SLOVENSKI STANDARD
SIST EN 1628:2012

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Okna, vrata in polkna - Protivlomna odpornost - Preskusna metoda za ugotavljanje odpornosti proti statičnim obremenitvam

Pedestrian doorsets, windows, curtain walling, grilles and shutters - Burglar resistance - Test method for the determination of resistance under static loading

Einbruchhemmende Bauprodukte (nicht für Betonfertigteile) - Prüfverfahren für die Ermittlung der Widerstandsfähigkeit unter statischer Belastung

Produits de construction résistants à l'effraction (sauf éléments en béton préfabriqué) - Méthode d'essai pour la détermination de la résistance à la charge statique

Ta slovenski standard je istoveten z: **EN 1628:2011**

ICS:

13.310	Varstvo pred kriminalom	Protection against crime
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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 1628

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ICS 13.310; 91.060.50

Supersedes ENV 1628:1999

English Version

Pedestrian doorsets, windows, curtain walling, grilles and shutters - Burglar resistance - Test method for the determination of resistance under static loading

Blocs-portes pour piétons, fenêtres, façades rideaux, grilles et fermetures - Résistance à l'effraction - Méthode d'essai pour la détermination de la résistance à la charge statique

Türen, Fenster, Vorhangfassaden, Gitterelemente und Abschlüsse - Einbruchhemmung - Prüfverfahren für die Ermittlung der Widerstandsfähigkeit unter statischer Belastung

This European Standard was approved by CEN on 2 December 2010.

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Contents

Page

Foreword

This document (EN 1628:2011) 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of an identical text or by endorsement, at the latest by November 2011, and conflicting national standards shall be withdrawn at the latest by November 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes ENV 1628:1999.

This European Standard is one of a series of standards for burglar resistant pedestrian doorsets, windows, curtain walling, grilles and shutters. The other standards in the series are:

— EN 1627:2011, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Requirements and classification*;

— EN 1629:2011, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Test method for the determination of resistance under dynamic loading*;

— EN 1630:2011, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Test method for the determination of resistance to manual burglary attempts*.

This standard is a revision of, and supersedes ENV 1628:1999. The three other standards in this series are revisions of, and supersede ENV 1627, ENV 1629 and ENV 1630 respectively.

This revision incorporates grilles and facades in the range of application.

There are two aspects to the burglar resistance performance of a construction product: their resistance to forced operation and their ability to remain fixed to the building. Due to the limitation of reproducing the fixing methods and the buildings construction in a laboratory environment this aspect is not fully covered by the standard. This is particularly true with products built into a building. The performance of the fixed part of the product is evaluated using a standard sub frame. It is the manufacturer’s responsibility to ensure that guidance on the fixing of the product is contained in the mounting instructions and that this guidance is suitable for the burglar resistance class claimed for the product. As with the other referenced standards this specification uses a standard sub frame and the product is mounted according to the manufacturers’ instructions. The fixing method to be considered is detailed in Annex A of EN 1627:2011. This test method does not evaluate the performance of the fixing to the building.

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

1 Scope

This European Standard specifies a test method for the determination of resistance to static loading in order to assess the burglar resistant properties of pedestrian door sets, windows, curtain walling, grilles and shutters. It is applicable to the following means of opening: Turning, tilting, folding, turn-tilting, top or bottom hung, sliding (horizontally and vertically) and rolling as well as fixed constructions.

This European Standard does not apply to doors, gates and barriers, intended for installation in areas in the reach of persons, and for which the main intended uses are giving safe access for goods and vehicles accompanied or driven by persons in industrial, commercial or residential premises, as covered by EN 13241-1.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 356:1999, *Glass in building — Security glazing — Testing and classification of resistance against manual attack*

EN 1303:2005, *Building hardware — Cylinders for locks — Requirements and test methods*

EN 1627:2011, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Requirements and classification*

EN 1630:2011, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Test method for the determination of resistance to manual burglary attempts*

EN 1906:2010, *Building hardware — Lever handles and knob furniture — Requirements and test methods*

EN 12195-2, *Load restraint assemblies on road vehicles — Safety — Part 2: Web lashing made from man-made fibres*

EN 12209:2003, *Building hardware — Locks and latches — Mechanically operated locks, latches and locking plates — Requirements and test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1627:2011 and the following apply.

3.1
attack side
side of the test specimen defined by the applicant as the side exposed to attack

3.2
test specimen
complete, fully functioning construction product as detailed in the scope of this standard

3.3
sub-frame
surrounding frame into which the test specimen is mounted in accordance with the manufacturer's instructions

3.4
test rig
surrounding substantial steel frame with movable steel supports into which the sub- frames containing test specimens of various dimensions can be mounted

3.5
load applicator
hydraulic ram or similar loading device that can apply the test forces required

3.6
pressure pad
pad fitted to the active end of the load applicator to spread the load

3.7
locking points
all connecting points between the opening element and the fixed element including the following:

— 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;

— junction of grille bars.

4 Apparatus

4.1 Test rig

The test rig is consisting of a rigid steel frame with movable steel supports into which test specimens of various dimensions can be mounted, as shown in Figure A.5. The stiffness of the rig shall be such that a 15 kN force applied to any of the defined points and normal to the plane of the frame shall not cause a deflection of more than 5 mm. The test rig shall not impede the execution of the test.

4.2 Load applicators

The load applicators consisting of a hydraulic ram or similar loading device shall be capable of applying the required test forces progressively and without shock.

4.3 Hooks

Hooks are shown in Figure A.12.

4.4 Straps

Straps shall conform to EN 12195-2 or equivalent and have a minimum tensile strength of 5kN. These straps may be used to apply some of the loads.

4.5 Pressure pads

Pressure pads are shown in Figures A.6 to A.11.

4.6 Measuring equipment

The measurement equipment is consisting of the following:

a) equipment to display and/or record the forces being applied;

b) a chronometer with seconds display for measuring the loading times;

c) equipment for determining temperature and relative humidity;

d) calliper and/or depth gauge;

e) angle measuring instrument;

f) four gap gauges as shown in Figures A.13 and A.14: gap gauge A shall be 10 mm in diameter, gap gauge B shall be 25 mm in diameter, gap gauge C shall be 50 mm in diameter, gap gauge D shall have an elliptical form with a major diameter of 250 mm and a minor diameter of 150 mm.

NOTE The various gap gauges detailed in A.10 are used to evaluate the resistance to an applied load. They represent an acceptable level of deformation of the various products above which vulnerabilities may be exposed. They are not intended to represent any particular attack method but are used as a simple method to establishing failure.

4.7 Sub-frame

The sub-frame shall simulate the support given to the product when installed into a building and shall be taken into consideration in the manufacturer´s installation instructions. It shall typically consist of the following:

a) for group 1 to group 4 products, a rectangular metal tube 120 mm x 120 mm x 5 mm or a rectangular timber frame 100 mm x 50 mm;

b) additionally for group 3 and group 4 products, a steel tube 40 mm x 40 mm x 3 mm; and a base plate of 8 mm steel, consisting of several segments which shall be removable for the purposes of loading if necessary.

See Figures A.15 to A.32.

4.8 Tolerances

Unless stated otherwise in this European Standard the following tolerances shall apply to the test equipment:

Load		± 5 %
Dimensions	< 20 mm	± 0,5 mm
	≥ 20 to 500 mm	± 1,0 mm
	≥ 500 to 2000 mm	± 2.0 mm
	≥ 2000 mm	± 3,0 mm

Angle	± 2°
Time	± 1 %
Temperature	± 2 °C
Relative humidity	± 5 %

5 Test specimen

5.1 General

Each test specimen shall be a functioning product complete with its frames, hardware, guide rails, curtain, tube, roller box and accessories, as appropriate. When testing roller shutters at least two test specimens consisting of separate sections of the guide rails shall be supplied for test. These sections shall be 1 m in length (see Figure A.56).

The test specimen shall be fixed square and plumb and without twist or bend into a sub-frame. The installation shall be in accordance with the manufacturer's instructions as detailed in clause 10 of EN 1627:2011, including the method of fixing, packing supports, sealing requirements, etc. (see Figures A.15 to A.63). The sub-frame shall simulate the support given to the product when installed into a building.

NOTE 1 The product may be installed directly into a building element as intended in practice.

For the purposes of this standard, the test specimen shall be glazed according to the relevant glazing resistance class of EN 356:1999, corresponding to the resistance class of the construction product according to EN 1627:2011, as shown in Table 1. Security glazing, when used in an insulating glass unit, is normally positioned on the non-attack side. For the purpose of this test the glass pane offering the highest security level shall be positioned on the attack side of the sample.

Table 1 — Test sample glazing requirements

Resistance class	Resistance class of glazing according to EN 356
RC 1 N	P4 A
RC 2 N	P4A
RC 2	P4 A
RC 3	P5 A
RC 4	P6 B
RC 5	P7 B
RC 6	P8 B

NOTE 2 The test specimen used in this test may also be used for the dynamic test in accordance with EN 1629:2011 and the pre-test in accordance with EN 1630:2011, provided that any damage caused by these tests will not affect the result of the pre-test.

5.2 Preparation and examination of the test specimen

The temperature of the test specimen shall be maintained between 15 °C and 30 °C for a period of not less than 8 hours prior to test.

The test specimen and sub-frame mounted in the test rig shall be visually examined for damage, defects or other particular conditions of finish, etc. These shall be recorded.

Each test specimen shall be examined and the direction to disengage each locking point shall be noted.

During testing the test specimen shall be closed and locked at the declared closing condition in accordance with the manufacturer's instructions.

All locking hardware that can be disengaged from the attack side without the use of a key or tool shall be disengaged during all tests.

Products in resistance class 1 shall additionally be prepared prior to the static loading test by removing all parts on the attack side that can be unscrewed, dismounted or disassembled using the tools described in EN 1630:2011, Annex A, tool set A1. Parts must not be damaged during this procedure. The total time for this preparation procedure shall not exceed 3 minutes.

The parts removed during this preparation shall be recorded.

6 Procedure

6.1 Test room climate

The test room temperature shall be maintained between 15 °C and 30 °C.

The relative humidity in the test room shall be between 30 % and 70 %.

6.2 General

The specified test loads detailed in EN 1627:2011 shall be applied in the order specified in 7.1 of EN 1627:2011 at the various loading points using the load applicator. The ability of the products to resist static loading shall be assessed by means of a gap gauge, as shown in Figures A.13 and A.14.

The complete test procedure shall be carried out as shown in Annex B.

Details of the hardware shall be recorded and their performance in terms of EN 1303:2005, EN 12209:2003 and EN 1906:2010 shall be identified, where relevant.

6.3 Testing of group 1 and group 2 construction products

6.3.1 Loading points for group 1 and group 2 products

6.3.1.1 Loading point F1: infilling corner

The specified load shall be applied, in turn, to each corner of the infilling medium at a point as shown in Figure A.1, unless the infilling medium is circular, in which case four points shall be selected at approximately equidistant intervals around the edge. The load shall be applied in a direction to disassemble the infilling medium retention system and perpendicular to the plane of the test specimen.

6.3.1.2 Loading point F2: leaf corner

The specified load shall be applied, in turn, to each corner of the leaf if the adjacent locking point has a greater distance A than 350 mm from the corner as shown in Figures A.33 to A.45. If no corner exists (e.g. circular product) apply the loads half way between locking points. It shall be applied in a direction to open the leaf and perpendicular to the plane of the test specimen.

6.3.1.3 Loading point F3: locking points

The specified load shall be applied, in turn, to each locking point as defined in 3.7 and shown in Figures A.2 to A.4. If the distance between two adjacent locking points is less than 200 mm then a single loading point shall be used located at the midpoint between the two locking points. The load shall be applied in a direction to open the leaf. For locking points on adjacent edges the sum on their distance from the corner shall be used, see Figure A.48. The load shall be applied in a direction to open the leaf. Where the locking point has a contact length of greater than 200 mm (e.g. piano hinge or locking bar) then a load shall be applied at each end.

6.3.1.4 Loading point: F3.a: locking points

The specified load shall be applied to the leaf and, where necessary, to the frame, in a direction to disengage the associated locking point as shown in Figure A.41 to A.50. The load F3a shall be applied in the plane of the specimen and only in association with the load applied to loading point F3 and to products in burglar resistance classes 1 and 2, as defined in EN 1627:2011. Where a separating force is required, a load shall also be applied to other elements of the product. The load F3.a shall be applied and maintained until the load applied to loading point F3 has been applied and removed.

NOTE 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. The loading direction is therefore dependent on the construction and function of the test specimen. For products where both sides are considered to be the attack side then no additional static tests are required.

6.3.2 Test procedure for the infill medium retention system (product groups 1 and 2)

For the purpose of this test, the leaf of the test specimen shall be restrained to resist any deflection between leaf and frame due to the loads applied to the infilling medium. The restraint shall have a nominal contact area of 100 X 50 mm and offer restraint in the opposite directions to the applied load.

The load F1 shall be applied progressively and without shock over a period of 10 s to 20 s and within 5° of perpendicular to plane to each corner of the infill medium. The load shall be maintained for a period of 8 s to 12 s. If the retention system exhibits any sign of disengagement at a corner, the loading test shall be continued along each section of the retention system in an attempt to defeat the system. Subsequent loads shall be applied at intervals of a minimum of 50 mm.

6.3.3 Test procedure for the leaf (product group 1, burglar resistance class 1)

The loads shall be applied to the points in the order shown in Figures A.33 to A.38, A.42 to A.45, and A.52. For side hung products the first point to be loaded shall be the uppermost point on the hinged side. Each subsequent point down the hinged side then along the bottom, up the locking side and across the top shall be tested in turn.

In the case of a loading point at the corner of the leaf and without an adjacent locking point within 350 mm, the load F3 shall be applied.

In the case of a loading point requiring an inplane load F3a, this load shall be applied first. With this load maintained, the corresponding load F3 shall be applied. In the case of a loading point that requires two or more inplane loads, all these loads shall be applied and maintained before the application of the relevant F3 load.

For products that contain two or more leaves, propping of the supporting element shall be provided as shown in Figure A.38. The slave door shall be tested first.

F3.a loads shall each be applied progressively and without shock over a period not exceeding 30 seconds. They shall be maintained until the F3 load has been applied and maintained for the required period.

Each F3 load shall be applied progressively and without shock over a period of 10 s to 20 s and within 5° of perpendicular to the plane of the test specimen. These loads shall be maintained for a period of 8 s to 12 s.

All loads shall be removed without shock.

All loading points shall be tested unless product failure occurs.

6.3.4 Test procedure for the leaf (product group 1, burglar resistance classes 2 and higher)

The test procedure for construction products in burglar resistance classes 2 and higher (product group 1) shall be as detailed in 6.3.3 except that the inplane load F3.a shall be omitted.

6.3.5 Test procedure for the leaf (product group 2, burglar resistance class 1)

The loads shall be applied to the points as shown in Figure A.11.

The first test shall assess the locking mechanism ability to resist a load applied at loading point F3 in the direction to open the sliding element.

The load applied at loading point F3 shall be applied in a direction to disengage the locking hardware. It shall be applied progressively and without shock over a period not exceeding 30 seconds. It shall be maintained until the load applied to loading point F3 has been applied and maintained for the required period.

The second test shall assess the retention of the sliding element in its frame. The load applied to loading point F3 shall be applied perpendicular to the plane of the sliding element at the point shown in Figure A.39.

In all cases the F3 load shall be applied progressively and without shock over a period of 10 s to 20 s and within 5° of the desired direction. These loads shall be maintained for a period of 8 s to 12 s.

All loads shall be removed without shock.

All loading points shall be tested unless product failure occurs.

6.3.6 Test procedure for the leaf (product group 2, burglar resistance classes 2 and higher)

The test procedure for construction products in classes 2 and higher (group 2) is as detailed in 6.3.5 except that the level of load F3.a is increased to equal the F3 load.

6.4 Expression of results for product groups 1 and 2

The ability of the product to resist the static load shall be assessed with the use of the gap gauges. Failure shall be deemed to have occurred if the appropriate gap gauge can pass through any aperture in the test specimen either with or without the application of the test loads. Where loads are applied to loading points F1 and F2, gap gauge B shall be used to assess the deflection of the leaf. Where loads are applied to loading point F3, gap gauge A shall be used. Use of the gap gauge shall not apply additional loads to the test specimen.

6.5 Testing of group 3 construction products

6.5.1 Loading points

6.5.1.1 General

Loads shall be applied to the weakest points of the test specimen at the loading points F1, F1.1, F2 and F3 for the static testing of roller shutters, as described in 6.5.1.2–6.5.1.5 and as shown in Figures A.56 to A.59.

6.5.1.2 Loading point F1: connection between guide rail and roller curtain

Loading point F1 for roller shutters shall correspond to loading point F1 for infilling corners of door sets and windows, as shown in Figure A.59.

6.5.1.3 Loading point F1.1: Guide rails as separate components

Loading point F1.a is a point located on the guide rail of group 3 products. The load is applied to the guide rail as a separate component, as shown in Figure A.56.

6.5.1.4 Loading point F2: extraction of bottom lath and roller curtain

Loading point F2 for the roller curtain and the bottom lath in the middle between the guide rails, as shown in Figures A.58, shall correspond with the loading point F2 for, doors sets and windows.

6.5.1.5 Loading point F3: Lift up of roller curtain

Loading points F3 shall correspond with those at the locking points of doors sets and windows, as shown in Figure A.57. Any additional locks shall also be loaded by this method.

6.5.2 Loading direction

The loading direction for the loading points F1, F1.1 and F2, as shown in Figures A.58 and A.59 shall be dependent on the attack side (levering out of the curtain ends). Test specimens with two defined attack sides shall undergo two tests.

The loading on the loading points F3, as shown in Figure A.57, shall be applied in the direction of opening (e.g. sliding up of a roller shutter with an overhead roller tube).

6.5.3 Loading and measurement procedure

6.5.3.1 Guide rail deflection test

The guide rail deflection test shall be carried out on each guide rail submitted for test. The rail exhibiting the highest angular measurement shall be selected for the tests described in 6.5.3.2 and 6.5.3.3.

The test shall be carried out on guide rails as separate components. The installation of the guide rails shall be in accordance with the manufacturer's published mounting instructions, e.g. the cavity fills and the distance A between the fixing points of the guide rails. The leg of the guide rail on the attack side shall be loaded, as shown in Figure A.56. The load F1.1 shall be applied progressively and without shock over a period of 10 s to 20 s. It shall be maintained for 8 s to 12 s. The angular displacement shall be measured with the load F1.a applied as shown in Figure A.56.

6.5.3.2 Curtain lift test

The curtain lift test shall be carried out on a complete roller shutter or roller grille assembly. In order that the load can be applied the corresponding segment of the test frame base plate has to be removed. The following sequence of the loading procedure shall be maintained: left - right - middle. The load F3 for roller shutters as shown in Figure A.57 and for roller grilles as shown in Figure A.62 shall be applied to the bottom section of the roller shutter or roller grille in an upward direction at the points and in the order shown in Figure A.57 or A.62.This load is not related to the attack side.

Any additional locking points – e.g. a lock in the bottom lath – shall also be loaded by this method. For such additional locking points the pressure pad 2 can be used. Under the loading F3 all parts of the lock shall remain in the locked condition.

6.5.3.3 Lath engagement

The minimum depth of engagement of the shutter laths into the guide rails shall be established by moving the shutter laths away from the loading point until the ends make contact with the other guide rail. The engagement shall either be measured and recorded or a reference mark shall be made on the laths.

6.5.3.4 Static test on guide rail and curtain

The required load F1 shall be applied progressively and without shock over a period of 10 s to 20 s to the side of the roller shutter laths as shown in Figure A.59. This load shall be maintained for 8 s to 12 s and the engagement under load of the shutter laths shall be measured and recorded or a second reference mark shall be used. The load shall be removed without shock. This procedure shall be repeated at the same points as shown in Figure A.59. This procedure is repeated using load F2 as shown in Figure A.58.

6.5.4 Expression of results

6.5.4.1 Guide rail deflection

Failure shall be deemed to have occurred if the deflection of the guide rail is more than 30° whilst the test load is applied.

6.5.4.2 Curtain lift

The deflection of the bottom section of the roller shutter shall be assessed with the use of gap gauge C. If the gauge can pass through any aperture whilst the test loads are applied then failure has occurred.

6.5.4.3 Lath engagement

Failure shall be deemed to have occurred if the minimum engagement and the engagement under load is less than 10 mm.

6.5.4.4 Static test on guide rail and curtain

Failure shall be deemed to have occurred if the minimum engagement and the engagement under load is less than 10 mm.