

Windows, doors, shutters — Burglar resistance — Test method for the determination of resistance under static loading

ICS 13.310; 91.060.50

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National foreword

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Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion into a European Standard. A review of this publication will initiated 2 years after its publication by the European organization so that a decision can be taken on its status at the end of its three-year life. The commencement of the review period will be notified by an announcement in *Update Standards*.

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

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ENV title page, pages 2 to 33 and a back cover.
This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This Draft for Development, having been prepared under the direction of the Sector Committee for Building and Civil Engineering, was published under the authority of the Standards Committee and comes into effect on 15 October 1999

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Amendments issued since publication

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Descriptors: Doors, windows, closures, tests, mechanical tests, determination, mechanical strength, burglar resistance, static loading, safety

English version

Windows, doors, shutters — Burglar resistance — Test method for the determination of resistance under static loading

Fenêtres, portes, fermetures — Résistance à
l'effraction — Méthode d'essai pour la
détermination de la résistance à la charge
statique

Fenster, Türen, Abschlüsse —
Einbruchhemmung — Prüfverfahren für die
Ermittlung der Widerstandsfähigkeit unter
statischer Belastung

This European Prestandard (ENV) was approved by CEN
on 25 December 1997 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two
years the members of CEN will be requested to submit their comments,
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European Standard.

CEN members are required to announce the existence of this ENV in the same
way as for an EN and to make the ENV available promptly at national level in
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European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Prestandard has been prepared by Technical Committee CEN/TC 33 “Doors, windows, shutters and building hardware”, the secretariat of which is held by AFNOR.

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

The status of European Prestandard is proposed because some countries do not yet have experience in testing with manual burglary attempts. The ENV phase gives all countries the possibility of gaining experience in the application of this Prestandard, of comparing experiences and of harmonising the procedure. During this time it will be possible to determine whether parts of the manual attempt test methods can be replaced by test methods with a higher degree of reproducibility, see e.g. BSI: PAS 011:1994

This ENV 1628 is a testing Prestandard, so its application does not depend at all on the material of the product.

To define the burglar resistance of a product this European Prestandard shall be used in conjunction with ENV 1627 “*Windows, doors, shutters — Burglar resistance — Requirements and classification*”, ENV 1629 “*Windows, doors, shutters — Burglar resistance — Test method for the determination of resistance under dynamic loading —*” and ENV 1630 “*Windows, doors shutters — Burglar resistance — Test method for the determination of resistance to manual burglary attempts*”.

ISO 8269:1985 was used as a basis for this document.

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1 Scope

This European Prestandard specifies a test method for the determination of resistance to static loading in order to assess the burglar resistant properties of windows, doors and shutters.

2 Normative references

This European Prestandard 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ENV 1627:1999, *Windows, doors, shutters — Burglar resistance — Requirements and classification*.

ENV 1629:1999, *Windows, doors, shutters — Burglar resistance — Test method for the resistance under dynamic loading*.

ENV 1630:1999, *Windows, doors, shutters — Burglar resistance — Test method for the resistance to manual burglary attempts*.

3 Definitions

For the purposes of this European Prestandard, the following definitions apply:

3.1

attack side

the side of the test specimen defined by the applicant as the side exposed to attack

3.2

test specimen

complete, fully functioning window, door or shutter

3.3

sub-frame

a surrounding frame into which the test specimen is mounted by the applicant, in accordance with the manufacturer's instructions. The sub-frame is supplied by the applicant and takes the place of the various forms of wall construction (see Figure 5 to Figure 19)

3.4

test rig

a surrounding substantial steel frame with movable steel supports into which the sub-frames containing test specimens of various dimensions can be mounted (see Figure 5 to Figure 19)

3.5

load applicator

a hydraulic ram or similar loading device which can exert the test forces required (see Figure 4)

3.6

pressure pad

a pad fitted to the active end of the load applicator to spread the load

(see Figure 20 to Figure 24)

3.7

datum point

a fixed point of reference from which the deflection is measured (see Figure 1 to Figure 3)

3.8

measurement point

a fixed point of measurement of deflection, normally located opposite the centre of the loading point (see Figure 1 to Figure 3)

3.9

loading point

the position on the surface of the specimen where the static load is applied (see Figure 1 to Figure 3 and Figure 25 to Figure 43)

3.10

deflection

the displacement between datum point and measurement point, i.e. of two adjacent parts of the specimen. Adjacent parts are e.g.:

- movable part adjacent to fixed frame, at hinges or locking points
- infilling adjacent to frame

(see Figure 1 to Figure 3 and Figure 25 to Figure 43)

3.11

locking points

the following components are designated as locking points:

- Main lock
- Bolts of additional locks or multi-point locks
- Hinges
- Hinge bolts
- Fixings of fixed elements
- Roller and slide bearings in guides of sliding elements

3.12

shutter for windows and doors

for this static test (ENV 1628), shutters are separated according to the type of construction into the following 2 groups:

3.12.1

panel shutter

shutter consisting of one or more panels which may pivot and/or fold and/or slide in order to open/close (see 6.1)

3.12.2

roller shutter

shutter, the curtain of which consists of movable, interconnected laths, and travels over a roller in order to open/close (see 6.2)

4 Test installation

4.1 Test rig

The test rig shall consist of a surrounding strong steel frame with movable steel supports into which test specimens of various dimensions can be mounted. All connecting parts, especially corner connections, shall resist the test loads during the test. The test rig shall not impede the execution of the test (see Figure 4).

4.2 Load applicator

The load applicator, consisting of a hydraulic ram or similar loading device, shall be suitable for applying the required test force up to 20 kN, according to 6.1.3.

The load applicator is to be attached to the test rig in such a manner that the loading points on the surface of the test specimen can be reached by repositioning it horizontally and/or vertically.

NOTE In order not to impede the test procedure of other tests, the load applicator should be removable prior to other tests.

4.3 Pressure pad

The pressure pads are as shown in Figure 20 to Figure 24.

4.4 Test room climate

Test room temperature from 15 °C to 30 °C

Relative humidity from 40 % to 60 %

4.5 Measuring equipment

The following equipment shall be provided:

- linear transducers or similar devices for measurement of displacement. They shall be supported on movable frames capable of reaching all measurement points, but shall not be unduly influenced by any movement of the devices during the test
- equipment to display and/or record the forces being applied
- a stop-watch with seconds display for measuring the loading times

d) suitable measuring equipment for determining the temperature of the test specimen and moisture content of wood

e) calliper and/or depth gauge

f) angle measuring instrument

See also 6.1.5 Tolerances

5 Test specimen

5.1 General

The test specimen shall be a functioning window, door or shutter complete with its frames, hardware, guide rails, curtain, tube, roller box and accessories, as appropriate.

The specimen shall be fixed square and plumb and without twist or bend into a sub-frame by the applicant. Installation is to be done in accordance with the manufacturer's instruction, including method of fixing, packing, sealants, etc. (see Figure 5 to Figure 19).

The test specimen shall be a representative specimen of subsequent production. It is essential that the correlation between its size and its security-related equipment shall be taken into account accordingly.

When a wide range of sizes is available, the testing laboratory shall define which sizes are to be tested in order to obtain a representative result for the whole range.

The test specimen used in this test, may also be used for the dynamic test in accordance with ENV 1629 and the pre-test in accordance with ENV 1630, provided that any damage caused by these tests will not affect the result of the pre-test.

5.2 Guide rails for roller shutters as separate components

For testing the guide rail as a separate component, the applicant shall provide at least two test specimens of each type, each 1 m long (see Figure 40).

5.3 Preparation and examination of the test specimen

The test specimen shall be stored in a suitable room until the temperature and the moisture content show stable values within the required limits.

Temperature from 15 °C to 30 °C

Moisture content from 5 % to 18 % (where relevant)

The test specimen, mounted in the test rig, is to be examined visually and any damage, defects or other particular conditions of finish, etc. are to be noted and recorded. In the case of load carrying parts constructed of wood, the testing laboratory shall measure and record the following values:

Temperature

Raw density ρ_o ¹⁾

Moisture content

Before the test is started the fastened or locked condition described by the applicant is to be effected and checked.

6 Procedure

The specified test loading shall be applied at the various loading points using the specified load applicator. When required, the deflection shall be measured with the measuring equipment, and recorded. The accuracy of measurement shall conform to subclause 6.1.5 of this European Prestandard.

6.1 Tests on windows, doors and panel shutters

6.1.1 Loading points

Loads shall be applied to the weakest points of the test specimens. The loading points F1, F2 and F3 are the points normally used for the static loads for windows, doors and panel shutters. These loading points and those for special constructions are shown in Figure 1 to Figure 3 and Figure 25 to Figure 39.

F1 Infilling corner: For the tests of test specimens in resistance class 1 a sheet of derived timber products of maximum 300 mm × 300 mm may be used in order to avoid any glass breakage (see 3.11 and Figure 1).

F2 Between two locking points: If the distance between two adjacent locking points is more than 400 mm, the load shall be applied midway between those points (see Figure 25).

F3 Locking points: (see 3.12)

6.1.2 Loading direction

There is no fixed correlation between the attack side and the loading direction, because in a realistic attack with tools, forces are applied in the direction of opening or contrary to the direction of assembly (see Figure 25 to Figure 43).

The loading direction is therefore dependent on the construction and function of the test specimen. it may be possible to consider both attack sides during one test.

6.1.3 Loading procedure

The load shall be applied at a uniform rate in (60 ± 5) s from zero to the required load. Loading shall be interrupted at a pre-load of 0,3 kN in order to switch the measuring devices to zero for the determination of the deflection. Then the loading shall be continued until the maximum test load is reached, and shall be held for (60 ± 5) s. The deflection for the static test shall be read and recorded. Unloading shall be done at the same speed.

6.1.4 Measurement procedure

The measuring transducers shall be fixed in position as indicated in Figure 1 to Figure 3 and set to zero at a pre-load of 0,3 kN.

Measurement of deflection is not required in the case of special loading points for a multi-leaf test specimen, but any opening under load shall be recorded, and the functioning shall be checked and recorded after this loading (see Figure 30, Figure 34, Figure 35, Figure 38, Figure 39).

6.1.5 Tolerances

In this European Prestandard, the following tolerances shall apply:

Measurement of load	$\pm 2 \%$
Deflections	$\pm 0,1 \text{ mm}$
Time	$\pm 5 \text{ s}$
Moisture content	$\pm 2 \%$
Temperature	$\pm 1 \text{ K}$

6.2 Tests on roller shutters

6.2.1 Loading points

Loads are to be applied to the weakest points of the test specimen. The loading points F1, F1.1, F2 and F3 are the points normally used in static testing of roller shutters. These loading points are shown in Figure 40 to Figure 43.

F1 Connection between guide rail and roller curtain: These loading points correspond to those for infilling corners (F1) of doors and windows (see Figure 43).

F1.1 Guide rails as separate components: (see subclause 5.2 and Figure 40)

F2 Extraction of bottom lath and roller curtain: The loading points for the roller curtain and the bottom lath in the middle between the guide rails (see Figure 42) correspond with the loading points for doors and windows between two locking points (F2).

¹⁾ For the determination of this value parts have to be cut out of the specimen; this value is to be determined immediately after the execution of the test and is related to the oven-dry condition.

F3 Lift up of roller curtain: These loading points correspond with those at the locking points of doors and windows (see Figure 41). Any additional locks shall also be loaded by this method.

6.2.2 Loading direction

The loading direction for the loading points F1, F1.1 and F2 (see Figure 40, Figure 42, Figure 43) is dependent on the attack side (levering out of the curtain ends). Test specimens with two defined attack sides require two tests.

The loading on the loading points F3 (see Figure 41) is applied in the direction of opening (e.g. sliding up of a roller shutter with an overhead roller tube).

6.2.3 Loading and measurement procedure

In the test on roller shutters there is no pre-load as, contrary to the test on doors and windows, the determination of the deflection values is done in a different way.

The minimum depth to which the shutter laths will be contained by the guide rails shall be ascertained prior to the loading procedure. This will be achieved by moving the shutter laths to the side away from the loading point. In the unloaded condition the measuring devices shall either be set to zero or marked with a reference mark. The load shall be applied at a uniform rate in (60 ± 5) s from zero to the required maximum test load on the fastened and/or locked specimen. This load shall be maintained for (60 ± 5) s, after which the deflection relevant for the static test shall be read and recorded. The unloading of the specimen shall be done with the same speed as used for the loading.

In the test on the guide rail as separate component, the leg of the guide rail directed towards the attack side shall be loaded (see Figure 40). It shall not deform more than 30° . The load shall be applied at a uniform rate in (60 ± 5) s. It shall then be held for (60 ± 5) s before the deflection is measured.

The procedure for the determination of the deflection values is shown in Figure 40 to Figure 43.

6.2.4 Tolerances

Unless stated otherwise in this European Prestandard the following tolerances shall apply:

Measurement of load	$\pm 2 \%$
Limiting value (length)	$\pm 0,5 \text{ mm}$
Deflection of angle	$\pm 1^\circ$
Time	$\pm 5 \text{ s}$
Moisture content	$\pm 2 \%$
Temperature	$\pm 1 \text{ K}$

7 Test results

All measured values of loads and deflections shall be recorded during the test. The specimen shall be inspected immediately before and after the test and any changes from the preceding inspection shall be recorded. Thus, any damage caused during the test can be determined.

Forces shall be expressed in newtons and deflections in millimetres.

8 Test report

The report shall include the following details:

- a) The name and address of the testing laboratory
 - b) The name of the applicant (additionally the name of the manufacturer of the test specimen, if they are not the same).
 - c) Details of the test specimen:
 - Types of construction
 - Profile references (codes, names, dimensions etc.)
 - Types of materials used
 - Designation of materials
 - Date of manufacture
 - d) Attack side/s of the test specimen
 - e) Dimensioned drawings of the specimen
 - Detailed drawings with dimensions and tolerances
 - Parts list of products including precise manufacturer's designation
- these shall be approved and stamped by the testing laboratory. These should be retained by the applicant as proof of testing.
- f) Details of the installation instructions for the window, door or shutter
 - g) Test results: Values of deflections and loads
 - h) Permitted range of manufacturing sizes
 - i) Report of the condition of the specimen before and after the test
 - k) Date of report
 - l) Signature of responsible person

The installation instruction is a part of the test report and shall be subject to approval by the testing laboratory.