

ICS 83.100

CCS G 32



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 10653-2001

Replacing GB/T 10653-1989

**Polymeric materials, cellular flexible - Determination of
compression set**

高聚物多孔弹性材料 压缩永久变形的测定

(English Translation)

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Foreword

This standard is identical to International Standard ISO 1856:1980, Polymeric materials, cellular flexible - Determination of compression set. It was revised from GB/T 10653-1989.

Difference from GB/T 10653-1989: the specimen thickness is changed from the 20 mm to 30 mm of the 1989 edition to $25 \text{ mm} \pm 1 \text{ mm}$. As of the date of implementation this standard replaces GB/T 10653-1989.

It was proposed by the State Bureau of Petroleum and Chemical Industry and is under the jurisdiction of the Subcommittee on Latex Products of the National Technical Committee on Rubber and Rubber Products. It was first published on 31 March 1989.

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1 Scope

This standard specifies three methods for determining the compression set of cellular materials.

It applies only to latex and polyurethane foam materials with a thickness greater than 2 mm. Methods for other materials shall be added separately as required.

2 Normative references

HG/T 3054-1988 (1997), Latex foam - Determination of linear dimensions (eqv ISO 1923:1981).

3 Definitions

Compression set: the difference between the initial thickness of the specimen and its final thickness after being compressed at a specified temperature for a specified duration and then allowed to recover for a specified period. The magnitude of the difference depends on the initial thickness.

4 Principle

The test specimen is maintained at a constant deformation for a specified time and temperature, and the change in its thickness is recorded after the load is removed.

5 Instruments

5.1

Compressor

Two flat plates larger than the specimen, able to adjust their spacing and clamp the specimen, kept parallel to each other, with the distance between them adjustable to the thickness required for the deformation. For thin specimens a glass plate 1 mm to 1.5 mm thick with sides of 50 mm to 55 mm is used.

5.2

The instruments for measuring the specimen dimensions shall comply with HG/T 3054. 5.3 The temperature control of the constant-temperature chamber shall be accurate to ± 1 °C.

6 Specimens

6.1

Conditioning

Flexible cellular polymeric materials shall not be tested within 72 h of production, and shall be conditioned for at least 16 h at (20 ± 2) °C and (65 ± 5) % relative humidity, or (23 ± 2) °C and (50 ± 5) %, or (27 ± 2) °C and (60 ± 5) %.

6.2

Requirements

The top and bottom faces shall be parallel and the edges essentially perpendicular; the specimen shall be free from contamination and have no surface skin on the vertical faces; the test direction shall correspond to the direction of compression in service. The length and

width shall be (50 ± 1) mm and the thickness (25 ± 1) mm, the difference between any two measuring points on one specimen not exceeding ± 1 mm. Thin materials may be stacked to a total thickness of at least 25 mm between glass plates; cored specimens shall have the core plugs removed with a foam cutter.

6.3

Quantity

Five specimens, or five stacks of thin material.

7 Test procedure

The test may be carried out by method A, method B or method C; the results of the three methods are not necessarily identical.

7.1

Method A, compression at 70 °C

After conditioning per 6.1 the initial thickness is measured as in HG/T 3054, deducting the thickness of the glass plates for thin specimens. The specimen is placed between the two plates and compressed to 50 % or 75 % of its thickness, or 90 % in special cases, and the assembly is held in an oven at (70 ± 1) °C for 22 h. The device is then taken out of the chamber, the specimen removed within 1 min, and left to recover for 30 min before the final thickness is measured.

8 Expression and calculation of results

The compression set is calculated from the initial thickness d_0 of the specimen and its thickness d_r after compression, and the median of the specimens is reported.

9 Test report

The report shall give: a) the specimen name, type and identification number; b) the number of specimens; c) the specimen thickness and other conditions where they do not conform to this standard; d) the conditioning conditions; e) the test method used; f) the median value of the compression set; g) the name of the person who carried out the test; h) the date of the test.