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**SVENSK STANDARD**  
**SS-EN 14317-1:2004**

Fastställd 2004-12-03

Utgåva 1

**Värmeisoleringsprodukter för byggnader –  
In situ-formad exfolierad vermiculit (EV) –  
Del 1: Egenskapsredovisning för bundna produkter  
och lösfallnadsprodukter före installation**

**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**

ICS 91.100.60

Språk: engelska

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Europastandarden EN 14317-1:2004 gäller som svensk standard. EN 14317-1 har tagits fram inom CEN/TC 88, Thermal insulating materials and products. Detta dokument innehåller den officiella engelska språkversionen av EN 14317-1:2004.

I del 1 av EN 14317 specificeras olika produkttegenskaper hos fyra olika typer av exfolierad vermiculit (EVA, EVC, EVH och EVM), avsedda för värmeisolering av tak, bjälklag, golv och väggar. Vidare anges hur dessa produkttegenskaper skall provas och rapporteras.

Denna europastandard är en harmoniserad standard. Det innebär att den har utarbetats på uppdrag av EG-kommissionen efter samråd med EUs medlemsstater. Standarden anger hur väsentliga krav i EG-direktiv enligt den nya metoden kan uppfyllas (se bilaga ZA). Så snart europastandarden har förtecknats i Europeiska gemenskapernas officiella tidning, EGT, får en produkt som tillverkats och kontrollerats enligt standarden förses med CE-märket.

Vad gäller standardens anknytning till de svenska byggreglerna – inkl. förutsättningar för CE-märkning – hänvisas till Boverket och verkets författningssamling, BFS TEK.

I del 2, som är under utarbetande, specificeras de kontroller och deklARATIONER som skall göras av installatören.

Ljudisolering behandlas inte i dessa standarder.

The European Standard EN 14317-1:2004 has the status of a Swedish Standard. This document contains the official English version of EN 14317-1:2004.

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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EN 14317-1

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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.

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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## Contents

	page
Foreword.....	3
1 Scope .....	4
2 Normative references .....	4
3 Terms, definitions, symbols, units and abbreviated terms .....	5
3.1 Terms and definitions .....	5
3.2 Symbols and abbreviations .....	6
4 Requirements .....	6
4.1 General.....	6
4.2 For all applications .....	6
4.3 For specific applications.....	8
5 Test methods.....	9
5.1 Sampling.....	9
5.2 Conditioning.....	9
5.3 Testing .....	9
6 Designation code .....	10
7 Evaluation of conformity.....	10
8 Marking and labelling .....	11
Annex A (normative) Determination of the declared values of thermal conductivity .....	12
Annex B (normative) Factory production control .....	14
Annex C (normative) Preparation of the test specimens to measure thermal conductivity.....	15
Annex D (normative) Special conditions to be used for the determination of organic content.....	16
Annex E (normative) Determination of the water repellency of exfoliated vermiculite.....	17
Annex F (informative) Example of the determination of the declared value of thermal conductivity for a product or product group .....	19
Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives .....	21
Bibliography .....	26

## **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.

## EN 14317-1:2004 (E)

### 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

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, *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

## EN 14317-1:2004 (E)

### 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	—
$\lambda$	is the thermal conductivity	W/(m·K)
$\lambda_D$	is the declared thermal conductivity	W/(m·K)
$\lambda_i$	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)
$\lambda_{\text{mean}}$	is the mean thermal conductivity	W/(m·K)
$\mu$	is the water vapour diffusion resistance factor	—
$n$	is the number of test results	—
$R_D$	is the declared thermal resistance	m <sup>2</sup> ·K/W
$R_{90/90}$	is the 90 % fractile with a confidence level of 90 % for the thermal resistance	m <sup>2</sup> ·K/W
$s_\lambda$	is the estimate of the standard deviation of the thermal conductivity	W/(m·K)

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

Abbreviated terms used in this document:

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,  $\lambda_D$ , 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  $\lambda_D$  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 m<sup>2</sup>·K/W, and declared in levels with steps of 0,05 m<sup>2</sup>·K/W;

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

NOTE 1  $\lambda$  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/m<sup>3</sup> and declared by the manufacturer in steps of 1 kg/m<sup>3</sup>.

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/m<sup>3</sup> to 180 kg/m<sup>3</sup>.

#### 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.

## **EN 14317-1:2004 (E)**

### **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/mm<sup>2</sup>.

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  $\mu$ , 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  $(23 \pm 5)$  °C and  $(50 \pm 10)$  % relative humidity after drying at  $(110 \pm 5)$  °C.

#### 5.3 Testing

##### 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;