BS EN 14063-2:2013

BSI Standards Publication

Thermal insulation products for buildings — In-situ formed expanded clay lightweight aggregate products

Part 2: Specification for the installed products

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee PRI/72, Rigid cellular materials.

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

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English Version

Thermal insulation products for buildings - In-situ formed expanded clay lightweight aggregate products - Part 2: Specification for the installed products

Produits isolants thermiques pour le bâtiment - Produits à base de granulats légers d'argile expansée formés en place - Partie 2: Spécifications relatives aux produits installés

Wärmedämmstoffe für Gebäude - An der Verwendungsstelle hergestellte Wärmedämmung aus Blähton-Leichtzuschlagsstoffen (LWA) - Teil 2: Spezifikation für die eingebauten Produkte

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Foreword

This document (EN 14063-2:2013) 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of an identical text or by endorsement, at the latest by January 2014, and conflicting national standards shall be withdrawn at the latest by January 2014.

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 European standard consists of two parts. The first part is the harmonised part satisfying the mandate and the CPD. It is the basis for the CE marking covering the products, which are placed on the market. The second part, which is the non-harmonised part, covers the specification for the installed products. Both parts need to be used for the application of the insulation products in the end-use applications covered by EN 14063.

Part 1 of this European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports the essential requirements of EU Directives. For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of Part 1.

Attention is drawn to the need to take into account any complementary member state rules (e.g. installation rules) which together with this European Standard ensures the fitness for purpose of the installed product.

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

The reduction in energy used and emissions produced during the installed life of insulation products exceeds by far the energy used and emissions made during the production and disposal processes.

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

1 Scope

This European Standard specifies the requirements for loose-fill expanded clay lightweight aggregate (LWA) products installed in roofs, ceilings, floors and ground floors.

This Part 2 is a specification for the installed product.

Part 2 of this European Standard describes, when taken together with Part 1, the product characteristics that are linked to the essential requirements of the EU Construction Products Directive. Part 2 also specifies the checks and tests to be used for the declarations made by the installer of the product.

Part 2 of this European Standard 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 national regulations or non conflicting standards.

This European Standard does not cover factory made expanded clay lightweight aggregate products or in-situ products intended to be used for the insulation of building equipment and industrial installations.

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

2 Normative references

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

EN 823:2013, *Thermal insulating products for building applications — Determination of thickness*

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 14063-1, *Thermal insulation products for buildings — In-situ formed expanded clay lightweight aggregate products — Part 1: Specification for the loose-fill products before installation*

EN ISO 9229:2007, *Thermal insulation — Vocabulary (ISO 9229:2007)*

3 Terms, definitions, symbols, units and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 9229:2007 and the following 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

3.1.2
design insulation thickness
insulation thickness after compaction as specified by the designer

3.1.3
declared installed insulation thickness
insulation thickness as installed by the installer including compaction if prescribed

3.1.4
compaction
mechanical compression (e.g. by vibrator) of the installed insulation layer, expressed as a percentage of the initially untreated layer thickness

[SOURCE: EN 14063-1:2004]

3.1.5
settlement
decrease of installed insulation thickness with time, expressed as a percentage of the initial installed thickness (after compaction if prescribed)

3.2 Symbols and units

d_m	mean insulation thickness	m
$d_{m,a}$	mean installed insulation thickness after compaction	m
$d_{m,b}$	mean installed insulation thickness before compaction	m
R_D	installed declared thermal resistance	m²·K/W
λ_D	declared thermal conductivity	W/m·K
C_p	degree of compaction	%

3.3 Abbreviated terms

LWA	Lightweight Aggregate

4 Requirements

4.1 General

The installer shall use an insulation product that complies with EN 14063-1.

The installer shall inspect the building in accordance with manufacturer's guidelines in order to determine whether it is suitable for application of the product.

NOTE National regulations may also apply.

4.2 Guidelines for installation

National Practice, National Standards, National Regulations or Local rules may exist, for the installation of the product, In the absence of National Regulations, National Standards or any local rules, the manufacturer's technical information shall be followed together with the procedure given in Annex B.

4.3 Declared installed thermal resistance, R_D

The thermal resistance, $R_{D,}$ shall be assessed by measurement of the declared installed insulation thickness according to 5.1 combined with the declared thermal conductivity, λ_D.

NOTE 1 For calculating the thermal resistance of complete building elements involving the use of these products the procedures given in EN ISO 6946 can be used.

NOTE 2 EN ISO 10456 describes how the design thermal conductivity is calculated from the declared thermal conductivity.

4.4 Declared installed insulation thickness, d_m

The mean value of the installed thickness, $d_{m,}$ shall be not less than the specified thickness prescribed by the designer. No individual value shall be less than 80 % of the specified value. Installed insulation thickness is measured according to 5.1.

4.5 Declared moisture content

When required the moisture content shall be measured in accordance with EN 1097-5 and expressed in % by mass.

NOTE The declaration of moisture content is only needed if the products are to be used in contact with wooden materials, e.g. between rafters and wooden beams.

4.6 Settlement

NOTE The settlement of expanded clay lightweight aggregate products is negligible and therefore no method of measurement has been specified.

4.7 Compaction

The installer shall ensure that the degree of compaction specified by the client or designer is obtained.

The degree of compaction in percent (C_p) shall be calculated using Formula (1):

$$C_p = 100 * (d_{m,b} - d_{m,a}) / d_{m,b} \quad (1)$$

where

$d_{m,b}$ is the mean installed insulation thickness before compaction, m

$d_{m,a}$ is the mean installed insulation thickness after compaction, m

In case of dispute determination of density and degree of compaction of the installed product shall be assessed by the method given in Annex A.

The mean installed insulation thickness is calculated as described in 5.1.

NOTE The typical degree of compaction is (5-15) % for rounded aggregates and could be more for other types of shapes

5 In-situ measurements and calculations

5.1 Calculation of the declared mean installed insulation thickness

The measured mean installed insulation thickness $d_{m,a}$, after compaction if prescribed, shall not be less than the design insulation thickness. At least five insulation thickness measurements in different places shall be made for each 100 m^2 insulation area. A pin or ruler graduated in millimetres shall normally be used for these measurements. In case of dispute the installed insulation thickness shall be measured in accordance with EN 823:2013, Annex A, pin and plate method.

5.2 Calculation of declared installed thermal resistance, R_D

The declared installed thermal resistance, R_D for the mean insulation thickness after compaction shall be calculated using Formula (2):

$$R_D = d_{m,a} / \lambda_D \quad (2)$$

where

$d_{m,a}$ is the declared mean installed insulation thickness after compaction, m

λ_D is the declared thermal conductivity, W/mK (as declared by the manufacturer)

The thermal resistance shall be given as the nearest lower value rounded to not more than two decimals or three significant figures.

6 Installer's declaration

The installer shall declare to the customer that the work has been carried out in accordance with the requirements of this Part 2 of the standard using an insulation product that complies with Part 1 of the standard.

The installer shall also declare at least the following information:

— trade name and designation code of the installed insulation product;

— that the declared mean installed insulation thickness is not less than the design thickness;

— the declared thermal resistance, R_D, according to 5.2, rounded downwards to the nearest 0,05 $m^2 \cdot K/W$;

— the total quantity of material used, in m^3;

— date of installation.

Annex A
(normative)

Method for the determination of density and degree of compaction of the installed product

A.1 Principle

By means of a tube worked vertically through the layer of expanded clay LWA a sample is separated from the rest of the layer. When the sample has been dug out the layer thickness is measured and the density and compaction is correlated to a sample of the delivered expanded clay LWA.

A.2 Apparatus

— Plastic or steel cylinder with min. diameter d_i = 125 mm and min. height 400 mm, see Figure A.1.

— Plywood plate 350 mm x 350 mm with centre hole for the cylinder (thickness maximum 25 mm).

— At least six plastic bags 5 litre.

— Spoon.

— Ruler with mm indications.

— Scale which determine the mass of the sample with an accuracy of 0,5 % or better.

— Ventilated drying cupboard in which the sample is dried at (110 ± 5) °C.

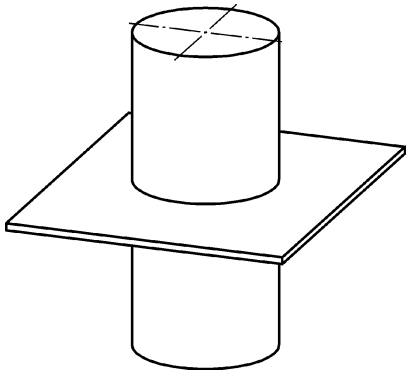
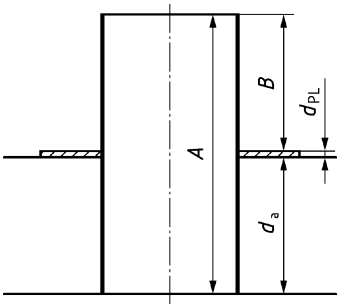


Figure A.1 — Cylinder and plate



Key

A free height inside the cylinder

B free height outside the cylinder

d_a installed insulation thickness after compaction

d_{pl} thickness of the plywood plate

Figure A.2 — Dimensions

A.3 Test specimens, samples

At delivery of the expanded clay LWA three representative samples for reference purpose is taken by filling the cylinder. The samples are each filled in a plastic bag that is marked and tightly closed.

After levelling and compaction of the aggregate layer, at least three samples at different locations is taken and filled in plastic bags, which is marked and closed tightly.

A.4 Procedure

A.4.1 Test conditions

No special conditions at the building site for the control of the layer thickness.

Normal laboratory conditions for the weighing and drying.

A.4.2 Test procedure

A.4.2.1 Sampling and measuring of thickness at the building site:

The plywood plate is placed horizontally on the top of the aggregate layer.

The cylinder is put through the hole in the plate and worked through the aggregate layer.

The content of the cylinder is dug out with spoon or hand and filled in a plastic bag, which is marked and tightly closed.

The distances A and B are measured and recorded, see Figure A.2.

A.4.2.2 Testing in the laboratory:

The moist weight of the samples is determined and recorded.

The samples are dried to constant mass at (110 ± 5) °C.

The dry weight of the samples is determined and recorded.

A.5 Calculation and expression of results

The reference density ($\rho_{D\ ref}$) is determined according to EN 1097-3.

The insulation thickness after compaction (d_a) is calculated using Formula (A.1):

$$d_a = A - (B + d_{pl}) \quad \text{(A.1)}$$

where (see Figure A.2):

d_a	installed insulation thickness after compaction	mm
A	free height inside the cylinder	mm
B	free height outside the cylinder	mm
d_{pl}	thickness of the plywood plate	mm

The volume of sample (V_{lay}) from layer is calculated using Formula (A.2):

$$V_{lay} = \frac{\pi}{4} * d_i^2 * da \quad \text{(A.2)}$$

where

V_{lay}	volume of sample from layer	m^3
d_i	inner diameter of the tube	m
d_a	installed insulation thickness after compaction	m

The mean value for the three samples is calculated.

The compacted density (ρ_{comp}) of layer is calculated using Formula (A.3):

$$\rho_{comp} = \frac{m_2}{V_{lay}} \quad \text{(A.3)}$$

where

ρ_{comp}	compacted density	kg/m^3
m_2	mass of dry material	kg
V_{lay}	volume of sample from layer	m^3

The degree of compaction (C_p) is calculated using Formula (A.4):

$$c_p = \frac{p_{comp} - p_{Dref}}{p_{comp}} 100\% = \frac{d_b - d_a}{d_b} 100\% \quad \text{(A.4)}$$

where

C_p	degree of compaction	%
ρ_{comp}	density after compaction	kg/m^3
$\rho_{D\,ref}$	density of reference samples	kg/m^3
d_a	installed insulation thickness after compaction	m
d_b	installed insulation thickness before compaction	m

A.6 Precision

No report on inter/intra - laboratory tests of repeatability - reproducibility is available.

A.7 Test report

The test report contains at least the following information:

a) Reference to this European Standard, EN 14063-2;

b) Product identification:

   1) trademark, factory, manufacturer or supplier;

   2) designation code;

   3) who sampled, date, signature and place of sampling;

   4) the form the product arrived at the laboratory;

c) Test procedure:

   1) conditioning;

   2) if any deviation from Clauses 3 and 4, e.g. number of test specimens;

   3) date of testing;

   4) general information related to the test;

   5) events which may have effected the result;

   6) information about the technician and the apparatus (not mandatory);

d) Results:

   1) the average value of loose bulk density in kg/m^3;

   2) the individual values from the determinations of density and degree of compaction.

Annex B
(normative)

Installation guidelines

B.1 Suitability of the building to receive the insulation product

Before installing the insulation product, the installer evaluates that the surrounding constructions are in the right conditions as described by the designer.

Only if the installer considers the constructions to be suitable should the installation be carried out.

B.2 Tests made by the installer when preparing the product on site

The expanded clay LWA does not require any preparation.

B.3 Installation procedure

The installer is trained in accordance with the guidelines given by the manufacturer or the system supplier. During the installation the installer verifies that the expanded clay LWA is spread in layer of the prescribed thickness.

If prescribed, the expanded clay LWA product should be fixed or stabilised after the installation according to the procedure or principle specified by the designer.

B.4 Installer's declaration

Clause 6 specifies the minimum information that should be given in the installer’s declaration.

Bibliography

[1] EN ISO 6946, *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method (ISO 6946)*

[2] EN ISO 10456, *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values (ISO 10456)*

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