



SLOVENSKI STANDARD

SIST EN 13169:2013

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Nadomešča:
SIST EN 13169:2009

Toplotnoizolacijski proizvodi za stavbe - Proizvodi iz ekspaniranega perlita (EPB) - Specifikacija

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

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

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

Ta slovenski standard je istoveten z: EN 13169:2012

ICS:

| | | |
|-----------|---|--|
| 91.100.60 | Materiali za toplotno in zvočno izolacijo | Thermal and sound insulating materials |
|-----------|---|--|

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EUROPEAN STANDARD

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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 Bläherlit (EPB) - Spezifikation

This European Standard was approved by CEN on 6 October 2012.

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EN 13169:2012 (E)**Foreword**

This document (EN 13169:2012) 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of an identical text or by endorsement, at the latest by May 2013, and conflicting national standards shall be withdrawn at the latest by May 2013.

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 EN 13169:2008.

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.

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

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- 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.

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 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.

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EN 13169:2012 (E)**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 m²·K/W or a declared thermal conductivity greater than 0,070 W/(m·K) at 10 °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

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*

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.

EN 13169:2012 (E)**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 | – |
| α_p | is the practical sound absorption coefficient | – |
| α_w | is the weighted sound absorption coefficient | – |
| b | is the width | mm |
| c | is the compressibility | mm |
| 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 |
| 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) |
| λ_{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) |
| λ_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 |
| 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_i | is one test result of thermal resistance | m ² ·K/W |
| R_{mean} | is the mean 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 |
| R_U | is the design thermal resistance | m ² ·K/W |
| S_b | is the deviation from squareness on length and width | mm/m |
| S_{max} | is the deviation from flatness | mm |
| s_R | is the estimate of the standard deviation of the thermal resistance | m ² ·K/W |
| s_λ | is the estimate of the standard deviation of the thermal conductivity | W/(m·K) |
| s' | is the dynamic stiffness | MN/m ³ |
| σ_b | is the bending strength | kPa |
| σ_{bc} | is the bending strength at a constant span | kPa |
| σ_c | is the declared compressive stress | kPa |
| σ_m | is the compressive strength | kPa |
| σ_{mt} | is the tensile strength perpendicular to faces | kPa |
| σ_{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 |

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| | | |
|----------|---|---------------------------|
| V | is the volume of the specimen | m^3 |
| W_p | is the short-term water absorption by partial immersion | kg/m^2 |
| W_{st} | is the short-term water absorption by total immersion | kg/dm^3 |
| 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 | $m^2 \cdot h \cdot Pa/mg$ |

| | |
|------------------------------|--|
| 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($i_1/i_2/y$) σ_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 | Expanded Perlite Board |
| ITT is | Initial Type Test |
| FPC is | Factory Production Control |
| RtF is | Reaction to Fire |

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, λ_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, λ_D , shall be declared;
- the declared thermal resistance, R_D , and declared thermal conductivity, λ_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 λ_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 m²·K/W, and declared as R_D in levels with steps of 0,05 m²·K/W;

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- 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 m² K/W, and declared as R_D in levels with steps of 0,05 m²-K/W.

NOTE λ_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:

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

Dimensions in millimetres

| Nominal thickness | $d_N \leq 35$ | $35 < d_N \leq 70$ | $70 < d_N \leq 120$ | $d_N > 120$ |
|-------------------|---------------|--------------------|---------------------|-------------|
| Tolerance | ± 1 | ± 2 | ± 3 | ± 4 |

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

NOTE The requirement for handling applies to individual boards. In the case of multi-layered boards, it may be assumed that the requirement is satisfied when each of the individual layers fulfils this requirement.

4.2.7 Reaction to fire of the product as placed on the market

Reaction to fire classification of the product, as placed on the market, shall be determined in accordance with EN 13501-1 and the mounting and fixing rules given in EN 15715.

NOTE This classification is compulsory and always included in the CE Marking label.

Detailed information about the test conditions and the field of application of the classification as stated in the reaction to fire classification report shall be given in the manufacturer's literature.

4.2.8 Durability characteristics

4.2.8.1 General

The appropriate durability characteristics have been considered and are covered in 4.2.8.2, 4.2.8.3 and where appropriate in 4.3.9 on compressive creep.

4.2.8.2 Durability of reaction to fire of the product as placed on the market against ageing/degradation

The reaction to fire performance of EPB products as declared by 4.2.6 does not change with time.

4.2.8.3 Durability of thermal resistance against ageing/degradation

The thermal conductivity of EPB products does not change with time. This is covered and considered for declaration by 4.2.1 thermal conductivity, and any change in thickness is covered by at least one of the 4.3.2 Dimensional stability tests, as relevant.

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 Dimensional stability

Dimensional stability under specified temperature or under specified temperature and relative humidity conditions shall be determined in accordance with EN 1604. The test shall be carried out for the conditions given in Table 2. The relative changes in length, $\Delta\epsilon_l$, and width, $\Delta\epsilon_b$ and the relative reduction in thickness, $\Delta\epsilon_d$, shall not exceed the values given in Table 2 for the declared level.