
Toplotnoizolacijski proizvodi za stavbe - Proizvodi iz razplastenega vermikulita (EV), oblikovani na mestu vgradnje - 1. del: Specifikacija za vezane in rzsute proizvode pred vgradnjo

Thermal insulation products for buildings - In-situ thermal insulation formed from exfoliated vermiculite (EV) products - Part 1: Specification for bonded and loose-fill products before installation

Wärmedämmstoffe für Gebäude - An der Verwendungsstelle hergestellte Wärmedämmung mit Produkten aus expandiertem Vermiculite (EV) - Teil 1: Spezifikation für gebundene und Schüttdämmstoffe vor dem Einbau

Produits isolants thermiques pour le bâtiment - Produits d'isolation thermique a base de vermiculite exfoliée formés en place - Partie 1: Specifications relatives aux produits en vrac ou agglomérés avant mise en oeuvre

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English version

Thermal insulation products for buildings - In-situ thermal
insulation formed from exfoliated vermiculite (EV) products - Part
1: Specification for bonded and loose-fill products before
installation

Produits isolants thermiques pour le bâtiment - Isolation
thermique formée en place à base de granulats légers de
vermiculite exfoliée (EV) - Partie 1: Spécification de
produits liés et en vrac avant mise en oeuvre

Wärmedämmstoffe für Gebäude - An der
Verwendungsstelle hergestellte Wärmedämmung mit
Produkten aus expandiertem Vermiculite (EV) - Teil 1:
Spezifikation für gebundene und 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.

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Foreword

This document (EN 14317-1:2004) 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 February 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 Directives.

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.

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1 Scope

This document specifies the requirements for the four types of exfoliated vermiculite products Vermiculite Aggregate (EVA), Coated Vermiculite (EVC), Hydrophobic Vermiculite (EVH) and Premixed Vermiculite (EVM), containing less than 1 % organic material as defined by Annex D for in-situ insulation of roofs, ceilings, walls and floors.

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

This document describes the product characteristics and includes procedures for testing, evaluation of conformity, 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 cover factory made insulation products of formed shapes and boards made with exfoliated vermiculite or in-situ products intended to be used for the insulation of building equipment and industrial installations.

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

2 Normative references

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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. [SIST EN 14317-1:2005](https://standards.iteh.ai/catalog/standards/sist/aa67d6ad-8801-4897-bd30-76c6ad587ce2/sist-en-14317-1-2005)

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EN 932-1, *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 12667, *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, *Lightweight aggregates — 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 excluding concrete, mortar and grout.*

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

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

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

exfoliated vermiculite

insulation material which results from expanding or exfoliating a natural micaceous mineral by heating

[prEN ISO 9229:1997]

3.1.2

vermiculite aggregate

exfoliated vermiculite with no treatment or surface coating, used either as a loose insulation in the cavities of walls and roofs and loose placement on ceilings, or for site mixing to specified mix proportions with bonding materials when applied as a surface layer

3.1.3

coated vermiculite

exfoliated vermiculite which has a coating

3.1.4

hydrophobic vermiculite

exfoliated vermiculite which is treated to give specific hydrophobic properties and used where moisture or water repellency is required

3.1.5

premixed vermiculite

exfoliated vermiculite premixed with binders, which will require the site addition of water or other material, to enable the insulation product to be bonded, both to itself and the surface of the roof, ceiling, wall or floor

3.1.6

settlement

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

3.1.7

level

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

3.1.8

class

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

3.1.9

internal direct measurements

measurements carried out by the manufacturer using the method detailed for a requirement

3.1.10

internal indirect measurements

measurements carried out by the manufacturer using the manufacturer's own test method

3.1.11

external direct measurements

measurements carried out by a third party using the method detailed for a requirement

3.2 Symbols and abbreviations

Symbols and units used in this document:

d_N	is the thickness of the product	m
K	is the factor related to number of test results	—
λ	is 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)
$\lambda_{90/90}$	is the 90 % fractile with a confidence level of 90 % for the thermal conductivity	W/(m·K)
λ_{mean}	is the mean thermal conductivity	W/(m·K)
μ	is the water vapour diffusion resistance factor	—
n	is the number of test results	—
R_D	is the declared thermal resistance	m ² ·K/W
$R_{90/90}$	is the 90 % fractile with a confidence level of 90 % for the thermal resistance	m ² ·K/W
s_λ	is the estimate of the standard deviation of the thermal conductivity	W/(m·K)

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CR is the symbol of the declared value for crushing resistance

LD is the symbol of the declared value for loose bulk density

PS is the symbol of the declared particle size

WR is the symbol for water repellency [SIST EN 14317-1:2005](https://standards.itih.ai/catalog/standards/sist/aa67d6ad-8801-4897-bd30-76c6ad587ce2/sist-en-14317-1-2005)

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Abbreviated terms used in this document: [76c6ad587ce2/sist-en-14317-1-2005](https://standards.itih.ai/catalog/standards/sist/aa67d6ad-8801-4897-bd30-76c6ad587ce2/sist-en-14317-1-2005)

EVA is vermiculite aggregate as defined in 3.1.2

EVC is coated vermiculite as defined in 3.1.3

EVH is hydrophobic vermiculite as defined in 3.1.4

EVM is premixed vermiculite as defined in 3.1.5

ITT is initial type testing

4 Requirements

4.1 General

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

One test result for 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 conductivity 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 thickness, d_N , and the corresponding declared thermal conductivity value, λ_D , where $R_D = d_N/\lambda$ (see NOTE 3);
- 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 the declared 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;

An example of the determination of the declared value of thermal conductivity is given in the Annex F.

NOTE 1 λ for exfoliated vermiculite is normally in the range 0,05 to 0,08 W/(m·K).

NOTE 2 A correlation between thermal conductivity and any other property specific to the manufacturer's product can be used for indirect testing.

NOTE 3 The declaration of the installed thermal resistance is described in prEN 14317-2.

4.2.2 Loose bulk density

Loose bulk density shall be determined in accordance with EN 1097-3. However the container should be filled using a flat bottomed scoop held centrally over the container without touching it, and be no more than 50 mm above the rim. The value shall be expressed as kg/m³ and declared by the manufacturer in steps of 1 kg/m³.

The loose bulk density shall be in the range of ± 15 % of the manufacturer's declared value.

NOTE Most exfoliated vermiculite products are in the range 50 kg/m³ to 180 kg/m³.

4.2.3 Particle size

4.2.3.1 Particle size distribution

Particle size distribution shall be determined in accordance with EN 933-1 without washing and expressed as a percentage by mass, and shall be in accordance with the manufacturer's declared limits.

4.2.3.2 Size designation

The particle size shall be designated by two sieve sizes between which the main proportion of the material lies and any undersize or oversize shall comply with 4.2.3.3 and 4.2.3.4.

The size in mm shall be selected from those specified in EN 13055-2.

NOTE The particle size will normally be in the range 0 mm to 32 mm.

4.2.3.3 Undersize

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

4.2.3.4 Oversize

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

4.2.4 Reaction to fire

This property is not measured since exfoliated vermiculite products described by this document are classified without testing as class A1 products.

NOTE 1 The products are classified without testing as class A1 products in accordance with commission decision 96/603/EC as amended by decision 2000/605/EC.

NOTE 2 Products with an organic content greater than 1 % are outside the scope of this standard.

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 fire performance of exfoliated vermiculite does not change with time (see 4.2.4).

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 (4.3.5) is negligible.

4.2.5.4 Durability of compression strength against ageing/degradation

The compressive strength of exfoliated vermiculite does not change with time. Exfoliated vermiculite is a stable laminar 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 does not need to be determined and declared by the manufacturer.

4.3.2 Water repellency

The water repellence of EVH shall be determined in accordance with Annex E, and shall not be less than 175 ml.

4.3.3 Crushing resistance

In load bearing applications the crushing resistance shall be determined in accordance with EN 13055-1 and expressed in N/mm².

NOTE Crushing resistance is a measure of the strength of the material but it does not necessarily relate directly to load bearing capacity.

4.3.4 Water vapour transmission

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

NOTE μ , for exfoliated vermiculite may be assumed to be 3.

4.3.5 Settlement

Settlement for exfoliated vermiculite is negligible and needs no measurement.

4.3.6 Release of dangerous substances

NOTE See Annex ZA.

5 Test methods

5.1 Sampling

Sampling shall be carried out according to EN 932-1 and EN 932-2 using a procedure which gives a representative sample and avoids sampling bias.

5.2 Conditioning

No special conditioning of the sample shall be used unless otherwise specified in the test method standards. In case of dispute the test samples shall be conditioned to moisture equilibrium at (23 ± 5) °C and (50 ± 10) % relative humidity after drying at (110 ± 5) °C.

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5.3 Testing

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5.3.1 General

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

Table 1 — Test methods, measurements and conditions

Clause		Test method	Minimum number of measurements to get one test result	Specific conditions
No.	Title			
4.2.1	Thermal conductivity	EN 12667	1	See Annex C
4.2.2	Loose bulk density	EN 1097-3	3	See 4.2.2
4.2.3	Particle size	EN 933-1	1	See 4.2.3
4.2.4	Reaction to fire	EN 13820 and AnnexD	1	None
4.3.2	Water repellency	See Annex E	1	None
4.3.3	Crushing resistance	EN 13055-1	1	None

5.3.2 Thermal conductivity

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

- at a mean temperature of $(10 \pm 0,3)$ °C;
- after preparation in accordance with the procedure given in Annex C;