



SLOVENSKI STANDARD
oSIST prEN 17139:2017
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Toplotnoizolacijski proizvodi za stavbe - Proizvodi na osnovi rastlinskih vlaken (VFBP)

Thermal insulation products for building - Factory made vegetal fibres based products (VFBP)

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte Produkte aus Pflanzenfasern (VFBP)

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Produits isolants thermiques pour le bâtiment - Produits manufacturés à base de fibres végétales (VFBP)

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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

DRAFT
prEN 17139

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ICS 91.100.60

English Version

Thermal insulation products for building - Factory made vegetal fibres based products (VFBP)

Produits isolants thermiques pour le bâtiment -
Produits à base de fibres végétales (VFBP)

Wärmedämmstoffe für Gebäude - Wärmedämmstoffe
auf Basis von pflanzlichen Fasern (VFBP)

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 88.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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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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prEN 17139:2017 (E)**European foreword**

This document (prEN 17139:2017) has been prepared by Technical Committee CEN/TC 88 “Thermal insulating materials and products”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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.

For relationship with EU Directive, see informative Annex ZA which is an integral part of this document.

This European Standard is one of a series of standards for 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 European Standards, setting 21 months after availability as the date of withdrawal (dow) of national standards which conflict with the European Standards of this package.

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 insulation products exceeds by far the energy used and emissions made during the production and disposal processes.

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1 Scope

This European Standard specifies the requirements for factory made vegetal fibres based products (VFBP), with or without facings or coatings and with or without integral reinforcement, which are used for thermal insulation of buildings. Products are manufactured in form of rolls, felts, slabs or boards. Products covered by this standard may also be used for acoustic applications. The standard also covers multilayered boards and slabs and composites insulation boards and slabs. Products covered by this standard are also used in prefabricated insulating systems and composites panels. The structural performance of systems incorporating these products is not covered by this standard.

This European Standard applies to any thermal insulation products made of at least 70 % of vegetal fibres per mass with or without the addition of bonding agents or bonding fibres and/or additives and which don't fall within the scope of the EN 13171. It does not replace the existing procedures for the determination of the declared properties of products already covered by an existing harmonized standard. This standard does not specify the required level of all properties to be achieved by a product to demonstrate fitness for purpose in a particular application. The required levels are to be found in regulations or non-conflicting standards. Products with a declared thermal conductivity at 10 °C, greater than 0,08 W/(m.K) or a declared thermal resistance lower than 0,20 m²/k/W are not covered by this standard. This European Standard does not cover *in situ* applied insulation and products intended to be used in the insulation of building equipment and industrial installations.

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

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 1608, *Thermal insulating products for building applications - Determination of tensile strength parallel to faces*

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

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

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 insulating 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, *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, *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*

EN 29053, *Acoustics - Materials for acoustical applications - Determination of airflow resistance (ISO 9053)*

EN ISO 354, *Acoustics - Measurement of sound absorption in a reverberation room (ISO 354)*

EN ISO 10456, *Building materials and products - Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values (ISO 10456)*

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)*

ISO 16269-6, *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 following terms and definitions apply.

3.1.1

agro fibres

fibres from stalk, leaf, seed or fruit of agricultural products (for example hemp, flax, sisal, cotton, coconut...)

prEN 17139:2017 (E)**3.1.2****wood fibres**

fibres from wood

3.1.3**vegetal fibres**

included agro fibres, wood fibres and paper

3.1.4**factory made vegetal fibres based products (VFBP)**

factory insulation products made of at least 70% of vegetal fibres per mass with or without the addition of bonding agents or bonding fibres and/or additives and which do not fall within the scope of the EN 13171

3.1.5**level**

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

3.1.6**class**

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

3.1.7**board, slabs**

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: Boards are usually thinner than slabs. They may also be supplied in tapered form.

3.1.8**facings**

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

3.1.9**coating**

functional or decorative surface layer with a thickness of less than 3 mm usually applied by painting, spraying, pouring or trowelling

3.1.10**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

3.1.11**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

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3.2 Symbols and abbreviations

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

α_p	is the practical sound absorption coefficient	–
a_w	is the weighted sound absorption coefficient	–
b	is the width	mm
c	is the compressibility	mm
d	is the thickness	mm
F_p	is the compressive force at critical point	kN
d_N	is the nominal thickness	mm
d_B	is the thickness under a load of 2 kPa, after a short time load of 48 kPa	mm
d_L	is the thickness under a load of 250 kPa	mm
$\Delta\varepsilon_l$	is the relative change in length	%
$\Delta\varepsilon_b$	is the relative change in width	%
K_i	is a factor related to the number of test results available	–
l	is the length	mm
λ	is the 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)
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)
λ_U	is the design thermal conductivity	W/(m·K)
μ	is the water vapour diffusion resistance factor	–
n	is the number of test results	–
$\psi_{23,50}$	is the moisture content at 23 °C and 50 % relative humidity	m ³ /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 thermal resistance	m ² ·K/W
ρ_a	is the apparent density	kg/m ³
ρ_0	is the dry density of the thermal product	kg/m ³
ρ_w	is the density of water	kg/m ³
S_b	is the deviation from squareness on length and width	mm/m

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S_{\max}	is the deviation from flatness	mm
S_R	is the estimate of the standard deviation of the thermal resistance	$m^2 \cdot K/W$
S_λ	is the estimate of the standard deviation of the thermal conductivity	$W/(m \cdot K)$
s'	is the dynamic stiffness	MN/m^3
σ_c	is the declared compressive stress	kPa
σ_{10}	is the compressive stress at 10 % deformation	kPa
σ_m	is the compressive strength	kPa
σ_{mt}	is the tensile strength perpendicular to faces	kPa
σ_t	is the tensile strength parallel to faces	kPa
τ	Is the shear strength	kPa
$u_{23,50}$	is the moisture content	kg/kg
W_p	is the short-term water absorption	kg/m^2
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	$m^2 \cdot h \cdot Pa/mg$

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AF_r	is the symbol of the declared level of airflow resistivity
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
$CC(i_1/i_2/y)\sigma_c$	is the symbol of the declared level for long term 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 strength
DS(N)	is the symbol of the declared value for dimensional stability at normal laboratory temperature and relative humidity conditions
DS(70,-)	is the symbol of the declared value for dimensional stability at 70 °C
DS(23/90)	is the symbol of the declared value for dimensional stability at 23 °C and 90 % relative humidity
DS(70/90)	is the symbol of the declared value for dimensional stability at 70 °C and 90 % relative humidity
MU	is the symbol of the declared value for water vapour diffusion resistance factor
PL(5)	is the symbol for the declared level of point load for 5 mm deformation
SD	is the symbol of the declared level of dynamic stiffness
T	is the symbol of the declared class for thickness tolerances
Tri	is the symbol of the declared level for tensile strength perpendicular to faces
WS	is the symbol of the declared level for short-term water absorption

Z	is the symbol of the declared value for water vapour resistance
DS(70/90)	is the symbol of the declared value for dimensional stability at 70 °C and 90 % relative humidity

Abbreviated terms used in this standard:

VF	is Vegetal Fibres
PTD	is Product Type Determination
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 D.

One test result for a product property is the average of the measured values on the number of test specimens given in Table 8.

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 the one the material has when equilibrium with the air at 23 °C and relative humidity 50 %;
- the measured values shall be expressed with three significant figures;
- for products of uniform thickness, the declared thermal resistance, RD, 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 and tapered products) only the thermal conductivity, λ_D , shall be declared;
- the declared thermal resistance, RD, 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 %;
- 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);

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- 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 4.3.11.3) 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 , and the corresponding declared thermal conductivity, $\lambda_{90/90}$, shall be rounded upwards to the nearest $0,05 \text{ m}^2 \cdot \text{K}/\text{W}$, and declared in levels with steps of $0,05 \text{ m}^2 \cdot \text{K}/\text{W}$;
- 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 $0,05 \text{ m}^2 \cdot \text{K}/\text{W}$ and declared as R_D in levels with steps of $0,05 \text{ m}^2 \cdot \text{K}/\text{W}$.

Examples of the determination of the declared values of thermal resistance, R_D , and the thermal conductivity, λ_D , are given in Annex E.

λ_U and R_U (design values) should 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:

$\pm 2 \%$ for length (for rolls, mats and felts no upper limit),

$\pm 1,5 \%$ for width.

4.2.3 Thickness

Thickness, d , for products not intended for floating floors shall be determined in accordance with EN 823 under a load of $(250 \pm 5) \text{ Pa}$ except for products with a level of compressive stress or strength of $\leq 10 \text{ kPa}$, where the load shall be $(50 \pm 5) \text{ Pa}$. 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.

Table 1 — Level and classes for thickness tolerances

Level or class	Tolerances	
	Lower	Upper
T1	-5 mm	Infinite
T2	-5 mm	+15 % or +15 mm ^a
T3	-4 mm	+10 % or +10 mm ^a
T4	-3 mm	+5 % or +5 mm ^a
T5	-1 mm	+3 mm

^a Whichever gives the smallest numerical tolerance

This test shall not be performed when the tests described in 4.3.10 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 , of boards and slabs shall not exceed $5 \text{ mm}/\text{m}$.

4.2.5 Flatness

Flatness shall be determined in accordance with EN 825. The deviation from flatness, of boards and slabs, S_{\max} , shall not exceed 6 mm.

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

Reaction to fire classification of the product shall be determined in accordance with EN 13501-1 and the mounting and fixing rules given in EN 15715, even if the behaviour is determined under 4.3.

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.

4.2.7 Durability characteristics

4.2.7.1 General

The appropriate durability characteristics have been considered and are covered in 4.2.7.2, 4.2.7.3 and where appropriate in 4.3.7 on compressive creep.

4.2.7.2 Durability of reaction to fire of the product as placed on the market against heat, weathering, ageing/degradation

The reaction to fire performance of vegetal based products as declared by 4.2.6 Reaction to fire of the product as placed on the market does not change with time.

4.2.7.3 Durability of thermal resistance and thermal conductivity and dimensional stability against heat, weathering, ageing/degradation

The thermal conductivity of vegetal based products is covered by 4.2.1 thermal conductivity, 4.2.2 Length and width and 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 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, $\Delta\varepsilon_l$, and width, $\Delta\varepsilon_b$ and the relative reduction in thickness, $\Delta\varepsilon_d$, shall not exceed the values given in Table 2 for the declared level.