section;
- cleaning and inspection door;
- distance piece;
- reinforcement.

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The wet system chimney covers a combination of compatible chimney components, obtained or specified from one manufacturing source with product responsibility for the whole system chimney.

NOTE This document does not cover soot fire resistance 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 998-2:2003, ^[A1] *Specification for mortar for masonry – Part 2: Masonry mortar* ^[A1]

EN 1366-8, ^[A1] *Fire resistance tests for service installations – Part 8: Smoke extraction ducts* ^[A1]

EN 1443:2003, *Chimneys – General requirements*

EN 1457:1999, *Chimneys – Clay/ceramic flue liners – Requirements and test methods*

EN 12446:2003, *Chimneys – Components – Concrete outer wall elements*

^[A1] EN 13063-1:2005+A1:2007 ^[A1], *Chimneys – System chimneys with clay/ceramic flue liners – Part 1: Requirements and test methods for sootfire resistance*

^[A1] EN 13069:2005 ^[A1], *Chimneys – Clay/ceramic outer walls for system chimneys – Requirements and test methods*

EN 13162:2001, *Thermal insulation products for buildings – Factory made mineral wool (MW) products – Specification*

EN 13216-1:2004, *Chimneys - Test methods for system chimneys – Part 1: General test methods*

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

^[A1] EN 14241-1 ^[A1], *Chimneys – Elastomeric seals and elastomeric sealants – Material requirements and test methods - Part 1: Seals in flue liners*

EN 14297:2004, *Chimneys – Freeze-thaw resistance test method for chimney products*

^[A1] ISO 2859-1, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection* ^[A1]

3 Terms and definitions

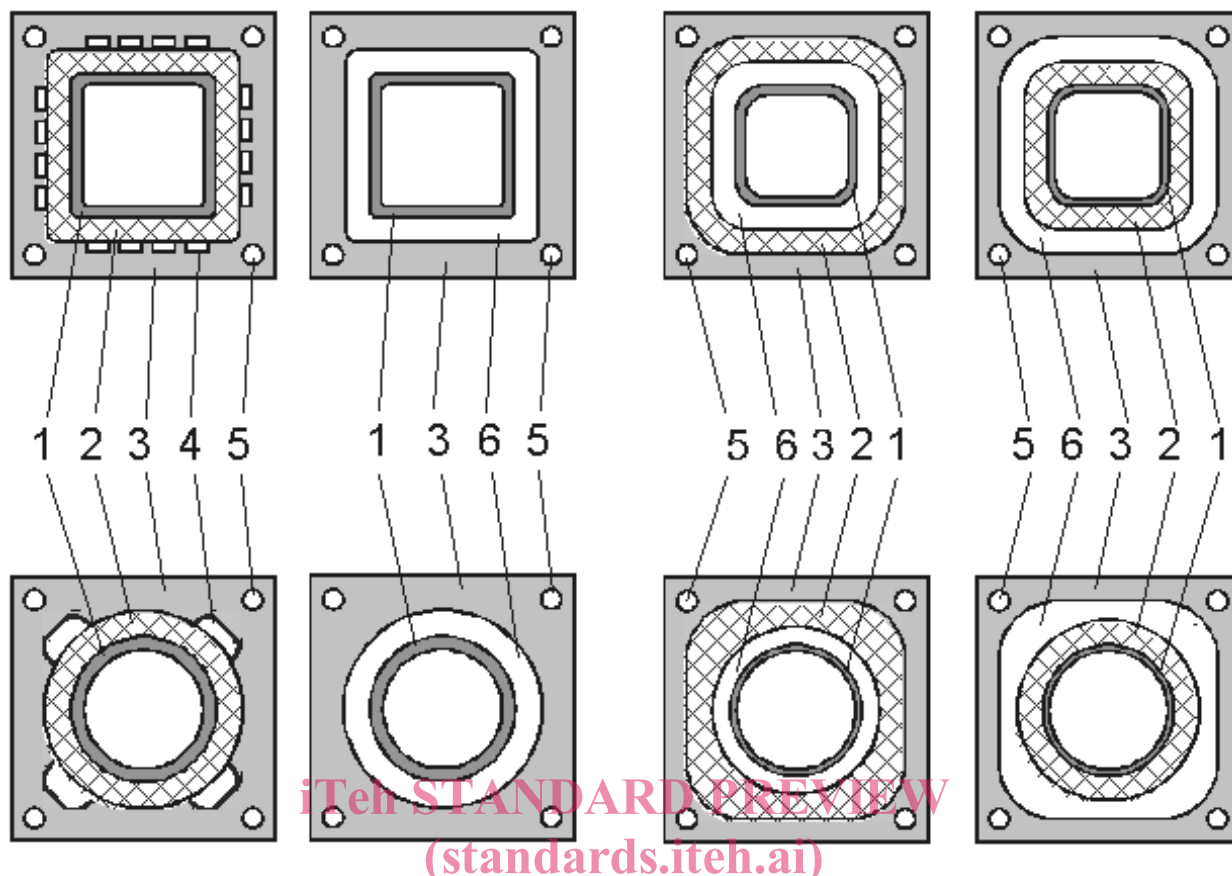
For the purposes of this European Standard, the terms and definitions given in EN 1443:2003, EN 13216-1:2004, ^[A1] EN 13063-1:2005+A1:2007 ^[A1] and the following apply.

3.1

system chimney under wet conditions

system chimney is a multiwall construction, consisting mainly of an outer wall, an insulation layer and the inner clay/ceramic flue liner that can work under wet conditions (see Figure 1)

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**Key**

- 1 flue liner
- 2 insulation layer
- 3 outer wall
- 4 back ventilation
- 5 cavities for structural reinforcement
- 6 non ventilated air gap

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Figure 1 — Examples of construction of a chimney for wet conditions**3.2****wet operating conditions**

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

3.3**condensate collector**

flue liner base unit for collecting the condensates with an opening for discharging the condensates

3.4**condensate outlet**

drain to ensure the discharge of the condensates from the condensates collector

3.5**jointing materials for flue liners****3.5.1****prefabricated elastomeric seals**

prefabricated element made of elastomeric material, which ensures a gastight seal in a joint

3.5.2**on site applied elastomeric sealant**

sealing material which is applied on site to ensure the gas tightness

3.5.3**acid resistant mortar**

jointing material made with acid resistant mortar

4 Shapes, dimensions and tolerances**4.1 Flue liners****4.1.1 General**

Flue liners shall meet the requirements on size and tolerance of dimensions given in EN 1457:1999, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6 and 7.7.

4.1.2 External diameter of flue liner

When tested in accordance with A.2.6, the external diameter of circular flue liners measured on any diameter shall not deviate more than ± 3 % of the manufacturer's stated nominal external diameter.

4.2 Insulation

The insulation layer shall meet the requirements on tolerances of dimension given in EN 13162:2001, 4.2.2 (length and width) and 4.2.3 (thickness class T3).

4.3 Outer wall elements

Outer wall elements shall fulfil the requirements on shapes and tolerances on dimensions given in:

- concrete outer wall elements: EN 12446:2003, Clause 7;
- clay/ceramic outer walls: \square_{A1} EN 13069:2005 \square_{A1} , Clause 6;
- metal outer walls: \square_{A1} EN 13063-1:2005+A1:2007 \square_{A1} , Annex B.

4.4 Cleaning and inspection doors

Dimensions and tolerances shall be declared by the manufacturers.

5 Material requirements**5.1 General requirements for components****5.1.1 Flue liners**

Flue liners shall meet the requirements of EN 1457:1999, 8.1, 9.1, 9.2, Clauses 10, 11, 12 and 13. If the requirement of EN 1457:1999, 13.1 "Water vapour permeability" is not fulfilled, the flue liner may be used for wet chimneys, if the system test for system chimneys under wet conditions according to \square_{A1} EN 13216-1:2004, 5.6, is passed according to the requirements in 5.3.2.1. \square_{A1}

EN 13063-2:2005+A1:2007 (E)**5.1.2 Maximum load for opening sections**

When tested as described in A.2.3, components shall withstand a load (F) of at least five times the manufacturer's declared design load ($H \times G$).

$$F = \frac{\chi \times H \times G}{100} \quad (1)$$

where

F is the minimum load, expressed in kilonewton (kN);

χ is the safety factor equal to 5;

H is the height of the chimney, is expressed in meter (m);

G is expressed in kilogram per meter (kg/m).

NOTE The limiting factor of the maximum height of system chimneys is the compressive strength of the opening section.

5.1.3 Jointing material for flue liners**5.1.3.1 Acid resistant mortar****5.1.3.1.1 Density**

The density of jointing material shall not vary more than ± 10 % of the manufacturer's declared value when tested in accordance with A.2.2.2.

5.1.3.1.2 Compressive strength

The compressive strength shall be tested after a 24 h preconditioning under water in accordance with A.2.2.3. The compressive strength shall be at least 10 N/mm².

5.1.3.1.3 Water resistance

Acid resistant mortar for jointing the components in system chimneys stated for use in wet conditions shall be tested in accordance with A.2.2.4 and the mass loss from any sample shall not exceed 3 %.

5.1.3.1.4 Acid resistance

When tested in accordance with A.2.2.5, the mass loss from any sample shall not exceed 2 %.

5.1.3.2 Prefabricated elastomeric seals

The elastomeric seals shall comply with  EN 14241-1 .

5.1.4 Insulation**5.1.4.1 General**

The insulation shall be to the manufacturer's specifications and shall be prefabricated and have an independent, permanent shape before and after being exposed to heat (e.g. blocks or bonded loose material).

5.1.4.2 Durability under normal operating conditions

When tested in accordance with A.2.1 at test temperature related to the temperature class (see Table 1), the change in the outside surface temperature of the test sample after the fourth cycle of heating shall not exceed 10 % of the maximum outside surface temperature of the sample of the first cycle.

Table 1 — Test temperatures

Temperature class	T 80	T 100	T 120	T 140	T 160	T 200	T 250	T 300	T 400	T 450	T 600
Test temperature (°C)	100	120	150	170	190	250	300	350	500	550	700

5.1.5 Outer wall elements

Outer wall elements shall fulfil EN 12446 for concrete outer wall elements, [A1] EN 13069 [A1] for clay/ceramic outer wall or Annex B of [A1] EN 13063-1:2005+A1:2007 [A1] for metal outer walls.

5.1.6 Jointing material for outer wall elements

Jointing materials used for jointing outer walls according to EN 12446 for concrete outer wall elements and [A1] EN 13069 [A1] for clay/ceramic outer walls, where supplied with the system chimney, shall comply with the system chimney manufacturer's declared specification and shall be at least M2,5 according to EN 998-2:2003, 5.3.1, Table 1.

5.1.7 Wind load

The freestanding part of the chimney above the last lateral support of the system chimney shall withstand a wind load of 1,5 kN/m². The maximum permissible height of a chimney outside the building of a system chimney shall be calculated according to calculation methods applicable in the place of use of the chimney, taking into account the tilt momentum of the outer wall element. Alternatively the tilt momentum of the complete construction can be taken into account. A test method to evaluate the tilt momentum is given in A.2.4.

5.2 Safety in use

5.2.1 Thermal shock resistance

The wet chimney shall be tested at the normal operating conditions in accordance with the heat stress test method described in [A1] EN 13216-1:2004, 5.7 [A1], for the required temperature types according to Table 1.

5.2.2 Distance to combustible materials

5.2.2.1 General

The distance to combustible materials shall be tested at the normal operating condition in accordance with [A1] EN 13216-1:2004, 5.7 [A1], the test assembly shall be the corner installation. The distance between the outer surface of the chimney and the adjacent combustible material shall be declared as O(xx), where (xx) is the minimum distance in mm.

5.2.2.2 Normal operating conditions

The wet chimney shall be tested in accordance with the heat stress test method described in [A1] EN 13216-1:2004, 5.7 [A1] for the required temperature types according to Table 1. The maximum surface temperature of combustible materials adjacent to the test wet chimney shall not be greater than 85 °C, when related to an ambient temperature of 20 °C.

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NOTE 1 This requirement is declared fulfilled when chimneys, where combustibles are at least 50 mm from the outer walls and the space ventilated, are tested in a free standing open room test assembly at the test-temperatures 500 °C (for T400) or 700 °C (for T600) and the temperature of the outer wall does not exceed 100 °C at an ambient temperature of 20 °C. For this case the distance is designated as O50.

NOTE 2 If the wet chimney has already been tested according to [A1] EN 13063-1:2005+A1:2007 [A1], 5.2.1.1, the results can be used.

5.2.3 Relative movement between flue liner and outer wall

After thermal testing (normal operating conditions) in accordance with [A1] EN 13216-1:2004, 5.7 [A1], the final position after cooling down to room temperature of the upper flue liner shall be ± 5 mm to the original position when tested according to [A1] EN 13216-1:2004, 5.3 [A1].

5.2.4 Thermal resistance

The thermal resistance value of the system chimney declared by the manufacturer shall be verified by testing according to the test method of EN 13216-1:2004, 5.8 (as the reference test method) or calculation in accordance with Annex B, both with inner surface temperature of the flue liner at 200 °C.

The designation of the thermal resistance shall be given as Ryy, where yy is the value in square metres Kelvin per Watt multiplied by 100, rounded to the nearest integer (e.g.: R22 is $R=0,22 \text{ m}^2\text{K/W}$).

5.2.5 Resistance to fire external to external

[A1] Until a European test method is available the resistance to fire, external to external, shall be evaluated and declared according to national regulations.

Examples of European classification are given in Table 2. [A1]

[A1] Table 2 — Examples of European fire resistance performance classes [A1]

Fire resistance performance classes	Duration in min
EI 000	$0 \leq \text{EI } 000 < 30$
EI 030	$30 \leq \text{EI } 030 < 60$
EI 060	$60 \leq \text{EI } 060 < 90$
EI 090	$90 \leq \text{EI } 090 < 120$
EI 120	$120 \leq \text{EI } 120$

5.3 Hygiene, health and environment**5.3.1 Gas tightness**

When a chimney is tested according to the test methods described in [A1] EN 13216-1:2004, 5.4 [A1], the leakage rate shall not be greater than that given in Table 3, both before and after the thermal performance test.

Table 3 — Leakage rate

Pressure type	Test pressure (Pa)	Leakage rate/ flue surface area (m ³ /s/ m ²)
N1	40	2×10^{-3}
N2	20	3×10^{-3}
P1	200	$0,006 \times 10^{-3}$

5.3.2 Durability

5.3.2.1 Condensate resistance

Wet chimneys shall have either clay/ceramic flue liners which are designated W according to [EN 1457:1999](#), Clause 13 and [EN 1457:1999/A1:2002](#), Clause 13 [A1](#), or clay/ceramic flue liners which are designated D according to [EN 1457:1999](#) and [EN 1457:1999/A1:2002](#) [A1](#) if the chimney, when tested according to [EN 13216-1:2004](#), 5.6 [A1](#), shows no water vapour saturation in any part of the system chimney.

Prefabricated elastomeric seals and on site applied elastomeric sealant shall comply with [EN 14241-1](#) [A1](#) condensate class W at the designated temperature class of the wet chimney

5.3.2.2 Corrosion resistance of flue liners and jointing material

The mass loss of clay/ceramic flue liners shall not exceed 2 % when tested according to [EN 1457:1999](#), 16.9. Prefabricated elastomeric seals and on site applied elastomeric sealant shall comply with [EN 14241-1](#) [A1](#) corrosion class 1 or 2 at the designated temperature class of the wet chimney.

5.3.3 Flow resistance of flue liners and fittings

[A1](#) The manufacturer shall declare either:

- 1) The flow resistance measured according to [EN 13216-1:2004](#), 5.11; or
- 2) The friction coefficient ζ and the mean roughness r calculated according to [EN 13216-1:2004](#), 5.11; or
- 3) The default roughness value for clay/ceramic inner liners of $r = 0,0015$ m and/or the default friction coefficient ζ for fittings taken from [EN 13384-1](#). [A1](#)

5.4 Cleaning and inspection doors

The increase of the surface temperature of the outer surface of the cleaning and inspection doors shall not exceed 140 K during thermal testing, the test shall be carried out in accordance with [EN 13216-1:2004](#), 5.7 [A1](#).

NOTE It is recommended that the distance to combustible materials should not be less than 400 mm from cleaning and inspection doors.

When tested in accordance with [EN 13216-1:2004](#), 5.4 [A1](#), the complete system with cleaning and inspection doors shall not have a leakage rate greater than the values given in Table 3.

The inspection opening shall not hinder the relative movement of the flue liner and no water shall occur at the outside of the cleaning and inspection doors.