

Building hardware — Gasket and weatherstripping for doors, windows, shutters and curtain walling —

Part 3: Deflection recovery test method

The European Standard EN 12365-3:2003 has the status of a
British Standard

ICS 91.060.50; 91.190

National foreword

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The UK participation in its preparation was entrusted by Technical Committee B/538, Doors, windows, shutters, hardware and curtain walling, to Subcommittee B/538/4, Building hardware, which has the responsibility to:

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Building hardware - Gasket and weatherstripping for doors, windows, shutters and curtain walling - Part 3: Deflection recovery test method

Quincaillerie pour le bâtiment - Profilés d'étanchéité de vitrage et entre ouvrant et dormant pour portes, fenêtres, fermetures et façades rideaux - Partie 3: Méthode d'essai pour déterminer la reprise élastique

Baubeschläge - Dichtungen und Dichtungenprofile für Fenster, Türen und andere Abschlüsse sowie vorgehängte Fassaden - Teil 3: Rückstellvermögen, Prüfverfahren

This European Standard was approved by CEN on 1 August 2003.

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Foreword

This document (EN 12365-3:2003) has been prepared by Technical Committee CEN/TC 33 “Doors, windows, shutters, building hardware and curtain walling”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by March 2004, and conflicting national standards shall be withdrawn at the latest by March 2004.

EN 12365 – Building hardware – Gaskets and weatherstripping, consists of the following parts :

- *Part 1: Performance requirements and classification;*
- *Part 2: Linear compression force test method;*
- *Part 3: Deflection recovery test method;*
- *Part 4: Recovery after accelerated ageing test method.*

This Standard is one of a series of European Standards for building hardware.

Annexes A and B are informative.

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

1 Scope

This standard specifies the method to be used to select, prepare, condition and test samples of gaskets or weatherstripping, to determine the percentage of recovery after being compressed or deflected through their working range to the minimum width under the conditions laid down in the test.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of this publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 12365-1:2003, *Building hardware — Gaskets and weatherstripping for doors, windows, shutters and curtain walling — Part 1: Performance requirements and classification*

prEN 12519:2003, *Windows and doors - Terminology*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

3 Terms and definitions

For the purposes of this European Standard the terms and definitions given in EN 12365-1:2003 and prEN 12519:2003 apply.

4 Requirements

4.1 Working temperature range

Six grades of working temperature range are identified:

- grade 1: 0 °C to +45 °C;
- grade 2: -10 °C to +55 °C;
- grade 3: -20 °C to +85 °C;
- grade 4: -25 °C to +100 °C;
- grade 5: -40 °C to +70 °C;
- grade 6: 0 °C to +200 °C.

4.2 Deflection recovery

Eight grades of deflection recovery are identified:

- grade 0: no performance requirement;
- grade 1: > 30 % to 40 %;
- grade 2: > 40 % to 50 %;
- grade 3: > 50 % to 60 %;
- grade 4: > 60 % to 70 %;
- grade 5: > 70 % to 80 %;
- grade 6: > 80 % to 90 %;
- grade 7: > 90 %.

5 Test apparatus

5.1 General

A typical compression block is shown in annex A. The compression block shall consist of a support for the gasket or weatherstripping such that one or more test pieces can be mounted separately or together in a manner that will allow them to be compressed or deflected to their minimum working width.

5.2 Heating chamber

An electrically heated oven which complies with the requirements of ISO 188, method A is required for the test. It shall be capable of being set and maintained at the maximum working temperature of any materials to be tested.

6 Test procedure

6.1 Test measurements

Throughout this test method the following tolerances shall apply, unless otherwise stated:

- temperature in degrees Celsius ($^{\circ}\text{C}$) : ± 1 $^{\circ}\text{C}$;
- deflection in millimetres (mm) : $\pm 0,5$ mm;
- relative humidity : ± 5 %.

6.2 Test samples

6.2.1 General

Wherever possible, the time between forming and testing shall not exceed 3 months. Every care shall be taken to ensure that samples arrive at the Test House in a pristine and fully testable condition.

NOTE This is to ensure that test pieces can be cut from any part of the sample without incurring more than the normal manufacturing variability.

6.2.2 Conditioning

Test samples shall be stored in a relaxed state in air at $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and a relative humidity of $50\% \pm 5\%$, for not less than 24 h and not more than 6 days, prior to test.

6.3 Preparation of test pieces

Test pieces with a minimum length of 100 mm and a maximum length of 500 mm shall be cut from various positions within the sample submitted for test. Care shall be taken to ensure that the test pieces have a good smooth finish and are free of blemishes or other flaws.

7 Test method

7.1 Temperature and humidity

The standard laboratory temperature shall be either $23\text{ }^{\circ}\text{C}$ or $25\text{ }^{\circ}\text{C}$, in accordance with national practice. The standard laboratory humidity shall be 45 % relative humidity at $23\text{ }^{\circ}\text{C}$ or 55% relative humidity at $25\text{ }^{\circ}\text{C}$.

7.2 Determination of free height

Measure the free height (a) of the test piece, without creating significant deformation, either before or after mounting the specimen in the test apparatus. A minimum of three measurements shall be taken.

The free height of the test piece shall be determined within a limit deviation of $\pm 0,05\text{ mm}$.

If any results are beyond the permitted tolerance then new test pieces shall be obtained.

NOTE 1 Suitable non-contact measuring equipment includes a shadowgraph, a laser light beam device or a travelling microscope.

Test pieces shall be labelled and marked to indicate the part of the surface which is uppermost.

NOTE 2 Care should be taken to ensure that markings used do not damage the test piece or disappear during heating. Alternatively, test pieces may be labelled after heating.

7.3 Deflection recovery test

Mount test pieces in a suitable compression block as shown in annex A and compress to the minimum width (b);

Heat the oven to the maximum temperature of the required grade, load the compression block and maintain the maximum working temperature for $22\text{ h} \begin{matrix} +2 \\ 0 \end{matrix}$ h.

Remove the block from the oven and allow to cool at ambient temperature for a minimum of 2 h.

7.4 Re-measurement of free height

Maintain the test pieces, in a horizontal stress free condition with the working face uppermost, for $22 \text{ h} \pm \begin{matrix} +2 \\ 0 \end{matrix} \text{ h}$.

Measure and record the new free height (a_1), perpendicular to the compressed surface, relative to a convenient datum, to an accuracy of $\pm 0,05 \text{ mm}$, using the same equipment and method as 7.2.

7.5 Expression of results

Results shall be expressed as a percentage in accordance with the following formula:

$$D_r = \left[1 - \frac{(a - a_1)}{W_R} \right] \cdot 100$$

Where

- D_r is the deflection recovery in %;
- a is the free height before the test, in mm;
- a_1 is the height after the test, in mm;
- W_R is the working range, in mm.

The results of three specimen tests shall be computed and the average value recorded to one decimal point.

7.6 Determination of final result of samples

After completing all three tests, the average percentage value shall be calculated and recorded.

8 Test report

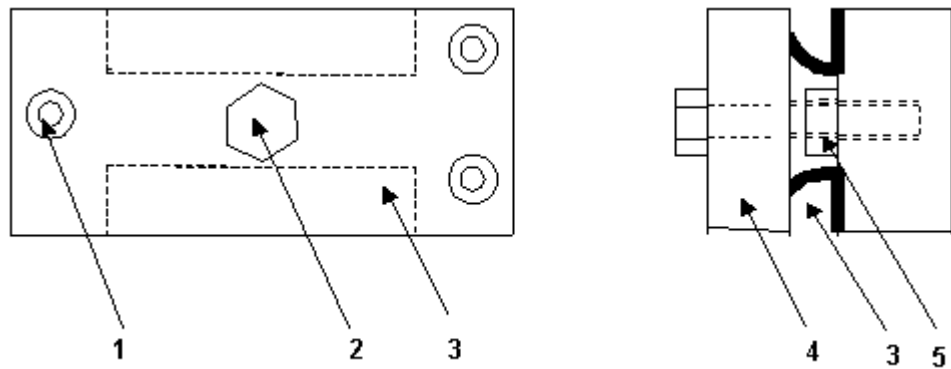
A test report shall be prepared which identifies the specimen(s) and records the performance level achieved together with the details of tests used in the assessment of that performance.

The following information shall be included in the test report:

- a) place of test;
- b) person or body carrying out the assessment;
- c) product designation according to the manufacturers standard literature;
- d) test results and any measurements or observations made at the time of the test;
- e) date and signature.

Annex A (informative)

Arrangement of compression block



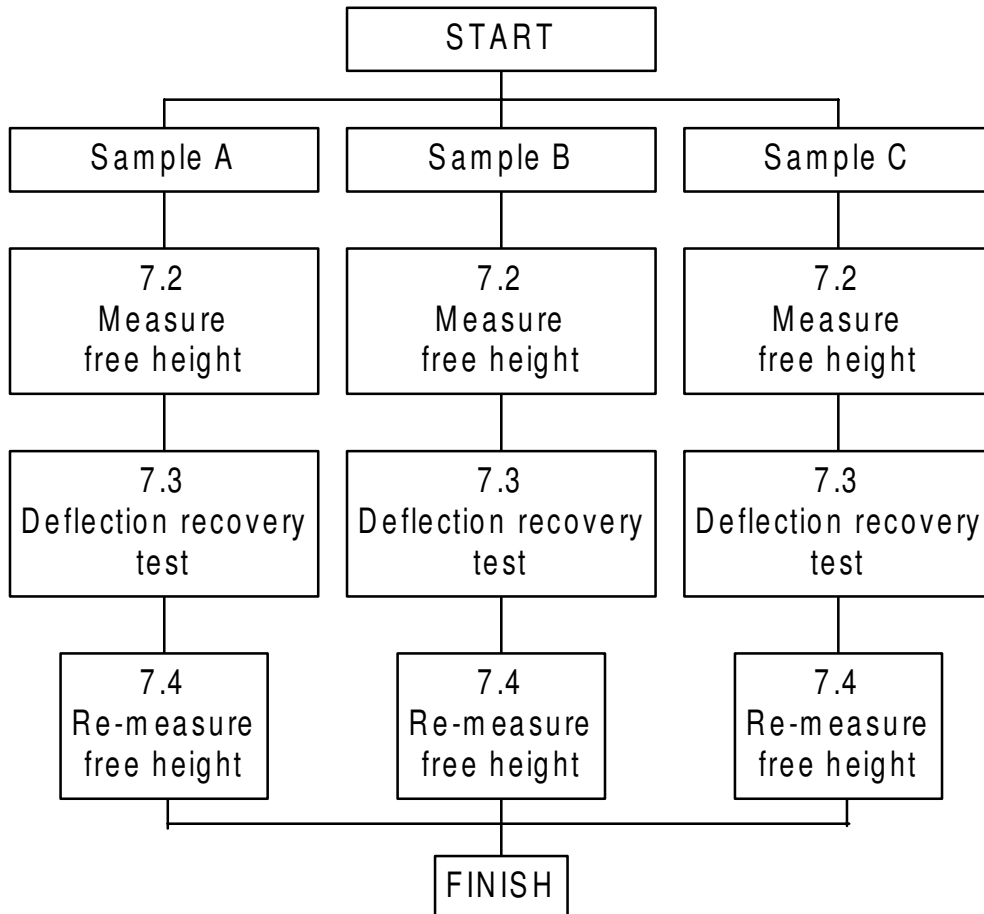
Key

- 1 Compression plate guide pillar
- 2 Compression block clamp bolt
- 3 Test piece
- 4 Compression plate
- 5 Spacer

Figure A.1 — Typical arrangement of compression block for deflection test

Annex B (informative)

Flow chart of test procedure



Bibliography

EN 12365-2, *Building hardware — Gaskets and weatherstripping for doors, windows, shutters and curtain walling — Part 2: Linear compression force test methods*

EN 12365-4, *Building hardware — Gaskets and weatherstripping for doors, windows, shutters and curtain walling — Part 4: Recovery after accelerated ageing test method*

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