

EHITUSLIKUD SOOJUSISOLATSIOONITOOTED.
TÖÖSTUSLIKULT VALMISTATUD FENOOLVAHUST (PF)
TOOTED. SPETSIFIKATSIOON

Thermal insulation products for buildings - Factory
made phenolic foam (PF) products - Specification

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

| | |
|---|--|
| See Eesti standard EVS-EN 13166:2012+A2:2016 sisaldab Euroopa standardi EN 13166:2012+A2:2016 ingliskeelset teksti. | This Estonian standard EVS-EN 13166:2012+A2:2016 consists of the English text of the European standard EN 13166:2012+A2:2016. |
| 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 08.06.2016. | Date of Availability of the European standard is 08.06.2016. |
| 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
phenolic foam (PF) products - Specification

Produits isolants thermiques pour le bâtiment -
Produits manufacturés en mousse phénolique (PF) -
Spécification

Wärmedämmstoffe für Gebäude - Werkmäßig
hergestellte Produkte aus Phenolharzschaum (PF) -
Spezifikation

This European Standard was approved by CEN on 6 October 2012 and includes Amendment 1 approved by CEN on 15 December 2014 and Amendment 2 approved by CEN on 23 February 2016.

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

| | |
|---|----|
| European foreword..... | 4 |
| 1 Scope..... | 7 |
| 2 Normative references..... | 7 |
| 3 Terms, definitions, symbols, units and abbreviated terms | 9 |
| 4 Requirements..... | 12 |
| 5 Test methods | 19 |
| 6 Designation code..... | 21 |
| 7 Assessment and Verification of the Constancy of Performance (AVCP)..... | 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 |
| Annex B (normative) \square_{A1} Product type determination \square_{A1} (\square_{A1} PTD \square_{A1}) 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 Preparation of test sample | 31 |
| C.3 Determination of the initial value of thermal conductivity..... | 31 |
| C.4 Determination of the aged value of thermal conductivity | 31 |
| C.5 Blowing agent..... | 33 |
| C.6 Declaration of thermal resistance and thermal conductivity..... | 34 |
| Annex D (informative) Additional properties..... | 35 |
| D.1 General..... | 35 |
| D.2 Shear strength | 35 |
| D.3 Cell gas composition..... | 35 |
| Annex E (normative) PF multi-layered thermal insulation products | 36 |
| E.1 General..... | 36 |
| E.2 Requirements | 36 |
| E.3 Test methods | 37 |
| E.4 Evaluation of conformity | 37 |
| Annex ZA (informative) \square_{A1} Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation \square_{A1} | 38 |
| Bibliography..... | 49 |

Tables

| | |
|--|----|
| Table 1 — Tolerances for length and width..... | 13 |
|--|----|

| | |
|--|----|
| Table 2 — Classes for thickness tolerances..... | 13 |
| Table 3 — Tolerances for deviation from flatness..... | 14 |
| Table 4 — Dimensional stability under specified temperature and humidity conditions..... | 15 |
| Table 5 — Levels for compressive strength | 16 |
| Table 6 — Levels for tensile strength perpendicular to faces | 16 |
| Table 7 — Levels for short term water absorption by partial immersion | 17 |
| Table 8 — Levels for long term water absorption by partial immersion | 17 |
| Table 9 — Test methods, specimens and conditions | 20 |
| Table A.1 — Values for k for one side 90 % tolerance interval with a confidence level of 90 %..... | 25 |
| Table B.1 — Minimum number of tests for $\boxed{A_1}$ PTD $\boxed{A_1}$ and minimum product testing frequencies..... | 26 |
| Table B.2 — Minimum product testing frequencies for the reaction to fire characteristics..... | 28 |
| Table C.1 — Test times for product thicknesses..... | 32 |
| Table C.2 — Increments to be added to accelerated aged values of thermal conductivity to obtain the time averaged value over 25 years (W/m·K) | 33 |
| Table D.1 — Test methods, test specimens, conditions and minimum testing frequencies..... | 35 |
| Table ZA.1 — Relevant clauses for factory made phenolic foam and intended use | 39 |
| Table ZA.2 — Systems of AVCP | 40 |
| Table ZA.3.1 — Assignment of AVCP tasks for factory made phenolic foam products under system 1 for reaction to fire and system 3 (see Table ZA.2) | 41 |
| Table ZA.3.2 — Assignment of AVCP tasks for factory made phenolic foam products under system 3 (see Table ZA.2) | 42 |
| Table ZA.3.3 — Assignment of AVCP tasks for factory made phenolic foam products under combined system 4 for reaction to fire and system 3 (see Table ZA.2) | 43 |
| Figures | |
| Figure ZA.1 — $\boxed{A_1}$ Example CE marking information of products under AVCP system 1 and system 3 $\boxed{A_1}$ | 48 |

European foreword

This document (EN 13166:2012+A2:2016) has been prepared by Technical Committee CEN/TC 88 “Thermal insulation 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 December 2016, and conflicting national standards shall be withdrawn at the latest by March 2018.

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 includes Amendment 1 approved by CEN on 2014-12-15, and Amendment 2, approved by CEN on 2016-02-23.

This document supersedes A2 EN 13166:2012+A1:2015 A2.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1 and A2 A2.

This standard 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 13166:2008, 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 on some editorial and technical content. This includes the limiting of the use of the slicing method for ageing in Annex C to unfaced and open-faced products and the clearer definition of how the ageing techniques should be applied to various types of PF products;
- 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.

A1 Amendment 1 modifies EN 13166:2012 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) replacement and additions in 3.2;

- h) a new subclause 4.3.11;
- i) modification of Clause 7;
- j) modification of Clause 8;
- k) modification of Annex B;
- l) modification of Table D.1;
- m) a new Annex ZA. ^{A1}

^{A2} Compared with EN 13166:2012+A1:2015 the main changes are:

- introducing a further blowing agent (HFO) 1233zd(E) and 1233zd(E) mixtures with LBL2 and/or pentanes in Annex C of this standard. ^{A2}

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 BT20/1993 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 reduction in energy used and emissions produced during the installed life of thermal 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 phenolic foam 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 and laminates.

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 $0,40 \text{ m}^2\cdot\text{K}/\text{W}$ or a declared thermal conductivity greater than $0,050 \text{ W}/(\text{m}\cdot\text{K})$ at 10°C are not covered by this standard.

This standard does not cover in-situ thermal insulation products, products intended to be used for the thermal insulation of building equipment and industrial installations (covered by EN 14314 [3]).

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 ($25^\circ\text{C}/50\%$ 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 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 12089:1997, *Thermal insulating products for building applications — Determination of bending behaviour*

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

EN 12667:2001, *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 4590, *Rigid cellular plastics — Determination of the volume percentage of open cells and of closed cells (ISO 4590)*

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*