



# SLOVENSKI STANDARD

## SIST EN 13168:2013+A1:2015

01-april-2015

Nadomešča:  
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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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#### 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 wood wool (WW) products - Specification

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

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte Produkte aus Holzwolle (WW) - 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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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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**EN 13168:2012+A1:2015 (E)****Foreword**

This document (EN 13168:2012+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of an identical text or by endorsement, at the latest by August 2015, and conflicting national standards shall be withdrawn at the latest by November 2016.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  $\boxed{A_1}$  EN 13168:2012  $\boxed{A_1}$ .

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  $\boxed{A_1}$   $\boxed{A_1}$ .

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).

$\boxed{A_1}$  For relationship with EU Construction Products Regulation (CPR), see informative Annex ZA, which is an integral part of this standard.  $\boxed{A_1}$

Compared with EN 13168:2008, 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 such as for MW: lamella, compressibility, etc;
  - d) addition of links to EN 15715, *Thermal insulation products — Instruction for mounting and fixing for reaction to fire testing — Factory made products*;
  - e) changes of Annex ZA.

$\boxed{A_1}$  Amendment 1 modifies EN 13168:2012 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

- f) an addition to the foreword;
- g) an addition in 3.2;
- h) an addition in 4.3.12;
- i) modification of Clause 7;
- j) modification of Clause 8;
- k) modification of Annex B;

l) a new Annex ZA. 

This 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 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 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.

**EN 13168:2012+A1:2015 (E)****1 Scope**

This European Standard specifies the requirements for factory made wood wool (WW) 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 or slabs.

This European Standard also specifies the requirements for the factory made composite products, made from wood wool in combination with other insulation materials.

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

Products covered by this European 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 and 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 m<sup>2</sup>·K/W or a declared thermal conductivity greater than 0,100 W/(m·K) at 10 °C are not covered by this standard.

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

EN 12430, *Thermal insulating products for building applications — Determination of behaviour under point load*

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*

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

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 for building products — 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:

**EN 13168:2012+A1:2015 (E)****3.1.1****wood wool**

long shavings of wood, deriving from a shaving process which insures wood wool with parallel edges, where the length to width ratio is  $\geq 20:1$

**3.1.2****inorganic cementing agent**

binders used for producing wood wool products are cement, combinations of cement and lime, magnesite and gypsum

**3.1.3****wood wool board, wood wool slab**

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

**3.1.4****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

EXAMPLE mineral wool, foamed rigid cellular plastics.

Note 1 to entry: The final thickness of the "two layer" or "three layer" products, produced in this way, is determined during manufacture.

Note 2 to entry: The wood wool layer(s) of composite wood wool slabs cover the bonded insulation layer completely.

**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

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**3.1.6****class**

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

**3.1.7****boards, 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****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

**3.1.9****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 layers to be added to the thermal resistance of the product

**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 by chemical or physical adhesion either horizontally and/or vertically

**3.2 Symbols, units and abbreviated terms**

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

$\alpha_p$	is the practical sound absorption coefficient	–
$\alpha_w$	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
$\Delta\varepsilon_b$	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	–
$l$	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 thermal conductivity	W/(m·K)
$\lambda_i$	is one test result of thermal conductivity	W/(m·K)
$\lambda_{\text{mean}}$	is the mean thermal conductivity	W/(m·K)
$\lambda_U$	is the design thermal conductivity	W/(m·K)
$\mu$	is the water vapour diffusion resistance factor	–
$N$	is the number of test results	–
$R_{90/90}$	is a 90 % fractile with a confidence level of 90 % for the thermal resistance	m <sup>2</sup> ·K/W
$R_D$	is the declared thermal resistance	m <sup>2</sup> ·K/W
$R_i$	is one test result of thermal resistance	m <sup>2</sup> ·K/W
$R_{\text{mean}}$	is the mean thermal resistance	m <sup>2</sup> ·K/W
$R_U$	is the design thermal resistance	m <sup>2</sup> ·K/W
$\rho_a$	is the apparent density	kg/m <sup>3</sup>
$S_b$	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	$m^2 \cdot K/W$
$s_\lambda$	is the estimate of the standard deviation of the thermal conductivity	$W/(m \cdot K)$
$\sigma_{10}$	is the compressive stress at 10 % deformation	kPa
$\sigma_b$	is the bending strength	kPa
$\sigma_c$	is the compressive stress	kPa
$\sigma_m$	is the compressive strength	kPa
$\sigma_{mt}$	is the tensile strength perpendicular to faces	kPa
$W_p$	is the short term water absorption	$kg/m^2$
$\chi_{ct}$	is the compressive creep	mm
$\chi_t$	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
$CC(i_1/i_2/y)\sigma_c$	is the symbol of the declared level for compressive creep
CI	is the symbol of the declared level for chloride content
CS(10\Y)	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
DS(70,-)	is the symbol of the declared value for dimensional stability at specified temperature
DS (23,90) or DS (70,90)	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 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 <b>Wood Wool</b> board, slab
WW-C	is <b>Composite Wood Wool</b> board, slab
WW-C/3 xx	is <b>3-layered Composite Wood Wool</b> board, slab in combination with <b>xx</b> .

NOTE 1 xx stands for the suitable insulation material used.

WW-C/3 MW (5/90/5)

NOTE 2 Figures in brackets give the nominal thickness of xx layers.

<b>A1</b> ) PTD	is <b>Product Type Determination</b> (previously named ITT for Initial Type Test) <b>A1</b>
FPC	is <b>Factory Production Control</b>
RtF	is <b>Reaction to Fire</b>
<b>A1</b> ) AVCP	is <b>Assessment and Verification of Constancy of Performance</b> (previously named attestation of conformity)
DoP	is <b>Declaration of Performance</b>
ThIB	is <b>Thermal Insulation for Buildings</b>
VCP	is <b>Verification of Constancy of Performance</b> (previously named evaluation of conformity) <b>A1</b>

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**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.

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 10.

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

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 EN 12667 or EN 12939 for thick products and in accordance with 5.2, 5.3.2 and Annex E.

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 material has when equilibrium with the air at 23 °C and relative humidity of 50 %;

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- 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 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  $d_N$ , and the corresponding thermal conductivity  $\lambda_{90/90}$ , unless measured directly;
- the statistical 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 m<sup>2</sup>·K/W, and declared as  $R_D$  in levels with steps of 0,05 m<sup>2</sup>·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<sup>2</sup>·K/W and declared as  $R_D$  in levels with steps of 0,05 m<sup>2</sup>·K/W.

NOTE  $\lambda_U$  and  $R_U$  (design values) may be determined with reference to EN ISO 10456.

#### 4.2.2 Length and width

SIST EN 13168:2013+A1:2015

<https://standards.iteh.ai/catalog/standards/sist/d7d06f22-fb7e-4979-a2f6-127c40cc59d0/sist-en-13168-2013-a1-2015>

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	+2, -3
L4	± 1 <sup>a</sup> ; ± 2 <sup>b</sup>
W1	± 3
W2	± 1
<sup>a</sup> For nominal length ≤ 1 250 mm. <sup>b</sup> For nominal length > 1 250 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	
	T1	+3, -2 <sup>a</sup>
T2	± 1 <sup>a</sup>	± 2 <sup>b</sup>
<sup>a</sup> For nominal length ≤ 1 250 mm. <sup>b</sup> For nominal length > 1 250 mm.		

#### 4.2.4 Squareness

Squareness,  $S_b$ , shall be determined in accordance with EN 824. The deviation from squareness on length and width shall not exceed 5 mm/m.

#### 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 3 for the declared level.

Table 3 — Levels for deviation from flatness

Level	Requirement mm
P1	≤ 6
P2	≤ 3

#### 4.2.6 Compatibility with other materials (chloride content)

The compatibility of wood wool slabs and the wood wool layers of composite wood wool slabs with other building materials is assessed through measurements of chloride content, determined in accordance with D.1. No test result shall exceed the values given in Table 4 for the declared level.

Table 4 — Levels for chloride content

Level	Requirement %
Cl1	≤ 0,35
Cl2	≤ 0,15
Cl3	≤ 0,06

#### 4.2.7 Tensile strength perpendicular to faces

Tensile strength perpendicular to faces,  $\sigma_{mt}$ , shall be determined in accordance with EN 1607. No test result shall be lower than the value given in Table 5 for the declared level.