



SLOVENSKI STANDARD

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SIST EN 13167:2009

Toplotnoizolacijski proizvodi za stavbe - Proizvodi iz penjenega stekla (CG) - Specifikacija

Thermal insulation products for buildings - Factory made cellular glass (CG) products -
Specification

Wärmedämmstoffe für Gebäude - Werkmässig hergestellte Produkte aus Schaumglas
(CG) - Spezifikation

Produits isolants thermiques pour le bâtiment - Produits manufacturés en verre cellulaire
(CG) - Spécification <https://standards.iteh.ai/catalog/standards/sist/41539489-4b34-44d0-a47d-6edb0afd54d9/sist-en-13167-2013>

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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 cellular glass (CG) products - Specification

Produits isolants thermiques pour le bâtiment - Produits manufacturés en verre cellulaire (CG) - Spécification

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte Produkte aus Schaumglas (CG) - Spezifikation

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

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

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Contents

Page

Foreword.....	3
1 Scope	5
2 Normative references	5
3 Terms, definitions, symbols, units and abbreviated terms	7
4 Requirements	10
5 Test methods.....	16
6 Designation code.....	19
7 Evaluation of conformity.....	20
8 Marking and labelling	20
Annex A (normative) Determination of the declared values of thermal resistance and thermal conductivity.....	22
Annex B (normative) Initial type testing (ITT) and factory production control (FPC)	24
Annex C (normative) CG multi-layered insulation products	28
Annex D (informative) Additional properties	30
Annex E (informative) Preparation of the test specimens to measure thermal conductivity.....	32
Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Directive.....	33
Bibliography	41
Tables	
Table 1 — Dimensional stability under specified conditions.....	12
Table 2 — Levels for compressive strength	13
Table 3 — Levels for bending strength.....	14
Table 4 — Levels for deformation under point load.....	14
Table 5 — Test methods, test specimens and conditions	18
Table A.1 — Values for k for one sided 90 % tolerance interval with a confidence level of 90 %.....	23
Table B.1 — Minimum number of tests for ITT and minimum product testing frequencies	24
Table B.2 — Minimum product testing frequencies for the reaction to fire characteristics	26
Table D.1 — Test methods, test specimens, conditions and minimum testing frequencies	31
Table ZA.1 — Relevant clauses for Cellular glass and intended use	34
Table ZA.2 — Systems of attestation of conformity	35
Table ZA.3.1 — Assignment of evaluation of conformity tasks for products under system 1 for reaction to fire and system 3 for other characteristics	36
Table ZA.3.2 — Assignment of evaluation of conformity tasks for products under system 3 or system 3 combined with system 4 for reaction to fire	37
Figures	
Figure ZA.1 — Example CE marking information.....	40

Foreword

This document (EN 13167:2012) 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 13167:2008.

Compared with EN 13167:2008, 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 point load (move towards 4.3); compressive strength (additional levels); bending strength (additional levels);
 - d) addition of links to EN 15715, *Thermal insulation products — Instructions for mounting and fixing for reaction to fire testing — Factory made products*;
 - e) 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 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 13167:2012 (E)

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 cellular glass (CG) 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.

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

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 0,50 m²·K/W or a declared thermal conductivity greater than 0,065 W/(m·K) at 10 °C are not covered by this 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 14305).

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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 826:1996, *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 1608, *Thermal insulating products for building applications — Determination of tensile strength parallel to faces*

EN 13167:2012 (E)

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 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*

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 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: 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

cellular glass

rigid insulation material made from expanded glass with a closed cell structure

Note 1 to entry: Cellular glass may also be supplied in tapered form.

3.1.2

faced cellular glass board

board of cellular glass with facing(s) with a maximum of 3 mm on one or two faces which may be roofing felt or metal foil or paper, cardboard, plastic foil, rendering or similar materials

Note 1 to entry: The core may consist of either one board, a part of a board or a number of boards bonded edge to edge in the factory, with an appropriate adhesive

Note 2 to entry: Cellular glass boards may also be supplied in tapered form.

3.1.3

level

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

3.1.4

class

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

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: Board is usually thinner than 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

EN 13167:2012 (E)

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

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

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
$\Delta\varepsilon_b$	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 in flatness	mm/m
k	is a factor related to the number of test results	–
l	is the length	mm
λ	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)
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	–
P_d	is the deformation under point load	mm
$R_{90/90}$	is a 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
S_b	is the deviation from squareness of the edge on length and width	mm/m
S_d	is the deviation from squareness of the edge on thickness	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_b	is the bending strength	kPa
σ_c	is the compressive stress	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
W_{lp}	is the long term water absorption by partial immersion	kg/m ²
W_p	is the short term water absorption	kg/m ²
X_{ct}	is the compressive creep	mm
X_t	is the total thickness reduction at time t	mm
Z	is the water vapour resistance	m ² ·h·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($i_1/i_2/y$) σ_c	is the symbol of the declared level for compressive creep
CS(Y)	is the symbol of the declared level for compressive strength
DS(N)	is the symbol of the declared value for dimensional stability in normal condition
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
MU	is the symbol of the declared value for water vapour diffusion resistance factor
PL(P)	is the symbol of the declared level for penetration under point load
TR	is the symbol of the declared level for tensile strength perpendicular to faces
WL(P)	is the symbol of the declared level for long term water absorption by partial immersion
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:

CG is Cellular Glass

ITT is Initial Type Test

FPC is Factory Production Control

RtF is Reaction to Fire

EN 13167:2012 (E)

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.

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 5.

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, 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, 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 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);
- 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 thermal resistance, $R_{90/90}$, when calculated from the nominal thickness, d_N , and the corresponding 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 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 m²·K/W, and declared as R_D in levels with steps of 0,05 m²·K/W;

NOTE λ_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 following:

- Slabs or unfaced board: ± 2 mm for length and width
- Faced board: ± 5 mm for length
 ± 2 mm for width

4.2.3 Thickness

Thickness, d , shall be determined in accordance with EN 823. The load shall be 250 Pa. No test result shall deviate from the nominal thickness, d_N , by more than ± 2 mm.

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 mm/m. The deviation from squareness on thickness, S_d , shall not exceed 2 mm.

4.2.5 Flatness

Flatness shall be determined in accordance with EN 825. The deviation from flatness, S_{max} , of boards and slabs, shall not exceed 2 mm.

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

Reaction to fire classification of the product, as placed on the market, shall be determined in accordance with EN 13501-1 and the mounting and fixing rules given in EN 15715.

NOTE 1 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.

Manufacturers declaring Euroclass A1 without further test shall demonstrate by testing in accordance with EN 13820 that the products do not contain more than 1,0 % by weight of organic matter.

NOTE 2 The commission decision 96/603/EC of 4 October 1996 amended by the commission Decision 2000/605/EC of 26 September 2000 and 2003/424/EG of 6 June 2003 gives the list of products to be considered as reaction to fire class Euroclass A1 without the need for testing.

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 and 4.2.7.3 and where appropriate in 4.3.8 on compressive creep.

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

The reaction to fire performance of CG products as declared by 4.2.6 does not change with time.