
Toplotnoizolacijski proizvodi za stavbe – Razsuti celulozni proizvodi za oblikovanje na mestu vgradnje – 2. del: Specifikacija za vgrajene proizvode

Thermal insulation products for buildings - In-situ formed loose-fill cellulose products - Part 2: Specification for the installed products

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Thermal insulation products for buildings - In-situ formed loose-fill cellulose products - Part 2: Specification for the installed products

Produits isolant thermiques pour le bâtiment - Isolation en vrac formée en place à base de cellulose - Partie 2: Spécification des produits mis en place

Wärmedämmstoffe für Gebäude - An der Anwendungsstelle hergestellte Wärmedämmung aus losem Zellulosefüllstoff - Teil 2: Spezifikation für die eingebauten Produkte

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Foreword

This document (prEN 15101-2:2004) has been prepared by Technical Committee CEN/TC 88 “Thermal insulating materials and products”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports the essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document

This European Standard is one of a series for mineral wool, expanded clay, expanded perlite, exfoliated vermiculite, polyurethane/polyisocyanurate, cellulose and urea formaldehyde in-situ formed insulation products used in buildings, but this standard may be used in other areas where appropriate.

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1 Scope

This document specifies requirements for in-situ formed loose-fill cellulose thermal insulation (LFCI) products when installed in internal walls, external walls, floors, galleries, roofs and ceilings.

This document is a specification for the installed products.

This document describes, when taken together with Part 1, the product characteristics that are linked to the essential requirements of the EU Construction Products Directive. This document also specifies the checks and tests to be used for the declarations made by the installer of the product and the rules for the evaluation of conformity.

This document does not specify the required level of all properties to be achieved by a product to demonstrate fitness for purpose in a particular application. The required levels are to be found in regulations or non-conflicting standards.

Products with a declared thermal conductivity at 10 °C (mean temperature) greater than 0,060 W/(m.K) or a declared thermal resistance lower than 0,25 m² · K/W are not covered by this document.

This document does not cover factory made cellulose products intended to be used for the insulation of buildings or in-situ cellulose products for the insulation of building equipment and industrial installations.

This document does not specific performance requirements for load-bearing applications.

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2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 823, *Thermal insulating products for building applications — Determination of thickness*

EN ISO 6946, *Building components and building elements - Thermal resistance and thermal transmittance. Calculation method*

ISO 10456:2000, *Building materials and products - Procedures for determining declared and design thermal values*

prEN xxxx-1:CCYY-MM, *Thermal insulation products for buildings - In-situ formed loose-fill cellulose products - Part 1: Specification for the products before installation*

prEN ISO 9229:CCYY-MM, *Thermal insulation - Definitions of materials, products, components, applications and terms*

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purpose of this document, the definitions given in prEN ISO 9229 and the following apply.

3.1.1

installed insulation thickness

insulation thickness as installed by the installer

3.1.2**frame construction**

walls with wood or metal studs, sloping roof with insulation between rafters.

3.1.3**floor**

horizontal division between 2 stories, over a crawl space or a floor directly on the ground.

3.1.4**settlement**

the decrease of installed insulation thickness in lofts or height in cavities and frame constructions with time, expressed as a percentage of the initial installed thickness (after compaction if prescribed).

3.1.5**coverage**

mass of insulation per unit area

3.1.6**performance chart**

a table giving thickness and coverage requirements for different values of declared thermal resistance

3.1.7**system**

a particular type of loose fill cellulose insulation used in conjunction with a defined blowing machine with a blowing hose and defined nozzle.

3.1.8**blowing hole**

a hole, cut or formed, in a masonry cavity wall or frame construction, through which the cellulose is blown.

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3.2 Symbols and abbreviations

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Symbols used in this document:

d	is the installed declared insulation thickness	m
R	is the thermal resistance	$\text{m}^2 \cdot \text{K/W}$
R_D	is the installed declared thermal resistance	$\text{m}^2 \cdot \text{K/W}$
R_0	is the declared thermal resistance	$\text{m}^2 \cdot \text{K/W}$
λ_i	is one test result of thermal conductivity	$\text{W}/(\text{m} \cdot \text{K})$
λ_d	is the declared thermal conductivity	$\text{W}/(\text{m} \cdot \text{K})$
s	is the relative reduction in thickness, due to settlement	%
W_p	is the short-term water absorption	kg/m^2
S	is the symbol of the declared class for settlement	

Abbreviations used in this document:

LFCI is Loose- Fill Cellulose Insulation

4 Requirements

4.1 General

The installer shall use an insulation product that complies with Part 1 of this document.

The installer shall inspect the building in accordance with manufacturers guidelines and National Rules, in order to determine whether it is suitable for application of the product in accordance with the information given in Annex F.

Properties of the installed product shall be assessed in accordance with clause 5. To comply with document, products shall meet the requirements of 4.2, and the requirements of 4.3 as appropriate.

One test result on a product property is the average of the measured values on the number of test specimens given in table 1.

The declared thermal resistance level is for the installed insulation only, disregarding the effects of studs, beams, rafters etc.

NOTE 1 EN ISO 10456 describes how the design thermal conductivity is calculated from the declared thermal conductivity.

NOTE 2 For calculating the thermal resistance of complete building elements involving the use of these products the procedures given in EN ISO 6946 can be used.

4.2 Installed declared thermal resistance of loft insulation

The installed declared thermal resistance shall be assessed by measurement of

- installed declared insulation thickness according to 5.1.2.1;
- installed number of bags and coverage according to 5.1.2.2.

The mean value for the installed declared thickness shall not be less than the minimum value given by the manufacturer's performance chart. No individual thickness value shall be less than 80% of the minimum value.

The installed number of bags and the installed coverage shall not be less than the minimum given by the performance chart.

In case of dispute, the method according to 5.1.2.3 shall be used to determine thickness and coverage. The thermal resistance level for the installed insulation shall be declared in accordance with the performance chart given by the manufacturer.

NOTE Annex K (informative) of Part 1 of this standard gives guidance for creating performance charts and examples of performance charts.

The installed declared thermal resistance for loft insulation can also be calculated using the formula (1):

$$R_D = d \cdot \left(1 - \frac{s}{100}\right) \cdot \frac{1}{\lambda_D} \quad (1)$$

where

d is the installed insulation thickness;

s is the percentage declared settlement; and

λ_D is the thermal conductivity declared according to Part 1 of this standard.

The value of the thermal resistance level shall be rounded upwards to the nearest 0,05 m²·K/W and declared in steps of 0,05 m²·K/W.

EXAMPLE

Declared thermal conductivity level = 0,045

$\Lambda_D = 0,045 \text{ W/(m}\cdot\text{K)}$

$d = 0,350 \text{ m}$

$s = 5 \% = 0,05$ (Settlement class S2)

The calculated value for R_D is

$R_D = 0350 \cdot (1 - 0,05) / 0,045 = 7,39 \text{ m}^2 \cdot \text{K/W}$

The declared thermal resistance level is R7,40

4.3 Installed declared thermal resistance of cavity wall and frame construction insulation

The installed declared thermal resistance shall be assessed by measurement of

- average cavity or frame width according to 5.1.3.1;
- machine output according to 5.1.3.2;
- installed coverage and density according to 5.1.3.3.

The number of bags installed shall not be less than the minimum number stated in the manufacturers performance chart.

The thermal resistance level for the installed insulation shall be declared in accordance with the performance chart given by the manufacturer.

The installed declared thermal resistance can also be calculated using the formula (2):

$$R_D = \frac{d}{\lambda_D} \quad (2)$$

where

d is the cavity/frame width

λ_D is the thermal conductivity declared according to Part 1 of this standard.

The value of the installed declared thermal resistance level shall be rounded upwards to the nearest 0,05 m²·K/W and declared in steps of 0,05 m²·K/W.

5 Test methods

5.1 Testing

5.1.1 General

Table 1 gives the dimensions of the test specimens, the minimum number of test specimens required to get one test result and any specific conditions which are necessary.

Table 1 — Test methods, test specimens and conditions

Clause	Title	Test method	Test specimen		Specific conditions
			Dimensions	Number to get one test result	
4.2	Thermal resistance of installed loft insulation	Clauses 5.1.2.1 to 5.1.2.3	-	5 per 100 m ²	Thickness and number of bags
			≥ 0,16 m ²	-	Frame method in case of dispute
4.3	Thermal resistance of cavity wall, floor and frame construction insulation	Clauses 5.1.3.1 to 5.1.3.3	-	10 per 100 m ²	-
			≥ 0,5 X 0,5 m	-	In case of dispute

5.1.2 Installed declared thermal resistance of loft insulation

The installed declared thermal resistance shall be assessed by measurement of

- installed declared insulation thickness according to 5.1.2.1;
- installed declared insulation coverage (the number of bags) according to 5.1.2.2.

In case of dispute, the frame method according to 5.1.2.3 shall be used.

5.1.2.1 Installed declared insulation thickness

At least five thickness measurements in different places shall be made for each 100 m² of loft area. A pin or ruler graduated in millimetres shall normally be used for these measurements.

In case of dispute the thickness shall be measured with the pin and plate method in accordance with Annex C.

5.1.2.2 Installed declared insulation coverage

The installed declared insulation coverage shall be calculated by dividing the total weight of product installed by the area of the installation. The total weight of the product shall be obtained from the number of bags used. In case of dispute the installed coverage shall be determined according to 5.1.2.3.

5.1.2.3 Frame method for the determination of installed coverage and density

A circular or square frame with an area of at least 0,16 m² shall be carefully pressed through the insulation after installation. The insulation material inside the frame shall be taken out as a specimen and weighed. The installed coverage shall be calculated as the mass of the specimen divided by the area of the frame.

If the installed density is to be calculated, the specimen thickness shall be measured in accordance with 5.1.2.1, before the specimen is taken. The installed density shall be calculated by dividing the installed coverage with the installed thickness.

5.1.3 Installed declared thermal resistance of cavity wall, floor and frame construction insulation

The installed declared thermal resistance shall be assessed by measurement of

- average cavity width according to 5.1.3.1;
- machine output according to 5.1.3.2;
- installed coverage and density according to 5.1.3.3.

5.1.3.1 Average cavity width

The average width of the cavity shall be measured in accordance with the method given in Annex A.

5.1.3.2 Machine output

The blowing machine shall be set in accordance with the insulation product manufacturer's instructions. The machine output shall be adjusted to fill the density test box in accordance with Annex D to the value specified by the manufacturer.

5.1.3.3 Installed declared insulation coverage and density

The installed declared insulation coverage shall be calculated from the number of bags used and the area of wall filled.

The installed declared insulation density of the product shall be calculated in accordance with Annex B.

In case of disputes either of the following procedures shall be used.

- a) The adequacy of fill can be determined using an endoscope in accordance with Annex E.
- b) A section of masonry wall approximately 0,5 x 0,5 m can be removed, the insulation removed and weighed. The density of the product can be calculated from the weight of the cellulose and the dimensions of the area where the specimen was removed. The density shall not be less than 85% of the minimum value declared by the manufacturer.

6 Installers declaration

The installer shall declare to the customer that the work has been carried out in accordance with the requirements of this standard using an insulation product that complies with Part 1.

The installer shall also declare at least the following information:

- trade name and designation code for the installed product;
- number of EC certificate of conformity for the insulation product, if applicable;
- the installed declared thermal resistance level in accordance with clause 4.2 or 4.3 whichever is applicable;
- the installed declared insulation thickness in accordance with clause 5;
- installed declared insulation coverage in accordance with clause 5;
- the quantity of insulation used for the installation (number of bags or kg);
- the place and date of installation.

NOTE Further information may be declared as in the examples given in Annex F.