SLOVENSKI STANDARD
SIST EN 15501:2016

01-februar-2016

Nadomešča:
SIST EN 15501:2013

Toplotnoizolacijski proizvodi za opremo stavb in industrijske inštalacije - Proizvodi iz ekspandiranega perlita (EPB) in vermikulita (EV) - Specifikacija

Thermal insulation products for building equipment and industrial installations - Factory made expanded perlite (EP) and exfoliated vermiculite (EV) products - Specification

Wärmedämmstoffe für die technische Gebäudeausrüstung und für betriebstechnische Anlagen in der Industrie - Werkmäßig hergestellte Produkte aus Blähperlit (EP) und expandiertem Vermiculit (EV) - Spezifikation

Produits isolants thermiques pour l'équipement du bâtiment et les installations industrielles - Produits manufacturés en perlite expansée (EP) et à base de vermiculite exfoliée (EV) - Spécification

Ta slovenski standard je istoveten z: **EN 15501:2015**

ICS:

91.100.60	Materiali za toplotno in zvočno izolacijo	Thermal and sound insulating materials

SIST EN 15501:2016 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15501

December 2015

ICS 91.100.60

Supersedes EN 15501:2013

English Version

Thermal insulation products for building equipment and industrial installations - Factory made expanded perlite (EP) and exfoliated vermiculite (EV) products - Specification

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This European Standard was approved by CEN on 24 October 2015.

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.

CEN members are the national standards bodies of 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 United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 15501:2015 E

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European foreword

This document (EN 15501:2015) 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 June 2016, and conflicting national standards shall be withdrawn at the latest by September 2017.

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 EN 15501:2013.

This document is identifying those clauses of the standard which are needed for the compliance of the European Standard with the Construction Products Regulation (CPR).

The main technical changes that have been made in this new edition of EN 15501 are the following:

a) an addition to the foreword;

b) an addition in 3.2.2;

c) a new 4.3.8;

d) modification of 5.3.2;

e) modification of Clause 7;

f) modification of Clause 8;

g) modification of Annex A;

h) a new Annex ZA.

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 Regulation (EU) No. 305/2011.

For relationship with Regulation (EU) No. 305/2011, see informative Annex ZA, which is an integral part of this document.

Locally responsible authorities and contracting entities, who are bound by EU Directives to specify their requirements using European harmonized product standards, are allowed to demand additional properties outside the provisions of this standard if this is technically necessary because of prevailing operational conditions of the building equipment or the industrial installation projected or because of safety regulations.

This European Standard contains six annexes:

— Annex A (normative), Factory production control;

— Annex B (normative), Special conditions to be used for the determination of organic content;

— Annex C (informative), Preparation of the test specimens to measure thermal conductivity;

— Annex D (informative), Product specific details for mounting and fixing for reaction to fire testing;

NOTE This annex will be transferred to Annex A of EN 15715 when this document is being revised.

— Annex E (informative), Additional properties;

— Annex ZA (informative), Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation.

This document includes a bibliography.

This European Standard is one of a series of standards for insulation products used in building equipment and industrial installations, but this standard can be used in other areas, where appropriate.

Other standards in the series include 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 14303, *Thermal insulation products for building equipment and industrial installations — Factory made mineral wool (MW) products — Specification*

EN 14304, *Thermal insulation products for building equipment and industrial installations — Factory made flexible elastomeric foam (FEF) products — Specification*

EN 14305, *Thermal insulation products for building equipment and industrial installations — Factory made cellular glass (CG) products — Specification*

EN 14306, *Thermal insulation products for building equipment and industrial installations — Factory made calcium silicate (CS) products — Specification*

EN 14307, *Thermal insulation products for building equipment and industrial installations — Factory made extruded polystyrene foam (XPS) products — Specification*

EN 14308, *Thermal insulation products for building equipment and industrial installations — Factory made rigid polyurethane foam (PUR) and polyisocyanurate foam (PIR) products — Specification*

EN 14309, *Thermal insulation products for building equipment and industrial installations — Factory made products of expanded polystyrene (EPS) — Specification*

EN 14313, *Thermal insulation products for building equipment and industrial installations — Factory made polyethylene foam (PEF) products — Specification*

EN 14314, *Thermal insulation products for building equipment and industrial installations — Factory made phenolic foam (PF) products — Specification*

EN 15501, *Thermal insulation products for building equipment and industrial installations — Factory made expanded perlite (EP) and exfoliated vermiculite (EV) 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, 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.

1 Scope

This European Standard specifies the requirements for factory made expanded perlite and exfoliated vermiculite products which are used for the thermal insulation of building equipment and industrial installations with an operating temperature in the range of approximately 0 °C to + 1 100 °C.

Expanded perlite and exfoliated vermiculite products can be used below 0 °C but special tests regarding the suitability of the product in the intended application are advised (e.g. liquefaction of oxygen). Manufacturer's advice should be heeded in all cases.

The products are manufactured in the form of boards, pipe sections, segments, prefabricated ware and special ware.

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 structural performance of systems incorporating these products is not covered.

This European Standard does not specify the required level of a given property that is achieved by a product to demonstrate fitness for purpose in a particular application. The levels required for a given application can be found in regulations and invitations to tender.

Products with a declared thermal conductivity greater than 0,6 W/(mK) at 10 °C are not covered by this European Standard.

This European Standard does not cover products intended to be used for the insulation of the building structure.

The European Standard does not cover the following acoustical aspects: direct airborne sound insulation and impact transmission noise index.

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 1094-6, *Insulating refractory products - Part 6: Determination of permanent change in dimensions of shaped products on heating (ISO 2477)*

EN 1604, *Thermal insulating products for building applications - Determination of dimensional stability under specified temperature and humidity conditions*

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 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 13467, *Thermal insulating products for building equipment and industrial installations - Determination of dimensions, squareness and linearity of preformed pipe insulation*

EN 13468, *Thermal insulating products for building equipment and industrial installations - Determination of trace quantities of water soluble chloride, fluoride, silicate, sodium ions and pH*

EN 13469, *Thermal insulating products for building equipment and industrial installations - Determination of water vapour transmission properties of preformed pipe insulation*

EN 13472, *Thermal insulating products for building equipment and industrial installations - Determination of short term water absorption by partial immersion of preformed pipe insulation*

EN 13501-1:2007+A1:2009, *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, *Thermal insulation products - Instructions for mounting and fixing for reaction to fire testing - Factory made products*

EN ISO 1182, *Reaction to fire tests for 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 8497, *Thermal insulation - Determination of steady-state thermal transmission properties of thermal insulation for circular pipes (ISO 8497)*

EN ISO 8894-1, *Refractory materials - Determination of thermal conductivity - Part 1: Hot-wire methods (cross-array and resistance thermometer) (ISO 8894-1)*

EN ISO 9229:2007, *Thermal insulation - Vocabulary (ISO 9229)*

EN ISO 13787, *Thermal insulation products for building equipment and industrial installations - Determination of declared thermal conductivity (ISO 13787)*

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 Terms and definitions as given in EN ISO 9229:2007

3.1.1.1
expanded perlite
lightweight granular (insulation) material manufactured from naturally occurring volcanic rock expanded by heat to form a cellular structure

[SOURCE: EN ISO 9229:2007, 2.1.7, modified — removed alternative term “perlite”]

3.1.1.2
exfoliated vermiculite
insulation material that results from expanding or exfoliating a natural micaceous mineral by heating

[SOURCE: EN ISO 9229:2007, 2.1.8, modified — removed alternative term “vermiculite”]

3.1.1.3
block
(insulation) product generally of rectangular cross-section and with a thickness not significantly smaller than the width

[SOURCE: EN ISO 9229:2007, 2.3.1, modified — removed the Note and alternative term “billet”]

3.1.1.4
board
slab
(insulation) rigid or semi-rigid 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.

[SOURCE: EN ISO 9229:2007, 2.3.2]

3.1.1.5
pipe section
section
(insulation) product in the shape of a cylindrical annulus that may be split to facilitate application

[SOURCE: EN ISO 9229:2007, 2.3.9, modified — removed the Note]

3.1.1.6
lag
segment
rigid or semi-rigid insulation product for application to large diameter cylindrical or spherical equipment

[SOURCE: EN ISO 9229:2007, 2.3.8]

3.1.2 Additional terms and definitions

3.1.2.1
level
given value which is the upper or lower limit of a requirement

Note 1 to entry: The level is given by the declared value of the characteristic concerned.

3.1.2.2
class
combination of two levels of the same property between which the performance falls

3.1.2.3
prefabricated ware
pieces cut, abraded or otherwise formed from a board or block of product e.g. elbows, T-pieces, etc

3.1.2.4
production line
assemblage of equipment that produces products in a continuous process

3.1.2.5
production unit
assemblage of equipment that produces products in a discontinuous process

3.1.2.6
special ware
(insulation) product formed in a mould to a given shape and dimension

3.2 Symbols, units and abbreviated terms

3.2.1 Symbols and units

b	is the width	mm
D_i	is the inside diameter of pipe sections	mm
d	is the thickness	mm
d_D	is the declared 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	%
Li	is the deviation from linearity	mm
l	is the length	mm
λ	is the thermal conductivity	W/(m·K)
λ_D	is the declared thermal conductivity	W/(m·K)
μ	is the water vapour diffusion resistance factor	—
S_b	is the deviation from squareness of boards on length and width	mm/m
S_d	is the deviation from squareness of boards on thickness	mm

S_{max}	is the deviation from flatness	mm
σ_{10}	is the compressive stress at 10 % deformation	kPa
σ_m	is the compressive strength	kPa
v	is the deviation from squareness for pipe sections and segments	mm
ρ_a	is the apparent density	kg/m^3
BS	is the symbol of the declared level for bending strength	
CS(Y)	is the symbol of the declared level for compressive stress at Y % deformation	
CS(10)	is the symbol of the declared level for compressive stress at 10 % deformation	
CL	is the symbol of the declared level of soluble chloride ions	
F	is the symbol of the declared level of soluble fluoride ions	
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	
Na	is the symbol of the declared level of soluble sodium ions	
P	is the symbol of the declared value for flatness tolerances	
pH	is the symbol of the declared level of the pH-value	
S	is the symbol of the declared class for squareness tolerances	
Sl	declared level of soluble silicate ions	
ST(+)	is the symbol of the declared level for maximum service temperature	
ST(-)	is the symbol of the declared level for minimum service temperature	
T	is the symbol of the declared class for thickness tolerances	
W	is the symbol of the declared class for width tolerances	

3.2.2 Abbreviated terms

AVCP	is **A**ssessment and **V**erification of **C**onstancy of **P**erformance (previously named attestation of conformity)
DoP	is **D**eclaration of **P**erformance
EP	is **E**xpanded **P**erlite
EV	is **E**xfoliated **V**ermiculite
FPC	is **F**actory **P**roduction **C**ontrol
PTD	is **P**roduct **T**ype **D**etermination (previously named ITT for Initial Type Test)
RtF	is **R**eaction to **F**ire
ThIBEII	is **T**hermal **I**nsulation for **B**uilding **E**quipment and **I**ndustrial **I**nstallations
VCP	is **V**erification of **C**onstancy of **P**erformance (previously named evaluation of conformity)

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 E.

One test result for a product property is the average of the measured values on the numbers of test specimens given in Table 4.

4.2 For all applications

4.2.1 Thermal conductivity

For flat specimens, thermal conductivity shall be based upon measurements carried out in accordance with EN 12667 and if relevant EN 12939 or EN ISO 8894-1 (this test is calibrated against EN 12667 and if relevant EN 12939). For cylindrical specimens EN ISO 8497 shall be used as specified in 5.3.2.

The thermal conductivity values shall be determined by the manufacturer and verified in accordance with EN ISO 13787. They shall be declared by the manufacturer according to the specified measuring standards mentioned above covering the product service temperature range. The following conditions apply:

— the measured values shall be expressed with three significant figures;

— the declared conductivity curve shall be given as a limit curve, defined in EN ISO 13787;

— the values of the declared thermal conductivity, λ_D, shall be rounded upwards to the nearest 0,001 W/(m·K).

The declared equation/limit curve is the “declared reference” with three significant figures, that is to 0,001 W/(m·K) for λ values below 0,1 W/(m·K) and in 0,01 W/(m·K) for λ values above 0,1 W/(m·K). This shall be used as a reference for the verification of the declaration.

When thermal conductivity is declared as a table derived from the equation, rounding upwards to the next 0,001 W/(m·K) has to be done for the full range of the thermal conductivity.

NOTE Determinations of the declared thermal conductivity of pipe sections, following EN ISO 8497, having joints in the metering area, include the effects of these joints as defined in EN ISO 23993.

4.2.2 Dimensions and tolerances

4.2.2.1 Linear dimensions

The length, *l*, width, *b*, and thickness, *d*, for flat products shall be respectively determined in accordance with EN 822 and EN 823. Length, *l*, thickness, *d*, and inside diameter, D, for pipe sections shall be determined in accordance with EN 13467. The dimensions of prefabricated and special ware shall be determined by the appropriated standard. No test result shall deviate from the declared values by more than the tolerance given in Table 1.