



SLOVENSKI STANDARD

SIST EN 826:2013

01-julij-2013

Nadomešča:
SIST EN 826:1997

Toplotno izolacijski proizvodi za uporabo v gradbeništvu - Ugotavljanje obnašanja pri tlačni obremenitvi

Thermal insulating products for building applications - Determination of compression behaviour

Wärmedämmstoffe für das Bauwesen - Bestimmung des Verhaltens bei Druckbeanspruchung

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

Ta slovenski standard je istoveten z: EN 826:2013

ICS:

91.100.60

Materiali za toplotno in
zvočno izolacijo

Thermal and sound insulating
materials

SIST EN 826:2013

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 826

March 2013

ICS 91.100.60

Supersedes EN 826:1996

English Version

**Thermal insulating products for building applications -
Determination of compression behaviour**

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

Wärmedämmstoffe für das Bauwesen - Bestimmung des
Verhaltens bei Druckbeanspruchung

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

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Foreword

This document (EN 826:2013) 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of an identical text or by endorsement, at the latest by September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.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 826:1996.

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

This European standard has been prepared for building applications, but it may also be used in other areas where it is relevant.

This European test standard is one of the following group of 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*

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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 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 to be used when determining the compression behaviour of test specimens. It is applicable to thermal insulating products and can be used to determine the compressive stress in compressive creep tests and for applications in which insulation products are only exposed to short-term loads.

The method can be used for quality control purposes. It may also be employed to obtain reference values from which design values can be calculated using safety factors.

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*

ISO 5725-1, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions*

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 Terms and definitions

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

3.1

relative deformation

ε

ratio of the reduction in thickness of the test specimen to its initial thickness, d_0 , measured in the direction of loading

3.2

compressive strength

σ_m

ratio of the maximum compressive force, F_m , reached when the strain, ε , at yield (see Figure 1b)) or rupture (see Figure 1a)) is less than 10 %, to the initial cross-sectional area of the test specimen

3.3

compressive stress at 10 % strain

σ_{10}

ratio of the compressive force, F_{10} , at 10 % strain, ε_{10} , to the initial cross section of the test specimen (see Figures 1c) and 1d)) for products presenting 10 % strain before possible yield or rupture

3.4

compression modulus of elasticity

E

compressive stress divided by the corresponding strain below the proportional limit, when the relationship is linear

Note 1 to entry: See Figure 1.

EN 826:2013 (E)**4 Principle**

A compressive force is applied at a given rate of displacement perpendicular to the major faces of a squarely cut test specimen and the maximum stress supported by the specimen calculated.

In case of tapered products, the test specimens should be cut to obtain two parallel faces.

When the value of the maximum stress corresponds to a strain of less than 10 %, it is designated as compressive strength and the corresponding strain is reported. If no failure is observed before the 10 % strain has been reached, the compressive stress at 10 % strain is calculated and its value reported as compressive stress at 10 % strain.

5 Apparatus**5.1 Compression testing machine**

Compression testing machine, designed to suit the range of force and displacement involved and having two very rigid, polished, square or circular plane parallel platens with a minimum side length (or diameter) equal to the side length (or diagonal) of the test specimen. One of the plates shall be fixed and the other movable, if appropriate, with a centrally positioned ball joint to ensure that only axial force is applied to the test specimen. The movable plate shall be capable of moving at a constant rate of displacement in accordance with Clause 7.

5.2 Measurement of displacement

Displacement measuring device, fitted to the compression testing machine, which allows continuous measurement of the displacement of the movable plate to an accuracy of $\pm 5\%$ or $\pm 0,1$ mm, whichever is smaller (see 5.3).

5.3 Measurement of force

Sensor fitted to one of the machine plates to measure the force produced by the reaction of the specimen upon the plates. This sensor shall be such that its own deformation during the measuring operation is negligible compared with that being measured or, if not, it shall be taken into account by calculation. In addition, it shall allow the continuous measurement of the force to an accuracy of $\pm 1\%$.

5.4 Recording device

Device for the simultaneous recording of the force, F , and the displacement, X , which provides a curve of F as a function of X (see 7.2).

NOTE The curve gives additional information on the behaviour of the product and possibly enables the determination of the compression modulus of elasticity.

6 Test specimens**6.1 Dimensions of test specimens**

The test specimens shall have the original product thickness. The width of the test specimens shall be not less than their thickness. Products with integrally moulded skins which are retained in use shall be tested with these skins intact.

Test specimens shall not be layered to produce a greater thickness for testing.

Test specimens shall be squarely cut and have the following dimensions:

50 mm \times 50 mm or

100 mm \times 100 mm or

150 mm × 150 mm or

200 mm × 200 mm or

300 mm × 300 mm.

The choice of dimensions to be used shall be specified in the relevant product standard.

In the absence of a product standard, the test specimen dimensions may be agreed between parties.

The linear dimensions shall be determined in accordance with EN 12085, to an accuracy of 0,5 %.

The tolerance on parallelism and flatness between the two faces of the specimen shall be not greater than 0,5 % of the test specimen side length or 0,5 mm, whichever is smaller.

If the specimens are not flat, they shall be ground flat or an adequate coating shall be applied to prepare the surface for the test. No significant deformation shall occur in the coating during the test.

The accuracy of the test result is reduced if the test specimens have a thickness of less than 20 mm.

6.2 Preparation of test specimens

Test specimens shall be cut so that their base is normal to the direction of compression of the product in its intended use. The test specimens shall be cut by methods that do not change the structure with regard to that of the original product. The method of selecting the test specimens shall be as specified in the relevant product standard. In the case of tapered products, the parallelism of the two faces of the test specimen shall be in accordance with 6.1.

In the absence of a product standard, the method of selecting the test specimens may be agreed between parties.

Special methods of preparation, when needed, are given in the relevant product standard.

In cases where a more complete characterisation is desired or where the principal direction of anisotropy is unknown, it may be necessary to prepare additional sets of test specimens.

6.3 Number of test specimens

The number of test specimens shall be as specified in the relevant product standard. In the absence of such a specification, at least five test specimens shall be used.

In the absence of a product standard, the number of test specimens may be agreed between parties.

6.4 Conditioning of test specimens

The test specimens shall be stored for at least 6 h at $(23 \pm 5) ^\circ\text{C}$. In cases of dispute, they shall be stored at $(23 \pm 2) ^\circ\text{C}$ and $(50 \pm 5) \%$ relative humidity for the time specified in the relevant product standard.

7 Procedure

7.1 Test conditions

Testing shall be carried out at $(23 \pm 5) ^\circ\text{C}$. In cases of dispute, it shall be carried out at $(23 \pm 2) ^\circ\text{C}$ and $(50 \pm 5) \%$ relative humidity.

7.2 Test procedure

Measure the test specimen dimensions in accordance with EN 12085.