SLOVENSKI STANDARD
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Toplotnoizolacijski proizvodi za uporabo v gradbeništvu - Ugotavljanje lastnosti pri prehodu zračne pare

Thermal insulating products for building applications - Determination of water vapour transmission properties

Wärmedämmstoffe für das Bauwesen - Bestimmung der Wasserdampfdurchlässigkeit

Produits isolants thermiques destinés aux applications du bâtiment - Détermination des propriétés de transmission de la vapeur d'eau

Ta slovenski standard je istoveten z: **EN 12086:2013**

ICS:

91.100.60	Materiali za toplotno in zvočno izolacijo	Thermal and sound insulating materials

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EUROPEAN STANDARD

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English Version

Thermal insulating products for building applications - Determination of water vapour transmission properties

Produits isolants thermiques destinés aux applications du bâtiment - Détermination des propriétés de transmission de la vapeur d'eau

Wärmedämmstoffe für das Bauwesen - Bestimmung der Wasserdampfdurchlässigkeit

This European Standard was approved by CEN on 15 December 2012.

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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.

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Foreword

This document (EN 12086:2013) 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of an identical text or by endorsement, at the latest by September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.

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 12086:1997.

The revision of this standard contains no major changes, only minor corrections and clarifications of an editorial nature.

This European Standard is one of a series of standards which specify test methods for determining dimensions and properties of thermal insulating materials and products. It supports a series of product standards for thermal insulating materials and products which derive from the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (Directive 89/106/EEC) through the consideration of the essential requirements.

This European Standard has been drafted for applications in buildings but it may also be used in other areas where it is relevant.

This European test standard is one of the following group of inter-related standards on test methods for determining dimensions and properties of thermal insulation materials and products, all of which fall within the scope of CEN/TC 88:

— 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 1608, *Thermal insulating products for building applications — Determination of tensile strength parallel to faces*

— EN 1609, *Thermal insulating products for building applications — Determination of short-term water absorption by partial immersion*

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

— EN 12086, *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 12430, *Thermal insulating products for building applications — Determination of behaviour under point load*

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

— 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*

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 equipment and procedures for determining the water vapour transmission rate, water vapour permeance and water vapour permeability of test specimens in the steady state under different sets of specified test conditions. It is applicable to thermal insulating products.

It is intended to be used for homogeneous materials and for products which may contain integral skins or facings of different material(s).

A material is considered to be homogeneous, with regard to mass distribution, if its density is approximately the same throughout, i.e. if the measured density values are close to its mean density.

This test method is not normally used for determining the water vapour transmission properties of single, separate vapour barriers (of high diffusion resistance), such as prefabricated films, foils, membranes or sheets, due to the long duration of the test. For products with a vapour retarder or barrier with a water vapour diffusion equivalent air layer thickness $s_d \geq 1\,000$ m (see 3.6) other test methods e.g. IR-detection can be used for measuring the single separate vapour retarder or barrier, provided that the results obtained are in the same range as the values measured in accordance with this standard.

The water vapour transmission rate and permeance values are specific to the test specimen (i.e. the product) thickness tested. For homogeneous products, the water vapour permeability is a property of the material.

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

3 Terms and definitions

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

3.1
water vapour transmission rate
g
quantity of water vapour transmitted through unit area in unit time under specified conditions of temperature, humidity and thickness

3.2
water vapour permeance
W
quotient of the water vapour transmission rate of the test specimen and the water vapour pressure difference between the two specimen faces during the test

3.3
water vapour resistance
Z
inverse of water vapour permeance

3.4
water vapour permeability
δ
product of the permeance and the thickness of the test specimen

Note 1 to entry: The water vapour permeability of a homogeneous product is a property of the material. It is the quantity of water vapour transmitted per unit of time through a unit area of the product per unit of vapour pressure difference between its faces for a unit thickness.

3.5
water vapour diffusion resistance factor
μ
quotient of the water vapour permeability of air and the water vapour permeability of the material or the homogeneous product concerned; it indicates the relative magnitude of the water vapour resistance of the product and that of an equally thick layer of stationary air at the same temperature

3.6
water vapour diffusion equivalent air layer thickness
s_d
thickness of a motionless air layer which has the same water vapour resistance as the test specimen with the thickness d

Note 1 to entry: A conversion table and units for the above definitions are given in Annex A.

4 Principle

The test specimen is sealed to the open side of a test dish containing a desiccant or an aqueous saturated salt solution. The assembly is then placed in a test atmosphere whose temperature and humidity are controlled. Because of the difference between the partial water vapour pressures in the test assembly and in the test atmosphere water vapour flows through the test specimen. Periodic weighings of the assembly are conducted to determine the rate of water vapour transmission when the steady state is reached.

5 Apparatus

5.1 Test dishes, preferably of circular shape and which are (corrosion) resistant to any desiccant or to the salt solution which they may be required to contain and impermeable to water or water vapour.

These dishes are typically made of glass or metal. The size of the dishes depends on the size of the test specimen to be tested. The difference in size between the upper exposed area (A_1) and the lower exposed area (A_2) of the test specimen shall be less than 3 % (see examples in Annex B).

Some types of test dish are unsuitable for use with certain materials. This should be stated in the relevant product standard or any other European Technical Specification.

5.2 Measuring instruments, capable of determining linear dimensions in accordance with EN 12085.

5.3 Template (with edge tapered to facilitate removal after use) with a shape and size corresponding to that of the test dish to duplicate the exposed area of the specimen.

The template shall have an area that is at least 90 % of the test specimen's surface in order to limit the edge effect due to non-linear vapour flow (see Annex C).

5.4 Analytical balance, capable of weighing the test assembly to an accuracy of ± 1 mg or better.

If larger test assemblies are used, the weighing accuracy may be determined with respect to the total weight and the required accuracy of the test results.

5.5 Chamber, capable of being maintained within ± 3 % of the required relative humidity and within ± 1 °C of the required temperature.

In order to maintain the required conditions throughout the chamber it may be necessary to use air circulation with an air speed of between 0,02 m/s to 0,3 m/s.

If a non-injection type humidity chamber is used, saturated salt solutions may then be used.

5.6 **Sealant**, unaffected by test conditions. The following are examples of suitable sealants:

5.6.1 Mixture of 90 % micro crystalline wax and 10 % of plasticiser (e.g. low molecular weight polyisobutylene).

5.6.2 60 % micro crystalline wax with 40 % refined crystalline paraffin.

6 Test specimens

6.1 Dimensions of test specimens

6.1.1 Shape and fit

The test specimens shall be representative of the product and shall include any natural surface skins or facings of different material(s).

If it is intended to measure the permeability of the core material, all skins and facings shall be removed and the test specimens shall have a thickness of at least 20 mm.

For faced and/or coated products with a water vapour diffusion resistance index $\mu \leq 3$, for the core material, the permeability may be determined from measurements made on the facing/coating itself, after separation from the product.

The test specimens shall be cut to correspond to the dimensions of the chosen test assembly (see examples in Annex B).

6.1.2 Thickness of test specimens

The thickness of the test specimen shall be the thickness of the product. If this exceeds 100 mm, the specimen thickness may be reduced by cutting.

6.1.3 Exposed area

The exposed area A of the test specimen (arithmetic mean of the upper and lower exposed areas) shall be at least 50 cm^2. The diameter of circular test specimens or the equivalent diameter of rectangular test specimens (calculated from the area) shall be at least twice the test specimen thickness.

6.2 Number of test specimens

A minimum of five test specimens shall be tested. If the test specimen area is $>$ 500 cm^2, a minimum of three test specimens shall be tested.

If the test specimens have been cut, all pieces shall be tested.

If the product to be tested is suspected of being anisotropic, the test specimens shall be cut such that the parallel faces are normal to the direction of vapour flow of the product in its application.

If the product is faced with natural skins or adhered facing which are different for the two sides, the test specimens shall be tested with the vapour flow in the same direction as that in the intended use. If the direction of intended use relative to the facings is not known, a duplicate set of test specimens shall *be* prepared so that tests can be made and reported for each direction of vapour flow.