



SLOVENSKI STANDARD

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Nadomešča:
SIST EN 13163:2009

Toplotnoizolacijski proizvodi za stavbe - Proizvodi iz ekspaniranega polistirena (EPS) - Specifikacija

Thermal insulation products for buildings - Factory made expanded polystyrene (EPS) products - Specification

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte Produkte aus expandiertem Polystyrol (EPS) - Spezifikation

Produits isolants thermiques pour le bâtiment - Produits manufacturés en polystyrène expansé (EPS) - Specification

Ta slovenski standard je istoveten z: EN 13163:2012

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 polystyrene (EPS) products - Specification

Produits isolants thermiques pour le bâtiment - Produits manufacturés en polystyrène expansé (EPS) - Spécification

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte Produkte aus expandiertem Polystyrol (EPS) - Spezifikation

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

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 13163:2012) 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of an identical text or by endorsement, at the latest by May 2013, and conflicting national standards shall be withdrawn at the latest by May 2013.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 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.

This document supersedes EN 13163:2008.

The main changes to EN 13163:2008 are:

- a) better harmonisation between the individual standards of the package (EN 13162 to EN 13171) on definitions, requirements, classes and levels;
- b) new annex on multi-layered products;
- c) new annex on voluntary verification of the reaction to fire classification of raw materials;
- d) changes on some editorial and technical content and addition of information on some specific items such as for EPS dimensional stability, compressibility;
- e) addition of links to EN 15715, *Thermal insulation products — Instructions for mounting and fixing for reaction to fire testing — Factory made products*;
- f) changes to the 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 European package of standards.

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*

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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 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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1 Scope

This European Standard specifies the requirements for factory made expanded polystyrene products, with or without rigid or flexible facings or coatings, which are used for the thermal insulation of buildings. The products are manufactured in the form of boards or rolls or other preformed ware (flat, tapered, tongue and grooves, shiplap, profiled etc.).

Products covered by this standard are also used for sound insulation and 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 class or level of a given property to be achieved by a product to demonstrate fitness for purpose in a particular application. The classes and levels required for a given application are to be found in regulations or non-conflicting standards.

Products with a declared thermal resistance lower than 0,25 m²-KW or a declared thermal conductivity at 10 °C greater than 0,060 W/(m-K) are not covered by this standard.

This standard does not cover in-situ insulation products (covered by FprEN 16025-1 and -2), products intended to be used for the insulation of building equipment and industrial installations (covered by EN 14309), products intended to be used in civil engineering applications (covered by EN 14933) and products intended to be used in beam and block systems in floors (covered by EN 15037-4).

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 1602, *Thermal insulating products for building applications — Determination of the apparent density*

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 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*

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EN 12085, *Thermal insulating products for building applications — Determination of linear dimensions of test specimens*

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 12088, *Thermal insulating products for building applications — Determination of long-term water absorption by diffusion*

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

EN 12090, *Thermal insulating products for building applications — Determination of shear behaviour*

EN 12091, *Thermal insulating products for building applications — Determination of freeze-thaw resistance*

EN 12429, *Thermal insulating products for building applications — Conditioning to moisture equilibrium under specified temperature and humidity conditions*

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

EN 12667, *Thermal performance of building material 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*

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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 13793, *Thermal insulating products for building applications — Determination of behaviour under cyclic loading*

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 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 polystyrene (EPS)

rigid cellular plastic material, manufactured by moulding beads or granules of expandable polystyrene or one of its copolymers, with an air filled closed cellular structure, which is divided into four types related to the intended use:

- EPS_i: for load bearing applications, where i stands for the declared value (expressed in compressive stress at 10 % deformation)
- EPS S: for non load bearing applications
- EPS SD: for non load bearing applications with acoustic properties
- EPS T: for floating floor applications

3.1.2

expanded polystyrene block

rigid insulation product or material generally of rectangular cross section and with a thickness not significantly smaller than the width, supplied trimmed or untrimmed

3.1.3

expanded polystyrene board

rigid insulation product (cut, moulded, or continuously foamed) of rectangular shape and cross section in which the thickness is significantly smaller than the other dimensions; it may be of uniform thickness or tapered and the edges may be of various sorts (e.g. square, half lapped, tongue and groove)

3.1.4

expanded polystyrene roll

boards or strips bonded to a flexible facing, supplied in a wound or folded form, which form a continuous insulation layer when unrolled

3.1.5

preformed ware

insulation shapes formed by cutting or routing from blocks or boards or by shape moulding

3.1.6

level

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

3.1.7

class

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

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3.1.8

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 either horizontally by chemical or physical adhesion

3.1.9

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

3.1.10

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

3.1.11

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

3.2 Symbols, units and abbreviated terms

Symbols and units used in this standard:

$l - \alpha$	is the prediction interval	1
b	is the width	mm
b_0	is a regression coefficient	kPa
b_1	is a regression coefficient	kPa·m ³ /kg
c	is the compressibility	mm
d	is the thickness	mm
δ	is the water vapour permeability	mg/(Pa·h·m)
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
d_s	is the thickness of the test specimen	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	%
ε_1	is the deformation after step A in accordance with EN 1605	%
ε_2	is the deformation after step B in accordance with EN 1605	%
ε_{ct}	is the compressive creep	%

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$\varepsilon_{i,max}$	is the maximum relative deformation in accordance with EN 13793	%
ε_t	is the total relative thickness reduction	%
E_{dyn}	is the dynamic elasticity modulus	MN/m ²
G	is the shear modulus	kPa
i	is a counter	1
k	is a factor related to the number of test results available	1
l	is the length	mm
$\lambda_{90,90}$	is the 90 % fractile with a confidence level of 90 % for the thermal conductivity	W/(m·K)
λ_D	is the declared of 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)
λ_{pred}	is the predicted thermal conductivity with a prediction interval of 90 %	W/(m·K)
λ_U	is the design value of thermal conductivity	W/(m·K)
μ	is the water vapour diffusion resistance factor	1
n	is the number of test results	1
ρ_a	is the apparent density	kg/m ³
ρ_{mean}	is the mean density	kg/m ³
$R_{90/90}$	is the 90 % fractile with a 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 thermal resistance	m ² ·K/W
R_U	is the design value of thermal resistance	m ² ·K/W
s'	is the dynamic stiffness	MN/m ³
σ_{10}	is the compressive stress at 10 % deformation	kPa
$\sigma_{10, mean}$	is the mean compressive stress at 10 % deformation	kPa
$\sigma_{10, pred}$	is the predicted compressive stress at 10 % deformation with a prediction interval of 90 %	kPa
σ_b	is the bending strength	kPa
σ_c	is the compressive stress	kPa
σ_i	is the compressive stress chosen for testing according to EN 13793	kPa
σ_{mt}	is the tensile strength perpendicular to faces	kPa
S_b	is the deviation from squareness on length and width	mm/m

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S_d	is the deviation from squareness on thickness	mm/m
s_λ	is the estimate of the standard deviation of the thermal conductivity	W/(m·K)
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_σ	is the estimate of the standard deviation of the compressive stress	kPa
t	is the testing time	d
$t_{k,1-\alpha}$	is the fractile of the Student distribution (k is the number of freedoms)	1
τ	is the shear strength	kPa
W_{dV}	is the water absorption by diffusion	%
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	%
WV	is the additional water absorption	%
X_0	is the initial deformation after 60 s from the beginning of the loading	mm
X_τ	is the deformation at time t (total thickness reduction)	mm
Z	is the water vapour resistance	m ² ·h·Pa/mg

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BS	is the symbol of the declared level for bending strength
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)	is the symbol of the declared level for compressive stress at 10 % deformation
DS(N)	is the symbol of the declared class for dimensional stability under constant normal laboratory conditions
DS(23,90); DS(70,-); DS(70,90)	is the symbol of the declared level for dimensional stability under specified temperature and humidity conditions
DLT(5)	is the symbol of the declared level for dimensional stability under load and temperature conditions
FTCD	is the symbol of the declared class for freeze-thaw resistance when using samples prepared by water absorption by diffusion
FTCI	is the symbol of the declared class for freeze-thaw resistance when using samples prepared by long term water absorption by total immersion
GM	is the symbol of the declared level for shear modulus
L	is the symbol of the declared class for length tolerances
MU	is the symbol of the declared water vapour diffusion behaviour
P	is the symbol of the declared class for flatness
S	is the symbol of the declared class for squareness
SD	is the symbol of the declared level for dynamic stiffness
SS	is the symbol of the declared level for shear strength
T	is the symbol of the declared class for thickness tolerance

TR	is the symbol of the declared level for tensile strength perpendicular to faces
W	is the symbol of the declared class for width tolerance
WD(V)	is the symbol of the declared level for water absorption by diffusion
WL(P)	is the symbol of the declared level for long term water absorption by partial immersion
WL(T)	is the symbol of the declared level for long term water absorption by total immersion
Z	is the symbol of the declared water vapour resistance value

Abbreviated terms used in this standard:

EPS	is Expanded PolyStyrene
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.

NOTE Information on additional properties is given in Annex F.

For multi-layered products, additional requirements are given in Annex D.

One test result for a product property is the average of the measured values on the number of test specimens given in Table 9.

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 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;
- for products of uniform thickness, the 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 (i.e. for sloped, tapered or shape moulded non flat products) only the thermal conductivity, λ_D , shall be declared;
- the declared thermal resistance, R_D , and the 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 %;