SLOVENSKI STANDARD
oSIST prEN ISO 29469:2021

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Toplotno izolacijski proizvodi za uporabo v gradbeništvu - Ugotavljanje obnašanja pri tlačni obremenitvi (ISO/DIS 29469:2021)

Thermal insulating products for building applications - Determination of compression behaviour (ISO/DIS 29469:2021)

Wärmedämmstoffe für das Bauwesen - Bestimmung des Verhaltens bei Druckbeanspruchung (ISO/DIS 29469:2021)

Produits isolants thermiques destinés aux applications du bâtiment - Détermination du comportement en compression (ISO/DIS 29469:2021)

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

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Thermal insulating products for building applications — Determination of compression behaviour

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

ICS: 91.100.60

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee Committee ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 1, *Test and measurement methods,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 88, *Thermal insulating materials and products,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This edition cancels and replaces the first edition (ISO 29469:2008) and the standard EN 826:2013, which have been technically revised. The main changes compared to the previous edition are as follows

Clause 5.3 conditioning of test specimen to reflect the conditions for tropical countries;

Clause 6.1 test conditions and

Clause 9 test report

Annexe A Modifications to the general test method for cellular glass products to include capping in the test protocol

The standard also includes the ISO 844 as published by ISO TC 61 SC 10. The standard is identical to the technical content of EN 826.

Thermal insulating products for building applications — Determination of compression behaviour

1 Scope

This International Standard specifies the equipment and procedures for determining the compression behaviour of 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 exposed only to short-term loads.

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

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.

ISO 29768, *Thermal insulating products for building applications — Determination of linear dimensions of test specimens*

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 document, 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 and expressed as a percentage

3.2
compressive strength
σ_m
ratio of the maximum compressive force, F_m, reached when the strain, ε, at yield [see Figure 1 b)] or rupture [see Figure 1 a)] 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 Figure 1, c) and d)] 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 (see Figure 1)

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.

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, 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.

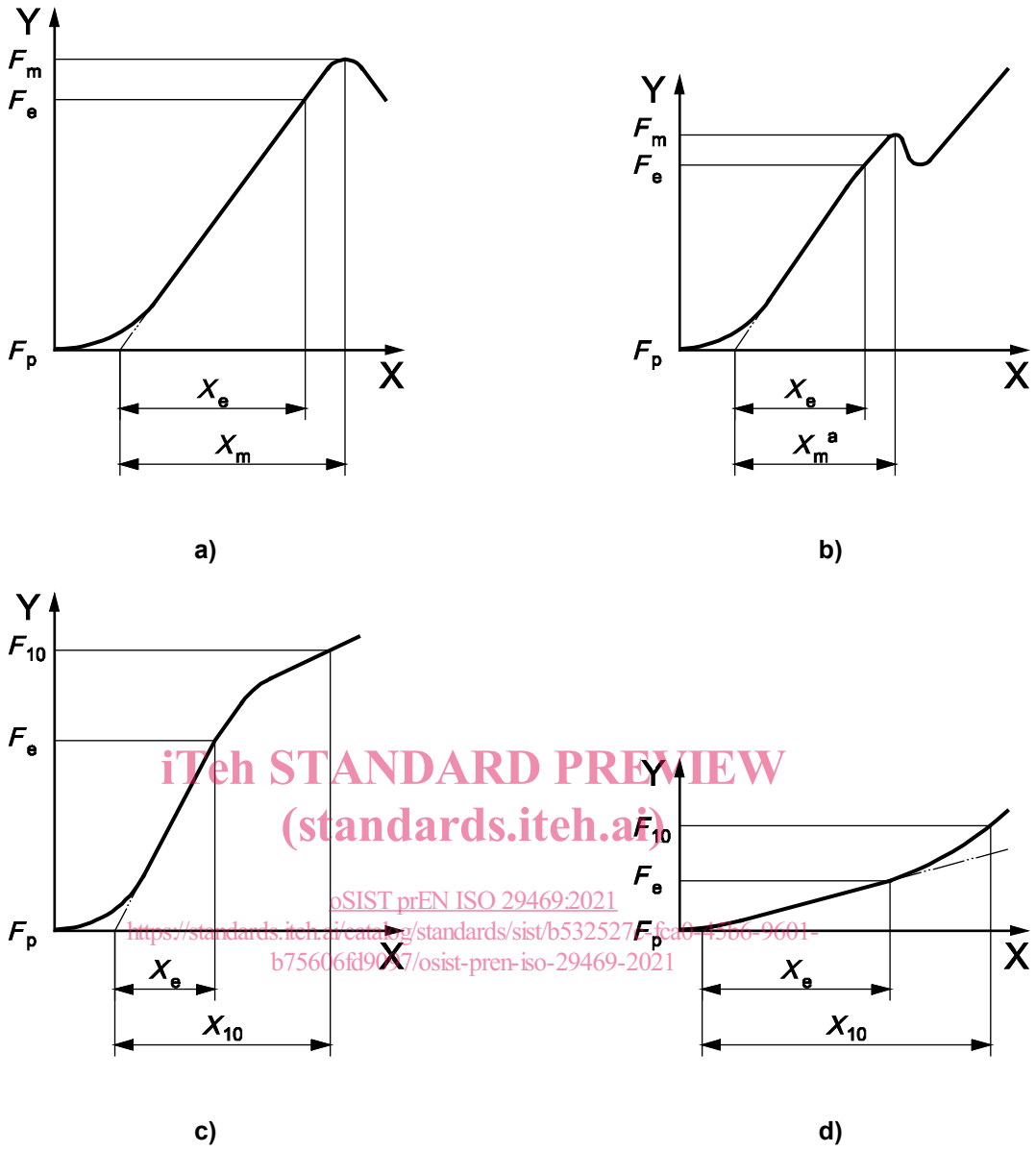
One of the platens shall be fixed and the other shall be movable, with a centrally positioned ball joint to ensure that only axial force is applied to the specimen, if appropriate. The movable platen shall be capable of moving at a constant rate of displacement in accordance with Clause 7.

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

5.3 Force measuring device, comprised of a sensor fitted to one of the machine platens to measure the force produced by the reaction of the specimen on the platens. This sensor shall be such that either its own deformation during the measuring operation is negligible compared with that of the object being measured or its own deformation shall be taken into account by calculation. In addition, it shall allow the continuous measurement of the force to an accuracy of ± 1 %.

5.4 Recording 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.



Key

X displacement
Y force

F_p force corresponding to the preload
F_m maximum force
X_m displacement at maximum force
F_{10} force at 10 % strain
X_{10} displacement at 10 % strain
F_e force corresponding to X_e (conventional proportional limit)
X_e displacement in the conventional elastic zone

[a] X_m is smaller than 10 %.

Figure 1 — Examples of force displacement curves

6 Test specimens

6.1 Dimensions of specimens

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

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

Specimens shall be squarely cut and have the following dimensions:

— 50 mm × 50 mm; or

— 100 mm × 100 mm; or

— 150 mm × 150 mm; or

— 200 mm × 200 mm; or

— 300 mm × 300 mm.

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

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

The linear dimensions shall be determined in accordance with ISO 29768, 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 specimen side length or 0,5 mm, whichever is smaller.

If a specimen is not flat, it 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.

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

6.2 Specimen preparation

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

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

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

In cases where a more complete characterization of anisotropic materials is desired or where the principal direction of anisotropy is unknown, it can be necessary to prepare additional sets of specimens.

6.3 Number of specimens

The number of specimens shall be as specified in the relevant product standard or any other international specification. In the absence of such a specification, either at least five specimens shall be used or the number of specimens may be agreed between the parties involved.

