

# **SLOVENSKI STANDARD**

## **SIST EN 13169:2013+A1:2015**

**01-april-2015**

**Nadomešča:**  
**SIST EN 13169:2013**

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### **Toplotnoizolacijski proizvodi za stavbe - Proizvodi iz ekspandiranega perlita (EPB) - Specifikacija**

Thermal insulation products for buildings - Factory made expanded perlite board (EPB)  
products - Specification

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte Produkte aus Blähperlite (EPB)  
- Spezifikation

Produits isolants thermiques pour le bâtiment - Produits manufacturés en panneaux de  
perlite expansée (EPB) - Spécification

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**Ta slovenski standard je istoveten z: EN 13169:2012+A1:2015**

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#### **ICS:**

91.100.60	Materiali za toplotno in zvočno izolacijo	Thermal and sound insulating materials
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13169:2012+A1**

February 2015

ICS 91.100.60

Supersedes EN 13169:2012

English Version

**Thermal insulation products for buildings - Factory made  
expanded perlite board (EPB) products - Specification**

Produits isolants thermiques pour le bâtiment - Produits  
manufacturés en panneaux de perlite expansée (EPB) -  
Spécification

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte  
Produkte aus Blähperlite (EPB) - Spezifikation

This European Standard was approved by CEN on 6 October 2012 and includes Amendment 1 approved by CEN on 15 December 2014.

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-CENELEC Management Centre or to any CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## Foreword

This document (EN 13169:2012+A1:2015) 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 August 2015, and conflicting national standards shall be withdrawn at the latest by November 2016.

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 document supersedes A1 EN 13169:2012 A1.

This document includes Amendment 1 approved by CEN on 2014-12-15.

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

A1 For relationship with EU Construction Products Regulation (CPR), see informative Annex ZA, which is an integral part of this standard. A1

Compared with EN 13169:2008, the main changes are:


- a) better harmonisation between the individual standards of the package (EN 13162 to EN 13171) on definitions, requirements, classes and levels;
- b) new normative annex on multi-layered products;
- c) changes on some editorial and technical content and addition of information on some specific items;
- d) addition of links to EN 15715, *Thermal insulation products — Instructions for mounting and fixing for reaction to fire testing — Factory made products*;
- e) changes to Annex ZA.

A1 Amendment 1 modifies EN 13169:2012 identifying those clauses of the standard which are needed for the compliance of the European Standard with the Construction Products Regulation (CPR).

This amendment introduces

- f) an addition to the foreword;
- g) an addition in 3.2;
- h) a new subclause 4.3.11;
- i) modification of Clause 7;
- j) modification of Clause 8;
- k) modification of Annex B;

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- l) modification of D.4;
- m) modification of Annex E;
- n) a new Annex ZA. 

This standard is one of a series of standards for thermal insulation products used in buildings, but this standard may be used in other areas where appropriate.

In pursuance of Resolution BT 20/1993 Revised, CEN/TC 88 have proposed defining the standards listed below as a package of documents.

The package of standards comprises the following group of interrelated standards for the specifications of factory made thermal insulation products, all of which come within the scope of CEN/TC 88:

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

EN 13163, *Thermal insulation products for buildings — Factory made expanded polystyrene (EPS) products — Specification*

EN 13164, *Thermal insulation products for buildings — Factory made extruded polystyrene foam (XPS) products — Specification*

EN 13165, *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*

EN 13166, *Thermal insulation products for buildings — Factory made phenolic foam (PF) products — Specification*

EN 13167, *Thermal insulation products for buildings — Factory made cellular glass (CG) products — Specification*

EN 13168, *Thermal insulation products for buildings — Factory made wood wool (WW) products — Specification*

EN 13169, *Thermal insulation products for buildings — Factory made expanded perlite board (EPB) products — Specification*

EN 13170, *Thermal insulation products for buildings — Factory made products of expanded cork (ICB) — Specification*

EN 13171, *Thermal insulation products for buildings — Factory made wood fibre (WF) products — Specification*

The reduction in energy used and emissions produced during the installed life of thermal 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 organizations 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 factory made expanded perlite board products, with or without facings or coatings, which are used for the thermal insulation of buildings. The products are manufactured in the form of boards, multi-layered insulation or composite insulation products.

This standard also covers composite insulation products (see Annex E).

Products covered by this standard are also used in prefabricated thermal insulation systems and composite panels; the performance of systems incorporating these products is not covered.

This standard describes product characteristics and includes procedures for testing, evaluation of conformity, marking and labelling.

This 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 regulations or non-conflicting standards.

Products with a declared thermal resistance lower than  $0,15 \text{ m}^2\cdot\text{K}/\text{W}$  or a declared thermal conductivity greater than  $0,070 \text{ W}/(\text{m}\cdot\text{K})$  at  $10^\circ\text{C}$  are not covered by this standard.

This standard does not cover in situ insulation products and products intended to be used for the insulation of building equipment and industrial installations.

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## 2 Normative references (standards.iteh.ai)

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 822, *Thermal insulating products for building applications — Determination of length and width*

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

EN 824, *Thermal insulating products for building applications — Determination of squareness*

EN 825, *Thermal insulating products for building applications — Determination of flatness*

EN 826, *Thermal insulating products for building applications — Determination of compression behaviour*

EN 1604, *Thermal insulating products for building applications — Determination of dimensional stability under specified temperature and humidity conditions*

EN 1605, *Thermal insulating products for building applications — Determination of deformation under specified compressive load and temperature conditions*

EN 1606, *Thermal insulating products for building applications — Determination of compressive creep*

EN 1607, *Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces*

EN 1609, *Thermal insulating products for building applications — Determination of short term water absorption by partial immersion*

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EN 12086:1997, *Thermal insulating products for building applications — Determination of water vapour transmission properties*

EN 12089, *Thermal insulating products for building applications — Determination of bending behaviour*

EN 12430, *Thermal insulating products for building applications — Determination of behaviour under point load*

EN 12431, *Thermal insulating products for building applications — Determination of thickness for floating floor insulation products*

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 12939, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Thick products of high and medium thermal resistance*

EN 13172:2012, *Thermal insulation products — Evaluation of conformity*

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

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

EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item*

EN 15715:2009, *Thermal insulation products — Instructions for mounting and fixing for reaction to fire testing — Factory made products*

EN 29052-1, *Acoustics — Determination of dynamic stiffness — Part 1: Materials used under floating floors in dwellings (ISO 9052-1)*

EN ISO 1182, *Reaction to fire tests for building products — Non-combustibility test (ISO 1182)*

EN ISO 1716, *Reaction to fire tests for products — Determination of the gross heat of combustion (calorific value) (ISO 1716)*

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

EN ISO 11925-2, *Reaction to fire tests — Ignitability of building products subjected to direct impingement of flame — Part 2: Single-flame source test (ISO 11925-2)*

ISO 16269-6:2005, *Statistical interpretation of data — Part 6: Determination of statistical tolerance intervals*

### **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 apply with exception or in addition of the following:

**3.1.1****expanded perlite board**

rigid insulation board manufactured from expanded perlite, reinforcing fibres and binding agents, which may be delivered as a board or as two or more boards bonded together with a suitable adhesive (multi-layered insulation product, see below)

Note 1 to entry: Boards may (can) also have a profiled edge.

**3.1.2****level**

value which is the upper or lower limit of a requirement and given by the declared value of the characteristic concerned

**3.1.3****class**

combination of two levels of the same property between which the performance shall fall

**3.1.4****board; slab**

(insulation) rigid or semi-rigid product of rectangular shape and cross section in which the thickness is uniform and substantially smaller than the other dimensions

Note 1 to entry: Board is usually thinner than slab. They may also be supplied in tapered form.

**3.1.5****facing**

functional or decorative surface layer with a thickness of less than 3 mm, e.g. paper, plastic film, fabric or metal foil, which is not considered as separate thermal insulation layers to be added to the thermal resistance of the product

**3.1.6****coating**

functional or decorative surface layer with a thickness of less than 3 mm usually applied by painting, spraying, pouring or trowelling, which is not considered as separate thermal insulation layer to be added to the thermal resistance of the product

**3.1.7****multi-layered insulation product**

product which can be faced or coated made from two or more layers of a thermal insulation material from the same European Standard, which are bonded together horizontally by chemical or physical adhesion

**3.1.8****composite insulation product**

product which can be faced or coated made from two or more layers bonded together by chemical or physical adhesion consisting of at least one factory made thermal insulation material layer

**3.2 Symbols units and abbreviated terms**

For the purposes of this document, the following symbols and units apply.

$a$	is the coefficient describing the influence of moisture on the thermal conductivity	—
$\alpha_p$	is the practical sound absorption coefficient	—
$\alpha_w$	is the weighted sound absorption coefficient	—
$b$	is the width	mm
$c$	is the compressibility	mm

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$d$	is the thickness	mm
$d_B$	is the thickness under a load of 2 kPa after removal of an additional load of 48 kPa	mm
$d_L$	is the thickness under a load of 250 Pa	mm
$d_N$	is the nominal thickness of the product	mm
$\Delta\varepsilon_b$	is the relative change in width	%
$\Delta\varepsilon_d$	is the relative change in thickness	%
$\Delta\varepsilon_l$	is the relative change in length	%
$F_p$	is the point load at a given deformation	N
$k$	is a factor related to the number of test results available	—
$l$	is the length	mm
$\lambda$	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)
$\lambda_{\text{mean}}$	is the mean thermal conductivity	W/(m·K)
$\lambda_{10,\text{dry}}$	is the thermal conductivity in the dry state	W/(m·K)
$\lambda_{90/90}$	is the 90 % fractile with a confidence level of 90 % for the thermal conductivity	W/(m·K)
$\lambda_U$	is the design thermal conductivity	W/(m·K)
$m_1$	is the mass of the test specimen after 2 h total immersion in water	kg
$m_{23,\text{dry}}$	is the mass of specimen in the dry state	kg
$m_{23,50}$	is the mass of specimen at 23 °C and 50 % relative humidity	kg
$\mu$	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
$R_i$	is one test result of thermal resistance	m <sup>2</sup> ·K/W
$R_{\text{mean}}$	is the mean 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
$R_U$	is the design thermal resistance	m <sup>2</sup> ·K/W
$S_b$	is the deviation from squareness on length and width	mm/m
$S_{\text{max}}$	is the deviation from flatness	mm
$s_R$	is the estimate of the standard deviation of 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)
$s'$	is the dynamic stiffness	MN/m <sup>3</sup>
$\sigma_b$	is the bending strength	kPa
$\sigma_{bc}$	is the bending strength at a constant span	kPa
$\sigma_c$	is the declared compressive stress	kPa

$\sigma_m$	is the compressive strength	kPa
$\sigma_{mt}$	is the tensile strength perpendicular to faces	kPa
$\sigma_{10}$	is the compressive stress at 10 % deformation	kPa
$u_{23,50}$	is the moisture content by mass at 23 °C and 50 % relative humidity	kg/kg
$V$	is the volume of the specimen	m <sup>3</sup>
$W_p$	is the short-term water absorption by partial immersion	kg/m <sup>2</sup>
$W_{st}$	is the short-term water absorption by total immersion	kg/dm <sup>3</sup>
$X_0$	is the initial deformation after 60 s from the beginning of loading	mm
$X_{ct}$	is the compressive creep	mm
$X_t$	is the deformation at time $t$ (total thickness reduction)	mm
$Z$	is the water vapour resistance	m <sup>2</sup> ·h·Pa/mg
BS	is the symbol of the declared level of bending strength	
BS(z)	is the symbol of the declared level of bending strength at a constant span	
CC( $i_1/i_2/y$ ) $\sigma_c$	is the symbol of the declared level for compressive creep	
CP	is the symbol of the declared level for compressibility	
CS(10\Y)	is the symbol of the declared level for compressive stress or compressive strength	
DLT5	is the symbol of the declared level of deformation under load and temperature for 5 % deformation	
DS(70,-)	is the symbol of the declared value for dimensional stability under specified temperature conditions	
DS(23,90)or DS(70,90)	is the symbol of the declared value for dimensional stability under specified temperature and relative humidity conditions	
MU	is the symbol of the declared value for water vapour diffusion resistance factor	
PL(2)	is the symbol of the declared level of point load for 2 mm deformation	
SD	is the symbol of the declared level of dynamic stiffness	
T	is the symbol of the declared class for thickness tolerances	
TR	is the symbol of the declared value for tensile strength perpendicular to faces	
WS	is the symbol of the declared level for short term water absorption by partial immersion	
WS(T)	is the symbol of the declared level of short term water absorption by total immersion	
Z	is the symbol of the declared value for water vapour resistance	

#### Abbreviated terms used in this standard:

EPB	is <b>Expanded Perlite Board</b>
<b>PTD</b>	is <b>Product Type Determination</b> (previously named ITT for Initial Type Test)
FPC	is <b>Factory Production Control</b>
RtF	is <b>Reaction to Fire</b>

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<b>AVCP</b>	is <b>Assessment and Verification of Constancy of Performance</b> (previously named attestation of conformity)
<b>DoP</b>	is <b>Declaration of Performance</b>
<b>ThIB</b>	is <b>Thermal Insulation for Buildings</b>
<b>VCP</b>	is <b>Verification of Constancy of Performance</b> (previously named evaluation of conformity) <b>(A1)</b>

**4 Requirements****4.1 General**

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

For multilayered insulation products additional requirements are given in Annex D.

For composite insulation products additional requirements are given in Annex E.

One test result on a product property is the average of the measured values on the number of test specimens given in Table 7.

NOTE Information on additional properties is given in Annex F.

**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 or EN 12939 for thick products and in accordance with 5.2, 5.3.2 and Annex C.

The thermal resistance and 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 declared values are to be given for a moisture content equal to that of the material when it has reached the equilibrium with the air at 23°C and relative humidity of 50 %;
- the measured values shall be expressed with three significant figures;
- for products of uniform thickness, the declared thermal resistance,  $R_D$ , shall always be declared. The thermal conductivity,  $\lambda_D$ , shall be declared where possible. Where appropriate, for products of non-uniform thickness (e.g. for sloped and tapered products) only the thermal conductivity,  $\lambda_D$ , shall be declared;
- the declared thermal resistance,  $R_D$ , and declared thermal conductivity,  $\lambda_D$ , shall be given as limit values representing at least 90 % of the production, determined with a confidence level of 90 %;
- the statistical 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 declared thermal resistance,  $R_D$ , shall be calculated from the nominal thickness,  $d_N$ , and the corresponding thermal conductivity,  $\lambda_{90/90}$ , unless measured directly;

- the statistical value of thermal resistance,  $R_{90/90}$ , when calculated from the nominal thickness,  $d_N$ , and the corresponding thermal conductivity,  $\lambda_{90/90}$ , shall be rounded downwards to the nearest 0,05 m<sup>2</sup>·K/W, and declared as  $R_D$  in levels with steps of 0,05 m<sup>2</sup>·K/W;
- the statistical value of thermal resistance,  $R_{90/90}$ , for those products for which only the thermal resistance is measured directly, shall be rounded downwards to the nearest 0,05 m<sup>2</sup> K/W, and declared as  $R_D$  in levels with steps of 0,05 m<sup>2</sup>·K/W.

NOTE  $\lambda_U$  and  $R_U$  (design values) may be determined with reference to EN ISO 10456.

#### 4.2.2 Length and width

Length,  $l$ , and width,  $b$ , shall be determined in accordance with EN 822. No test result shall deviate from the nominal values by more than the following:

- $\pm 3$  mm for length and width not exceeding 1 200 mm;
- $\pm 5$  mm for length and width exceeding 1 200 mm.

#### 4.2.3 Thickness

Thickness,  $d$ , shall be determined in accordance with EN 823, using a load equal to 250 Pa. No test result shall deviate from the nominal thickness,  $d_N$ , by more than the tolerances given in Table 1.

Table 1 — Thickness tolerances

SIST EN 13169:2013+A1:2015				Dimensions in millimetres
Nominal thickness	$d_N \leq 35$	$35 < d_N \leq 70$	$70 < d_N \leq 120$	$d_N > 120$
Tolerance	$\pm 1$	$\pm 2$	$\pm 3$	$\pm 4$

This test shall not be performed when the tests described in E.2.7 are used.

#### 4.2.4 Squareness

Squareness shall be determined in accordance with EN 824. The deviation from squareness on length and width,  $S_b$ , shall not exceed 3 mm/m.

#### 4.2.5 Flatness

Flatness shall be determined in accordance with EN 825. The deviation from flatness,  $S_{max}$ , shall not exceed the following:

- 3 mm for length and width not exceeding 1 200 mm;
- 5 mm for length and width exceeding 1 200 mm.

#### 4.2.6 Bending strength

Bending strength,  $\sigma_b$ , shall be determined in accordance with EN 12089. For handling purpose, the bending strength of boards shall not be less than 250 kPa.