BRITISH STANDARD

BS EN
12046-1:2003

Operating forces — Test method —

Part 1: Windows

The European Standard EN 12046-1:2003 has the status of a British Standard

ICS 91.060.50; 91.190

BSI
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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/538/1, Windows, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 12046-1:2003) 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of an identical text or by endorsement, at the latest by May 2004, and conflicting national standards shall be withdrawn at the latest by May 2004.

This European Standard is one of a series of standards for windows.

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 European Standard specifies the test method for determining the force required when engaging or releasing the hardware of a window and when commencing the movement of a casement or sash, in both opening and closing directions.

It is applicable to manually operated windows.

This European Standard is applicable to products of any materials.

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 these 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).

prEN 12519:2003, *Windows and pedestrian doors — Terminology.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in prEN 12519:2003 apply, together with the following.

3.1
linear motion
movement of casement, sash or hardware in a straight line when acted upon by an operating force; also movement through an arc of which the radius is large in proportion to the length of the arc

3.2
rotary motion
movement, usually of hardware but also applicable to a casement or sash; in a circular path when acted upon by an operating torque, e.g. the turning action of the bow of a key

4 Principle of test

The principle consists of measuring the minimum static force or torque required

— to release or lock the hardware (locks or handles);

— to commence opening and

— to complete closing of the casement or sash.

5 Apparatus

5.1 Test rig

A surrounding substantial steel frame with movable steel supports[1)] into which the sub-frames containing test specimens of various dimensions can be mounted.

Means for the application of forces and/or torques with an accuracy of ± 5 % uniformly and without shock.

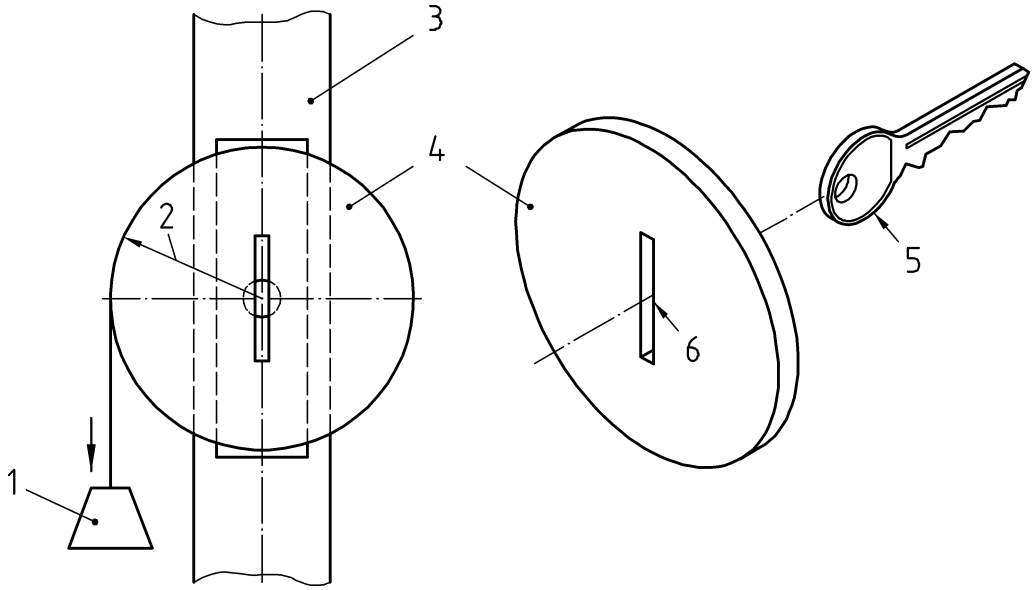
The apparatus shall consist of either

— weights and pulleys (see Figures 1 and 2) or

— an apparatus other than a spring mechanism, with which the required force or torque can be smoothly applied, coupled with an analogue or digital measuring instrument for determining measurements with an accuracy of 0,1 mm, and recording equipment (see Figures 3 and 4).

In neither case shall the apparatus influence the test results.

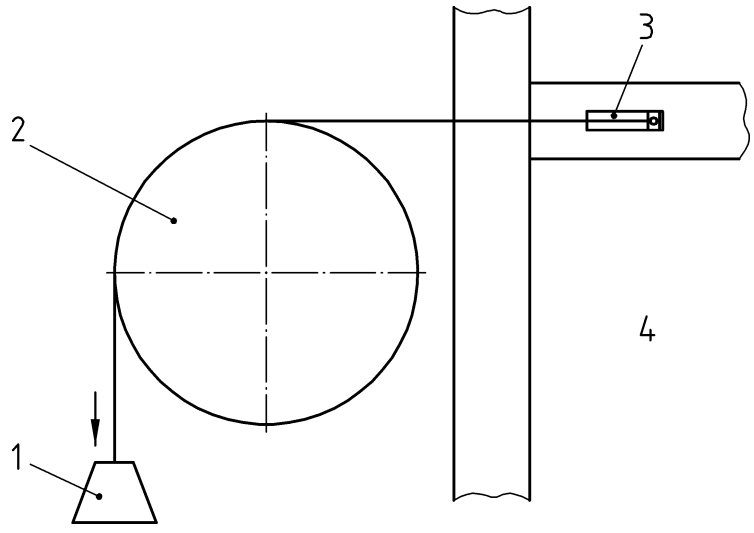
1) A suitable frame would, e.g., be of such stiffness that the mid-span deflection of any member of the frame does not exceed 1/500 of its unsupported length under the action of a force of 1 kN applied at any point or direction perpendicular to the length of that member.



Key

1 Weight
2 Radius r
3 Stile of sash
4 Pulley
5 Bow of key
6 Slot to suit bow of key

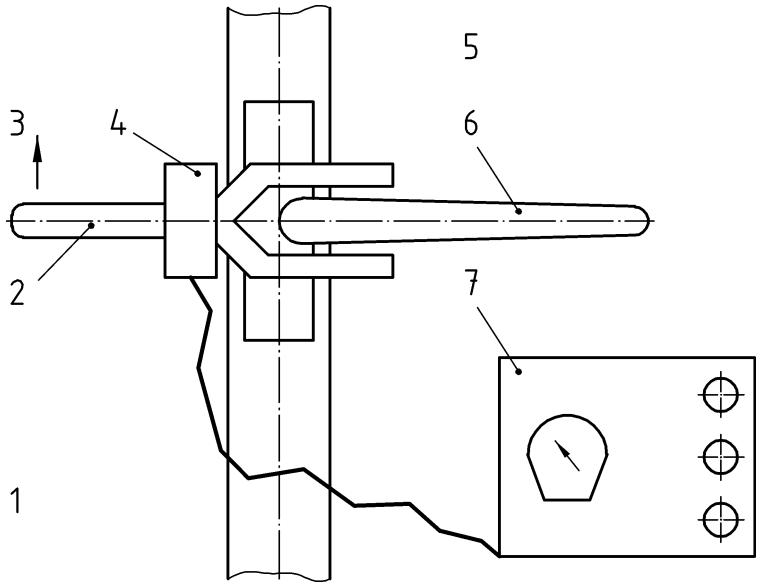
Figure 1 — Weight and pulley mechanism as applied to a key



Key

1 Weight
2 Pulley
3 Lock
4 Part of window

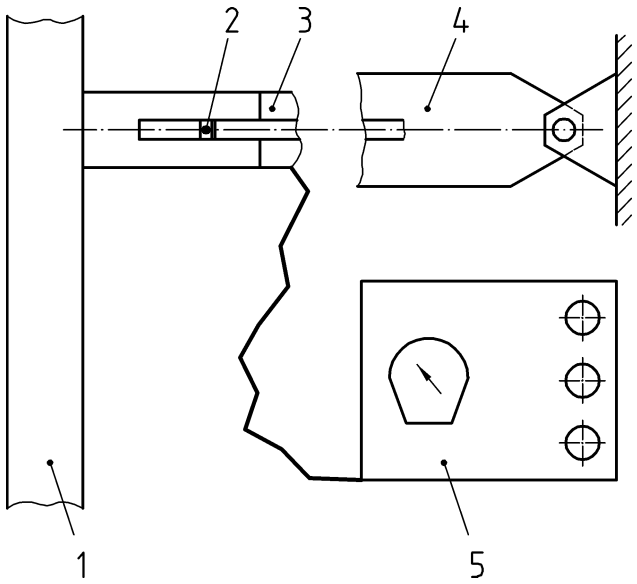
Figure 2 — Weight and pulley mechanism as applied to a lock



Key

1 Torque meter applied to handle
2 Torque meter
3 Torque
4 Load cell
5 Window sash
6 Handle
7 Recording equipment

Figure 3 — Torque mechanism as applied to a handle



Key

1 Part of window
2 Lock
3 Load cell
4 Ram
5 Recording equipment

Figure 4 — Actuator mechanism as applied to a lock

5.2 Linear motion

A linear actuator (hydraulic cylinder or other suitable device) coupled with an electronic load cell and measuring and recording equipment, capable of smoothly reaching the required maximum force. Alternatively a weight and pulley mechanism shall be used. The apparatus shall be mounted so that it is in line with the casement's or sash's nominal direction of travel and not deviating from it by more than ± 5°.

5.3 Rotary motion

A torque-meter capable of measuring the torques required to operate the mechanism. The equipment shall have an attachment for connection to the hardware (handle/key) which will enable correct alignment of the forces during test. Alternatively a weight and pulley mechanism can be used.

This apparatus shall also include any measuring and recording equipment.

The connection between the measuring device and the test specimen shall be such as to avoid local damage to the test specimen and shall in no way affect its performance.

6 Test specimen

The test specimen shall be supplied in a fully operable condition. It shall be suitable for fixing into the surrounding frame in accordance with the manufacturer’s published recommendations or standardised instructions.

7 Conditioning and preparation of the test specimen

7.1 Conditioning

Storage and testing shall be carried out in a non-destructive environment within the ranges of 10 °C to 30 °C and 25 % to 75 % relative humidity.

7.2 Preparation

Remove all transport blocks, bracings, packaging and protective wrappings from the test specimen.

The test specimen shall be mounted level, square and without visible twist resulting from the use of fixing devices.

8 Procedure

8.1 Test sequence

Testing shall start with the casements or sashes of the test specimen closed and with all relevant hardware in the fully engaged position (see Figure 5).

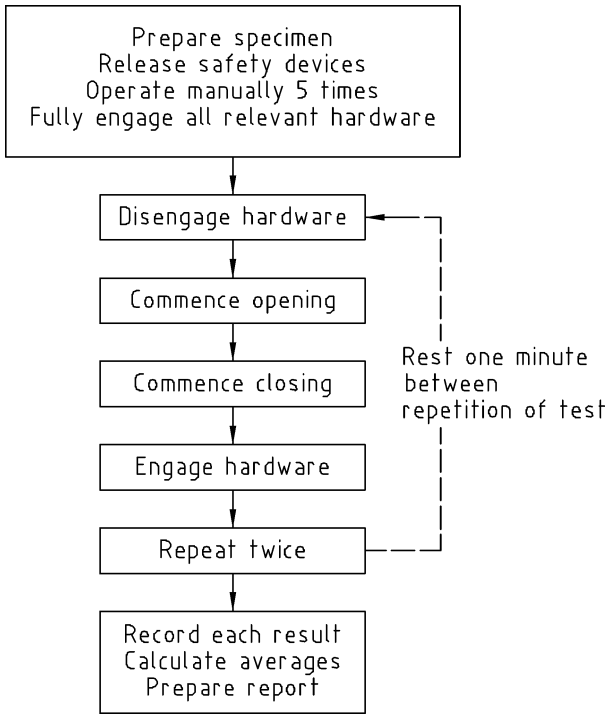


Figure 5 — Test sequence

The presence of any safety device shall not influence the test result.

Tests shall be performed on the test specimen as received and shall be immediately preceded by manual operation of all moving parts five times.

The application of forces or torques shall be arranged to avoid local damage to the test specimen.

Tests shall be carried out in accordance with the following predetermined sequence for the application and measurement of the operational forces and torques:

a) disengage the closing and locking hardware;

b) commence opening (up to the first 100 mm);

c) commence closing up to the beginning of the engagement of the closing and locking hardware;

d) fully engage the closing and locking hardware;

Repeat the sequences a) to d) twice and average the results.

Between each repetition of this test the casement or sash shall remain open for approximately 1 min to allow the weather-stripping to relax.

8.2 Rate of loading

The maximum load shall be reached in a time between 2 s and 4 s.

8.3 Disengagement of hardware

Apply a force or torque in the direction to unlock the hardware and record the result.

8.4 Measurement of the force to start motion of the casement or sash

Determine the minimum force required in both the opening and closing directions of travel, for a distance of 100 mm and record the result.

8.5 Full engagement of closing and locking hardware

According to the type of hardware provided with the test specimen, apply a force or torque using the apparatus as described in clause 5 and as follows:

— install the linear/rotary mechanism so as to act in the direction of locking;

— apply a minimum force to position the casement or sash so that the closing and locking hardware can start to be fully engaged. This force shall be held throughout the full engagement operation;

— apply and measure a force or torque sufficient to operate the hardware and record the result.

9 Expression of results

Forces shall be expressed to three significant figures, torques to two significant figures.

The final individual value and the average value of the forces from the linear actuator or from the use of weights shall be recorded in Newtons (N).

For the retention of the casement or sash in the closed position, the force shall be recorded in Newtons (N).

Linear forces (individual value and average value) on the hardware shall be recorded in Newtons (N) and the torques (individual value and average value) in Newton metres (Nm).

10 Test report

The test report shall contain at least the following information:

a) reference to this European Standard;

b) name of the test laboratory;

c) name of the manufacturer and applicant;

d) date of test and test report;

e) all relevant details for identifying the test specimen and apparatus:

- type;
- profile references;
- materials;
- description of hardware;

f) test results;

g) observations as to the condition of the test specimens before and after the test.

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