



SLOVENSKI STANDARD
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Toplotnoizolacijski proizvodi za uporabo v gradbeništvu - Ugotavljanje odpornosti proti ponavljajočemu zmrzovanju in taljenju

Thermal insulating products for building applications - Determination of freeze-thaw resistance

Wärmedämmstoffe für das Bauwesen - Bestimmung des Verhaltens bei Frost-Tau-Wechselbeanspruchung

Produits isolants thermiques destinés aux applications du bâtiment - Détermination de la résistance aux effets du gel-dégel

Ta slovenski standard je istoveten z: FprEN 12091

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 freeze-thaw resistance

Produits isolants thermiques destinés aux applications du bâtiment - Détermination de la résistance aux effets du gel-dégel

Wärmedämmstoffe für das Bauwesen - Bestimmung des Verhaltens bei Frost-Tau-Wechselbeanspruchung

This draft European Standard is submitted to CEN members for unique acceptance procedure. It has been drawn up by the Technical Committee CEN/TC 88.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (FprEN 12091:2012) 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 Unique Acceptance Procedure.

This document will supersede EN 12091:1997.

The revision of this standard contains no major changes only minor corrections and clarifications of 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 EN 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 come 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*

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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 products for building applications — Determination of organic content*

1 Scope

This European Standard specifies the equipment and procedures for determining the effect of successive cycling from dry conditions at -20 °C to wet conditions at 20 °C on the mechanical properties and moisture content of the product. It is applicable to thermal insulating products.

It is intended to simulate freeze-thaw effects on thermal insulating products which are frequently exposed to water and low temperature conditions, e.g. inverted roofs and unprotected ground insulation.

This test method is not recommended for all thermal insulating products. If relevant the product standards will state for which products this standard is applicable.

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 826, *Thermal insulating products for building applications — Determination of compression behaviour*

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*

3 Terms and definitions

For the purposes of this document, the following term and definition apply.

3.1

freeze-thaw resistance

ability of a product to withstand repeated wetting followed by freezing conditions, quantified by water absorption and change in compression behaviour

4 Principle

The freeze-thaw resistance is determined as the change in the amount of water absorbed and the change in compression strength or stress of a test specimen which is subjected to 300 successive cycles from dry conditions at -20 °C to wet conditions at 20 °C. Testing is carried out in conjunction with either one of the following long term water absorption tests:

- a) Water absorption by diffusion according to EN 12088;
- b) Water absorption by total immersion according to EN 12087.

The chosen long-term water absorption test a) and/or b) is given in the relevant product standard in accordance to the application. Freezing takes place in the air; thawing in the water.

5 Apparatus

5.1 Cold chamber

Cold chamber with a constant temperature of $(-20 \pm 2) \text{ °C}$

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5.2 Watertank

Watertank with a constant water temperature of (20 ± 2) °C equipped with a device for keeping the test specimen in position.

NOTE Normally no accelerated thermal exchange is provided, e.g. fan assistance in the cold chamber or turbulent water circulation in the watertank.

5.3 Balance

Balance which permits reading to 0,1 g.

5.4 Compression testing machine

Compression testing machine including measuring devices according to EN 826.

6 Test specimens

6.1 General

The freeze-thaw test shall be made on the same test specimens, referred to as set A, which have been used for the determination of long-term water absorption by diffusion according to EN 12088, or by total immersion according to EN 12087.

6.2 Dimensions of test specimens

The thickness of the test specimens shall be the original product thickness.

The test specimens for set A shall be squares with squarely cut edges having sides of (500 ± 1) mm or (200 ± 1) mm depending on the chosen water absorption test.

6.3 Number of test specimens

The number of test specimens for set A is determined by the requirement that two sets of test specimens for the compression test (set B1 and B2) can be prepared from set A.

The number and dimensions of test specimens for each set B1 and B2 for the compression test shall be as specified in the relevant product standard or any other European technical specification. In the absence of such a specification, the number and dimensions of test specimens shall be as defined in EN 826.

The number of test specimens for the long-term water absorption should be adapted accordingly.

6.4 Preparation of test specimens

If possible the test specimens shall be cut so that they do not include original product edges.

Cutting of the test specimens shall be by methods that do not change the original structure of the product. Any skins, facings and/or coatings shall be retained.

6.5 Conditioning of test specimens

The test specimens shall be stored for at least 6 h at (23 ± 5) °C. In case of dispute they shall be stored at (23 ± 2) °C and (50 ± 5) % relative humidity for the time specified in the relevant product standard with a minimum of 6 h.