



SLOVENSKI STANDARD
SIST EN 12089:1999

01-september-1999

Toplotnoizolacijski proizvodi za uporabo v gradbeništvu – Določanje obnašanja pri upogibu

Thermal insulating products for building applications - Determination of bending behaviour

Wärmedämmstoffe für das Bauwesen - Bestimmung des Verhaltens bei Biegebeanspruchung

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Produits isolants thermiques destinés aux applications du bâtiment - Détermination du comportement en flexion

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Ta slovenski standard je istoveten z: EN 12089:1997

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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June 1997

ICS 91.100.99

Descriptors: buildings, thermal insulation, thermal insulating materials, bend tests, determination, flexural strength, tests specimen, procedure, computation, fidelity

English version

Thermal insulating products for building applications - Determination of bending behaviour

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This European Standard was approved by CEN on 1997-04-26. 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard 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 December 1997, and conflicting national standards shall be withdrawn at the latest by December 1997.

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.

In pursuance of Resolution BT 20/1993 Revised, CEN/TC 88 have proposed defining the standards listed below as a European "package" of standards, setting December 31, 1997 as the date of withdrawal (dow) of national standards which conflict with the European Standards of this package.

The "package" of standards comprises 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
- 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

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According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the equipment and procedures for determining the bending behaviour of full size products (Method A) and test specimens (Method B) under the action of three-point loading. It is applicable to thermal insulating products.

The test is designed to determine the bending strength of products and their deflection at a given load.

The method can be used to determine the resistance of the product to bending stresses during transport and application.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to 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 12085	Thermal insulating products for building applications - Determination of linear dimensions of test specimens
ISO 5725-1	Accuracy (trueness and precision) of measurement methods and results - Part 1: General principles and definitions https://standards.iteh.ai/catalog/standards/sist/c5b5c91a-f0d0-4b2e-b9ec-5af2cf67cfa0/sist-en-12089-1999
ISO 5725-2	Accuracy (trueness and precision) of measurement methods and results - Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 bending strength, σ_b : The maximum stress calculated from the maximum force F_m recorded during the bending procedure.

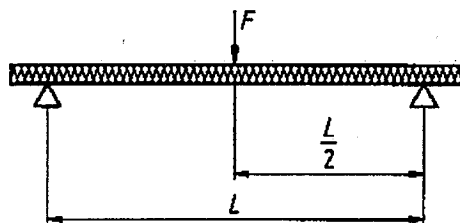
3.2 bending stress, σ_x : The stress calculated from the force F_x at the deflection X .

3.3 deflection, X : The vertical displacement of the test specimen at mid span, at the force F_x , measured at the loading edge.

4 Principle

The test method consists of applying, at a given speed, a force by means of a loading edge in an axial direction to the faces of a squarely cut rectangular test specimen, which is placed on two support edges. The force is applied to the test specimen at a position midway between the supporting positions (see figure 1).

a) Bending strength



b) Deflection

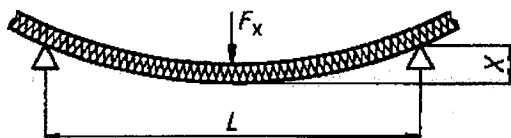


Figure 1: Principle of test method

5 Apparatus

5.1 Test machine

A test machine suited to the range of force and displacement involved, and with a loading edge and adjustable support edges.

It shall be capable of operating at a constant rate of movement of the movable head.

5.1.1 Support edges. Test specimen supports shall consist of two adjustable cylindrical support edges placed parallel to each other and in the same horizontal plane. The diameter of the supports shall be (80 ± 3) mm or (30 ± 3) mm (see figure 2). The length of the support edges shall be at least equal to the width of the test specimens.

The span L (see figure 2) between the support edges shall be adjustable in the range 300 mm to 1200 mm (method A) or 200 mm to 500 mm (method B).

5.1.2 Loading edge. The test specimen loading edge shall have the same shape and dimensions as the support edges. The loading edge shall be located centrally between and parallel to the supporting edges.

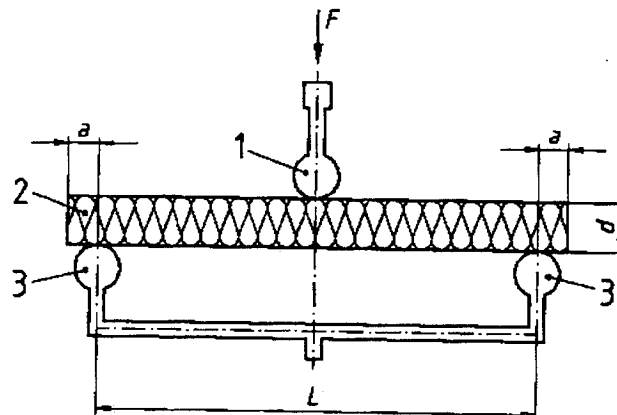
5.1.3 Load distribution plates. For products which may be subject to crushing by the loading and support edges, steel load distribution plates with a thickness of at least 1 mm shall be used. The width of the distribution plates shall be (30 ± 1) mm and their length shall be at least equal to the width of the test specimen.

5.2 Measuring devices for displacement and force

5.2.1 Measurement of displacement. The test machine shall be fitted with a system that allows continuous measurement of the displacement of the movable loading edge with an accuracy of $\pm 5\%$ or $\pm 0,1$ mm, whichever is the smaller. The measured displacement corresponds to the deflection, X , of the test specimen.

5.2.2 Measurement of force. A force sensor shall be fixed to the loading edge in order to measure the force F produced by the reaction of the test specimen upon the edges during the test. This sensor shall be such that its own deformation during the course of the measuring operation is negligible compared with that being measured or may be taken into account by calculation. In addition it shall allow the continuous measurement of the force at all times permitting reading to $\pm 1\%$.

A device shall be used for the simultaneous recording of the force, F , and the deflection, X , to provide the force-deflection curve, required in clause 7.



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- 1 Loading edge
2 Test specimen with the thickness d

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- 3 Support edges
 a 50 mm for method A, 25 mm for method B

Figure 2: Principles of apparatus for testing of bending behaviour

6 Test specimens

6.1 Dimensions of test specimens

6.1.1 Method A

The test specimen is a full size product. It shall be a squarely cut rectangle having the following dimensions:

Thickness: Original product thickness;

Length: Length of the full size product, with a maximum of 1300 mm;

Width: Width of the full size product. If this is impossible because of limitations caused by the testing machine, the width shall be at least 300 mm.