SLOVENSKI STANDARD
SIST ISO 3386-2:1996

01-januar-1996

Penjeni polimerni materiali - Mehke pene - Določevanje tlačnih lastnosti - Diagram napetost/deformacija - 2. del: Materiali z visoko gostoto

Polymeric materials, cellular flexible -- Determination of stress-strain characteristic in compression -- Part 2: High density materials

Matériaux polymères alvéolaires souples -- Détermination de la caractéristique de contrainte-déformation relative en compression -- Partie 2: Matériaux à masse volumique élevée

Ta slovenski standard je istoveten z: **ISO 3386-2:1984**

ICS:

83.100	Penjeni polimeri	Cellular materials

SIST ISO 3386-2:1996 **en**

TC 45

International Standard ISO 3386/2

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

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First edition — 1984-11-15

p.2

UDC 678-405.8 : 620.173 **Ref. No. ISO 3386/2-1984 (E)**

Descriptors : polymers, flexible cellular materials, tests, compression tests, determination, compressive stress.

Price based on 2 pages

Polymeric materials, cellular flexible — Determination of stress-strain characteristic in compression — Part 2 : High density materials

1 Scope and field of application

This part of ISO 3386 specifies a method for the determination of the compression stress-strain characteristic of cellular flexible polymeric materials of density greater than 250 kg/m^3.

The compression stress-strain characteristic is a measure of the load-bearing properties of the material, though not necessarily of its capacity to sustain a long-term load.

The compression stress-strain characteristic differs from the indentation hardness characteristics (as determined in accordance with ISO 2439) which are known to be influenced by the thickness and the tensile properties of the cellular flexible material under test, the shape of the compression plate, and the shape and size of the test piece.

ISO 3386/1 specifies a method for low density flexible materials, and differs from Part 2 in the following ways :

— Part 1 is concerned with materials of density up to 250 kg/m^3, whilst Part 2 is mainly concerned with materials of density above 250 kg/m^3;

— compression stress values have been deleted from Part 2;

— Part 2 does not allow the use of a cylindrical test piece.

This part of ISO 3386 is a general method for testing denser cellular flexible materials (i.e. expanded cellular rubbers), measurements being made on one or more points on the steeply rising part of the stress-strain curve. The shape factor of the test piece is important and comparative test results can only be obtained on test pieces having the same shape factor.

NOTE — For comparison purposes, the method may be used for material of 150 kg/m^3 density or greater.

2 References

ISO 1923, *Cellular plastics and rubbers — Determination of linear dimensions.*

ISO 2439, *Polymeric materials, cellular flexible — Determination of hardness (indentation technique).*

3 Definitions

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

3.1 compression stress-strain characteristic (CC) : The stress, expressed in kilopascals[1)], required to produce a compression, at a constant rate of deformation during the fourth loading cycle of the test specified in this International Standard, expressed as a function of the compression.

NOTE — Stresses are usually quoted at compressions of 25 ± 1, 40 ± 1, 50 ± 1 and 65 ± 1 %, being designated CC25, CC40, CC50 and CC65 respectively.

3.2 shape factor : The ratio of the area of one applied force bearing face of the test piece to the sum of the areas of the four perpendicular sides of the test piece.

4 Apparatus

The apparatus comprises a test machine capable of compressing the test piece by means of a compression plate moving at a uniform rate of 5 ± 1 mm/min. Autographic recording of the stress-strain values is preferred.

The compression plate shall be maintained parallel to the base plate. The testing machine shall have means of measuring the sample thickness under load to an accuracy of ± 0,02 mm. It shall be capable of maintaining the specified degree of compression for the period specified by the procedure appropriate to the material under test.

The test machine shall be capable of measuring the force to produce the specified compression with an accuracy of ± 2 %.

The test piece shall be supported on a smooth, flat and rigid surface larger than the test piece.

The compression plate may be of any convenient size or shape provided that it overlaps the test piece in all directions. The surface of the compression plate shall be smooth but not polished.

1) 1 kPa = 10^3 N/m^2