# SLOVENSKI STANDARD
# SIST EN 16069:2013+A1:2015

**01-april-2015**

**Nadomešča:**
**SIST EN 16069:2013**

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**Toplotnoizolacijski proizvodi za stavbe - Proizvodi iz polietilenske pene (PEF) - Specifikacija**

Thermal insulation products for buildings - Factory made products of polyethylene foam (PEF) - Specification

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte Produkte aus Polyethylenschaum (PEF) - Spezifikation



Produits isolants thermiques pour le bâtiment - Produits manufacturés en mousse de polyethylene (PE) - Spécification



**Ta slovenski standard je istoveten z:** **EN 16069:2012+A1:2015**

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**ICS:**

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

**SIST EN 16069:2013+A1:2015** **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

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# EN 16069:2012+A1

February 2015

ICS 91.100.60

Supersedes EN 16069:2012

English Version

# Thermal insulation products for buildings - Factory made products of polyethylene foam (PEF) - Specification

Produits isolants thermiques pour le bâtiment - Produits manufacturés en mousse de polyethylene (PE) - Spécification

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte Produkte aus Polyethylenschaum (PEF) - Spezifikation

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

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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 CEN-CENELEC Management Centre has the same status as the official versions.



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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 16069:2012+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 16069:2012 ⟨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▌



▌A1⟩ Amendment 1 modifies EN 16069:2012 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:



a) an addition to the foreword;

b) an addition in 3.2;

c) an addition in 4.3.10.2;

d) a new subclause 4.3.13;

e) modification of Clause 7;

f) modification of Clause 8;

g) modification of Annex B;

h) modification of Annex E;

i) a new Annex ZA. ⟨A1▌

This document 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.

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 factory made polyethylene foam (PEF) products, with or without facing or coating, which are used for thermal insulation of buildings. The products are manufactured in the form of boards or rolls or other preformed ware.

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

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

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 0,5 $m^2K/W$ or a declared thermal conductivity greater than 0,050 W/(m·K) at 10 °C are not covered by this European 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 (covered by EN 14313). Further excluded are non-foamed materials such as bubble films, foils etc.

## 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 1603, *Thermal insulating products for building applications — Determination of dimensional stability under constant normal laboratory conditions (23 °C/ 50 % relative humidity)*

EN 1604, *Thermal insulating products for building applications — Determination of dimensional stability under specified temperature and humidity 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 12087, *Thermal insulating products for building applications — Determination of long term water absorption by immersion*

EN 12430, *Thermal insulating products for building applications — Determination of the 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 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 354, *Acoustics — Measurement of sound absorption in a reverberation room (ISO 354)*

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 1798, *Flexible cellular polymeric materials — Determination of tensile strength and elongation at break (ISO 1798:2008)*

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

EN ISO 11654, *Acoustics — Sound absorbers for use in buildings — Rating of sound absorption (ISO 11654)*

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

▌A1⟩ EN ISO 13790:2008, *Energy performance of buildings — Calculation of energy use for space heating and cooling (ISO 13790:2008)* ⟨A1▐

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 and the following apply.

**3.1.1**
**polyethylene foam**
semi-rigid or flexible cellular plastics insulation material based on polymers derived mainly from ethylene and/or propylene

**3.1.2**
**level**
given 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**
**roll**
(insulation) product supplied in the form of a spirally wound cylinder



**3.1.5**
**board, slab**
rigid or semi-rigid (insulation) product of rectangular shape and cross section in which the thickness is uniform and substantially smaller than the other dimensions



Note 1 to entry A board is usually thinner than a slab. They may also be supplied in tapered form.

**3.1.6**
**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 layer to be added to the thermal resistance of the product

**3.1.7**
**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

**3.1.8**
**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

**3.1.9**
**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

## 3.2 Symbols, units and abbreviated terms

### 3.2.1 Symbols and units used in this European Standard

| | | |
|---|---|---|
| αp | is the practical airborne sound absorption coefficient | - |
| $\alpha_w$ | is the weighted airborne sound absorption coefficient | - |
| $b$ | is the width | mm |
| $c$ | is the compressibility | mm |
| $d$ | is the thickness | mm |
| $d_B$ | is the thickness under load of 2 kPa after removal of an additional load of 48 kPa | mm |
| $d_L$ | is the thickness under load of 250 Pa | mm |
| $d_N$ | is the nominal thickness of a product | m |
| $\Delta\varepsilon_b$ | is the relative change in width | % |
| $\Delta\varepsilon_d$ | is the relative change in thickness | % |
| $\Delta\varepsilon_l$ | is the relative change in length | % |
| $\Delta\varepsilon_s$ | is the relative change flatness | mm/m |
| $F_p$ | is the point load at a given deformation | N |
| $k$ | is a factor related to the number of test results | - |
| $l$ | is the length | mm |
| $\lambda$ | is the thermal conductivity | W/(m·K) |
| $\lambda_{90/90}$ | is a 90 % fractile with a confidence level of 90 % for the thermal conductivity | W/(m·K) |
| $\lambda_D$ | is the declared of thermal conductivity | W/(m·K) |
| $\lambda_i$ | is one test result of thermal conductivity | W/(m·K) |
| $\lambda_U$ | is the design thermal conductivity | W/(m·K) |
| $\lambda_{mean}$ | is the mean value of the measured thermal conductivity | W/(m·K) |
| $\mu$ | is the water vapour diffusion resistance factor | - |
| $n$ | is the number of test results | - |
| $\rho_a$ | is the apparent density | kg/m$^3$ |
| $R_{90/90}$ | is a 90 % fractile with the confidence level of 90 % for the thermal resistance | m$^2$·K/W |
| $R_D$ | 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 value of the measured thermal resistance | m$^2$·K/W |
| $R_U$ | is the design thermal resistance | m$^2$·K/W |
| $S_b$ | is the deviation from squareness of the edge 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 |
| $s_\lambda$ | is the estimate of the standard deviation of the thermal conductivity | W/(m·K) |

| | | |
|---|---|---|
| $s'$ | is the dynamic stiffness | $MN/m^3$ |
| $\sigma_{\%}$ | is the compressive stress at defined % of deformation | kPa |
| $\sigma_b$ | is the bending strength | kPa |
| $\sigma_c$ | is the compressive stress | kPa |
| $\sigma_{mt}$ | is the tensile strength perpendicular to faces | kPa |
| $TE_L$ | is the tensile elongation in length | % |
| $TE_w$ | is the tensile elongation in width | % |
| $TS_l$ | is the tensile strength in length | kPa |
| $TS_w$ | is the tensile strength in width | kPa |
| $\tau$ | is the shear strength | kPa |
| $W_{lp}$ | is the long term water absorption by partial immersion | $kg/m^2$ |
| $W_{lt}$ | is the long term water absorption by total immersion | vol.-% |
| $Wp$ | is the short term water absorption by partial immersion | $kg/m^2$ |
| $X_{ct}$ | is the compressive creep | mm or % |
| $Z$ | is the water vapour resistance | $m^2 \cdot h \cdot Pa/mg$ |



| | |
|---|---|
| AP | is the symbol of the declared level of practical sound absorption coefficient |
| AW | is the symbol of the declared level of weighted sound absorption coefficient |
| BS | is the symbol of the declared level for bending strength |
| CC(i1/i2/y)σc | 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 at defined % of deformation |
| DS(N) | is the symbol of the declared level for dimensional stability under normal laboratory conditions |
| DS(23,90) | is the symbol of the declared value for dimensional stability under specified temperature and relative humidity conditions |
| DS (70,-) | is the symbol of the declared value for dimensional stability under specified temperature and relative humidity conditions |
| L | is the symbol of the declared class for length tolerances |
| MU | is the symbol of the declared value for water vapour diffusion resistance factor |
| P | is the symbol of the declared class for flatness tolerance |
| PL | is the symbol of the declared level of point load at defined deformation |
| S | is the symbol of the declared class for squareness tolerance |
| SD | is the declared level for dynamic stiffness |
| T | is the symbol of the declared class for thickness tolerance |
| W | is the symbol of the declared class for width tolerance |
| WL(P) | is the symbol of the declared level for water absorption by partial immersion |
| WL(T) | is the symbol of the declared level for water absorption by total immersion |

Z is the symbol of the declared value for water vapour resistance

### 3.2.2 Abbreviated terms used in this European Standard:

PEF is **P**oly**E**thylene **F**oam

[A1] PTD is **P**roduct **T**ype **D**etermination (previously named ITT for Initial Type Test) [A1]

FPC is **F**actory **P**roduction **C**ontrol

RtF is **R**eaction **t**o **F**ire

[A1] AVCP is **A**ssessment and **V**erification of **C**onstancy of **P**erformance (previously named attestation of conformity)

DoP is **D**eclaration of **P**erformance

ThIB is **T**hermal **I**nsulation for **B**uildings

VCP is **V**erification of **C**onstancy of **P**erformance (previously named evaluation of conformity) [A1]

## 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 multi-layered products additional requirements are given in Annex C.

One test result for a product property is the average of the measured values on the number of test specimens given in Table 6.



NOTE Information on additional properties is given in Annex E.

### 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.

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 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 (i.e. for sloped and tapered products) only the thermal conductivity, $\lambda_D$, shall be declared;

— the declared thermal resistance, $R_D$, and the 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, $d_N$, or $d_L$ in case of products with declared compressibility (see 4.3.10.3) 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, $d_N$, or $d_L$ in case of products with declared compressibility (see 4.3.10.3), and the corresponding thermal conductivity, $\lambda_{90/90}$, shall be rounded downwards to the nearest 0,05 $m^2$·K/W, and declared as $R_D$ in levels with steps of 0,05 $m^2$·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 $m^2$·K/W and declared as $R_D$ in levels with steps of 0,05 $m^2$·K/W.

Examples of determination of the declared values of thermal resistance, $R_D$, and thermal conductivity, $\lambda_D$, are given in Annex D.

$\lambda_U$ 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 tolerances given in Table 1.



### 4.2.3 Thickness



Thickness, $d$, shall be determined in accordance with EN 823. No test result shall deviate from the nominal thickness, $d_N$, by more than the tolerances given in Table 1 for the declared level or class.