BS EN 14303:2015

BSI Standards Publication

Thermal insulation products for building equipment and industrial installations — Factory made mineral wool (MW) products — Specification

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National foreword

This British Standard is the UK implementation of EN 14303:2015. It supersedes BS EN 14303:2009+A1:2013 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/540, Energy performance of materials components and buildings.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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English Version

Thermal insulation products for building equipment and industrial installations - Factory made mineral wool (MW) products - Specification

Produits isolants thermiques pour l'équipement du bâtiment et les installations industrielles - Produits manufacturés à base de laines minérales (MW) - Spécification

Wärmedämmstoffe für die technische Gebäudeausrüstung und für betriebstechnische Anlagen in der Industrie - Werkmäßig hergestellte Produkte aus Mineralwolle (MW) - Spezifikation

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.

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European foreword

This document (EN 14303:2015) 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of an identical text or by endorsement, at the latest by June 2016, and conflicting national standards shall be withdrawn at the latest by September 2017.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 14303:2009+A1:2013.

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 14303 are the following:

a) an addition to the foreword;

b) modification to 3.2.1;

c) an addition in 3.2.2;

d) a new 4.3.9;

e) modification of 5.3.2;

f) modification of Clause 7;

g) modification of Clause 8;

h) modification of Annex A;

i) 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 three annexes:

— Annex A (normative), Factory production control;

— Annex B (informative), Additional properties;

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

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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.

In pursuance of Resolution BT 20/1993 revised, CEN/TC 88 have proposed defining the standards listed below as a European package of 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 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.

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1 Scope

This European Standard specifies the requirements for factory made mineral wool products, which are used for the thermal insulation of building equipment and industrial installations with an operating temperature range of approximately 0 °C to + 800 °C.

Below an operating temperature of ambient, special means against water vapour diffusion and water accumulation by air flow might be required. Below an operating temperature of - 50 °C, special tests regarding the suitability of the products in the intended application are advised (e.g. liquefaction of oxygen). Manufacturer's advice should be heeded in all cases.

The products are manufactured with or without facings or coatings, in the form of rolls, boards, slabs, mats, felts, quilts, wired mats, lamella mats, bevelled lags and pipe sections.

This European 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 European Standard does not specify the required level of a given property that should be 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 0,065 W/(m·K) at 10 °C are not covered by this standard.

This European Standard does not cover products for *in situ* insulation (blowing or pouring) or products for the insulation of the building structure.

This European Standard does not cover the following acoustical aspects: direct airborne sound insulation and impact noise transmission 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 826, *Thermal insulating products for building applications - Determination of compression behaviour*

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 12086:2013, *Thermal insulating products for building applications - Determination of water vapour transmission properties*

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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 13162, *Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification*

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 14706, *Thermal insulating products for building equipment and industrial installations - Determination of maximum service temperature*

EN 14707, *Thermal insulating products for building equipment and industrial installations - Determination of maximum service temperature for preformed pipe insulation*

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

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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)*

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

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

3.1 Terms and definitions

3.1.1 Terms and definitions as given in EN ISO 9229:2007

3.1.1.1
batt
portion of a mat in the form of a rectangular piece generally between 1 m and 3 m in length and usually supplied flat or folded

3.1.1.2
bevelled lag
rigid or semi-rigid insulation product with one or more edges bevelled for application to large diameter cylindrical or spherical equipment

3.1.1.3
felt
thin, loosely bonded mat

3.1.1.4
lamella mat
mat made from fibrous materials in which the general orientation of the fibres is perpendicular to the major surfaces

3.1.1.5
mineral wool
generic term for insulation wool manufactured from molten rock, slag or glass

3.1.1.6
pipe section
(insulation) product in the shape of a cylindrical annulus that may be split to facilitate application

3.1.1.7
mattress
quilt
flexible insulation product, normally faced on one or both sides, or totally enclosed with fabric, wire netting, expanded metal or a similar covering attached mechanically to the insulation material

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3.1.1.8
roll
(insulation) product supplied in the form of a wound cylinder

3.1.1.9
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 can also be supplied in tapered form.

3.1.2 Additional terms and definitions

3.1.2.1
mat
flexible fibrous insulation product supplied rolled or flat, which may be faced or enclosed

3.1.2.2
wired mat
insulation mat covered by flexible metal mesh facing or other types of high temperature resistant threads or wires, suitable for mounting the mats, attached on one or both sides

Note 1 to entry: Metallic foils (reinforced aluminium foil, etc.) may be sewn on the mats as facings on one or more sides of the mat.

3.1.2.3
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.

3.1.2.4
class
combination of two levels of the same property between which the performance shall fall

3.1.2.5
production line
assemblage of equipment that produces products using a continuous process

3.1.2.6
production unit
assemblage of equipment that produces products using a discontinuous process

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3.2 Symbols, units and abbreviated terms

3.2.1 Symbols and units used in this standard

α_p	is the practical sound absorption coefficient	–
α_w	is the weighted sound absorption coefficient	–
B	is the width	mm
D_i	is the inside diameter	mm
D_o	is the outside diameter	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	%
l	is the length	m or 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 on length and width	mm/m
s_d	is the water vapour diffusion equivalent air layer thickness	m
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	mm
W_p	is the short-term water absorption	kg/m^2
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	
CL	is the symbol of the declared level of soluble chloride ions	
CS(10\Y)	is the symbol of the declared level for compressive stress or strength	
DS(TH)	is the symbol of the declared value for dimensional stability under specified temperature and relative humidity conditions	
F	is the symbol of the declared level of soluble fluoride ions	
MV	is the symbol of the declared level for water vapour diffusion equivalent air-layer thickness	
NA	is the symbol of the declared level of soluble sodium ions	
pH	is the symbol of the declared level of the pH-value	
SI	is the symbol of the declared level of soluble silicate ions	
ST(+)	is the symbol of the declared level for maximum service temperature with a test load of 500 Pa	

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ST(+/250)	is the symbol of the declared level for maximum service temperature with a test load of 250 Pa
ST(+/100)	is the symbol of the declared level for maximum service temperature with a test load of 100 Pa
T	is the symbol of the declared class for thickness tolerances
WS	is the symbol of the declared level for short-term water absorption

3.2.2 Abbreviations used in this standard

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
FPC	is **F**actory **P**roduction **C**ontrol
MW	is **M**ineral **W**ool
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 B.

One test result for a product property is the average of the measured values on the numbers of test specimens given in Table 5.

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 or EN 12939 for thick products. For cylindrical specimens EN ISO 8497 shall be used as specified in 5.3.2.

In both cases 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 measuring standards mentioned above covering the product service temperature range. The following conditions apply:

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

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

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

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The declared equation/limit curve is the "declared reference" with three significant figures, that is to 0,000 1 W/(m·K) for λ values below 0,1 W/(m·K) and in 0,001 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 determined in accordance with EN 822 and EN 823. Length, thickness and inside diameter, D_i for pipe sections shall be determined in accordance with EN 13467.

Thickness, d, of slabs/boards, lamella products, mats, mattresses, quilts, rolls, and wired mats shall be determined in accordance with EN 823. The load shall be as shown in Table 3. The measurements shall be done excluding the preparation of test specimens of compressed products expressed in EN 823:2013, Annex A. This preparation may be used upon request by the manufacturer.

For wired mats the manufacturer may declare the thickness under loads of 50 Pa or 1 000 Pa. The thickness declaration shall be accompanied by the relevant thickness measurement load.

NOTE The choice of load for thickness measurement for wired mats is not related to the compression behaviour.

No test result shall deviate from the declared values by more than the tolerances given in Table 1 or Table 2 for the labelled level or class.

Table 1 — Levels and classes for thickness tolerances

Level or class	Tolerances	
T1	– 5 % or – 5 mm [a]	Excess permitted
T2	– 5 % or – 5 mm [a]	+ 15 % or + 15 mm [b]
T3	– 3 % or – 3 mm [a]	+ 10 % or + 10 mm [b]
T4	– 3 % or – 3 mm [a]	+ 5 % or + 5 mm [b]
T5	– 1 % or – 1 mm [a]	+ 3 mm
T8	– 5 % or – 3 mm [a]	+ 5 % or + 3 mm [a]
T9	– 6 % or – 5 mm [a]	+ 6 % or + 5 mm [a]

[a] Whichever gives the greatest numerical tolerance.

[b] Whichever gives the smallest numerical tolerance.

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