

**EHITUSLIKUD SOOJUSISOLATSIOONITOOTED.
TÖÖSTUSLIKULT VALMISTATUD EKSTRUDEERITUD
VAHTPOLÜSTÜREENTOOTED (XPS).
SPETSIFIKATSIOON**

**Thermal insulation products for buildings - Factory
made extruded polystyrene foam (XPS) products -
Specification**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 13164:2012+A1:2015 sisaldab Euroopa standardi EN 13164:2012+A1:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 13164:2012+A1:2015 consists of the English text of the European standard EN 13164:2012+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.

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; telefon 605 5050; e-post 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; phone +372 605 5050; e-mail info@evs.ee

English Version

**Thermal insulation products for buildings - Factory made
extruded polystyrene foam (XPS) products - Specification**

Produits isolants thermiques pour le bâtiment - Produits
manufacturés en mousse de polystyrène extrudé (XPS) -
Spécification

Wärmedämmstoffe für Gebäude - Werkmäßig hergestellte
Produkte aus extrudiertem Polystyrolschaum (XPS) -
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, abbreviated terms	8
3.1 Terms and definitions	8
3.2 Symbols, units and abbreviated terms.....	9
4 Requirements	11
4.1 General.....	11
4.2 For all applications	12
4.2.1 Thermal resistance and thermal conductivity	12
4.2.2 Length, width, squareness, flatness.....	12
4.2.3 Thickness	13
4.2.4 Reaction to fire of the product as placed on the market	13
4.2.5 Durability characteristics.....	13
4.3 For specific applications.....	14
4.3.1 General.....	14
4.3.2 Dimensional stability under specified conditions.....	14
4.3.3 Deformation under specified compressive load and temperature conditions.....	14
4.3.4 Compressive stress or compressive strength	15
4.3.5 Tensile strength perpendicular to faces	15
4.3.6 Compressive creep.....	16
4.3.7 Water absorption	16
4.3.8 Freeze-thaw resistance	17
4.3.9 Water vapour transmission	17
4.3.10 Release of dangerous substances.....	18
4.3.11 Reaction to fire of the product in standardized assemblies simulating end-use applications	18
4.3.12 Continuous glowing combustion.....	18
4.3.13 Shear strength.....	18
5 Test methods.....	18
5.1 Sampling.....	18
5.2 Conditioning.....	18
5.3 Testing	19
5.3.1 General.....	19
5.3.2 Thermal resistance and thermal conductivity	19
6 Designation code	21
7 Assessment and Verification of the Constancy of Performance (AVCP)	22
7.1 General.....	22
7.2 Product Type Determination (PTD).....	22
7.3 Factory Production Control (FPC)	22
8 Marking and labelling	22
Annex A (normative) Determination of the declared values of thermal resistance and thermal conductivity.....	24
A.1 General.....	24
A.2 Input data.....	24

A.3	Declared values	24
A.3.1	General	24
A.3.2	Case where thermal resistance and thermal conductivity are declared	24
A.3.3	Case where only thermal resistance is declared	25
Annex B (normative)	Product type determination $\langle A_1 \rangle$ ($\langle A_1 \rangle$ PTD $\langle A_1 \rangle$) and Factory production control (FPC)	26
Annex C (normative)	Determination of the aged values of thermal resistance and thermal conductivity	30
C.1	General	30
C.2	Procedure for XPS foam without diffusion tight facings	30
C.2.1	Principle.....	30
C.2.2	Sample preparation	30
C.2.3	Procedure	30
C.3	Procedure for XPS foam for use with diffusion tight facing on both sides	31
C.3.1	Principle.....	31
C.3.2	Ageing procedure	31
C.4	Determination of value after ageing: “aged value”	31
C.4.1	Determination of aged value for XPS products without diffusion tight facings on both sides.....	31
C.4.2	Determination of aged value for XPS products for use with diffusion tight facing on both sides.....	32
C.5	Blowing agent	33
C.6	Product grouping	33
Annex D (normative)	XPS multi-layered insulation products	34
D.1	General	34
D.2	Requirements.....	34
D.2.1	For all applications	34
D.2.2	For specific applications	35
D.3	Test methods	35
D.4	Evaluation of conformity	35
Annex E (informative)	Additional properties	36
E.1	General	36
E.2	Behaviour under cyclic loading	36
E.3	Compressive modulus of elasticity	36
E.4	Bending strength.....	36
E.5	Determination of volume percentage of closed cells	36
Annex F (informative)	Plan for cutting test specimen.....	38
Annex ZA (informative)	Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation $\langle A_1 \rangle$	40
ZA.1	Scope and relevant characteristics	40

ZA.2	Procedures for AVCP of factory made extruded polystyrene products	41
ZA.2.1	Systems of AVCP	41
ZA.2.2	Declaration of Performance (DoP)	45
ZA.3	CE Marking and labelling	48
	Bibliography	50

Tables

Table 1	— Tolerances of length, width, squareness and flatness	13
Table 2	— Classes for thickness tolerances	13
Table 3	— Dimensional stability under specified conditions	14
Table 4	— Levels for deformation under specified compressive load and temperature conditions	15
Table 5	— Levels for compressive stress or compressive strength	15
Table 6	— Levels for tensile strength, perpendicular to faces	16
Table 7	— Levels for long term water absorption by total immersion	16
Table 8	— Levels for long term water absorption by diffusion	17
Table 9	— Test methods, test specimens and conditions	19
Table A.1	— Values for k for one sided 90 % tolerance interval with a confidence level of 90 %	25
Table B.1	— Minimum number of tests for IPTD" and minimum product testing frequencies	26
Table B.2	— Minimum product testing frequencies for the reaction to fire characteristics	28
Table E.1	— Test methods, test specimens, conditions and minimum testing frequencies	37
Table ZA.1	— Relevant clauses for factory made extruded polystyrene foam and intended use	40
Table ZA.2	— Systems of AVCP	42
Table ZA.3.1	— Assignment of AVCP tasks for factory made extruded polystyrene foam products under system 1 for reaction to fire and system 3 (see Table ZA.2)	42
Table ZA.3.2	— Assignment of AVCP tasks for factory made extruded polystyrene foam products under system 3 (see Table ZA.2)	44
Table ZA.3.3	— Assignment of AVCP tasks for factory made extruded polystyrene foam products under combined system 4 for reaction to fire and system 3 (see Table ZA.2)	44

Figures

Figure ZA.1	— Example CE marking information of products under AVCP system 3"	49
--------------------	--	-----------

Foreword

This document (EN 13164:2012+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 A1 EN 13164:2012 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.

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


Compared with EN 13164:2008, the main changes are:

- 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 of some editorial and technical content and addition of information on some specific items such as for XPS: Annex C;
- d) addition to 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.

A1 Amendment 1 modifies EN 13164:2012 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) a new subclause 4.3.10;
- i) modification of Clause 7;
- j) modification of Clause 8;
- k) modification of Annex B;

- l) modification of Annex E;
- m) a new Annex ZA. 

This European 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 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 reductions in energy used and emissions produced during the installed life of the 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 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 products of extruded polystyrene foam, with or without facings or coatings, which are used for thermal insulation of buildings. The products are manufactured in the form of boards which are also available with special edge and surface treatment (tongue & grooves, shiplap etc.).

Products covered by this standard are also used in prefabricated thermal insulating 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.

The 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 0,25 m²·K/W or a declared thermal conductivity greater than 0,060 W/(m·K) at 10 °C are not covered by this standard.

This standard does not cover in situ insulation products, nor products intended to be used for the insulation of building equipment and industrial installations (covered by EN 14307), or civil engineering applications (covered by EN 14934).

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 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 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 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 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 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 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, 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

extruded polystyrene foam

rigid cellular plastics insulation material expanded and extruded with or without a skin, from polystyrene or one of its copolymers and which has a closed cell structure

3.1.2

level

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