
**Flexible cellular polymeric materials —
Determination of compression set under
humid conditions**

*Matériaux polymères alvéolaires souples — Détermination de la
déformation rémanente après compression dans des conditions humides*



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

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Foreword

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International Standard ISO 13362 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 4, *Products (other than hoses)*.

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1 Scope

This International Standard specifies a method for determining the compression set of flexible cellular materials under humid conditions.

This method consists of maintaining the test piece under specified conditions of time, temperature, humidity and constant compressive strain and determining the effect on the thickness of the test piece after a specified recovery period.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

3 Term and definition

For the purposes of this International Standard, the following term and definition applies.

3.1

compression set

difference between the initial thickness and the final thickness of a test piece of the cellular material after compression for a given time at a given temperature and after a given recovery time, this difference being referred to the initial thickness

4 Principle

A test piece is maintained for a specified time at a specified temperature and relative humidity under constant deflection and the effect on the thickness of the test piece noted after release.

5 Apparatus

5.1 Stainless-steel compression device, consisting of two flat plates having dimensions larger than those of the test pieces, with spacers and a clamping mechanism such that the plates are held parallel to each other and the distance between the plates is adjustable to the required compression of the test pieces.

5.2 Dial gauge, as specified in subclause 3.1 of ISO 1923:1981.

5.3 Air-circulating oven/humidity cabinet, hermetically sealed and capable of maintaining a temperature of $(40 \pm 1) ^\circ\text{C}$ and a relative humidity of 95 % to 100 %.

6 Test pieces

The test pieces shall be parallelepipeds, with or without skin, with square load-bearing surfaces of side (100 ± 2) mm and with a thickness of (50 ± 1) mm. Three test pieces shall be tested. These shall not be taken close to the edges or ends of the sample.

7 Conditioning

Material shall not be tested for at least 72 h after manufacture, unless, at either 16 h or 48 h after manufacture, it can be demonstrated that the compression set values obtained do not differ by more than ± 10 % from those obtained after 72 h. Testing is permitted at either 16 h or 48 h if, at the selected time, the above criteria have been satisfied.

Prior to the test, the test pieces shall be conditioned for at least 16 h in one of the following atmospheres:

$(23 \pm 2) ^\circ\text{C}$ and (50 ± 5) % relative humidity;

$(27 \pm 2) ^\circ\text{C}$ and (65 ± 5) % relative humidity.

NOTE This storage period can form the final part of the period following manufacture.

8 Procedure

After conditioning in accordance with clause 7, measure the initial thickness of each test piece to the nearest 0,1 mm as described in subclause 4.3 of ISO 1923:1981.

Place a test piece in the compression device and compress it by $(70 \pm 0,5)$ % of its original thickness. Within 5 min of compression, place the compressed test piece in the oven/humidity cabinet at $(40 \pm 1) ^\circ\text{C}$ and 95 % to 100 % RH for 22^{+2}_{-0} h.

Remove the compression device from the oven/humidity cabinet and, within 1 min, remove the test piece from the device and place it on a wooden surface. Allow the test piece to recover for 15 min in the same atmosphere as was used for conditioning and then remeasure the thickness as described above.

9 Calculation

Calculate the percentage compression set under humid conditions, CSH, from the following equation:

$$\text{CSH} = \frac{d_0 - d_r}{d_0} \times 100$$