SLOVENSKI STANDARD
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Penjeni polimerni materiali - Tlaļ ni preskus za trde pene - Specifikacija

Cellular plastics -- Compression test for rigid materials -- Specification

Plastiques alvéolaires -- Essai de compression des matériaux rigides -- Specification

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INTERNATIONAL STANDARD

ISO 844

Second edition
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Cellular plastics — Compression test for rigid materials — Specification

Plastiques alvéolaires — Essai de compression des matériaux rigides — Spécifications

Reference number
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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 844 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 10, *Cellular plastics.*

This second edition cancels and replaces the first edition (ISO 844:1978), which has been technically revised.

Cellular plastics — Compression test for rigid materials — Specification

1 Scope

This International Standard specifies a method of determining

a) the compressive strength and corresponding relative deformation

or

b) the compressive stress at 10 % relative deformation

and

c) when desired, the compressive modulus

of rigid cellular plastics.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 291:1997, *Plastics – Standard atmospheres for conditioning and testing.*

ISO 1923:1981, *Cellular plastics and rubbers – Determination of linear dimensions.*

3 Terms and definitions

For the purposes of this International Standard, the following definitions apply.

3.1 relative deformation, ε: The ratio of the reduction (in relation to its initial value) in thickness of the test specimen to its initial thickness. It is expressed as a percentage.

ε_m is the relative deformation corresponding to σ_m (see 3.2).

3.2 compressive strength, σ_m: The maximum compressive force F_m divided by the initial cross-sectional area of the test specimen when the relative deformation ε is < 10 %.

3.3 compressive stress at 10 % relative deformation, σ_{10}: The ratio of the compressive force F_{10} at 10 % relative deformation ε_{10} to the initial cross-sectional area of the test specimen.

3.4 compressive modulus of elasticity, E: The compressive stress divided by the corresponding relative deformation below the proportional limit, i.e. when the relation is linear.

4 Symbols and abbreviated terms

— A_0 initial cross-sectional area, in square millimetres

— E compressive modulus of elasticity, in percent

— F_e force corresponding to x_e (conventional proportional limit), in newtons

— F_m maximum force, in newtons

— F_{10} force at 10 % relative deformation, in newtons

— h_0 initial thickness of test specimen, in millimetres

— ε_m relative deformation corresponding to the compressive strength σ_m, in percent

— σ_m compressive strength, in kilopascals

— σ_{10} compressive stress at 10 % relative deformation, in kilopascals

— x_e displacement at F_e in the conventional elastic zone, in millimetres

— x_m displacement at maximum force, in millimetres

— x_{10} displacement at 10 % relative deformation, in millimetres

— kPa kilopascals

— Pa pascals

5 Principle

A compressive force is applied in an axial direction to the faces of a rectangular parallelepiped test specimen. The maximum stress supported by the test specimen is calculated.

If the value of the maximum stress corresponds to a relative deformation of less than 10 %, it is noted as the "compressive strength". Otherwise, the compressive stress at 10 % relative deformation is calculated and its value noted as the "compressive stress at 10 % relative deformation".

6 Apparatus

6.1 Compression-testing machine

Any compression-testing machine suited to the range of force and displacement involved and having two square or circular plane, parallel plates which are polished and cannot be deformed and of which the length of one side (or the diameter) is at least 10 cm may be used. One of the plates shall be fixed and the other movable; the latter shall be capable of moving at a constant rate of displacement in accordance with the conditions laid down in clause 8. Neither plate shall be self-aligning.

6.2 Displacement- and force-measurement devices

6.2.1 Measurement of displacement

The compression-testing machine shall be fitted with a system allowing continuous measurement of the displacement x of the movable plate with an accuracy of ±5 % or ±0,1 mm if this latter value is a more accurate measurement (see note to 6.2.2).

6.2.2 Measurement of force

A force sensor shall be fixed to one of the machine plates in order to measure the force F produced by the reaction of the test specimen upon the plates during the test. This sensor shall be such that its own deformation during the course of the measurement operation is negligible compared with that being measured and, in addition, it shall allow the continuous measurement of the force at any point in time with an accuracy of ±1 %.

NOTE – It is recommended that a device be used for the simultaneous recording of the force F and the displacement x that allows, by plotting a curve of $F = f(x)$, the graphical determination of the pair of values F, x required in clause 9 with the accuracy laid down in 6.2.1 and this subclause, and provides additional information on the behaviour of the product.

6.2.3 Calibration

Devices for measuring, and if applicable recording graphically, the force and displacement produced by the test machine shall be checked periodically. The devices shall be checked by using a series of standard weights, the masses of which are known to accuracies exceeding ±1 % and which correspond to the forces applied during the test. To check the devices, spacers shall be used which have thicknesses known to accuracies better than either ±1 % or ±0,1 mm, whichever is more restrictive.

6.3 Instruments for measuring the dimensions of the test specimens

These instruments shall be in accordance with ISO 1923.

7 Test specimens

7.1 Dimensions

The test specimens shall be 50 mm ± 1 mm in thickness except for products with moulded skins which are intended to remain integral with the product in use. With such products, the specimens shall be the full thickness, provided that the minimum thickness is 10 mm or greater and that the maximum thickness is not greater than the width or diameter of the specimen.

The test specimen base shall be either square or circular, with a minimum area of 25 cm^2 and maximum of 230 cm^2. The preferred geometry and dimensions are a right prism with a base of (100 ± 1) mm × (100 ± 1) mm.

The distance between two faces shall not vary by more than 1 % (tolerance on parallelism).

Under no circumstances may several test specimens be piled up to produce a greater thickness for testing.

Results obtained with specimens of differing thickness shall not be compared.

7.2 Preparation

Test specimens shall be cut so that the specimen base is normal to the direction of compression of the product in its intended use. In some cases with anisotropic materials, where a more complete characterization is desired or where the principal direction of anisotropy is unknown, it may be necessary to prepare additional sets of specimens.

The test specimens shall be cut by methods that do not change the structure of the cellular material. Moulding skins that do not remain with the product in use shall be removed.