

**EHITUSLIKUD SOOJUSISOLATSIOONITOOTED.  
TÖÖSTUSLIKULT VALMISTATUD PAISUTATUD  
POLÜSTÜREENIST TOOTED (EPS). SPETSIFIKATSIOON**

**Thermal insulation products for buildings - Factory  
made expanded polystyrene (EPS) products -  
Specification**

**EESTI STANDARDI EESSÕNA****NATIONAL FOREWORD**

See Eesti standard EVS-EN 13163:2012+A1:2015 sisaldab Euroopa standardi EN 13163:2012+A1:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 13163:2012+A1:2015 consists of the English text of the European standard EN 13163:2012+A1:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 18.02.2015.	Date of Availability of the European standard is 18.02.2015.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 91.100.60

**Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele**

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Aru 10, 10317 Tallinn, Eesti; koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

**The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation**

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

English Version

**Thermal insulation products for buildings - Factory made  
expanded polystyrene (EPS) products - Specification**

Produits isolants thermiques pour le bâtiment - Produits  
manufacturés en polystyrène expansé (EPS) - Spécification

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte  
Produkte aus expandiertem Polystyrol (EPS) - Spezifikation

This European Standard was approved by CEN on 6 October 2012 and includes Amendment 1 approved by CEN on 15 December 2014.

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**

# Contents

Page

Foreword.....	5
1 Scope .....	7
2 Normative references .....	7
3 Terms, definitions, symbols, units and abbreviated terms .....	9
3.1 Terms and definitions .....	9
3.2 Symbols, units and abbreviated terms.....	10
4 Requirements .....	13
4.1 General.....	13
4.2 For all applications .....	13
4.2.1 Thermal resistance and thermal conductivity .....	13
4.2.2 Length and width .....	14
4.2.3 Thickness .....	14
4.2.4 Squareness.....	14
4.2.5 Flatness .....	14
4.2.6 Reaction to fire of the product as placed on the market .....	15
4.2.7 Durability characteristics .....	15
4.3 For specific applications.....	15
4.3.1 General.....	15
4.3.2 Dimensional stability .....	15
4.3.3 Squareness.....	16
4.3.4 Compressive stress at 10 % deformation .....	16
4.3.5 Bending strength .....	17
4.3.6 Tensile strength perpendicular to faces .....	18
4.3.7 Deformation under specified compressive load and temperature conditions.....	18
4.3.8 Compressive creep.....	18
4.3.9 Shear behaviour.....	19
4.3.10 Cyclic loading behaviour .....	19
4.3.11 Water absorption .....	19
4.3.12 Freeze-thaw resistance .....	19
4.3.13 Water vapour transmission .....	20
4.3.14 Dynamic stiffness .....	20
4.3.15 Compressibility (only applicable on EPS T products).....	21
4.3.16 Apparent density.....	22
4.3.17 Reaction to fire of the product in standardised assemblies simulating end-use applications .....	22
4.3.18 Continuous glowing combustion.....	22
4.3.19 Release of dangerous substances.....	22
5 Test methods.....	22
5.1 Sampling .....	22
5.2 Conditioning.....	23
5.3 Testing .....	23
5.3.1 General.....	23
5.3.2 Thermal resistance and thermal conductivity .....	23
6 Designation code .....	26

<b>7</b>	<b>Assessment and Verification of the Constancy of Performance (AVCP)</b>	<b>27</b>
<b>7.1</b>	<b>General</b>	<b>27</b>
<b>7.2</b>	<b>Product Type Determination (PTD)</b>	<b>27</b>
<b>7.3</b>	<b>Factory Production Control (FPC)</b>	<b>27</b>
<b>8</b>	<b>Marking and labelling</b>	<b>27</b>
<b>Annex A</b>	<b>(normative) Determination of the declared values of thermal resistance and thermal conductivity</b>	<b>29</b>
<b>A.1</b>	<b>General</b>	<b>29</b>
<b>A.2</b>	<b>Input data</b>	<b>29</b>
<b>A.3</b>	<b>Declared values</b>	<b>29</b>
<b>Annex B</b>	<b>(normative) <math>\text{A}_1</math> Product type determination <math>\text{A}_1</math> (<math>\text{A}_1</math> PTD <math>\text{A}_1</math>) and factory production control (FPC)</b>	<b>31</b>
<b>B.1</b>	<b><math>\text{A}_1</math> Product type determination <math>\text{A}_1</math> and factory production control</b>	<b>31</b>
<b>B.2</b>	<b>Indirect testing for factory production control</b>	<b>36</b>
<b>Annex C</b>	<b>(normative) Product classification</b>	<b>39</b>
<b>Annex D</b>	<b>(normative) Multi layered EPS products</b>	<b>41</b>
<b>D.1</b>	<b>General</b>	<b>41</b>
<b>D.2</b>	<b>Requirements</b>	<b>41</b>
<b>D.3</b>	<b>Test methods</b>	<b>42</b>
<b>D.4</b>	<b>Evaluation of conformity</b>	<b>42</b>
<b>Annex E</b>	<b>(informative) Verification of the reaction to fire classification of raw materials</b>	<b>43</b>
<b>E.1</b>	<b>General</b>	<b>43</b>
<b>E.2</b>	<b>Material covered by this annex</b>	<b>43</b>
<b>E.3</b>	<b>Preparation of samples</b>	<b>43</b>
<b>E.4</b>	<b><math>\text{A}_1</math> Product type determination <math>\text{A}_1</math> for EPS raw material</b>	<b>43</b>
<b>E.5</b>	<b>Factory Production Control for EPS raw material</b>	<b>44</b>
<b>E.6</b>	<b>Certification of conformity for EPS raw material</b>	<b>44</b>
<b>E.7</b>	<b>Continuous surveillance of EPS raw material</b>	<b>45</b>
<b>E.8</b>	<b>Material certificate for EPS raw material</b>	<b>45</b>
<b>E.9</b>	<b>Requirement for raw material supply</b>	<b>46</b>
<b>Annex F</b>	<b>(informative) Additional properties</b>	<b>47</b>
<b>F.1</b>	<b>General</b>	<b>47</b>
<b>F.2</b>	<b>Long-term compressive behaviour</b>	<b>47</b>
<b>F.3</b>	<b>Shear behaviour</b>	<b>47</b>
<b>F.4</b>	<b>Water vapour diffusion resistance factor</b>	<b>48</b>
<b>F.5</b>	<b>Examples of determination of thermal conductivity</b>	<b>48</b>
<b>F.6</b>	<b>Additional information</b>	<b>49</b>
<b>Annex ZA</b>	<b>(informative) <math>\text{A}_1</math> Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation</b>	<b>50</b>
	<b>Bibliography</b>	<b>61</b>
	<b>Tables</b>	
	<b>Table 1 — Classes of dimensional tolerances</b>	<b>14</b>
	<b>Table 2 — Dimensional stability under specified temperature or specified temperature and humidity conditions</b>	<b>16</b>
	<b>Table 3 — Levels for compressive stress at 10 % deformation</b>	<b>17</b>
	<b>Table 4 — Levels for bending strength</b>	<b>17</b>
	<b>Table 5 — Levels of deformation under specified compressive load and temperature conditions</b>	<b>18</b>
	<b>Table 6 — Levels for dynamic stiffness</b>	<b>20</b>
	<b>Table 7 — Classes for thickness tolerances</b>	<b>21</b>

<b>Table 8 — Levels for compressibility .....</b>	<b>21</b>
<b>Table 9 — Test methods, test specimens and conditions.....</b>	<b>24</b>
<b>Table A.1 — Values for k for one sided 90 % tolerance interval with a confidence level of 90 %.....</b>	<b>30</b>
<b>Table B.1 — Number of tests for !PTD" and minimum product testing frequencies.....</b>	<b>31</b>
<b>Table B.2 — Minimum product testing frequencies for the reaction to fire characteristics .....</b>	<b>34</b>
<b>Table C.1 — Classification of EPS products.....</b>	<b>39</b>
<b>Table C.2 — Classification EPS products with acoustical properties .....</b>	<b>40</b>
<b>Table E.1 — Testing frequency of raw material .....</b>	<b>45</b>
<b>Table F.1 — Correlation between bending strength and shear strength.....</b>	<b>47</b>
<b>Table F.2 — Tabulated values of water vapour diffusion resistance index and water vapour permeability.....</b>	<b>48</b>
<b>Table ZA.1 — Relevant clauses for factory made expanded polystyrene and intended use .....</b>	<b>51</b>
<b>Table ZA.2 — Systems of AVCP.....</b>	<b>52</b>
<b>Table ZA.3.1 — Assignment of AVCP tasks for factory made expanded polystyrene products under system 1 for reaction to fire and system 3 (see Table ZA.2).....</b>	<b>53</b>
<b>Table ZA.3.2 — Assignment of AVCP tasks for factory made expanded polystyrene products under system 3 (see Table ZA.2).....</b>	<b>54</b>
<b>Table ZA.3.3 — Assignment of AVCP tasks for factory made expanded polystyrene products under combined system 4 for reaction to fire and system 3 (see Table ZA.2).....</b>	<b>55</b>
<b>Figures</b>	
<b>Figure B.1 — Relationship between compressive stress at 10 % deformation and apparent density for indirect testing.....</b>	<b>37</b>
<b>Figure F.1 — Example of a relationship between thermal conductivity (at 50 mm reference thickness and 10 °C mean temperature) apparent density for indirect testing of non infrared absorbing EPS.....</b>	<b>49</b>
<b>Figure ZA.1 — Example CE marking information of products under AVCP system 3" .....</b>	<b>60</b>

## Foreword

This document (EN 13163:2012+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 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).

**A1** For relationship with EU Construction Products Regulation (CPR), see informative Annex ZA, which is an integral part of this standard. **A1**

This document supersedes **A1** EN 13163:2012 **A1**.

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 **A1** **A1**.


The main changes to EN 13163:2008 are:

- a) better harmonisation between the individual standards of the package (EN 13162 to EN 13171) on definitions, requirements, classes and levels;
- b) new annex on multi-layered products;
- c) new annex on voluntary verification of the reaction to fire classification of raw materials;
- d) changes on some editorial and technical content and addition of information on some specific items such as for EPS dimensional stability, compressibility;
- e) addition of links to EN 15715, *Thermal insulation products — Instructions for mounting and fixing for reaction to fire testing — Factory made products*;
- f) changes to the Annex ZA.

**A1** Amendment 1 modifies EN 13163:2012 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

- g) an addition to the foreword;
- h) an addition in 3.2;
- i) a new subclause 4.3.19;
- j) modification of Clause 7;
- k) modification of Clause 8;

- l) modification of Annex B;
- m) modification of Annex E;
- n) a new 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 European package of standards.

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.



## 1 Scope

This European Standard specifies the requirements for factory made expanded polystyrene products, with or without rigid or flexible facings or coatings, which are used for the thermal insulation of buildings. The products are manufactured in the form of boards or rolls or other preformed ware (flat, tapered, tongue and grooves, shiplap, profiled etc.).

Products covered by this standard are also used for sound insulation and 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 class or level of a given property to be achieved by a product to demonstrate fitness for purpose in a particular application. The classes and levels required for a given application are to be found in regulations or non-conflicting standards.

Products with a declared thermal resistance lower than  $0,25 \text{ m}^2\cdot\text{K}/\text{W}$  or a declared thermal conductivity at  $10^\circ\text{C}$  greater than  $0,060 \text{ W}/(\text{m}\cdot\text{K})$  are not covered by this standard.

This standard does not cover in-situ insulation products (covered by FprEN 16025-1 and -2), products intended to be used for the insulation of building equipment and industrial installations (covered by EN 14309), products intended to be used in civil engineering applications (covered by EN 14933) and products intended to be used in beam and block systems in floors (covered by EN 15037-4).

## 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 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 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 12085, *Thermal insulating products for building applications — Determination of linear dimensions of test specimens*

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 12088, *Thermal insulating products for building applications — Determination of long term water absorption by diffusion*

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 12091, *Thermal insulating products for building applications — Determination of freeze-thaw resistance*

EN 12429, *Thermal insulating products for building applications — Conditioning to moisture equilibrium under specified temperature and humidity conditions*

EN 12431, *Thermal insulating products for building applications — Determination of thickness for floating floor insulation products*

EN 12667, *Thermal performance of building material 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 13793, *Thermal insulating products for building applications — Determination of behaviour under cyclic loading*

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 29052-1, *Acoustics — Determination of dynamic stiffness — Part 1: Materials used under floating floors in dwellings (ISO 9052-1)*

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 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

##### **expanded polystyrene (EPS)**

rigid cellular plastic material, manufactured by moulding beads or granules of expandable polystyrene or one of its copolymers, with an air filled closed cellular structure, which is divided into four types related to the intended use:

- EPS<sub>i</sub>: for load bearing applications, where i stands for the declared value (expressed in compressive stress at 10 % deformation)
- EPS S: for non load bearing applications
- EPS SD: for non load bearing applications with acoustic properties
- EPS T: for floating floor applications

##### 3.1.2

##### **expanded polystyrene block**

rigid insulation product or material generally of rectangular cross section and with a thickness not significantly smaller than the width, supplied trimmed or untrimmed

##### 3.1.3

##### **expanded polystyrene board**

rigid insulation product (cut, moulded, or continuously foamed) of rectangular shape and cross section in which the thickness is significantly smaller than the other dimensions; it may be of uniform thickness or tapered and the edges may be of various sorts (e.g. square, half lapped, tongue and groove)

##### 3.1.4

##### **expanded polystyrene roll**

boards or strips bonded to a flexible facing, supplied in a wound or folded form, which form a continuous insulation layer when unrolled

##### 3.1.5

##### **preformed ware**

insulation shapes formed by cutting or routing from blocks or boards or by shape moulding

##### 3.1.6

##### **level**

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

##### 3.1.7

##### **class**

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