
Toplotnoizolacijski materiali in proizvodi - Proizvodi iz ekspandiranega glinenega agregatnega proizvoda (LWA), oblikovani na mestu vgradnje - 1. del: Specifikacija za vezane in razsute proizvode pred vgradnjo

Thermal insulation products for buildings - In-situ formed expanded clay lightweight aggregate products - Part 1: Specification for the loose-fill products before installation

Wärmedämmstoffe für Gebäude - An der Verwendungsstelle hergestellte
Wärmedämmung aus Blähton-Leichtzuschlagsstoffen - Teil 1: Spezifikation für die
Schüttdämmstoffe vor dem Einbau

Produits isolants thermiques pour le bâtiment - Isolation thermique formée en place a
base de granulats légers d'argile expansée - Partie 1: Spécification des produits en vrac
avant la mise en place

Ta slovenski standard je istoveten z: EN 14063-1:2004

ICS:

91.100.60

SIST EN 14063-1:2005

en

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 14063-1:2005

<https://standards.iteh.ai/catalog/standards/sist/e02e76c5-a683-4542-8c06-8aa6a9739075/sist-en-14063-1-2005>

English version

Thermal insulation materials and products - In-situ formed
expanded clay lightweight aggregate products (LWA) - Part 1:
Specification for the loose-fill products before installation

Produits isolants thermiques pour le bâtiment - Isolation
thermique formée en place à base de granulats légers
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Wärmedämmstoffe für Gebäude - An der
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Blähton-Leichtzuschlagsstoffen (LWA) - Teil 1:
Spezifikation für die Schüttdämmstoffe vor dem Einbau

This European Standard was approved by CEN on 10 June 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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



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Foreword

This document (EN 14063-1:2004) has been prepared by Technical Committee CEN/TC 88 "Thermal insulating materials and products", the secretariat of which is held by DIN.

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 February 2005, and conflicting national standards shall be withdrawn at the latest by May 2006.

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 consists of two parts. The first part, which is the harmonised part satisfying the mandate, the CPD and is the basis for the CE marking, covers the products which are placed on the market. The second part, which is the non-harmonised part, covers the specification for the installed products.

This European Standard is one of a series for mineral wool, expanded clay, expanded perlite, exfoliated vermiculite, polyurethane/polyisocyanurate, cellulose and urea formaldehyde in-situ formed insulation products used in buildings, but this standard may be used in other areas where appropriate.

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

1 Scope

This document specifies the requirements for loose-fill expanded clay lightweight aggregate products for in-situ installation in roofs, ceilings, floors and ground floors.

This document is a specification for the insulation products before installation.

This document also describes the product characteristics and includes procedures for testing, marking and labelling.

This document does not specify the required level of a given property to be achieved by a product to demonstrate fitness for purpose in a particular application. The levels required for a given application are to be found in regulations or non-conflicting standards.

This document does not specify performance requirements for airborne sound insulation and for acoustic absorption applications.

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 932-1:1996, *Tests for general properties of aggregates — Part 1: Methods for sampling.*

EN 932-2, *Tests for general properties of aggregates — Part 2: Methods for reducing laboratory samples.*

EN 933-1, *Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution — Sieving method.*

EN 1097-3, *Tests for mechanical and physical properties of aggregates — Part 3: Determination of loose bulk density and voids.*

EN 1097-5, *Tests for mechanical and physical properties of aggregates — Part 5: Determination of the water content by drying in a ventilated oven.*

EN 1097-10, *Tests for mechanical and physical properties of aggregates — Part 10: Determination of water suction height.*

EN 12667:2001, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Products of high and medium thermal resistance.*

EN 13055-1:2002, *Lightweight aggregates — Part 1: Lightweight aggregates for concrete, mortar and grout.*

EN 13055-2, *Lightweight aggregates — Part 2: Lightweight aggregates for bituminous mixtures and surface treatments and for unbound and bound applications.*

EN 13172:2001, *Thermal insulation products — Evaluation of conformity.*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests.*

EN 13820, *Thermal insulating materials for building applications — Determination of organic content.*

EN ISO 10456, *Building materials and products — Procedures for determining declared and design thermal values* (ISO 10456:1999).

ISO 12491, *Statistical methods for quality control of building materials and components*.

3 Terms, definitions, symbols, units and abbreviated terms

3.1 Terms and definitions

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

3.1.1

expanded clay lightweight aggregate

insulation material or product composed of lightweight granular material having a cellular structure formed by expanding clay minerals by heat

[prEN ISO 9229:1997]

3.1.2

settlement

decrease of installed insulation thickness with time, expressed as a percentage of the initial installed thickness (after compaction if prescribed)

3.1.3

compaction

mechanical compression (e.g. by vibrator) of the installed insulation layer, expressed as a percentage of the initial untreated layer thickness

3.1.4

level

given value, which is the upper or lower limit of a requirement. The level is given by the declared value of the characteristic concerned

3.1.5

class

combination of two levels of the same property, between which the performance shall fall, where the levels are given by the declared value of the characteristic concerned

3.2 Symbols, units and abbreviated terms

Symbols and units used in this document:

H	is the water suction height	mm
k	is a factor related to the number of test results available	—
$\lambda_{10, \text{dry}}$	is the thermal conductivity at 10 °C mean temperature after drying at (110 ± 5) °C	W/(m·K)
$\lambda_{90/90}$	is the 90 % fractile with a confidence level of 90 % for the thermal conductivity	W/(m·K)
λ_D	is the declared thermal conductivity	W/(m·K)
λ_i	is one test result of thermal conductivity	W/(m·K)
λ_{mean}	is the mean thermal conductivity	W/(m·K)
n	is the number of test results	—
s_λ	is the estimate of the standard deviation of the thermal conductivity	W/(m·K)
LD	is the symbol of the declared level for loose bulk density	
PS	is the symbol of the declared level for aggregate size	
CR	is the symbol of the declared level for crushing resistance	
WH	is the symbol of the declared level for water suction height	

Abbreviated terms used in this document:

LWA is Lightweight Aggregate
ITT is Initial Type Test
FPC is Factory Production Control

4 Requirements

4.1 General

Product properties shall be assessed in accordance with Clause 5. To conform with this document, products shall meet the requirements of 4.2, and the requirements of 4.3 as appropriate.

This document gives requirements for two different groups of applications:

- roof, ceiling and floor insulation;
- insulation in ground floors.

NOTE 1 The difference between the two applications lies in the requirement for water suction height in ground floors, whereas there should be no requirement for water suction height when the products are used for roof, ceiling and floor insulation.

One test result on a product property is the average of the measured values on the number of test specimens given in Table 1.

4.2 For all applications

4.2.1 Thermal resistance and thermal conductivity

Thermal resistance and thermal conductivity shall be based upon measurements carried out in accordance with EN 12667.

The thermal values shall be determined in accordance with Annex A and declared by the manufacturer, according to the following:

- the reference mean temperature shall be 10 °C;
- the measured values shall be expressed with three significant figures;
- the declared thermal values, shall be given as limit values representing at least 90 % of the production determined with a confidence level of 90 %;
- the declared thermal resistance, R_D , shall be calculated from the insulation thickness and the declared thermal conductivity, λ_D (see NOTE 1);
- the value of thermal conductivity $\lambda_{90/90}$ shall be rounded upwards to the nearest 0,001 W/(m·K) and declared as λ_D in levels with steps of 0,001 W/(m·K);
- the value of thermal resistance, R_D , shall be rounded downwards to the nearest 0,05 m²·K/W and declared in levels with steps of 0,05 m²·K/W.

NOTE 1 The declaration of the installed thermal resistance for loose fill expanded clay LWA is described in prEN 14063-2.

NOTE 2 A correlation between thermal conductivity and loose bulk density / particle size distribution, specific to manufacturer and each product can be used for indirect testing (see A.4).

4.2.2 Loose bulk density

Loose bulk density shall be measured in accordance with EN 1097-3 and declared by the manufacturer in classes with steps of 5 kg/m^3 up to a density of 400 kg/m^3 and thereafter with steps of 10 kg/m^3 and shall be in the range of $\pm 15 \%$ of the manufacturers declared value. The value shall be expressed in kg/m^3 .

NOTE The dry loose bulk density for expanded clay LWA products will normally be in the range 150 kg/m^3 to 800 kg/m^3 .

4.2.3 Particle size distribution

4.2.3.1 General

Particle size distribution shall be measured in accordance with EN 933-1 and shall be declared in % by mass.

4.2.3.2 Aggregate size

The pair of sieve sizes between which the main proportion of the particles lies shall designate the size and any undersize or oversize shall comply with 4.2.3.3 and 4.2.3.4.

The sieve sizes in mm shall be selected from the specifications in EN 13055-2.

NOTE Normally the aggregate size for expanded clay LWA products will be in the range 0 mm to 32 mm.

4.2.3.3 Undersize

The content of undersize material shall not exceed 15 % by mass.

4.2.3.4 Oversize

The content of oversize material shall not exceed 10 % by mass.

4.2.4 Reaction to fire

Reaction to fire classification (Euroclasses) shall be determined in accordance with EN 13501-1.

NOTE Expanded clay LWA as described in 3.1.1.1 of this document is classified without testing as a class A1 product in accordance with Commission Decision 96/603/EC as amended by decision 2000/605/EC.

4.2.5 Durability characteristics

4.2.5.1 General

The appropriate durability characteristics have been considered and are covered in 4.2.5.2, 4.2.5.3 and 4.2.5.4.

4.2.5.2 Durability of reaction to fire against ageing/degradation

The reaction to fire performance of expanded clay does not change with time. The product is classified without testing as a class A1 product in accordance with EN 13501-1.

4.2.5.3 Durability of thermal resistance against ageing/degradation

The thermal conductivity (4.2.1) of the product does not change with time and neither does the insulation thickness since any settlement (4.3.3) is negligible.

4.2.5.4 Durability of compression strength against ageing/degradation

The compression strength of expanded clay does not change with time. The product is a clay mineral product burnt to clinkers in a stable structure.

4.3 For specific applications

4.3.1 General

If there is no requirement for a property, described in 4.3, for a product in use, then the property need not be determined and declared by the manufacturer.

4.3.2 Crushing resistance

Crushing resistance shall be measured in accordance with EN 13055-1:2002, Annex A, shall be expressed in N/mm^2 and if declaration is required, declared by the manufacturer in levels with steps of $0,05 \text{ N/mm}^2$ up to $1,0 \text{ N/mm}^2$ and thereafter with steps of $0,1 \text{ N/mm}^2$.

4.3.3 Settlement

Settlement for expanded clay LWA's is negligible and need no measurement.

4.3.4 Water vapour transmission

This property is not measured because the open structure of the final product itself offers no substantial resistance to the free movement of water vapour. See EN 12524.

4.3.5 Water suction height

Water suction height shall be measured in accordance with EN 1097-10, expressed in mm.

Declaration of water suction height is only required for application in contact with the ground.

4.3.6 Release of dangerous substances

NOTE See Annex ZA.

5 Test methods

5.1 Sampling

Sampling shall be carried out according to the procedures given in EN 932-1.

5.2 Conditioning

The test specimens shall be dried to constant mass at $(110 \pm 5) ^\circ\text{C}$ according to EN 1097-5.

NOTE Conditioning for measurements of thermal conductivity, see Annex B.

5.3 Testing

5.3.1 General

Table 1 gives the dimensions of the test specimens, the minimum number of measurements required to get one test result and any specific conditions, which are necessary.

5.3.2 Thermal conductivity

Thermal conductivity shall be determined in accordance with EN 12667 under the following conditions:

- at a mean temperature of $(10 \pm 0,3) ^\circ\text{C}$;
- the test specimen shall be prepared according to Annex B and to EN 12667.

The thermal conductivity shall be declared by the manufacturer in accordance with Annex A.

NOTE 1 Thermal conductivity may also be measured at mean temperatures other than $10 ^\circ\text{C}$, providing that the accuracy of the relationship between temperature and thermal conductivity is sufficiently well documented.

NOTE 2 The measured thermal conductivity, $\lambda_{10, \text{dry}}$, may be converted to a value at the moisture content at $23 ^\circ\text{C}$ and 50% relative humidity provided that the accuracy of the relationship is sufficiently documented. Annex C gives the formula for the conversion to other conditions than $\lambda_{10, \text{dry}}$.

Table 1 — Test methods, test specimens and conditions
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Dimensions in millimetres

Clause		Test method	Dimensions of test specimen	Minimum number of measurements to get one test result	Specific conditions
No.	Title				
4.2.1	Thermal conductivity	EN 12667 ^a	$\geq 600 \times 600 \times 100$	1	Measuring area $\geq 250 \times 250$ Thickness ≥ 100
4.2.2	Loose bulk density	EN 1097-3	see EN 1097-3	3	-
4.2.3	Particle size distribution	EN 933-1	see EN 933-1	3	-
4.2.4	Reaction to fire, organic content	EN 13820	see Annex ZA, Reaction to fire class A1 without testing		
4.3.2	Crushing resistance	EN 13055-1	see EN 13055-1	3	-
4.3.5	Water suction height	EN 1097-10	see EN 1097-10	1	-

^a See Annex B for conditioning.

6 Designation code

A designation code for the product shall be given by the manufacturer. The following shall be included except when there is no requirement for a property described in 4.3:

	Abbreviated term
– Expanded clay LWA	Exp. clay LWA
– This EN standard number	EN 14063-1
– Loose bulk density	LD
– Particle size	PS
– Crushing resistance	CR
– Water suction height	WH

The designation code according to this document for an expanded clay lightweight aggregate product is illustrated by the following example:

Exp. clay LWA EN 14063-1 – LD250 – PS(8-16)

7 Evaluation of conformity

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The manufacturer or his authorised representative shall be responsible for the conformity of his product with the requirements of this document. The evaluation of conformity shall be carried out in accordance with EN 13172 and shall be based on initial type testing (ITT), factory production control (FPC) by the manufacturer, including product assessment and tests on samples taken at the factory.

ITT shall be carried out in accordance with EN 13172 for all characteristics declared.

FPC testing shall be made for the characteristics listed in Annex C.

If a manufacturer decides to group his products it shall be done in accordance with EN 13172.

The minimum frequencies of tests in the factory production control shall be in accordance with Annex C of this document. When indirect testing is used, the correlation to direct testing shall be established in accordance with EN 13172.

The manufacturer or his authorised representative shall make available, in response to a request, a certificate or declaration of conformity as appropriate.

NOTE For the EC certificate and declaration of conformity, as appropriate, see ZA.2.2.

8 Marking and labelling

Products conforming with this document shall be clearly marked, either on the label on the packaging or on the delivery note, with the following information:

- product name or other identifying characteristic;
- name or identifying mark and address of the manufacturer or his authorised representative;