



SLOVENSKI STANDARD SIST EN 13168:2002

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Toplotnoizolacijski proizvodi za stavbe - Proizvodi iz lesne volne (WW) - Specifikacija

Thermal insulation products for buildings - Factory made wood wool (WW) products -
Specification

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte Produkte aus Holzwolle (WW)
- Spezifikation

Produits isolants thermiques pour le bâtiment - Produits manufacturés en laine de bois
(WW) - Spécification

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English version

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This European Standard was approved by CEN on 16 April 2001.

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 Management Centre or to any CEN member.

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 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

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Foreword

This European Standard has been prepared by the 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of an identical text or by endorsement, at the latest by November 2001, and conflicting national standards shall be withdrawn at the latest by March 2003.

This European Standard 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 standard.

This European Standard contains five annexes:

- Annex A (normative) Determination of the declared values of thermal conductivity and thermal resistance;
- Annex B (normative) Factory production control;
- Annex C (normative) Specific test methods;
- Annex D (normative) Specific items concerning this standard;
- Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Directive.

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 products of expanded polystyrene (EPS) – Specification.*
- EN 13164, *Thermal insulation products for buildings – Factory made products of extruded polystyrene foam (XPS) – Specification.*
- EN 13165, *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products – Specification.*
- EN 13166, *Thermal insulation products for buildings – Factory made products of phenolic foam (PF) – 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 products of expanded perlite (EPB) – 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.*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the requirements for factory made products of wood wool, with or without facings, which are used for the thermal insulation of buildings.

The standard also specifies the requirements for the factory made composite products, made from wood wool in combination with other insulation materials. The products are manufactured in the form of boards or slabs.

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 insulation 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/classes 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 m²K/W or a declared thermal conductivity greater than 0,1 W/(m·K) at 10 °C are not covered by the 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.

This standard does not cover the following acoustical aspects: direct airborne sound insulation and impact noise transmission.

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2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 354:1993/A1, *Acoustics – Measurement of sound absorption in a reverberation room – Amendment 1: Test specimen mountings for sound absorption tests (ISO 354:1985/AMD 1:1997)*.

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*.

prEN ISO 1182, *Reaction to fire tests for building products – Non-combustibility test (ISO/DIS 1182:1998)*.

EN 1602, *Thermal insulating products for building applications – Determination of apparent density*.

EN 1604, *Thermal insulation products for building applications – Determination of dimensional stability under specified temperature and humidity conditions*.

EN 1605, *Thermal insulating products for building applications – Determination of dimensional stability under specified 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.*

prEN ISO 1716, *Reaction to fire tests for building products – Determination of calorific potential value (ISO/DIS 1716:1998).*

prEN ISO 9229, *Thermal insulation – Definitions of terms (ISO/DIS 9229:1997).*

EN ISO 11654, *Acoustics – Sound absorbers for use in buildings – Rating of sound absorption (ISO 11654:1997).*

prEN ISO 11925-2, *Reaction to fire tests for building products – Part 2: Ignitability when subjected to direct impingement of flame (ISO/DIS 11925-2:1998).*

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 application – Determination of the behaviour under point load.*

prEN 12667, *Thermal performance for 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 for 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 13172:2001, *Thermal insulating products – Evaluation of conformity.*

prEN 13501-1:2000, *Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire test.*

prEN 13820, *Thermal insulating products for building applications – Determination of organic content.*

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

ISO 12491, *Statistical methods for quality control of building materials and components.*

3 Terms, definitions, symbols, units and abbreviated terms

3.1 Terms and definitions

For the purposes of this standard, the following terms and definitions apply.

3.1.1 Terms and definitions as given in prEN ISO 9229

3.1.1.1

wood wool

long shavings of wood

3.1.1.2

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

3.1.2 Additional terms and definitions

3.1.2.1 level

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

3.1.2.2 class

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

3.1.2.3 inorganic cementing agent

binder used for producing wood wool products are portland cement, magnesite and a combination of cement and lime

3.1.2.4 wood wool board, slab

rigid insulation product manufactured from loose wood wool, bonded with a mineral binder and compressed to its final thickness

3.1.2.5 composite wood wool slab

composite insulation product in which wood wool is bonded with a mineral binder, on one or both face(s) to other insulating materials, e.g. mineral wool, foamed rigid cellular plastics. The final thickness of the „two layer“ or „three layer“ products, produced in this way, is determined during manufacture. The wood wool layer(s) of composite wood wool slabs shall cover the bonded insulation layer completely

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3.2 Symbols, units and abbreviated terms

Symbols and units used in this standard: [SIST EN 13168:2002](#)

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α_p	is the practical sound absorption coefficient	—
α_w	is the weighted sound absorption coefficient	—
b	is the width	mm
d	is the thickness	mm
d_N	is the nominal thickness of the product	mm
$\Delta\epsilon_b$	is the relative change in width	%
$\Delta\epsilon_d$	is the relative change in thickness	%
$\Delta\epsilon_l$	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	—
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 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)
μ	is the water vapour diffusion resistance factor	—
n	is the number of test results	—
$R_{90/90}$	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
ρ_a	is the apparent density	kg/m ³
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)
σ_{10}	is the compressive stress at 10% deformation	kPa
σ_b	is the bending strength	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
W_p	is the short term water absorption	kg/m ²
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	$m^2 \cdot h \cdot Pa/mg$
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 for a specified span	
CC(i mm ,y)	σ_c is the symbol of the declared level for compressive creep	
CI	is the symbol of the declared level for chloride content	
CS(10Y)	is the symbol of the declared level for compressive stress or strength	
DS(L)	is the symbol of the declared value for dimensional stability under specified load and temperature conditions	
DS(TH)	is the symbol of the declared dimensional stability at 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 value for flatness tolerances	
PL(2)	is the symbol of the declared level of point load for 2 mm deformation	
S	is the symbol of the declared class for squareness tolerances	
T	is the symbol of the declared class for thickness tolerances	
TR	is the symbol of the declared level for tensile strength perpendicular to faces	
W	is the symbol of the declared class for width tolerances	
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	

Abbreviated terms used in this standard:

WW	is Wood Wool board, slab
WW-C	is Composite Wood Wool board, slab
WW-C/3 EPS	is 3-layered Composite Wood Wool board, slab in combination with EPS
ITT	is Initial Type Test

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4 Requirements

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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.

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

All thermal insulating products used for the manufacture of WW-C-slabs shall comply with the relevant European Product Standards.

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 prEN 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;
- the thermal resistance, R_D , shall always be declared. The thermal conductivity, λ_D , shall be declared where possible;

- the declared thermal resistance, R_D , and 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 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 $\lambda_{90/90}$.
- the value of the 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 downwards to the nearest 0,05 m²·K/W, and declared as R_D in levels with steps of 0,05 m²·K/W;
- the value of $R_{90/90}$, 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.

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 length and width by more than the tolerances given in Table 1 for the declared class.

Table 1 - Classes for length and width tolerances

Class	Tolerances mm
L1	+ 5, - 10
L2	+ 3, - 5
L3	± 1 ^a ; ± 2 ^b
W1	± 3
W2	± 1

^a For nominal length ≤ 1250 mm.
^b For nominal length > 1250 mm.

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 2 for the declared class.

Table 2 - Classes for thickness tolerances

Class	Tolerances mm	Nominal thickness mm
T1	+ 3, - 2	≤ 100
T2	± 1	
T3	+ 4, - 3	> 100
T4	± 2	

4.2.4 Squareness

Squareness, S_b , shall be determined in accordance with EN 824. The deviation from squareness shall not exceed the requirements given in Table 3 for the declared level.

Table 3 - Levels for the deviation from sqareness

Level	Requirement mm/m
S1	≤ 6
S2	≤ 4
S3	≤ 2

4.2.5 Flatness

The property is only relevant for faced products. Flatness, S_{max} , shall be determined in accordance with EN 825. The deviation from flatness shall not exceed the requirements given in Table 4 for the declared level.

Table 4 - Levels for deviation from flatness

Level	Requirement mm
P1	≤ 6
P2	≤ 3

4.2.6 Compressive stress or compressive strength

Compression stress at 10 % deformation, σ_{10} , or the compressive strength, σ_m , shall be determined in accordance with EN 826. No test result for either the compressive stress or the compressive strength, which ever is the smaller, shall be less than the value, given in Table 5 for the declared level.

Table 5 - Levels for compressive stress or compressive strength

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Level	Requirement kPa
CS(10/Y)20	≥ 20
CS(10/Y)30	≥ 30
CS(10/Y)50	≥ 50
CS(10/Y)75	≥ 75
CS(10/Y)100	≥ 100
CS(10/Y)150	≥ 150
CS(10/Y)200	≥ 200
CS(10/Y)300	≥ 300
CS(10/Y)500	≥ 500
CS(10/Y)750	≥ 750
CS(10/Y)1000	≥ 1000

For handling purposes, all products shall have as a minimum level CS(10/Y)20

4.2.7 Apparent density and mass per unit area

The apparant density of wood wool slabs, ρ_a , shall be determined in accordance with EN 1602. No test result shall differ from the declared value by more than $\pm 10\%$.

The mass per unit area of composite wood wool slabs shall be determined from measurements of mass and shall be determined in accordance with EN 1602. No test result shall differ from the declared value by more than $\pm 10\%$.

