PLASTID. SURVEOMADUSTE MÄÄRAMINE

Plastics - Determination of compressive properties

EESTI STANDARDIKESKUS
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NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 604:2000 sisaldab Euroopa standardi EN ISO 604:1996 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 604:2000 consists of the English text of the European standard EN ISO 604:1996.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 11.12.1996.	Date of Availability of the European standard is 11.12.1996.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 83.080.01

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 604

December 1996

ICS **83.080**
Descriptors: Plastics, tests, compression tests, determination, compressibility

English version

Plastics - Determination of compressive properties (ISO 604:1993)

Plastiques – Determination des proprieties en compression (ISO 604:1993)

Kunststoffe – Bestimmung von Druckeigenschaften (ISO 604 1993)

This European Standard was approved by CEN on 1994-12-14. 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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CEN

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

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Foreword

The text of the International Standard from Technical Committee ISO/TC 61 ”Plastics” of the International Organization for Standardization (ISO) has been taken over as an European Standard by Technical Committee CEN/TC 249 ”Plastics”, the secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by June 1997, and conflicting national standards shall be withdrawn at the latest by June 1997.

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

Endorsement notice

The text of the International Standard ISO 604:1993 has been approved by CEN as a European Standard without any modification.

Plastics — Determination of compressive properties

1 Scope

1.1 This International Standard specifies a method for determining the compressive properties of plastics under defined conditions. A standard test specimen is defined and its length is adjusted to prevent buckling under load from affecting the results. A range of testing speeds is included.

1.2 The method is used to investigate the compressive behaviour of the test specimens and for determining the compressive strength, compressive modulus and other aspects of the compressive stress/strain relationship under the conditions defined.

1.3 The method applies to the following range of materials:

— rigid and semirigid thermoplastics moulding and extrusion materials, including compounds filled and reinforced by e.g. short fibres, small rods, plates or granules in addition to unfilled types; rigid and semirigid thermoplastic sheet;

— rigid and semirigid thermoset moulding materials, including filled and reinforced compounds; rigid and semirigid thermoset sheet;

— thermotropic liquid crystal polymers.

The method is not normally suitable for use with materials reinforced by textile fibres, rigid cellular materials and sandwich structures containing cellular material.

1.4 The method is performed using specimens which may be either moulded to the chosen dimensions, machined from the central portion of the standard multipurpose test specimen (see ISO 3167) or machined from finished and semifinished products such as mouldings, laminates and extruded or cast sheet.

1.5 The method specifies preferred dimensions for the test specimen. Tests which are carried out on specimens of different dimensions, or on specimens which are prepared under different conditions, may produce results which are not comparable. Other factors, such as the speed of testing and the conditioning of the specimens, can also influence the results. Consequently, when comparative data are required, these factors should be carefully controlled and recorded.

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 291:1977, *Plastics — Standard atmospheres for conditioning and testing.*

ISO 293:1986, *Plastics — Compression moulding test specimens of thermoplastic materials.*

ISO 294:—[1], *Plastics — Injection moulding of test specimens of thermoplastic materials.*

ISO 295:1991, *Plastics — Compression moulding of test specimens of thermosetting materials.*

ISO 472:1988, *Plastics — Vocabulary.*

ISO 1268:1974, *Plastics — Preparation of glass fibre reinforced, resin bonded, low-pressure laminated plates or panels for test purposes.*

1) To be published. (Revision of ISO 294:1975)

ISO 2602:1980, *Statistical interpretation of test results — Estimation of the mean — Confidence interval.*

ISO 2818:—[2], *Plastics — Preparation of test specimens by machining.*

ISO 3167:1993, *Plastics — Multipurpose test specimens.*

ISO 5893:1985, *Rubber and plastics test equipment — Tensile, flexural and compression types (constant rate of traverse) — Description.*

3 Principle

The test specimen is compressed along its major axis at constant speed until the specimen fractures or until the load or the decrease in length reaches a predetermined value. The load sustained by the specimen is measured during this procedure.

4 Definitions

For the purposes of this International Standard, the following definitions apply (see also figure 1):

4.1 gauge length, L_0: Initial distance between the gauge marks on the test specimen.

It is expressed in millimetres (mm).

4.2 speed of testing, v: Rate of approach of the plates of the testing machine during the test.

It is expressed in millimetres per minute (mm/min).

4.3 compressive stress, σ (engineering)**:** Compressive load, per unit area of original cross-section, carried by the test specimen (see note 3).

It is expressed in megapascals (MPa).

4.3.1 compressive stress at yield, σ_y: First stress at which an increase in strain (see 4.4) occurs without an increase in stress; may be less than the maximum attainable stress (see figure 1, curve a, and note 3).

4.3.2 compressive strength, σ_M: Maximum compressive stress sustained by the test specimen during a compressive test (see figure 1 and note 3).

4.3.3 compressive stress at break (rupture), σ_B: Compressive stress at break of the test specimen (see figure 1 and note 3).

4.3.4 compressive stress at x % strain, σ_x: Stress at which the strain reaches a specified value of x % (see 4.5).

The compressive stress at x % strain may be measured, e.g., if the stress/strain curve does not exhibit a yield point (see figure 1, curve b, and note 3). In this case, x shall be taken from the relevant product standard or agreed upon by the interested parties. However, in any case, x must be lower than the strain at compressive strength.

4.4 compressive strain, ε: Decrease in length per unit original length of the gauge L_0 [see 8.2, equation (3) and note 3].

It is expressed as a dimensionless ratio or percentage (%).

4.5 nominal compressive strain, ε_c: Decrease in length per unit original length l of the test specimen [see 8.2, equation (4)].

It is expressed as a dimensionless ratio and may be specified directly or as a percentage of the initial length.

4.5.1 nominal compressive yield strain, ε_{cy}: Strain corresponding to the compressive yield stress σ_y (see 4.3.1).

4.5.2 nominal compressive strain at compressive strength, ε_{cM}: Strain corresponding to the compressive strength σ_M (see 4.3.2).

4.5.3 nominal compressive strain at break, ε_{cB}: Strain at break of the test specimen.

4.6 compressive modulus, E_c: Ratio of the stress difference ($\sigma_2 - \sigma_1$) to the corresponding strain difference values ($\varepsilon_2 = 0{,}002\ 5$ minus $\varepsilon_1 = 0{,}000\ 5$) [see 8.3, equation (7)].

It is expressed in megapascals, MPa.

NOTES

1 The compression modulus is calculated on the basis of the compressive strain ε only (see 4.4).

2 With computer-aided equipment, the determination of the modulus E_c using two distinct stress/strain points may be replaced by a linear regression procedure applied on the part of the curve between these mentioned points.

3 In compression tests the stresses σ and strains ε are negative. The negative sign, however, is generally omitted. If this generates confusion, e.g. in comparing tensile and compressive properties, the negative sign may be added for the latter. This unnecessary for the nominal compressive strains ε_c.

2) To be published. (Revision of ISO 2818:1980)